Treatment Intervention Inventory
TII-Juvenile Version
TII: An Inventory of Scientific Findings

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INTRODUCTION

TREATMENT INTERVENTION INVENTORY

Over the past decade we have witnessed dramatic changes in health care systems, particularly in mental health, chemical dependency and counseling. There is renewed emphasis upon objective and accurate 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 here to stay.

The Treatment Intervention Inventory (TII) was developed to help meet these needs. The TII combines objective assessment with the client's perception of his or her own needs. As Ulenhuth (1970) observed, "it is the patient's opinion with all its biases that is most relevant for the initiation and maintenance of treatment." The Treatment Intervention Inventory enables staff to compare patient's opinions with empirically based objective measures of client problems and need.

This document is a cumulative research record of the evolution of the Treatment Intervention Inventory (TII) into a state-of-the-art clinical assessment instrument. It should be noted that research studies are presented chronologically, from 1980 to the present, in the same order each of the research analyses was done. **Recent studies are most representative of the TII.** No attempt has been made to incorporate all TII research into this document. However, it is representative of the TII's reliability, validity and accuracy.

The Treatment Intervention Inventory (TII) is an automated computerized assessment instrument designed for use at intake (pre-treatment) and post-treatment intervals. It enables comparison of client status prior to, during and upon treatment completion. The TII can be re-administered to the same client at 30 day intervals or at important decision making points in the treatment program, e.g., intake, referral and continuation or completion of treatment. The proprietary TII database ensures continued research and development. The TII is a brief, easily administered and automated (computer scored) test that is designed for clinical assessment. It includes true/false and multiple choice items and can be completed in 30 to 35 minutes. The TII contains nine empirically based scales: Truthfulness, Self-esteem, Stress Coping Abilities, Anxiety, Depression, Alcohol, Drug, Distress and Family Issues. The TII has been researched on outpatients, inpatients, college students and others.

The TII report explains client's attained scores and makes specific intervention and treatment recommendations. It also presents Truth-Corrected scores, significant items, a concise "structured interview" and much more. The TII is designed to measure the severity of problems in clinical settings. It is a risk and needs assessment instrument. The TII has demonstrated reliability, validity and accuracy. It correlates impressively with both experienced staff judgment and other recognized tests.

TII users usually identify client risk, substance (alcohol and other drugs) abuse and client need prior to recommending intervention, supervision levels and/or treatment. The TII is to be used in conjunction with a review of available records and respondent interview. No decision or diagnosis should be based solely on TII results. Client assessment is not to be taken lightly as the decisions made can be vitally important as they effect peoples lives. TII research is ongoing in nature, so that evaluators can be provided with the most accurate information possible.

Information on the Treatment Intervention Inventory (TII) is available in the TII Orientation & Training

Manual. Computer scoring information is contained in the TII Computer Operating Guide. Each of these manuals can be obtained upon request.

TII MEASURES (SCALES)

Users of the Treatment Intervention Inventory (TII) should be familiar with each TII scale. A description of each TII scale follows.

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NINE TII SCALES (MEASURES)

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    1. Truthfulness Scale: measures the truthfulness of the client while they were completing the TII. This scale identifies self-protective, defensive or guarded people who minimize or even fake answers. This type of scale is considered necessary, if not essential, in any objective assessment instrument. In most referral and treatment settings, clients are cooperative and positively responsive to assessment procedures. However, it would be very naïve to believe that all clients answer all assessment questions truthfully. All interview and self-report test information is subject to the dangers of untrue answers due to defensiveness, guardedness, or deliberate falsification. The Truthfulness Scale also identifies clients who are reading impaired.

    2. Self-Esteem Scale: reflects a client's explicit valuing and appraisal of self. Self-esteem incorporates an attitude of acceptance-approval versus rejection-disapproval. Self-esteem refers to a person's perception of self.

    3. Stress Coping Abilities Scale: establishes how well the client copes with stress. The National Institute for Occupational Safety and Health (NIOSH) evaluated the health records of 22,000 workers in 130 organizations. **Their conclusion: stress affects workers in all types of job levels; unskilled laborers are equally susceptible, as are top-line executives.** Stress exacerbates symptoms of emotional and mental health problems.

The Stress Coping Abilities Scale is much more than just a measure of stress. It is a measure of how well the client copes with stress. Two people can be in the same stressful situation, however, one person is overwhelmed and the other person handles it well. The Stress Coping Abilities Scale can account for these different reactions to stress.

    4. Anxiety Scale: Anxiety is an unpleasant emotional experience characterized by non-directed fear. Most definitions of anxiety include a sympathetically induced feeling associated with a sense of threat. General symptoms such as nervousness, apprehension and tenseness are included in this definition, as are panic, terror, and somatic correlates of anxiety.

The Anxiety Scale provides a quantitative score that varies directly with client's self-reported symptoms. The presence, severity and magnitude of these symptoms is measured by client's multiple-choice answers, i.e., "rare or never", "sometimes", "often" or "very often".

Two symptom clusters--anxiety and depression--are clinically significant and consistently related in clinical literature. Anxiety and depression represent the most commonly reported symptoms of distress in clinical and counseling settings. **The interaction or blending of these symptom clusters is evident in the definition of dysphoria, i.e., a generalized feeling of anxiety, restlessness and depression.**

Perceived distress, whether by self or others, represents the major reason people seek help or are

referred for counseling and assistance. Estimates of the prevalence of anxiety and depression in general medical practice are very high. The American Academy of Family Physicians (Business Week, 2-2-86) is quoted as estimating at least half of all office visits to family doctors are prompted by psychological problems such as stress, anxiety and depression.

5. Depression Scale: Depression is a 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 Depression Scale provides a quantitative score that varies directly with client's self-reported symptoms and concerns. The Depression Scale identifies depression and establishes its magnitude or severity via multiple-choice answers, i.e., "rare or never", "sometimes", "often" or "very often".

Anxiety and depression are not mutually exclusive as any given case may represent both symptom clusters. For these reasons, separate scales are included in the TII for anxiety and depression. A person's perceived distress level is related to emotional, institutional, family or marital concerns, and work as well as their overall adjustment. It is important to assess both anxiety and depression due to their prominence in treatment, counseling, intervention and outcome.

6. Alcohol Scale: The Alcohol Scale measures the client's alcohol proneness and alcohol-related problems. This scale was developed with the assistance of experienced chemical dependency program staff. Item selection was based on relevance and comprehensiveness employing a rational consensual agreement procedure. Final item selection is based on each item's statistical properties.

Alcoholism is a significant problem in our society. Woolfolk and Richardson note in "Stress, Sanity and Survival" (1978) that alcoholism costs industry over $15.6 billion annually due to absenteeism and medical expenses. The harm associated with alcohol abuse--mental, emotional and physical, is well documented. The costs and pain associated with alcohol-related problems are staggering.

7. Drugs Scale: The burgeoning awareness of the impact of illicit drugs emphasizes the need for any clinical assessment to differentiate between licit and illicit drugs. The Drugs Scale is an **independent** measure of the client's drug-related problems. Without this type of scale many drug abusers would remain undetected. Thus, the Treatment Intervention Inventory (TII) differentiates between "alcohol" and "drug" abuse or licit versus illicit drugs. Increased public awareness of drug (marijuana, cocaine, crack, heroin, etc.) abuse emphasizes the importance of a drug scale.

The national outcry in the 1980's concerning cocaine momentarily obscured the fact that a number of other substances are also being abused--including marijuana, cocaine, crack, LSD, heroin, etc. The prevalence of drug-related problems is increasing. The Drugs Scale provides insight into areas of inquiry that may need to be pursued in counseling and treatment.

8. Distress Scale: measures sorrow, misery, pain and suffering. Distress incorporates pain (physical and mental), physical and mental abuse, agony and anguish. Distress involves both mental and physical pain and strain. This Distress Scale was adopted from other clinical tests in which it is used.

9. Family Issues Scale: measures family problems, concerns and stability. Clients rate their own family and relationship stability versus problems.

The following studies summarize research conducted on a variety of clients, e.g., substance abuse inpatients/outpatients, people applying for jobs, college students, municipal court diversion defendants, etc.

Treatment Intervention Inventory (TII) research is presented chronologically in the order it was conducted. Chronological presentation enables the reader to follow the evolution of the TII into a state-of-the-art automated (computerized) screening instrument. More recent studies (toward the end of this document) are most representative of current TII statistics.

TII RESEARCH

STRESS QUOTIENT

The Stress Quotient (SQ) or Stress Coping Abilities Scale is based upon the following mathematical equation:

$$SQ = CS/S \times k$$

The Stress Quotient (SQ) scale is a numerical value representing a person's ability to handle or cope with stress relative to their amount of experienced stress. CS (Coping Skill) refers to a person's ability to cope with stress. S (Stress) refers to experienced stress. k (Constant) represents a constant value in the SQ equation to establish SQ score ranges. The SQ includes measures of both stress and coping skills in the derivation of the Stress Quotient (SQ) score. The better an individual's coping skills, compared to the amount of experienced stress, the higher the SQ score.

The Stress Quotient (SQ) scale equation represents empirically verifiable relationships. The SQ scale (and its individual components) lends itself to research. Nine studies were conducted to investigate the validity and reliability of the Stress Quotient or Stress Coping Abilities Scale.

Validation Study 1: This study was conducted (1980) to compare SQ scores between High Stress and Low Stress groups. The High Stress group (N=10) was comprised of 5 males and 5 females. Their average age was 39. Subjects for the High Stress group were randomly selected from outpatients seeking treatment for stress. The Low Stress group (N=10) was comprised of 5 males and 5 females (average age 38.7) randomly selected from persons not involved in treatment for stress. High Stress group SQ scores ranged from 32 to 97, with a mean of 64.2. Low Stress group SQ scores ranged from 82 to 156, with a mean of 115.7. The t-test statistical analysis of the difference between the means of the two groups indicated that the High Stress group had significantly higher SQ scores than the Low Stress group (t = 4.9, p < .001). This study shows that the SQ or Stress Coping Abilities Scale is a valid measure of stress coping. The Stress Coping Abilities Scale significantly discriminates between high stress individuals and low stress individuals.

Validation Study 2: This study (1980) evaluated the relationship between the SQ scale and two criterion measures: Taylor Manifest Anxiety Scale and Cornell Index. These two measures have been shown to be valid measures of anxiety and neuroticism, respectively. If the SQ or Stress Coping Abilities Scale is correlated with these measures it would indicate that the SQ or Stress Coping Abilities Scale is a valid measure. In the Taylor Manifest Anxiety Scale, high scores indicate a high level of anxiety. Similarly, in

the Cornell Index high scores indicate neuroticism. Negative correlation coefficients between the two measures and the SQ were expected because high SQ scores indicate good stress coping abilities. The three tests were administered to forty-three (43) subjects selected from the general population. There were 21 males and 22 females ranging in age from 15 to 64 years. Utilizing a product-moment correlation, SQ scores correlated -.70 with the Taylor Manifest Anxiety Scale and -.75 with the Cornell Index. Both correlations were significant, in the predicted direction, at the p < .01 level. These results support the finding that the Stress Coping Abilities Scale is a valid measure of stress coping abilities. The reliability of the SQ was investigated in ten subjects (5 male and 5 female) randomly chosen from this study. A split-half correlation analysis was conducted on the SQ items. The product-moment correlation coefficient (r) was .85, significant at the p < .01 level. This correlation indicates that the SQ or Stress Coping Abilities Scale is a reliable measure. These results support the Stress Coping Abilities Scale as a reliable and valid measure.

Validation Study 3: In this study (1981) the relationship between the SQ Scale and the Holmes Rahe Social Readjustment Rating Scale (SRRS) was investigated. The SRRS, which is comprised of a self-rating of stressful life events, has been shown to be a valid measure of stress. Three correlation analyses were done. SRRS scores were correlated with SQ scores and separately with two components of the SQ scale: Coping Skill (CS) scores and Stress (S) scores. It was hypothesized that the SQ and SRRS correlation would be negative, since subjects with lower SQ scores would be more likely to either encounter less stressful life events or experience less stress in their lives. It was also predicted that subjects with a higher CS would be less likely to encounter stressful life events, hence a negative correlation was hypothesized. A positive correlation was predicted between S and SRRS, since subjects experiencing more frequent stressful life events would reflect more experienced stress. The participants in this study consisted of 30 outpatient psychotherapy patients. There were 14 males and 16 females. The average age was 35. The SQ and the SRRS were administered in counterbalanced order. The results showed there was a significant positive correlation (product-moment correlation coefficient) between SQ and SRRS (r = .4006, p<.01). The correlation results between CS and SRRS was not significant (r = .1355, n.s.). There was a significant positive correlation between S and SRRS (r = .6183, p<.001). The correlations were in predicted directions. The significant correlations between SQ and SRRS as well as S and SRRS support the construct validity of the SQ or Stress Coping Abilities Scale.

Validation Study 4: This validation study (1982) evaluated the relationship between factor C (Ego Strength) in the 16 PF Test as a criterion measure and the SQ in a sample of juveniles. High scores on factor C indicate high ego strength and emotional stability, whereas high SQ scores reflect good coping skills. A positive correlation was predicted because emotional stability and coping skills reflect similar attributes. The participants were 34 adjudicated delinquent adolescents. They ranged in age from 15 to 18 years with an average age of 16.2. There were 30 males and 4 females. The Cattell 16 PF Test and the SQ scale were administered in counterbalanced order. All subjects had at least a 6.0 grade equivalent reading level. The correlation (product-moment correlation coefficient) results indicated that Factor C scores were significantly correlated with SQ scores (r = .695, p<.01). Results were significant and in the predicted direction. These results support the SQ or Stress Coping Abilities Scale as a valid measure of stress coping abilities in juvenile offenders.

In a subsequent study the relationship between factor Q4 (Free Floating Anxiety) on the 16 PF Test and S (Stress) on the SQ scale was investigated. High Q4 scores reflect free floating anxiety and tension, whereas high S scores measure experienced stress. A high positive correlation between Q4 and S was predicted. There were 22 of the original 34 subjects included in this analysis since the remainder of the original files were unavailable. All 22 subjects were male. The results indicated that Factor Q4 scores were significantly correlated (product-moment correlation coefficient) with S scores (r = .584, p<.05). Results were

significant and in predicted directions. The significant correlations between factor C and SQ scores as well as factor Q4 and S scores support the construct validity of the SQ scale.

Validation Study 5: Psychotherapy outpatient clients were used in this validation study (1982) that evaluated the relationship between selected Wiggin's MMPI (Minnesota Multiphasic Personality Inventory) supplementary content scales (ES & MAS) as criterion measures and the SQ scale. ES measures ego strength and MAS measures manifest anxiety. It was predicted that the ES and SC correlation would be positive, since people with high ego strength would be more likely to possess good coping skills. Similarly, it was predicted that MAS and S correlations would be positive, since people experiencing high levels of manifest anxiety would also likely experience high levels of stress. The subjects were 51 psychotherapy outpatients ranging in age from 22 to 56 years with an average age of 34. There were 23 males and 28 females. The MMPI and the SQ were administered in counterbalanced order. The correlation (product-moment correlation coefficient) results indicated that ES and CS were positively significantly correlated (r = .29, p<.001). MAS and S comparisons resulted in an r of .54, significant at the p < .001 level. All results were significant and in predicted directions.

In a related study (1982) utilizing the same population data (N=51) the relationship between the Psychasthenia (Pt) scale in the MMPI and the S component of the SQ scale was evaluated. The Pt scale in the MMPI reflects neurotic anxiety, whereas the S component of the SQ scale measures stress. Positive Pt and S correlations were predicted. The correlation (product-moment correlation coefficient) results indicated that the Pt scale and the S component of the SQ scale were significantly correlated (r = .58, p<.001). Results were significant and in the predicted direction. The significant correlations between MMPI scales (ES, MAS, Pt) and the SQ scale components (CS, S) support the construct validity of the SQ or Stress Coping Abilities Scale.

Reliability Study 6: The reliability of the Stress Quotient (SQ) or Stress Coping Abilities Scale was investigated (1984) in a population of outpatient psychotherapy patients. There were 100 participants, 41 males and 59 females. The average age was 37. The SQ was administered soon after intake. The most common procedure for reporting inter-item (within test) reliability is with Coefficient Alpha. The reliability analysis indicated that the Coefficient Alpha of 0.81 was highly significant (F = 46.74, p<.001). Highly significant inter-item scale consistency was demonstrated.

Reliability Study 7: (1985) The reliability of the Stress Quotient (SQ) or Stress Coping Abilities Scale was investigated in a sample of 189 job applicants. There were 120 males and 69 females with an average age of 31. The SQ was administered at the time of pre-employment screening. The reliability analysis indicated that the Coefficient Alpha of 0.73 was highly significant (F = 195.86, p<.001). Highly significant Cronbach Coefficient Alpha reveals that all SQ scale items are significantly (p<.001) related and measure one factor or trait.

Validation Study 8: Chemical dependency inpatients were used in a validation study (1985) to determine the relation between MMPI scales as criterion measures and the Stress Quotient (SQ) Scale or Stress Coping Abilities Scale. The SQ is inversely related to other MMPI scales, consequently, negative correlations were predicted. The participants were 100 chemical dependency inpatients. There were 62 males and 38 females with an average age of 41. The SQ and the MMPI were administered in counterbalanced order. The reliability analysis results indicated that the Coefficient Alpha of 0.84 was highly significant (F = 16.20, p<001). Highly significant inter-item scale consistency was demonstrated.

The correlation (product-moment correlation coefficient) results between the Stress Quotient (SQ) and selected MMPI scales were significant at the p < .001 level and in predicted directions. The SQ correlation

results were as follows: Psychopathic Deviate (-0.59), Psychasthenia (-.068), Social Maladjustment (-0.54), Authority Conflict (-0.46), Taylor Manifest Anxiety Scale (-0.78), Authority Problems (-0.22), and Social Alienation (-0.67). The most significant SQ correlation was with the Taylor Manifest Anxiety Scale. As discussed earlier, stress exacerbates symptoms of impaired adjustment as well as emotional and attitudinal problems. These results support the Stress Quotient or Stress Coping Abilities Scale as a valid measure of stress coping abilities.

Validation Study 9: In a replication of earlier research, a study (1986) was conducted to further evaluate the reliability and validity of the Stress Quotient (SQ). The participants were 212 inpatients in chemical dependency programs. There were 122 males and 90 females with an average age of 44. The SQ and MMPI were administered in counterbalanced order. Reliability analysis of the SQ scale resulted in a Coefficient Alpha of 0.986 (F = 27.77, p<.001). Highly significant inter-item scale consistency was again demonstrated. Rounded off, the **Coefficient Alpha for the SQ was 0.99**.

In the same study (1986, inpatients), product-moment correlations were calculated between the Stress Quotient (SQ) and selected MMPI scales. The SQ correlated significantly (.001 level) with the following MMPI scales: Psychopathic Deviate (Pd), Psychasthenia (Pt), Anxiety (A), Manifest Anxiety (MAS), Ego Strength (ES), Social Responsibility (RE), Social Alienation (PD4A), Social Alienation (SC1A), Social Maladjustment (SOC), Authority Conflict (AUT), Manifest Hostility (HOS), Suspiciousness/Mistrust (TSC-II), Resentment/Aggression (TSC-V) and Tension/Worry (TSC-VII). **All SQ correlations with selected MMPI scales were significant (at the .001 level of significance) and in predicted directions.** These results support the SQ scale or Stress Coping Abilities Scale as a valid measure of stress coping abilities.

The studies cited above demonstrate empirical relationships between the SQ scale (Stress Coping Abilities Scale) and other established measures of stress, anxiety and coping skills. This research demonstrates that the Stress Quotient (SQ) or Stress Coping Abilities Scale is a reliable and valid measure of stress coping abilities. The SQ has high inter-item scale reliability. The SQ also has high concurrent (criterion-related) validity with other recognized and accepted tests. The SQ scale permits objective (rather than subjective) analysis of the interaction of these important variables. In the research that follows, the **Stress Quotient** or **SQ** is also referred to as the **Stress Coping Abilities Scale**.

TREATMENT INTERVENTION INVENTORY RESEARCH

Treatment Intervention Inventory is designed for intake assessment as well as pre-treatment and post-treatment evaluation. Clinics, hospitals, EAP's, HMO's and health care professionals need an objective, accurate, reliable, valid and fair assessment instrument to augment decision making. The TII has a long history of research and development, much of which is contained in the following summary. **TII research is reported in a chronological format, reporting studies as they occurred.** This gives the reader the opportunity to see how the TII evolved into a state-of-the-art assessment instrument. For current information refer to the more recent studies near the end of this research section.

Initially, a large item pool was rationally developed for TII scale consideration. Consensual agreement among three Ph.D. level psychologists and other experienced chemical dependency counselors familiar with TII scale definitions reduced the initial item pool markedly. Final item selection was empirical - comparing statistically related item configurations to known substance abuse groups. Items chosen had acceptable inter-item reliability coefficients and correlated highest with their respective scales. Final item selection was based on each item's statistical properties. Items with the best statistical properties were retained. The TII was then objectively standardized and normed on inpatient and outpatient chemical

dependency and a variety of counseling clients.

10. A Study of TII Test-Retest Reliability
Any approach to detection, assessment, or measurement must meet the criteria of reliability and validity. Reliability refers to an instrument's consistency of results regardless of who uses it. This means that the outcome must be objective, verifiable, and reproducible. Ideally, the instrument or test must also be practical, economical, and accessible. Psychometric principles and computer technology insures TII accuracy, objectivity, practicality, cost-effectiveness and accessibility.

Reliability is a measure of the consistency of a test in obtaining similar results upon re-administration of the test. One measure of test reliability, over time, is the test-retest correlation coefficient. In this type of study, the test is administered to a group and then the same test is re-administered to the same group at a later date.

<u>Method</u>
College students at two different colleges enrolled in introductory psychology classes participated in this study (1984). A total of 115 students participated and received class credit for their participation. The students were administered the TII in a paper-pencil test format. One week later they were re-tested with the TII again.

<u>Results</u>
The results of this study revealed a significant test-retest product-moment correlation coefficient of r = 0.71, p<.01. These results support the reliability of the TII. Test-retest consistency was very high and indicates that the TII scores are reproducible and reliable over a one week interval.

11. Validation of the Truthfulness Scale
The Truthfulness Scale in the TII is an important psychometric scale as these scores establish how truthful the respondent was while completing the TII. Truthfulness Scale scores determine whether or not TII profiles are accurate and are integral to the calculation of Truth-Corrected TII scale scores.

The Truthfulness Scale identifies respondents who are self-protective, recalcitrant and guarded, as well as those who minimized or even concealed information while completing the test. Truthfulness Scale items are designed to detect respondents who try to fake good or put themselves into a favorable light. These scale items are statements about oneself that most people would agree to. The following statement is an example of a Truthfulness Scale item, "Sometimes I worry about what others think or say about me."

This preliminary study used the 21 Truthfulness Scale items in the Treatment Intervention Inventory to determine if these Truthfulness Scale items could differentiate between respondents who were honest from those trying to fake good. It was hypothesized that the group trying to fake good would score higher on the Truthfulness Scale than the group instructed to be honest.

<u>Method</u>
Seventy-eight Arizona State University college students (1985) enrolled in an introductory psychology class were randomly assigned to one of two groups. Group 1 comprised the "Honest" group and Group 2 comprised the "Fakers" group. Group 1 was instructed to be honest and truthful while completing the test. Group 2 was instructed to "fake good" while completing the test, but to respond "in such a manner that their faking good would not be detected." The test, which included the TII Truthfulness Scale, was administered to the subjects and the Truthfulness Scale was embedded in the test as one of the five scales.

Truthfulness Scale scores were made up of the number of deviant answers given to the 21 Truthfulness Scale items.

Results
The mean Truthfulness Scale score for the Honest group was 2.71 and the mean Truthfulness Scale score for Fakers was 15.77. The results of the correlation (product-moment correlation coefficient) between the Honest group and the Fakers showed that the Fakers scored significantly higher on the Truthfulness Scale than the Honest group ($r = 0.27$, $p < .05$).

The Truthfulness Scale successfully measured how truthful the respondents were while completing the test. The results of this study reveal that the Truthfulness Scale accurately detects "Fakers" from those students that took the test honestly.

12. Validation of Four Treatment Intervention Inventory Scales using Criterion Measures

In general terms, a test is valid if it measures what it is supposed to measure. The process of confirming this statement is called validating a test. A common practice when validating a test is to compute a correlation between it and another (criterion) test that purports to measure the same thing and that has been previously validated. For the purpose of this study, the four Treatment Intervention Inventory scales (Truthfulness, Alcohol, Drugs and Stress Coping Abilities) were validated with comparable scales on the Minnesota Multiphasic Personality Inventory (MMPI). The MMPI was selected for this validity study because it is the most researched, validated and widely used objective personality test in the United States. The TII scales were validated with MMPI scales as follows. The Truthfulness Scale was validated with the L Scale. The Alcohol Scale was validated with the MacAndrew Scale. The Drug Scale was validated with the MacAndrew and Psychopathic Deviant scales. The Stress Coping Abilities Scale was validated with the Taylor Manifest Anxiety, Psychasthenia, Social Maladjustment and Social Alienation scales.

Method
One hundred (100) chemical dependency inpatients (1985) were administered both the TII and the MMPI. Tests were counterbalanced for order effects -- half were given the TII first and half the MMPI first.

Results and Discussion
Product-moment correlation coefficients were calculated between TII scales and MMPI scales. These results are summarized in Table 1. Correlation results presented in Table 1 show that all TII scales significantly correlated (.001 level of significance) with all represented MMPI scales. In addition, all correlations were in predicted directions.

The **Truthfulness Scale** correlates significantly with all of the represented MMPI scales in Table 1. Of particular interest is this scale's highly significant positive correlation with the MMPI Lie (L) Scale. A high L Scale score on the MMPI invalidates other MMPI scale scores due to untruthfulness. This helps in understanding why the Truthfulness Scale is significantly, but negatively, correlated with the other represented MMPI scales. Similarly, the MMPI L Scale correlates significantly, but negatively, with the other TII scales.

Table 1. (1985) Product-moment correlations
between MMPI scales and Treatment Intervention Inventory scales

MMPI SCALES (MEASURES)	Treatment Intervention Inventory Scales (Measures)			
	Truthfulness	Alcohol	Drugs	Stress Coping
L (Lie) Scale	0.72	-0.38	-0.41	0.53

Psychopathic Deviant	-0.37	0.52	0.54	-0.59
Psychasthenia	-0.34	0.38	0.41	-0.68
Social Maladjustment	-0.25	0.34	0.26	-0.54
Authority Conflict	-0.43	0.31	0.47	-0.46
Manifest Hostility	-0.45	0.34	0.47	-0.58
Taylor Manifest Anxiety	-0.58	0.47	0.46	-0.78
MacAndrew	-0.40	0.58	0.62	-0.33
Social Alienation	-0.47	0.35	0.45	-0.67

NOTE: All correlations were significant at $p < .001$.

The **Alcohol Scale** correlates significantly with all represented MMPI scales. This is consistent with the conceptual definition of the Alcohol Scale and previous research that has found that alcohol abuse is associated with mental, emotional and physical problems. Of particular interest are the highly significant correlations with the MacAndrew ($r = 0.58$) Scale and the Psychopathic Deviant ($r = 0.52$) Scale. High MacAndrew and Psychopathic Deviant scorers on the MMPI are often found to be associated with substance abuse. Similarly, the **Drugs Scale** correlates significantly with the MacAndrew ($r = 0.62$) Scale and the Psychopathic Deviant ($r = 0.54$) Scale.

The **Stress Coping Abilities Scale** is inversely related to MMPI scales which accounts for the negative correlations shown in Table 1. The positive correlation with the L scale on the MMPI was discussed earlier, i.e., Truthfulness Scale. It should be noted that stress exacerbates symptoms of impaired adjustment and even psychopathology. The Stress Coping Abilities Scale correlates most significantly with the Taylor Manifest Anxiety ($r = -0.78$) Scale, the Psychasthenia ($r = -0.68$) Scale and the Social Alienation ($r = -0.67$) Scale.

These findings strongly support the validity of Treatment Intervention Inventory scales. All of the TII scales were highly correlated with the MMPI criterion scale they were tested against. The large correlation coefficients support the validity of the TII. All product-moment correlation coefficients testing the relation between TII scales and MMPI scales were significant at the $p < .001$ level.

13. Inter-item Reliability of the Treatment Intervention Inventory
Within-test reliability measures to what extent a test with multiple scales measuring different factors, measures each factor independent of the other factors (scales) in the test. It also measures to what extent items in each scale consistently measures the particular trait (or factor) that scale was designed to measure. Within-test reliability measures are referred to as inter-item reliability. The most common method of reporting within-test (scale) inter-item reliability is with Coefficient Alpha.

Method
This study (1985) included three separate groups of subjects: 100 outpatients in private practice, 100 substance abuse inpatients, and 189 job applicants -- totaling 389 subjects. Separate inter-item reliability analyses were conducted to compare results across the three groups.

Results and Discussion
The inter-item reliability coefficient alpha and within-test reliability statistics are presented in Tables 2 and 3, respectively. All inter-item reliability coefficient alphas and within-test reliability F-values are significant at $p<.001$. These results supports the reliability of the TII. The TII is a highly reliable instrument.

Table 2. Inter-item reliability, coefficient alpha. (1985)
Outpatients, Substance Abuse Inpatients and Job Applicants (N = 389)

TII SCALES MEASURES	N ITEMS	Outpatients (N = 100)	Inpatients (N = 100)	Job Applicants (N = 189)
Truthfulness Scale	21	0.81	0.79	0.81
Alcohol Scale	21	0.86	0.93	0.83
Drugs Scale	21	0.80	0.85	0.79
Stress Coping Abilities	40	0.81	0.84	0.73

Table 3. Within-test reliability, F statistic.
All F statistics are significant at p<.001.

TII SCALES MEASURES	N ITEMS	Outpatients (N = 100)	Inpatients (N = 100)	Job Applicants (N = 189)
Truthfulness Scale	21	21.73	53.15	45.91
Alcohol Scale	21	9.29	31.46	47.75
Drugs Scale	21	27.19	16.34	58.18
Stress Coping Abilities	40	46.74	16.20	195.86

These results (Table 2 and 3) demonstrate the impressive reliability of the TII. Reliability was demonstrated with three different groups of people (outpatients, inpatients and job applicants) taking the TII.

In each of these subject samples, all TII scales (measures) were found to be significantly independent of the other TII scales as shown by the highly significant within-test F statistics. The F statistic is obtained in within-subjects between measures ANOVA performed on each individual TII scale in each of the samples.

The F statistics show that each TII scale measures essentially one factor (or trait). In addition, all TII scales show high inter-item reliability. This is demonstrated by the Standardized Cronbach's Coefficient Alpha - a widely used test of inter-item reliability when using parallel models. This measure reveals that all items in each TII scale are significantly related and measure just one factor. In other words, each TII scale measures one factor, yet the factor being measured is different from scale to scale.

The inter-item reliability coefficients show very similar results across the three subject samples. The Truthfulness Scale, Alcohol Scale and Drugs Scale are in close agreement. The Stress Coping Abilities Scale shows similar results for the chemical dependency groups but the job applicant group had a slightly lower coefficient alpha. This difference might be accounted for by the fact that individuals applying for a job would not want to show themselves in a bad light by indicating they have an emotional, stress-related or mental health problem.

Because each sample may have scored differently from the other two samples, the data for all subjects were combined. For example, job applicants may score low on the Alcohol and Drugs Scales and inpatient clients may score high. By combining the data, scale scores would likely be distributed from low to high and result in even better coefficient alphas than each sample separately. Table 4 presents the inter-item reliability analysis of all of these independent studies (N = 100, N = 100, N = 189) combined (N = 389).

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The combined data shows that all but one coefficient alpha increased in the combined data compared to coefficient alphas of each subject sample alone. These coefficient alphas in the combined data are very high and provide strong support for the reliability of the TII.

Table 4. Inter-item reliability, coefficient alpha. All data combined (N = 389).
All F statistics are significant at p<.001.

TII SCALES MEASURES	N ITEMS	COEFFICIENT ALPHA	F VALUE
Truthfulness Scale	21	0.82	96.93
Alcohol Scale	21	0.94	26.68
Drugs Scale	21	0.88	79.71
Stress Coping Abilities	40	0.85	150.78

14. Relationships between Selected TII Scales and Polygraph Examination

A measure that has often been used in business or industry for employee selection is the Polygraph examination. The polygraph exam is most often used to determine the truthfulness or honesty of an individual while being tested. The Polygraph examination is more accurate as the area of inquiry is more "situation" specific. Conversely, the less specific the area of inquiry, the less reliable the Polygraph examination becomes.

Three Treatment Intervention Inventory scales were chosen for this study; Truthfulness Scale, Alcohol Scale and Drugs Scale. The Truthfulness Scale was chosen because it is used in the TII to measure the truthfulness or honesty of the respondent while completing the TII. The Alcohol and Drugs Scales are well suited for comparison with the polygraph exam because of the situation specific nature of the scales. Alcohol and drug items are direct and relate specifically to alcohol and drug use. The comparison with the Truthfulness Scale is less direct because of the subtle nature of the Truthfulness Scale items as used in the TII. The respondent's attitude, emotional stability and tendencies to fake good affect the Truthfulness Scale. It was expected that the Alcohol and Drugs Scales would be highly correlated with the polygraph results and the Truthfulness Scale would show a somewhat less but nonetheless significant correlation.

Method
One hundred and eighty-nine (189) job applicants (1985) were administered both the TII scales and the Polygraph examination. Tests were given in a counterbalanced order, half of the applicants were given the TII scales first and the other half of the applicants were administered the polygraph first. The subjects were administered the TII scales and polygraph exam in the same room in the same session with the examiner present for both tests.

Results
The product-moment correlation results between the Polygraph exam and TII scales indicated there was a significant positive correlation between the Truthfulness Scale and Polygraph exam ($r = 0.23$, $p<.001$). Similarly, significant positive relationships were observed between the Polygraph exam and the Alcohol Scale ($r = 0.54$, $p<.001$) and the Drugs Scale ($r = 0.56$, $p<.001$).

In summary, this study supports the validity of the TII Truthfulness Scale, Alcohol Scale and Drugs Scale. There were strong positive relationships between the selected TII scales and the Polygraph examination.

The highly significant product-moment correlations between TII scales and Polygraph examinations demonstrates the validity of the TII Truthfulness, Alcohol and Drugs measures.

These results are important because the Polygraph exam is a direct measure obtained from the individual being tested rather than a rating by someone else. This is similar to self-report such as utilized in the TII. The fact that there was a very strong relationship between Polygraph results and TII scales shows that this type of information can be obtained accurately in self-report instruments.

These results indicate that the TII Truthfulness Scale is an accurate measure of the respondent's truthfulness or honesty while completing the TII. The Truthfulness Scale is an essential measure in self-report instruments. There must be a means to determine the honesty or "correctness" of the respondent's answers and there must be a means to adjust scores when the respondent is less than honest. The TII Truthfulness Scale addresses both of these issues. The Truthfulness Scale measures truthfulness and then applies a correction to other scales based on the Truthfulness Scale score. The Truthfulness Scale ensures accurate assessment. The results of this study show that the TII is a valid assessment instrument.

15. Replication of TII Reliability in a Sample of Inpatient Clients
In a replication of earlier TII research, chemical dependency inpatients (1987) were used to evaluate the reliability of the TII scales.

Method and Results
The TII was administered to 192 inpatients in a chemical dependency facility. The inter-item coefficient alpha statistics are presented in Table 5. These results are in close agreement to reliability results obtained in an earlier study using chemical dependency inpatient clients. In some cases the coefficient alphas are higher in the present study as in the previous study. The results of the present study support the reliability of the TII.

In all of the subject samples studied, the TII scales were demonstrated to be independent measures. This mutual exclusivity (significant at $p<.001$) was demonstrated by a within-subjects measures ANOVA performed on each TII scale. These analyses demonstrate that each TII scale measures one factor or trait. All TII scales demonstrate high inter-item congruency, as reflected in the standardized Cronbach Coefficient Alpha. The items on each TII scale are significantly related to the factor or trait each scale was designed to measure. In other words, each TII scale measures one factor, and the factor (or trait) being measured differs from scale to scale.

Table 5. Inter-item reliability, coefficient alpha.
Chemical dependency inpatients (1987, N = 192).

TII SCALES MEASURES	N ITEMS	COEFFICIENT ALPHA	F VALUE	P VALUE $P\leq$
Truthfulness Scale	21	0.79	13.28	0.001
Alcohol Scale	21	0.92	24.39	0.001
Drugs Scale	21	0.87	22.23	0.001
Stress Coping Abilities	40	0.99	27.77	0.001

TII scales (measures) have been shown to be both mutually exclusive and have high inter-item scale consistency. The TII has acceptable and empirically demonstrated reliability. In addition, inter-item reliability studies have shown that each TII scale is an independent measure of the trait (factor) it was designed to measure.

16. Validation of TII Scales Using DWI Evaluator Ratings

This study (1987) was designed to demonstrate the relationship between TII scales and DWI evaluator ratings, i.e., concurrent validity. Participating DWI evaluators had over six years expertise in DWI offender assessment. Evaluators were instructed to complete their normal and usual screening procedures "prior to rating" clients on the scales incorporated into the TII, i.e., the Alcohol and Drug Scales. Evaluators were "blind" in the sense that they did not have any knowledge of scale scores at the time of their ratings.

Method and Results

There were 563 DWI offenders included in this study (1987). The participants completed the TII as part of normal DWI screening and evaluation procedures. Results of staff (evaluator) ratings and scale scores (Alcohol and Drug Scales) are presented in Table 6. As shown in the table below, the product-moment correlation coefficients between staff ratings and scale scores are highly statistically significant at p<.001.

Table 6. Agreement Coefficients between Evaluator Ratings and TII Scale Scores (1987, N=563)

TII SCALES	AGREEMENT COEFFICIENT	SIGNIFICANCE LEVEL
Alcohol Scale	.63	P<.001
Drug Scale	.54	P<.001

It should be noted that these experienced evaluators invested considerable time in reviewing available records and interviewing each client. In contrast, scale scores were arrived at after 25 minutes of testing time. These results strongly support the validity of the Alcohol and Drug Scales. Concurrent (criterion related) validity is demonstrated.

In addition, product-moment correlations were computed between these scales and the MAST, Sandler and Court Screening procedures used by these experienced evaluators. These results are represented in Table 7.

Table 7. Product-moment correlations (1987, N=563)
Mast, Sandler, and Court Procedures

TII SCALES	MAST	SANDLER	COURT PROCEDURE
Alcohol Scale	.68	.46	.80
Drug Scale	.37	.11	.32

These results support the validity (criterion) of the TII scales (Alcohol and Drug Scales). The highest coefficient is between the Alcohol Scale and Court Procedure, indicating that both procedures are essentially reflecting the same information. The Court Procedure involved a review of court records (DUI priors, BAC level, substance abuse-related convictions, MAST results and Sandler scores). These findings support the validity of the Alcohol and Drugs Scales.

Although researchers look for high coefficients, any positive correlation indicates that predictions from the test will be more accurate than guesses. Whether a validity coefficient is high enough to permit use of the test as a predictor, depends upon numerous factors, such as the importance of prediction and evaluation cost.

And, any statistics has a variation from one sample to another. Even if subjects are drawn randomly from

the same population, criterion coefficients between variables will differ from sample to sample. Using a large sample makes the correlation more dependable. Correlations between a test and criterion are called validity coefficients, coefficients of productivity and concurrent validity. Concurrent validity procedures involve administering a test and comparing test results with identifiable criterion of performance.

17. Validation of TII Scales Using the Mortimer-Filkins Test

In this study (1988), TII Alcohol and Drug Scale scores were validated with Mortimer-Filkins total scores. The Product-moment correlations are presented in Table 8. There were 1,299 participants included in the study.

Table 8. Product-moment correlations. (1988, N = 1,299)
Mortimer-Filkins versus TII Alcohol And Drug Scales

TII Measures	First Sample Coefficients	Second Sample Coefficients
Alcohol Scale	.451	.323
Drug Scale	.240	.237

The Mortimer-Filkins total score correlate highly significantly (p<.001) with the TII Alcohol Scale and Drug Scale. These high correlations support the validity of the Alcohol and Drug Scales.

18. Validation of TII Scales Using the MacAndrews Scale

This study (1989) evaluated relationships between the MacAndrews Scale (in the Minnesota Multiphasic Personality Inventory) and the TII Alcohol Scale and Drug Scale. Product-moment correlations are reported in Table 9. There were 1,181 participants included in the study.

Table 9. Product-moment correlations. (1989, N = 1,181)
MacAndrews Scale Versus TII Alcohol and Drug Scales

TII Measures	MacAndrews	Significance Level
Alcohol Scale	.1660	P<.02
Drug Scale	.1694	P<.02

A positive correlation is demonstrated between the MacAndrews Scale and the TII Alcohol Scale and Drug Scale. These results support the concurrent validity of the TII Alcohol Scale and the Drug Scale.

19. Validation of TII Scales Using SAQ Scales as Criterion Measures

This study (1989) compared the Substance Abuse Questionnaire (SAQ) with the TII. The SAQ has been demonstrated to be a valid, reliable and accurate adult assessment instrument. The TII is designed for treatment intake assessment. It contains seven measures or scales: Truthfulness, Anxiety, Depression, Self-Esteem, Alcohol, Drugs and Stress Coping Abilities. Four of these seven TII scales are analogous (although independent) and directly comparable to SAQ measures or scales. The SAQ is designed for adult offender evaluation. The SAQ contains six measures or scales: Truthfulness, Alcohol, Drug, Aggressivity, Resistance and Stress Coping Abilities.

Although the scales designated Truthfulness, Alcohol, Drugs and Stress Coping Abilities are independent and differ in the TII and SAQ, they were designed to measure similar behaviors or traits. Thus, although essentially composed of different test questions in the TII and SAQ test booklets, these comparable measures or scales do have similarity.

Method
The TII and SAQ were administered in group settings to 154 adult offenders, in counter balanced order. All of the subjects in this study were male inmates. The demographic composition was as follows. There were 98 Caucasians, 25 Hispanics, 13 American Indians, 12 Blacks and six other ethnicities. Five age categories were represented: 16-25 years (N = 26), 26-35 years (N = 74), 36-55 years (N = 38), 46-55 years (N = 11) and 56 or older (N = 5). Six educational levels were represented: Eighth grade or less (N = 7), Partially completed high school (N = 50), High school graduates (N = 70), Partially completed college (N = 16), College graduates (N = 9), and Professional/graduate school (N = 2). Each participant completed both the TII and the SAQ. Although all inmates volunteered to participate in this study, inmate motivation varied.

Results and Discussion
The results of this study are presented in Table 10. The results demonstrate highly significant relationships between the analogues TII and SAQ scales. The SAQ has been shown to be a valid measure of substance abuse in adult offenders,' hence, these correlation results support the validity of the TII.

It was noted that inmate motivation varied widely. This is evident in the Stress Coping Abilities correlation coefficient of .7642. Even though this is a highly significant correlation (p<.001), the Agreement Coefficient could be expected to be even higher because these scales were nearly identical and only differed by the number of test items. It is reasonable to conclude that low motivation on the part of many inmate volunteers contributed to lower Agreement Coefficients. Inmate volunteers were serving DWI-related sentences and these tests had no bearing on their incarcerated status or sentences. However, in spite of widely varied inmate motivation, Agreement Coefficients for all five sets of scale comparisons were highly significant. The validity of the TII has been demonstrated on a sample of incarcerated offenders.

Table 10. Product-moment correlations 1988 study of male inmates (N = 154).
All product-moment correlations are significant at p<.001.

SAQ versus TII Scales	Agreement Coefficients
Truthfulness Scale	.6405
Alcohol Scale	.3483
Drug Scale	.3383
Stress Coping Abilities	.7642

These results support the relationships between independent, but analogous SAQ and TII scales. Correlation coefficients for this study are presented in Table 10. And, these concurrent validity findings support the accuracy of the TII Truthfulness Scale, Alcohol Scale, Drug Scale, and Stress Coping Abilities Scale. These TII scales measure what they were intended to measure.

20. Validation of the TII Self-Esteem Scale

This study (1990) evaluated ratings between experienced counselors and the TII Self-Esteem Scale. These counselors had at least 8 years experience and an MA degree in counseling. Two counselors rated each client's self-esteem. They reviewed client outpatient files containing court history's, progress notes, diagnoses, MMPI and Incomplete Sentence materials. Each patient was interviewed for a minimum of 30 minutes. Product-moment correlation coefficients were calculated for each rater and are presented in Table 11.

Table 11. Staff Ratings and TII Self-Esteem Scale (1990, N=89)
Product-moment correlation coefficients significant at p<.05.

TII Scale	First Rater	Second Rater
Self-Esteem	.11	.18

The results of this study show that staff ratings of client's self-esteem and the TII Self-Esteem Scale are statistically significantly correlated. These results support the accuracy of the TII Self-Esteem Scale. Even though this study was completed over a six month period, all comparisons were significant.

21. Validation of the TII with MMPI Scales as Criterion Measures

This study (1990) validated TII scales using analogous scales from the MMPI. The TII Truthfulness Scale was correlated with the MMPI L (Lie) Scale. The TII Alcohol Scale and Drugs Scale were correlated with the MMPI MacAndrews Scale and Psychopathic Deviate Scale. The TII Anxiety Scale was correlated with the Taylor Manifest Anxiety (MAS) Scale, and the Psychasthenia (PT) Scale. The TII Depression Scale was correlated with the MMPI Depression Scale. The TII Stress Coping Abilities Scale was correlated with the Hypomania (Mam) and Taylor Manifest Anxiety (MAS) Scales. The TII Self-Esteem Scale was correlated with the Psychasthenia (PT) and the Social Alienation (SOA) Scales.

Method and Results
The participants in this study (1990) were 100 chemical dependency inpatients. Tests were administered in counterbalanced order. Product-moment correlation coefficients between analogous TII and MMPI scale scores are discussed individually.

The **Truthfulness Scale** (L, r=0.72) correlates highly significantly with the MMPI Lie (L) Scale. Although

independent of each other, the MMPI - L Scale and the TII - Truthfulness Scale are conceptually similar. Each consists of items that most people agree or disagree with. And, they both determine client honesty. The **Alcohol Scale** correlates significantly with the MacAndrews Alcohol (ALC, r=0.58) Scale and the Psychopathic Deviate (PD, r=0.52) Scale. The **Drug Scale** correlates significantly with the MacAndrews (ALC, r=0.62) Scale and the Psychopathic Deviate (PD, r=0.54) Scale. High PD and ALC scores on the MMPI are often associated with substance abuse. The **Anxiety Scale** correlates significantly with the Taylor Manifest Anxiety (MAS, r=.56), and the Psychasthenia (PT, r=0.47) Scale. The **Depression Scale** correlates significantly with the Depression (D, r=0.57) Scale. The **Stress Coping Abilities Scale** correlates significantly with the Hypomania (Mam r=0.37) and Taylor Manifiest Anxiety (MAS, r=0.78) Scales. The **Self-Esteem Scale** correlates significantly with the Psychasthenia (PT, r=0.34) and the Social Alienation (SOA, r=0.36) Scale.

All correlations were highly statistically significant. These results strongly support the validity of the TII. Validity refers to a test measuring what it is purported to measure. The TII is a accurate assessment instrument. The TII measures what it is designed to measure.

22. Reliability of the TII in a Sample of Outpatient Clients

The present study (1990) investigated the reliability of the TII in a sample of outpatient clients. Reliability refers to consistency of results, regardless of who uses the test. A common statistical test of reliability is coefficient alpha which is a measure internal consistency.

Method and Results

The subjects used in the present study consisted of 294 substance abuse outpatient clients. There were 291 males and 3 females. This sample is summarized as follows, Age: 19 years or younger (14, 4.8%); 19 years to 29 years of age (124, 42.2%); 30 years to 39 years (113, 38.4%); 40 years to 49 years (33, 11.2%); 50 years to 59 years (8, 2.7%) and 60 + years (2, 0.7%). Ethnicity: Caucasian (160, 54.4%); Black (126, 42.9%); Hispanic (1, 0.3%); Asian (4, 1.4%); Native American (2, 0.7%) and Other (1, 0.3%). Education: 8th grade or less (7, 2.4%); Partially Completed High School (72, 24.2%); High School Graduate (111, 37.7%); Partially Completed College (71, 24.2%); College Graduate (15, 5.1%); Advanced Degree (8, 2.8%) and Professional (3, 1.0%). Marital Status: Single (172, 58.5%); Married (47, 16.0%); Divorced (51, 17.3%); Separated (19, 6.5%); Widowed (4, 1.4%) and Missing (1, 0.3%). Employment: Employed (215, 73.1%) Unemployed (79, 26.5%). Reliability (internal consistency) coefficients are presented in Table 12.

Table 12. Reliability coefficients alphas. Outpatients (1990, N=294)

TII Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.84	P<.001
Alcohol Scale	.86	P<.001
Drug Scale	.85	P<.001
Anxiety Scale	.81	P<.001
Depression Scale	.83	P<.001
Self-Esteem Scale	.92	P<.001
Stress Coping Abilities Scale	.88	P<.001

These results strongly support the statistical reliability of the TII. All reliability coefficients were significant at p<.001. The TII is a reliability instrument for the assessment of outpatient clients.

23. A Study of TII Reliability in a Sample of Inpatient Clients

The present (1992) study was conducted to evaluate the statistical reliability of the TII in an inpatient adult sample. As the population of substance abuse clients could conceivably consist of widely varying people, it is important to continue to investigate statistical (reliability) properties on the various substance abuse client population databases.

Method and Results
This study (1992) involved 365 inpatients (222 males and 143 females). The demographic composition of the sample was the following. Age: 18 years or less (41, 1.2%); 19 years to 29 years of age (134, 36.7%); 30 years to 39 years (111, 30.4%); 40 to 49 (47, 12.9%); 50 to 59 (20, 5.5%) and 60 + years (12, 3.3%). Gender: males (222, 60.8%) and females (143, 39.2%). Ethnicity/Race: Caucasian (304, 83.3%); Black (28, 7.7%); Hispanic (21, 5.8%); Asian (3, 0.8%); Native American (7, 1.9%) and Other (2, 0.5%). Education: 8th grade or less (19, 5.2%); Partially Completed High School (82, 22.5%); G.E.D. (28, 7.7%); High School Graduate (116, 31.8%); Partially Completed College (75, 20.5%); Technical/Business School (6, 1.6%); College Graduate (30, 8.2%); Professional/Graduate School (9, 2.5%). Marital Status: Single (190, 52.1%); Married (108, 29.6%); Divorced (21, 5.8%); Separated (38, 10.4%); Widowed (7, 1.9%).

Coefficient Alpha reliability (internal consistency) coefficients are presented in Table 13.

Table 13. Reliability coefficient alphas. Inpatients (1992, N=365)
All reliability coefficients are significant at p<.001.

TII Scales	Coefficient Alpha
Truthfulness Scale	.85
Alcohol Scale	.90
Drugs Scale	.87
Anxiety Scale	.85
Depression Scale	.87
Self-Esteem Scale	.91
Stress Coping Abilities Scale	.95

This study supports the reliability of these scales of the Treatment Intervention Inventory (TII). The coefficient alpha is the most widely used statistic of internal consistency or reliability. The TII produces similar results upon repetition. The TII is reliable.

24. A Study of TII Reliability in a Sample of Outpatients
The present study (1994) was conducted to investigate reliability of the TII in a sample of outpatient participants.

Method and Results
There were 227 adult outpatient participants included in the present study. This sample is summarized as follows: Gender (149 males, 65.9% and 78 females, 34.4%). Age: 18 or less (10, 4.4%); 19 through 29 (77, 33.9%); 30 through 39 (97, 42.7%); 40 through 49 (33, 14.5%); 50 through 59 (6, 2.6%) and 60 + (4, 1.8%). Ethnicity: Caucasian (151, 66.5%); Black (27, 11.9%); Hispanic (44, 19.4%); Native American (4, 1.8%); and Other (1, 0.4%). Education: 8th grade or less (20, 8.8%); Partially Completed High School (67, 29.5%); G.E.D. (16, 7.0%); High School Graduate (78, 34.4%); Partially Completed College (33, 14.5%); Technical/Business School (3, 1.3%); College Graduate (9, 4.0%) and Professional/Graduate School (1, 0.4%). Marital Status: Single (126, 55.5%); Married (61, 26.9%); Divorced (30, 13.2%); Separated (6, 2.6%) and Widowed (4, 1.8%). Reliability coefficient alphas are presented in the Table 14.

Table 14. Reliability coefficient alphas. Inpatients (1994, N=227)

TII Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.87	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.89	P<.001
Anxiety Scale	.90	P<.001
Depression Scale	.88	P<.001
Self-Esteem Scale	.95	P<.001
Stress Coping Abilities Scale	.92	P<.001

These results are in close agreement with reliability coefficient alphas found in previous TII studies. These results again demonstrate the internal consistency of the Treatment Intervention Inventory.

25. Reliability of the TII in a Large Sample of Outpatients

The purpose of the present study (1995) was to test the reliability of the Treatment Intervention Inventory in a large sample of outpatients.

Method and Results

The TII was administered to 887 adult outpatient participants as part of routine evaluation programs. Subjects were administered the TII individually in paper-pencil test format. There were 663 males and 224 females. The demographic composition of this sample is summarized as follows. Age: 18 or less (65, 7.3%); 19 to 29 (335, 37.8%); 30 to 39 (321, 36.2%); 40 to 49 (113, 12.8%); 50 to 59 (34, 3.8%) and 60 + (18, 2.0%). Ethnicity: Caucasian (615, 69.4%); Black (181, 20.4%); Hispanic (66, 7.4%); Asian (7, 0.8%); Native American (13, 1.5%) and Other (4, 0.5%). Education: 8th grade or less (40, 4.5%); Partially Completed High School (201, 25.0%); G.E.D. (7, 8.2%); High School Graduate (255, 27.4%); Partially Completed College (204, 23.1%); Technical/Business School (13, 1.5%); College Graduate (46, 5.2%); Professional/Graduate School (45, 5.1%). Marital Status: Single (488, 55.1%); Married (217, 24.4%); Divorced (102, 11.5%); Separated (63, 7.1%); Widowed (15, 1.7%).

Reliability coefficient alphas are presented in Table 15.

This study supports the reliability of the Treatment Intervention Inventory (TII). The Alpha Coefficient is the most widely used statistic of internal consistency or reliability. The TII produces similar results upon repetition. The TII is a reliable adult assessment instrument.

Table 15. Reliability coefficient alphas. Outpatients (1995, N=887)

TII Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.89	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.91	P<.001
Anxiety Scale	.90	P<.001
Depression Scale	.89	P<.001
Self-Esteem Scale	.91	P<.001
Stress Coping Abilities Scale	.92	P<.001

26. Reliability Study on Three Samples of Outpatient Clients

This study (1996) examined the reliability of the TII in three samples of outpatient clients. There were a total of 1,485 participants. The Treatment Intervention Inventory (TII) was administered as part of the established intake procedure. **Group 1** consisted of 204 adult outpatient clients. There were 147 males (72.1%), 56 females (27.5%) and 1 (0.5%) missing gender information. The demographic composition of this sample is the following. Age: 18 years or younger (36, 17.6%); 19 through 29 (115, 56.4%); 30 through 39 (35, 17.2%); 40 through 49 (9, 4.4%); 50 through 59 (6, 2.9%); and 60+ (3, 1.5%). Ethnicity: Caucasian (102, 50.0%); Black (16, 7.8%); Hispanic (67, 32.8%); American Indian (6, 2.9%); Other (5, 2.5%); and Missing (8, 3.9%). Education: 8th grade or less (5, 2.5%); Partially Completed High School (49, 24.0%); G.E.D. (13, 6.4%); High School Graduate (63, 30.9%); Partially Completed College (60, 29.4%); Technical/Business School (1, 0.5%); College Graduate (9, 4.4%) and Missing (4, 2.0%). Marital Status: Single (141, 69.1%); Married (34, 16.7%); Divorced (7, 3.4%); Separated (4, 2.0%); and Missing (18, 8.8%).

Group 2 consisted of 116 participants. There were 79 males (68.1%) and 37 females (31.9%). Demographic composition is summarized as follows. Age: 18 years or younger (12, 10.3%); 19 through 29 (48, 41.4%); 30 through 39 (33, 28.4%); 40 through 49 (17, 14.7%); 50 through 59 (4, 3.4%); 60 years and older (2, 1.7%). Ethnicity: Caucasian (94, 81.0%); Black (19, 16.4%); Hispanic (2, 1.7%); Asian (1, 0.9%). Education: 8th grade or less (8, 6.9%); Partially Completed High School (22, 19.0%); G.E.D. (14, 12.1%); High School Graduate (27, 23.3%); Partially Completed College (37, 31.9%); Technical/Business School (4, 3.4%); College Graduate (3, 2.6%); and Professional/Graduate School (1, 0.9%). Marital Status: Single (70, 60.3%); Married (26, 22.4%); Divorced (8, 6.9%); Separated (9, 7.8%); Widowed (2, 1.7%); and Missing (1, 0.9%).

Group 3 consisted of 1,165 counseling outpatients. Demographic composition is summarized as follows. Of the 1,165 outpatients 842 (72.3%) were men and 323 (27.7%) were women. Age: 18 years or less (95, 8.2%); 19 through 29 (407, 34.9%); 30 through 39 (418, 35.9%); 40 through 49 (173, 14.8%); 50 through 59 (44, 3.8%); 60 years and older (27, 2.3%) and Missing (1, 0.1%). Ethnicity: Caucasian (809, 69.4%); Black (210, 18.0%); Hispanic (107, 9.2%); Asian (8, 0.7%); American Indian (20, 1.7%); and Other (11, 0.9%). Education: 8th grade or less (662, 56.8%); Partially Completed High School (248, 21.3%); G.E.D. (19, 1.6%); High School Graduate (140, 12.0%); Partially Completed College (76, 6.5%); Technical/Business School (2, 0.2%); College Graduate (13, 1.1%); Professional/Graduate Degree (4, 0.3%); and Missing (1, 0.1%). Marital Status: Single (652, 56.0%); Married (277, 23.8%); Divorced (145, 12.4%); Separated (72, 6.2%); Widowed (18, 1.5%); and Missing (1, 0.1%).

Reliability coefficient alphas for all three groups (total N = 1,485) are presented in Table 16.

Table 16. Reliability coefficient alphas. (1996, N = 1,485)
All coefficient alphas are significant at p<.001.

TII Scale	Group 1 N = 204	Group 2 N = 116	Group 3 N = 1,165
Truthfulness Scale	.85	.85	.86
Alcohol Scale	.88	.88	.89
Drug Scale	.85	.86	.88
Anxiety Scale	.88	.85	.85
Depression Scale	.87	.84	.84
Self-Esteem Scale	.95	.95	.95
Stress Coping Abilities Scale	.90	.91	.92

These results support the reliability (internal consistency) of the TII. The TII is an objective and reliable assessment instrument. Reliability coefficient alphas across the three groups of adult outpatient participants are in close agreement. These results suggest that the TII is applicable across different national adult outpatient samples. The TII is a reliable adult intake assessment instrument.

27. TII Reliability in a Large Sample of Inpatient Clients

A study (1996) was conducted to determine the reliability of the TII in a large sample of inpatient clients. The sample contained 630 inpatient clients at a hospital treatment center for substance (alcohol and other drugs) abuse. Demographic composition of this sample is as follows. Of the 630 inpatients 439 were males (69.7%) and 191 were females (30.3%). Age: 18 years and younger (19, 3.0%); 19 through 29 (209, 33.2%); 30 through 39 (241, 38.3%); 40 through 49 (132, 21.0%); 50 through 59 (23, 3.7%); 60 years and older (6, 1.0%). Ethnicity: Caucasian (493, 78.3%); Black (130, 20.6%); Hispanic (1, 0.2%); Asian (1, 0.2%); American Indian (1, 0.2%); and Other (4, 0.6%). Education: 8th grade or less (12, 1.9%); Partially Completed High School (110, 17.5%); G.E.D. (66, 10.5%); High School Graduate (277, 44.0%); Partially Completed College (128, 20.3%); Technical/Business School (7, 1.1%); College Graduate (23, 3.7%); Professional/Graduate School (3, 0.5%); and Missing (4, 0.6%). Marital Status: Single (254, 40.3%); Married (192, 30.5%); Divorced (136, 21.6%); Separated (41, 6.5%); Widowed (6, 1.0%); and Missing (1, 0.2%).

Reliability coefficient alphas are represented in Table 17.

Table 17. Reliability coefficient alphas. Inpatients (1996, N = 630).
All coefficient alphas are significant at p<.001.

TII Scales	Coefficient Alphas
Truthfulness Scale	.85
Alcohol Scale	.90
Drug Scale	.88
Anxiety Scale	.90
Depression Scale	.93
Self-Esteem Scale	.95
Stress Coping Abilities Scale	.94

These results support the internal consistency (reliability) of the TII for this inpatient sample. These results are similar to those reported earlier on other inpatient and outpatient client populations. Similar results will

be obtained upon replication or retest. Outcomes are objective, verifiable and reproducible. TII test results are reliable.

28. TII Reliability in a Sample of Outpatient Clients

A study (1996-1997) was conducted to determine the reliability of the Treatment Intervention Inventory in a sample of adult counseling outpatient clients. The sample consisted of 2,141 adult clients in outpatient counseling. Of the 2,141 outpatients 1,527 were men (71.3%); and 613 women (28.6%). Demographic composition of this sample was the following: Age: 18 years or younger (162, 7.6%); 19 through 29 (787, 36.8%); 30 through 39 (741, 34.6%); 40 through 49 (334, 15.6%); 50 through 59 (78, 3.6%); 60 and older (38, 1.8%); and Missing (1, 0.1%). Ethnicity: Caucasian (1,502, 70.2%); Black (375, 17.5%); Hispanic (195, 9.1%); Asian (10, 0.5%); American Indian (28, 1.3%); Other (22, 1.0%); and Missing (9, 0.4%). Education: 8th grade or less (688, 32.1%); Partially Completed High School (438, 20.5%); G.E.D. (113, 5.3%); High School Graduate (514, 24.0%); Partially Completed College (305, 14.2%); Technical/Business School (14, 0.7%); College Graduate (51, 2.4%); Professional/ Graduate Degree (8, 0.4%); and Missing (10, 0.5%). Marital Status: Single (1,134, 53.0%); Married (532, 24.8%); Divorced (298, 13.9%); Separated (126, 5.9%); Widowed (26, 1.2%) and Missing (25, 1.2%).

Reliability coefficient alphas are represented in Table 18.

Table 18. Reliability coefficient alphas. Outpatients (1996-1997, N = 2,141).
All coefficient alphas are significant at p<.001.

TII Scales	Coefficient Alphas
Truthfulness Scale	.84
Alcohol Scale	.89
Drug Scale	.87
Anxiety Scale	.87
Depression Scale	.90
Self-Esteem Scale	.95
Stress Coping Abilities Scale	.93

These results support the reliability of the TII for this a sample of outpatient clients. These results are similar to those reported earlier on other client populations. All coefficient alphas are significant at p<.001. These results support the reliability of the TII.

29. Reliability of the Revised TII

In response to many counseling agencies requests the Treatment Intervention Inventory (TII) expanded from seven to nine scales (measures) in late 1996. The TII continues to be designed for counseling program intake. The earlier 195 items TII was reduced to 162 items, which can be completed in 30 to 35 minutes. Items were retained in the original seven TII scales on the basis of their statistical properties. The two new scales include a Distress Scale and a Family Issues Scale.

> **Distress Scale:** measures pain, worry, sorrow, discomfort and distress. Distress involves both mental and physical pain and strain. This Distress Scale was adopted from other clinical tests in which it is used.

> **Family Issues Scale:** measures family problems, concerns and stability. Clients rate their

own family and relationship stability versus problems. This was a new scale.

Inclusion of these two scales was in response to many users' requests. The nine TII scales (measures) include: **1. Truthfulness Scale, 2. Anxiety Scale, 3. Depression Scale, 4. Distress Scale, 5. Alcohol Scale, 6. Drug Scale, 7. Family Issues Scale, 8. Self-Esteem Scale and 9. Stress Coping Abilities Scale.** These areas of inquiry (scales) represent important treatment, relapse and recovery indicators.

The TII is designed for program intake and as appropriate referral for counseling or treatment. The TII provides an objective and accurate assessment of the client's situation and needs. It can be administered at intake, discharge and follow-up intervals. The TII produced a quick yet objective and accurate screening for counseling programs and treatment agencies.

The shift from 195 (7 scale) item to the 162 (9 scale) TII was made in late 1996 and early 1997. Subsequent TII database research refers to the 162 item (9 scale) TII. The Self-Esteem Scale was reduced from 50 items to 25 items. And the Stress Coping Abilities Scale was reduced from 40 items to 30 items. These changes had only minor impact on the Self-Esteem and Stress Coping Abilities very impressive statistics.

A study (1997) involving the 9 scale TII and 123 outpatient counseling clients was conducted. It involved 69 males (56.1%) and 54 females (43.9%). Demographics include: age, gender, ethnicity, education and marital status. Age: 18 or younger (13, 10.6%); 19 through 29 (37, 30.1%); 30 through 39 (49, 39.8%); 40 through 49 (20, 16.3%); 50 through 59 (1, 0.8%); 60 and older (3, 2.4%). Ethnicity: Caucasian (28, 22.8%); Black (16, 13.0%); Hispanic (4, 33.3%); Asian (1, 0.8%); Native American (5, 4.1%); Other (3, 2.4%); and Missing (29, 23.6%). Education: 8th grade or less (3, 2.4%); Partially Completed High School (43, 35.0%); G.E.D. (13, 10.6%); High School Graduate (32, 26.0%); Partially Completed College (19, 15.4%); Technical/Business School (1, 0.8%); College Graduate (9, 7.3%); and Missing (3, 2.4%). Marital Status: Single (72, 58.5%); Married (28, 22.8%); Divorced (15, 12.2%); Separated (3, 2.4%); Widowed (1, 0.8%); and Missing (4, 3.3%).

Reliability coefficient alphas are presented in Table 19.

Table 19. TII Reliability Coefficient Alphas. Outpatients (1997, N=123)
All coefficients are significant at p<.001.

TII SCALES	Coefficient Alpha
Truthfulness Scale	.85
Anxiety Scale	.85
Depression Scale	.84
Distress Scale	.86
Alcohol Scale	.91
Drug scale	.89
Family Issues Scale	.85
Self-Esteem Scale	.89
Stress Coping Abilities Scale	.91

This study supports the reliability of the TII. The TII is a reliable screening or assessment instrument. The TII is an objective, accurate and reliable test.

TII - JUVENILE RESEARCH

The Treatment Intervention Inventory (TII) adult test was modified for juvenile (12 to 17 years) assessment. The TII-Juvenile is designed for juvenile and troubled youth assessment. The nine TII-Juvenile scales (measures) are the same as those contained in the TII. The TII-Juvenile tests reading level has been lowered and a few items had to be juvenile oriented. The nine TII-Juvenile scales (measures) are: Truthfulness Scale, Anxiety Scale, Depression Scale, Alcohol Scale, Drug Scale, Distress Scale, Family Issues Scale, Self-Esteem Scale and Stress Coping Abilities Scale.

In response to many requests, the TII was modified for use with juveniles and troubled youth. The nine scales or measures remain the same. And the TII-Juvenile incorporates all of the TII's special features.

30. Reliability Study of the TII-Juvenile in a Sample of Juveniles
In early 1997 the Treatment Intervention Inventory (TII) was modified for juveniles (12 to 17 years of age). The present study was conducted to test the reliability of the TII-Juvenile. This juvenile client sample was taken from different offender assessment programs from different areas in the country.

Method
The TII-Juvenile was administered to 153 juvenile clients. There were 117 males (76%) and 36 females (24%). The demographic composition of this group is as follows: Age: 12 & Under (7.2%), 13 (13%), 14 (15%), 15 (22%), 16 (22%), 17 (16%), 18 & Over (6%). Ethnicity: Caucasian (72%), Black (5%), Hispanic (11%), American Indian (11%), and Other (2%). Education: 6th grade or less (10%), 7th grade (14%), 8th grade (17%), 9th grade (24%), 10th grade (13%), 11th grade (16%), 12th grade (3%) and Some college (4%).

Reliability coefficient alphas for the TII-Juvenile sample is presented in Table 20.

Table 20. Reliability coefficient alphas. Juvenile clients (1997, Total N=153)
All coefficient alphas significant at p<.001.

TII-J Scale	Coefficient Alphas
Truthfulness Scale	.80
Alcohol Scale	.82
Drug Scale	.83
Anxiety Scale	.83
Depression Scale	.87
Distress Scale	.82
Family Issues Scale	.80
Self-Esteem Scale	.90
Stress Coping Abilities	.91

These results support the reliability (internal consistency) of the TII-Juvenile test. All reliability coefficient alphas were significant at p<.001. The TII-Juvenile was standardized on a juvenile population of troubled youth.

These results strongly support the reliability of the TII-Juvenile. This sample consisted of youths who were evaluated as part of normal counseling program assessment procedures. The TII-Juvenile has impressive reliability (internal consistency). The TII-Juvenile now offers an alternative for troubled youth assessment. The TII is appropriate for adult assessment, and the TII-Juvenile is an appropriate assessment

instrument for juvenile clients.

31. Reliability of the TII in Three Adult Samples
This study (1998) was conducted to test the reliability of the Treatment Intervention Inventory in three samples of adult participants. The participants were administered the TII as part of normal intake evaluation procedures.

Method and Results
There were three groups of subjects in this study (1998) that consisted of a total of 477 adult counseling clients. Group 1 consisted of 100 participants. There were 74 males (74%) and 26 females (26%). Demographic composition of these participants is as follows: Age: 19 & under (6%); 20-29 (37%); 30-39 (32%); 40-49 (18%); 50-59 (5%) and 60 & Over (2%). Ethnicity: Caucasian (80%); Black (7%) and Hispanic (13%). Education: Eighth grade or less (9%); Some H.S. (30%); H.S. graduate (42%); Some college (17%) and College graduate (2%). Marital Status: Single (60%); Married (20%); Divorced (17%); Separated (1%) and Widowed (2%).

Group 2 consisted of 181 participants. There were 152 males (84%) and 29 females (16%). Demographic composition of these participants is as follows: Age: 19 & under (8%); 20-29 (37%); 30-39 (30%); 40-49 (20%); 50-59 (4%) and 60 & Over (1%). Ethnicity: Caucasian (79%); Black (6%); Hispanic (14%); Asian (1%); Native American (1%) and Other (1%). Education: Eighth grade or less (8%); Some H.S. (24%); H.S. graduate (53%); Some college (13%) and College graduate (2%). Marital Status: Single (64%); Married (22%); Divorced (12%) and Separated (3%).

Group 3 consisted of 196 participants. There were 157 males (80%) and 39 females (20%). Demographic composition of these participants is as follows: Age: 19 & under (13%); 20-29 (43%); 30-39 (24%); 40-49 (13%) and 50-59 (6%). Ethnicity: Caucasian (16%); Hispanic (79%); Native American (4%) and Other (1%). Education: Eighth grade or less (8%); Some H.S. (28%); H.S. graduate (46%); Some college (13%) and College graduate (5%). Marital Status: Single (70%); Married (15%); Divorced (11%); Separated (3%) and Widowed (1%).

Reliability coefficient alphas are presented in Table 21 for the three groups, total N = 477 clients.

Table 21. Reliability coefficient alphas (1998, Total N = 477).
All coefficient alphas are significant at p<.001.

TII Scale	Group 1 N=100	Group 2 N=181	Group 3 N=196
Truthfulness Scale	.87	.87	.87
Alcohol Scale	.92	.86	.92
Drugs Scale	.84	.85	.84
Anxiety Scale	.88	.86	.88
Depression Scale	.81	.86	.81
Distress Scale	.87	.83	.87
Family Issues Scale	.81	.80	.81
Self-Esteem Scale	.90	.91	.90
Stress Coping Abilities	.92	.92	.92

The results of the study support the reliability of the TII. All coefficient alphas are significant at p<.001. All scale reliability coefficients maintained high levels. These results show that the TII is a reliable risk assessment instrument.

32. Reliability, Validity, Scale Risk Range Accuracy and Gender Differences of the TII

This study (1999) was conducted to test the reliability, validity and accuracy of the Treatment Intervention Inventory in a sample of adult participants. Reliability of the TII, validity and risk range percentile score accuracy was investigated in the present study.

Method and Results
The subjects in this study consisted of 476 adult counseling clients. Demographic composition of these participants is as follows: Age: 19 & under (10%); 20-29 (29%); 30-39 (33%); 40-49 (21%); 50-59 (5%) and 60 & over (2%). Ethnicity: Caucasian (82%); Black (11%); Hispanic (4%); Asian (1%); Native American (1%) and Other (2%). Education: Eighth grade or less (5%); Some H.S. (24%); H.S. graduate (47%); Some college (20%) and College graduate (4%). Marital Status: Single (44%); Married (27%); Divorced (20%); Separated (7%) and Widowed (1%).

Accuracy of the TII
Risk range percentile scores are calculated for each TII scale. These risk range percentile scores are derived from scoring equations based on responses to scale items and Truth-Corrections, then converted to percentile scores. There are four risk range categories: **Low Risk** (zero to 39th percentile), **Medium Risk** (40 to 69th percentile), **Problem Risk** (70 to 89th percentile) and **Severe Problem or Maximum Risk** (90 to 100th percentile). Risk range percentile scores represent degree of severity.

Analysis of the accuracy of TII risk range percentile scores involves comparing the risk range percentile scores obtained from TII test results to the predicted risk range percentages as defined above. The percentages of participants expected to fall into each risk range are the following: Low Risk **(39%)**, Medium Risk **(30%)**, Problem Risk **(20%)** and Severe Problem or Maximum Risk **(11%)**. The actual percentage of individuals falling in each of the four risk ranges, based on their risk range percentile scores, was compared to these predicted percentages.

The risk range percentile score results for the 476 participants administered the TII are presented in Table 22.

These obtained risk range percentile scores are shown in the graph with the actual data shown in the table below the graph. The obtained risk range scores can be compared to the predicted risk range scores that are shown in the right-hand column of the table.

Table 22. Risk Range Percentile Scores, N = 476 adult clients.

■Low □Medium □Problem ■Severe Problem
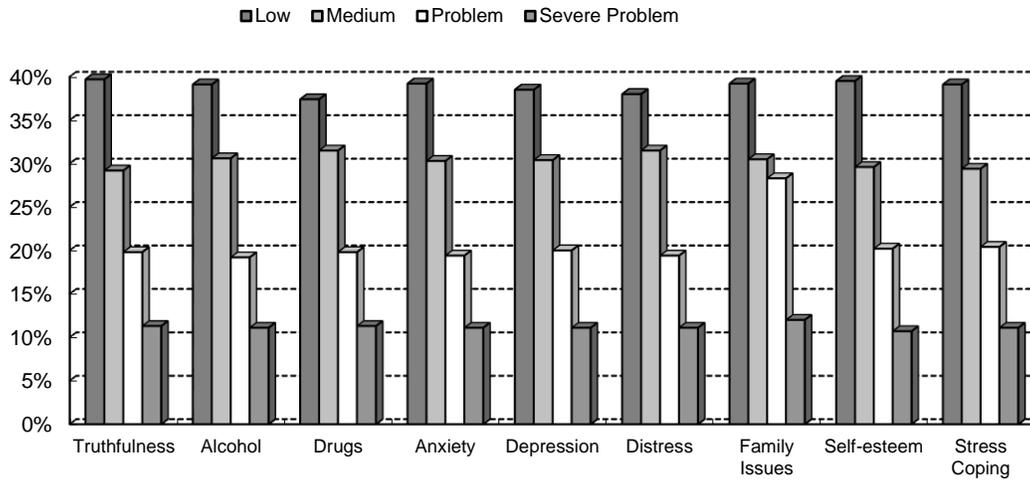
Risk Range	Truthful-ness	Alcohol	Drugs	Anxiety	Depression	Distress	Family Issues	Self-Esteem	Stress Coping	**Predicted**
Low	39.7	39.1	37.4	39.2	38.5	38.0	39.2	39.5	39.1	**39%**
Medium	29.2	30.6	31.5	30.3	30.4	31.5	30.5	29.6	29.4	**30%**
Problem	19.8	19.2	19.8	19.4	20.0	19.4	28.3	20.2	20.4	**20%**
Maximum	11.3	11.1	11.3	11.1	11.1	11.1	12.0	10.7	11.1	**11%**

These results show that obtained risk range percentile scores closely approximated the predicted risk range percentile scores for each of the nine TII scales presented in Table 22 for the adult clients included in the study. **These results indicate that the TII is a very accurate risk assessment instrument.**

The results of the comparisons between obtained risk percentages and predicted percentages show that all obtained scale risk range percentile scores were within 1.7 percent of predicted. For the Problem Risk and Maximum Risk categories, all but two comparisons (Family Issues Scale) showed that the obtained percentages were within one percentage point of predicted. **This is a very accurate assessment.**

Gender Differences

T-tests were calculated for all TII scales to assess possible sex differences. These results are presented in Table 23.

Table 23. T-test comparisons of sex differences. (1999, N=476)
TII Adult Client Sex Differences

TII Scale	Males Mean	Females Mean	T-Test Comparisons
Truthfulness Scale	6.80	6.12	n.s.
Anxiety Scale	7.72	11.15	t=3.95, p<.001
Depression Scale	7.59	11.59	t=4.69, p<.001
Alcohol Scale	10.74	7.79	t=2.84, p=.005
Drug Scale	9.69	10.13	n.s.
Distress Scale	14.44	20.09	t=5.51, p<.001
Family Issues Scale	5.37	7.17	t=3.02, p=.003
Self-Esteem Scale	22.79	21.19	n.s.
Stress Coping Abilities	104.44	82.64	t=4.54, p<.001

Significant sex differences were demonstrated on six of the nine scales, i.e., Anxiety, Depression, Alcohol, Distress, Family Issues and Stress Coping Abilities Scale. Males had higher scale scores than females on the Alcohol Scale, whereas, females had higher scales scores than males on the Anxiety, Depression, Distress, Family Issues and Stress Coping Abilities Scales.

Based on this (1999) study, gender specific norms (or separate male and female scoring procedures) have been established in the TII software program for men and women on the Anxiety, Depression, Alcohol, Distress, Family Issues and Stress Coping Abilities scales. Significant sex differences were not observed on the Truthfulness, Drug or Self-Esteem scales. This is an example of the value of ongoing TII research. With more accurate and fair measures, assessment personnel can be more confident in their assessment-related decisions.

Reliability of the TII

Reliability coefficient alphas are presented in Table 24.

Table 24. Reliability coefficient alphas (1999, N = 476).
All coefficient alphas are significant at p<.001.

TII Scale	Coefficient Alphas
Truthfulness Scale	.86
Alcohol Scale	.92
Drug Scale	.93
Anxiety Scale	.93
Depression Scale	.91
Distress Scale	.90
Family Issues Scale	.88
Self-Esteem Scale	.89
Stress Coping Abilities	.94

The results of the study support the statistical reliability of the TII. All coefficient alphas are significant at p<.001. All scale reliability coefficients are well above the generally accepted level of .80 for assessment

instruments. These results show that the TII is a highly statistically reliable risk assessment instrument.

<u>Validity of the TII</u>
In assessment, a measurement can be considered a prediction. For example, the Alcohol Scale is a measure of alcohol abuse or severity of abuse. Alcohol Scale scores would predict if an individual has an alcohol problem. A benchmark that can be used for the existence of an alcohol problem is admission of being an alcoholic or a recovering alcoholic. If an individual states that he or she is an alcoholic then the individual is known to have had an alcohol problem. Therefore, the Alcohol Scale should predict if an individual has an alcohol problem or admits to alcoholism.

Statistical decision-making is closely related to predictive validity of a test. The quality of statistical decision-making and test validity are both assessed by the accuracy with which the test (Alcohol Scale) classifies "known" cases (alcoholic admission). In the present study predictive validity was evaluated in the Treatment Intervention Inventory (TII) by using scale scores and admission of alcoholism.

Alcohol abuse information was obtained from clients' answers to TII test items (#53, #63, #136 & #151) concerning alcoholism or recovering alcoholic. Drug abuse information was obtained from TII test items (#55, #61, #142 & #151).

The results showed that the TII Alcohol Scale accurately identified 97 percent who admitted to abusing alcohol. Of the 147 clients who stated they were alcoholics or recovering alcoholics, 142 individuals or 97 percent had TII Alcohol Scale Scores in the Problem or Severe Problem risk ranges (70th percentile or higher). In addition to the high correct identification rate, the false positive rate was very low. Only one percent of the clients who did not indicate abusing alcohol scored in the Problem or above risk range. The Alcohol Scale was very accurate in identifying clients who admitted to abusing alcohol. These results support the validity of the TII Alcohol Scale.

The Drugs Scale correctly identified all of the clients who admitted to abusing drugs. Of the 142 clients who admitted they were drug addicts or recovering from drugs, 100 percent scored in the Problem or Severe Problem risk ranges on the TII Drugs Scale. The false positive rate was less than two percent. These results strongly support the validity of the TII Drugs Scale.

Taken together these results strongly support the reliability, validity and accuracy of the TII. Reliability coefficient alphas were significant at p<.001 for all TII scales. Validity of the Alcohol Scale and Drugs Scale was shown by the accuracy with which the scales identified problem risk behavior (admission to abusing or recovering from abuse). **The Alcohol Scale accurately identified 97 percent and the Drugs Scale accurately identified 100 percent of the clients who admitted to alcohol and drug problems.** These results support the reliability, validity and accuracy of the TII.

33. Study of TII Accuracy, Reliability, and Validity with a Large Sample
This study (2008) examined TII statistics for data obtained from agencies that administered the TII to clients throughout the United States. Clients were tested throughout the years beginning January 1, 2006 and ending June 31, 2008. There were 3,387 clients included. TII accuracy, reliability, and validity were examined.

<u>Method</u>
Participants in this study (2008) consisted of 3,387 clients. There were 2,238 (66.1%) males and 1,132 (33.4%) females. Demographic composition of the sample follows. Age: 19 & under (10.3%); 20-29

(38.4%); 30-39 (25.5%); 40-49 (18.8%); 50-59 (5.3%); 60 & over (1.1%). Ethnicity: Caucasian (81.0%); African American (10.0%); Hispanic (5.2%); Asian (0.4%); Native American (2.0%); "Other" (0.9%). Education: Eighth grade or less (2.4%); Some High School (21.0%); G.E.D. (10.7%); High School graduate (35.3%); Some college (21.1%); Technical/Business School (2.5%); College graduate (5.4%); Professional/Graduate School (0.6%). Marital Status: Single (54.1%); Married (19.5%); Divorced (16.9%); Separated (5.9%); Widowed (0.9%).

Accuracy

Test accuracy is demonstrated by how close attained scale scores are to predicted scores. Four categories of risk are assigned: 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). The top row of Table 1 shows the percentages of clients that were predicted to score within each risk range. (These predicted percentages for each TII scale risk category were obtained from TII standardization data.) The body of Table 1 presents actual attained risk category percentages. Differences between attained and predicted percentages are shown in bold in parentheses. For example, in terms of the Problem Risk range for the Truthfulness Scale: 20% of clients were predicted to score within this range; the attained percentage of clients who scored in this range was 17.4%, which is a difference of 2.6 percentage points from what was predicted.

Table 25. TII Scales Risk Range Accuracy (N = 3,387, 2008)
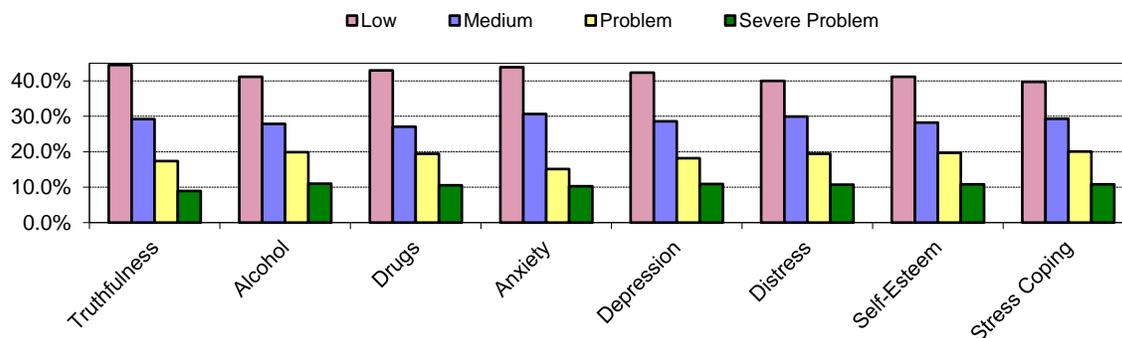
Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	44.5	**(5.5)**	29.2	**(0.8)**	17.4	**(2.6)**	8.9	**(1.1)**
Alcohol	41.2	**(2.2)**	27.9	**(2.1)**	19.9	**(0.1)**	11.0	**(0.0)**
Drugs	43.0	**(4.0)**	27.1	**(2.9)**	19.4	**(0.6)**	10.5	**(0.5)**
Anxiety	43.9	**(4.9)**	30.7	**(0.7)**	15.1	**(4.9)**	10.3	**(0.7)**
Depression	42.3	**(3.3)**	28.6	**(1.4)**	18.2	**(1.8)**	10.9	**(0.1)**
Distress	40.0	**(1.0)**	29.9	**(0.1)**	19.4	**(0.6)**	10.7	**(0.3)**
Family Issues	51.1*	**(12.1)**	20.2*	**(9.8)**	18.5	**(1.5)**	10.2	**(0.8)**
Self-Esteem	41.2	**(2.2)**	28.2	**(1.8)**	19.7	**(0.3)**	10.8	**(0.2)**
Stress Coping	39.7	**(0.7)**	29.3	**(0.7)**	20.1	**(0.1)**	10.8	**(0.2)**

*In marked contrast to prior TII Family Issues Scale analyses, an unusually large number of clients scored in the Family Issues Scale's Low Risk range, which resulted in fewer clients scoring in the Medium Risk range. This may be a one-time sampling occurrence, or it could represent a trend. To adequately understand this "phenomenon", we will evaluate further in 2009.

Thirty two out of 36 attained risk range percentiles were within **5.0** points of the predicted percentages**.** The one exception (excluding the Family Issues Scale)- the Low Risk percentile for the Truthfulness Scale- was within 5.5 points of the predicted percentages. These results strongly support the accuracy of

the TII.

Reliability

Test reliability refers to a scale's consistency of measurement. A scale is reliable if a person gets the same score when re-tested as he/she did when originally tested. Table 130 shows the reliability scores for each TII scale. Perfect reliability is 1.00.

Table 26. TII Reliability Coefficient Alphas (N = 3,387, 2008)

TII Scale	Alpha coefficient
Truthfulness Scale	.87
Alcohol Scale	.92
Drugs Scale	.91
Anxiety Scale	.94
Depression Scale	.93
Distress Scale	.91
Family Issues Scale	.86
Self-Esteem Scale	.94
Stress Coping Abilities Scale	.94

All TII scales have a reliability of **.86** or higher, and seven of the nine scales have reliabilities greater than **.90**. The professionally accepted reliability standard is .75. All TII scales exceed this standard and demonstrate very impressive reliability.

Validity

Validity refers to a test's ability to measure what it is purported to measure. The quality of a test is largely determined by its validity. Concurrent validity correlates the independent scales of the test being validated with corresponding measures from another established test. This type of validation (concurrent validation) has been conducted in numerous studies, which are presented earlier in this document.

Predictive validity refers to a test's ability to predict observable "criterion" behaviors. In this analysis, our prediction criterion was whether or not clients considered themselves to have significant problems pertaining to each of the constructs measured by TII scales. Direct self-admissions were utilized. It was predicted that clients who admitted to having serious problems would be identified by their higher scores on the relevant TII Scales. More specifically, it was predicted that a large percentage of these clients would have Scale scores that fell within the 70th and 100th percentile range (the High Risk range). In contrast, it was predicted that clients who claimed to have no problems would be identified by their lower scores on the relevant TII scales; i.e. their scale scores would fall below the 70th percentile (the Low Risk range). The possibility that clients would score in the risk range that was opposite from what was predicted (e.g. a problem-drinker scoring in the Low Risk range,) was not discounted altogether; however, it was expected that a significantly higher percentage of these individuals would score within the predicted scale risk ranges.

The results of the analysis confirmed these predictions. The majority (**97.6%**) of clients who rated their current alcohol use as a serious problem scored in the High Risk range on the Alcohol Scale, and the majority (**83.6%**) of clients who rated their current alcohol use as no problem scored in the Low Risk

range. Likewise, the majority (**96.7**%) of clients who rated their current drug use as a serious problem scored in the High Risk range on the Drugs Scale, and the majority (**87.6**%) of clients who rated their current drug use as no problem scored in the Low Risk range.

Similar results were found in terms of the Distress, Anxiety, Depression, and Family Issues Scales*. Most clients (**90.8**%) who rated their present level of distress as severe were Distress Scale "High Risk" clients, and **94.6%** of clients who rated their current level of distress as "no distress" were Distress Scale "Low Risk" clients. The majority (**87.4%**) of clients who rated their present level of anxiety as severe were Anxiety Scale "High Risk" clients, and **93.0%** of clients who reported experiencing no anxiety were Anxiety Scale "Low Risk" clients. Most clients (**89.9**%) who described their present family situation as having serious problems scored in the High Risk range on the Family Issues Scale, and most clients (**89.4**%) who described their present family situation as having no problems scored in the Low Risk range on the Family Issues Scale. Finally, **91.7**% of clients who rated their present level of depression as severe scored in the Depression Scale High Risk range, and **84.8%** of clients who asserted that they were not at all depressed scored in the Depression Scale Low Risk range.

Results indicate that the TII Alcohol Scale, Drugs Scale, Distress Scale, Anxiety Scale, Depression Scale, and Family Issues Scale accurately identify both clients who admit to having serious (scale-specific) problems and clients who claim to have no problems pertaining to the constructs measured by the scales. These findings support the predictive validity of the TII.

*The Self-Esteem and Stress Coping Abilities Scales were excluded from analysis because there were no individual test items that directly addressed clients' ratings of problems concerning their self-esteem levels or stress coping abilities.

34. Exploratory and Confirmatory Factor Analysis of the TII

The purpose of this study was to test the risk/need principle or theoretical underpinning of the TII; namely whether individual scales contributed to a model of risk and protective factors. Exploratory Factor Analyses (EFA) were conducted to provide a context for the *scale items* and identify factors *within each scale*. This was followed by Confirmatory Factor Analysis (CFA) to validate whether *scales contributed to an overall model* of risk/protective factors.

Procedures:
Data submitted to the Behavior Data Systems research database were extracted for examination. Data were received from agencies across the United States with a sample size of 3, 369. Approximately 10% of data had invalid truthfulness scores and were eliminated leaving a final sample size of 3, 012.

Participants
63% were male, 37% were female; Race/Ethnicity: 75% were Caucasian; 11% were African-American; 9% were Hispanic; 3% were Native American and 2% reported Other. Marital Status: 45% were single; 30% were married and 22% were divorced or separated. Education: 4% completed 8th grade or less; 17% completed some high school but did not graduate; 42% completed a HSD or GED; 22% completed some college; 3% completed technical or business school; 9% completed college and 3% completed a graduate or professional degree.

Analysis:
Five different types of analyses were conducted on the TII test data:

(1) Initially, Exploratory Factor Analysis (EFA) was conducted. Exploratory Factor Analysis is a data-driven technique for identifying groups or clusters of variables. In EFA there are no *a priori* decisions about patterns or relationships between items. In this study, clusters represented underlying constructs within the TII scales. EFA produces factor loading scores which can be thought of "a Pearson correlation between a factor and a variable" (Field, 2009). Factors are extracted through use of eigenvalues. In general, factors with high eigenvalues are retained. Factor loading scores are associated with eigenvalues. For this study, eigenvalues above 1.0 were retained.

    a. Kaiser-Meyer-Olkin values were calculated and were <.90 for all scales, indicating relatively compact factors that were distinct and sample size was adequate.

    b. Tests of Bartlett Sphericity were statistically significant confirming item clusters.

    c. Principal components with oblique rotation was then performed with loadings at .50; items below this threshold were excluded from subsequent analyses.

(2) Internal consistency (reliability) for each of the TII scales, *with non-loading items removed*, were conducted using Cronbach's alpha coefficients.

(3) The next step was validation of the factor structure using the same sample of respondents applying Confirmatory Factor Analysis (CFA). CFA requires a theoretical foundation and all elements must be laid out ahead of time. CFA was used to determine whether the TII identifies *risk and protective factors* in clients, patients and offenders. We were able to use the same sample for the CFA that was used in the EFA. Some authors have recommended, when possible, using the same sample to facilitate meaningful comparisons between EFA and CFA results (van Prooijen & van der Kloot, 2001; Pruett, Deichs, Pfaller, Moser, & Chan, 2014).

    a. Three separate confirmatory models were tested using LISREL CFA examined how well the scales fit a model of Risk and Prosocial factors. The one-factor model examined all scales as a construct of Risk; two-factor model examined Risk and Protective Factors; and the final model examined Misuse, Protective Factors, and Well-Being. Figure 1 provides a visual representation
.

    b. Goodness of model fit was assessed using three indices; Goodness of Fit index (GFI) values, Comparative Fix Index (CFI) values, as well as root mean square error of approximation (RMSEA) (Brown, 2006; Weston, Gore, Chan, & Catalano, 2008).

(4) T-test analyses were conducted to identify whether there were mean score differences between male and female TII test takers.

(5) Based on the results of t-test results, a secondary ad hoc analysis was conducted to further evaluate the scale score differences between males and females who completed the TII A test of configural invariance was conducted; it is considered the first step in determining test equivalence. A test of configural invariance also provides a baseline model of subsequent tests of invariance (Milfont & Fischer, 2010). It was conducted because the statistically significant results did not address whether male and female respondents viewed the constructs in the same way.

Results:

(6) Table 1 summarizes scale statistics including KMO, Bartlett's results, eigenvalues for the identified factors within each scale, and the percentage of variance accounted for. A total of 28 items were removed from the scales because they did not load onto the factors with eigenvalues above 1.0 and did not cluster together. For example, the original Alcohol Scale contained 17 items. After EFA, 13 items were retained that loaded onto two factors (eigenvalues 8.3 and 1.5). Approximately 60% of scale variance was represented by these two factors.

Figure 1. Three factor Confirmatory Factor Analysis
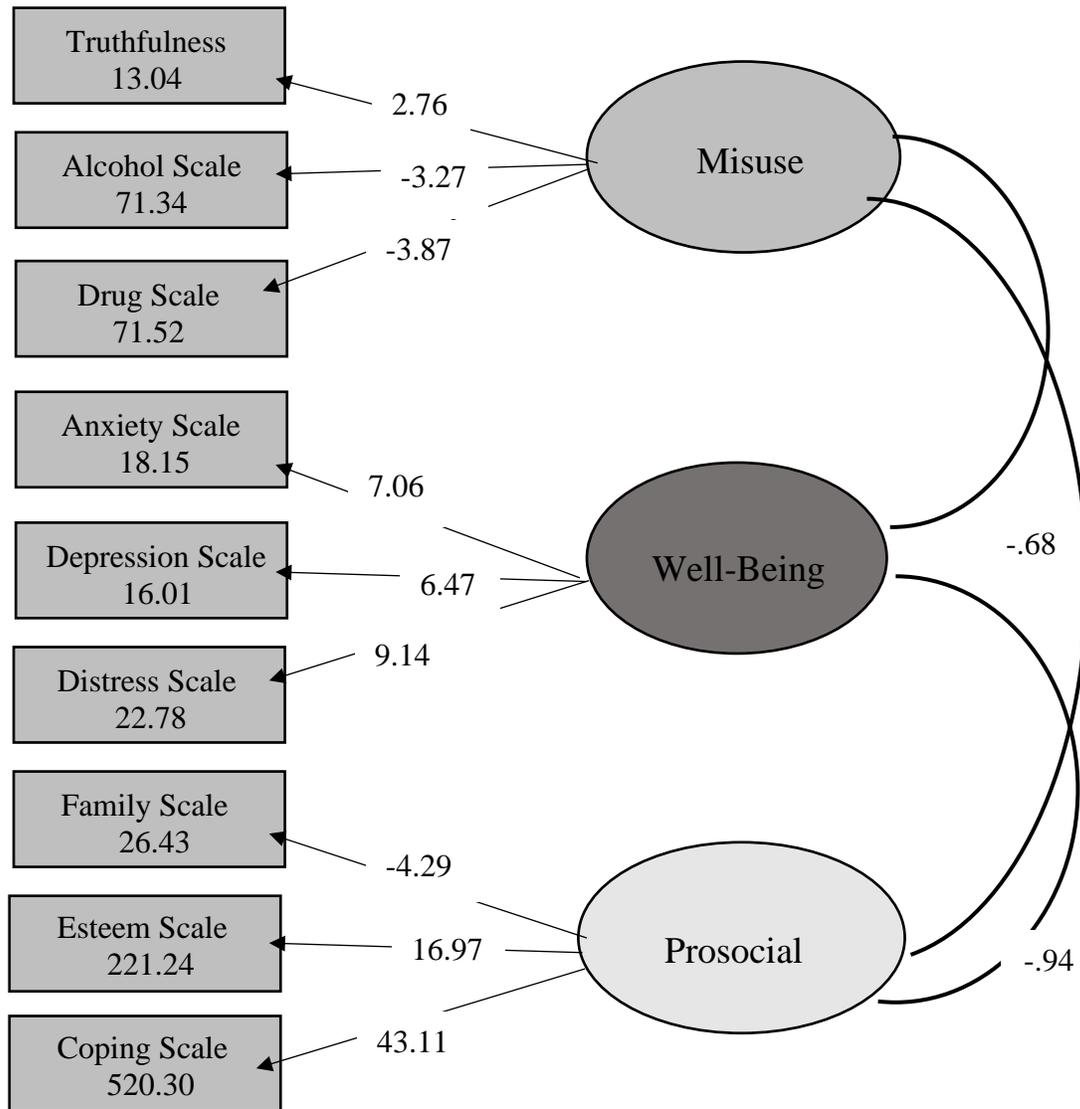
Table **27.**

Confirmatory Factor Analysis Results (N = 3, 012, 2014)

Scales	Bartlett Sphericity p <.001	KMO	Eigenvalues	% Variance Accounted
Alcohol	30473.68	.96	8.33	58.02
			1.53	

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Drug	26198.14	.94	7.49	59.02
			1.70	
			1.43	
Anxiety	26383.02	.96	8.10	55.25
			1.31	
Depression	22669.96	.95	7.36	51.30
			1.31	
			1.10	
Distress	26667.70	.94	7.79	48.35
			2.13	
			1.48	
			1.18	
Family	13669.47	.91	5.28	56.52
			1.05	
			1.02	
Esteem	36063.92	.97	10.46	53.42
			1.69	
			1.21	
Stress Coping	429740.4	.97	11.56	50.93
			2.55	
			1.18	

(7) Cronbach's Alpha, a measure of internal consistency, was conducted for each of the scales using the items that were retained after the EFA. Coefficients were greater than .86 for all adjusted scales (see Table 2.)

Table 28. Item and Reliability (N = 3, 012, 2014)

Scales	Original Item #	# Items after EFA	Cronbach's Alpha (EFA items)
Alcohol	17	13	.90
Drug	18	13	.85
Anxiety	17	15	.92
Depression	19	16	.89
Distress	26	18	.88
Family Interactions	13	12	.87
Self-Esteem	25	20	.93
Stress Coping Abilities	30	30	.94

(8) Results of the one-factor and two-factor models revealed similar goodness of fit values that were acceptable, RMSEA values indicated a poor fit for both factor models. There was a marked improvement in model fit with the addition of the third factor (Well-Being); CFI and GFI values confirmed an excellent fit; RMSEA improved over the previous models but was still outside the range (.05 -.08) of acceptable fit. Table 3 presents fit indices for all three models tested.

Table 29. Goodness of Fit Indices (N = 3, 012, 2014)

	Factor Model		
	1	2	3
Goodness of Fit Index(GFI)	.912	.914	.931
Comparative Fit Index (CFI)	.947	.950	.960
Root Mean Square Error Approximation (RMSEA)	.123	.122	.097

(9) There were statistically significant differences between male and female respondents on the Anxiety Scale [7.3, 10.6], Depression Scale [7.1, 10.0], Alcohol Scale [6.6, 5.3], Self-Esteem Scale [15.5, 10.8], Distress Scale [12.5, 17.0], Family Dynamics Scale [4.99, 6.97], and Stress Coping Abilities Scale [113.0, 96.0]. Males scored higher on the Alcohol Scale, Self-Esteem, and Stress Coping Abilities Scales respectively.

(10) As this was an exploratory study, concerned with confirming factors assessed by the TII, no additional tests of invariance were conducted. Results of fit were GFI =.91, CFI = .95, and

RMSEA = .122. GFI results were considered good; CFI results were considered excellent; RMSEA was a poor fit.

Discussion
This study has implications for the current users of the TII. The study confirmed that TII assess risk and prosocial protective factors at the item level and the scales comprise three latent constructs (Use/Misuse, Protective, and Well-Being) that represented a good fit. In other words, the TII does measure risk factors and protective factors and can provide a comprehensive profile of clients and patients. Moreover, the comparison of male and female responses revealed that the constructs (misuse, well-being, prosocial) were viewed in the same way by both genders. Counselors who currently administer the TII can have greater confidence given the additional evidence of validity for the TII.

35. TII Reliability and Validity Confirmation Using a Small Clinical Sample
This study was conducted to confirm reliability and construct validity of the Treatment Intervention Inventory. There were 226 clients used in these analyses; the majority of offenders were married, Hispanic females with at least a high school education.

Reliability
Test reliability refers to a scale's consistency of measurement. Cronbach's Alpha, a measure of reliability, measured the internal consistency of each scale for each instrument administered by the Renew Counseling. Perfect reliability is 1.00 and the professionally accepted standard of reliability for these types of instruments is .70 - .80 (Murphy & Davidshofer, 2001).

Table 30. Reliability (N = 226, 2014)

Scales	Coefficient Alphas
Truthfulness	.84
Alcohol	.82
Drug	.80
Anxiety	.85
Depression	.83
Self-Esteem	.89
Distress	.84
Family Issues	.72
Stress Coping Abilities	.90

All scales scores exceeded professionally accepted reliability standards and provide evidence of reliability.

Validity
In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems or symptoms receive higher scale scores than individuals known to have fewer problems or symptoms, the test is said to have evidence of construct validity (DeVon et al., 2007). In all analyses, adjustments were made for differences in variance and Bonferroni correction was applied to control for experimentwise error.

Comparison groups were established using responses to *item #161* about motivation for treatment; *Motivated* and *Not Motivated* mean scale scores were compared. Results found higher mean scale scores for repeat clients on the Alcohol Scale, Drug Scale, Anxiety Scale, Depression Scale, Distress Scale, and Family Issues Scale. As expected clients who were not motivated scored higher on the Self-Esteem Scale and Stress Coping Abilities Scale, indicating better esteem and stress management than motivated clients.

Clients in the *Not Motivated* group, had higher Truthfulness Scale scores which may be associated with a client's level of experience with assessment. These individuals may, naively, engage in more denial and minimizing behaviors whereas, multiple clients (who have more experience) may be aware that denial, minimization, and deception will be detected.

Table 31. TII Validity Using Motivation (N = 226, 2014)

	Motivated Mean Scores	Not Motivated Mean Scores	*t*	*p*
Truthfulness	9.13	11.80	4.29	<.001
Alcohol	3.01	2.25	.57	n.s
Drug	2.25	1.32	1.24	n.s
Anxiety	11.48	6.79	4.48	<.001
Depression	9.52	6.28	3.30	<.001
Self-Esteem	5.34	13.72	2.79	.006
Distress	17.82	8.39	8.45	<.001
Family Issues	6.46	2.70	4.50	<.001
Stress Coping Abilities	93.67	120.33	4.76	<.001

T-test analyses were conducted to examine whether the differences in mean scores were statistically significant. In all analyses, adjustments were made for differences in variance and Bonferroni correction was applied to control for experimentwise error (*p <.006)*.

Results for all scales were statistically significant for the all scales except the Alcohol Scale and Drug Scale. The non-significant findings are likely due to the small difference between group means; however, as a general rule, higher TII scores were obtained by clients who demonstrated greater problems and a stronger desire for help (Motivated Group).

36. TII Reliability and Validity Confirmation Using a Hospital Sample

This study examined the psychometric properties of the TII that was administered by a Midwestern hospital. Data were submitted from 2006 – 2015.

Participants
73% were male, 27% were female; Race/Ethnicity: 86% were Caucasian; 11% were African-American; 1% were Hispanic; and 2% reported Other. Marital Status: 37% were single; 41% were married and 21% were divorced or separated. Education: <1% completed 8th grade or less; 7% completed some high school but did not graduate; 41% completed a HSD or GED; 33% completed some college; 4% completed technical or business school; 12% completed college and 3% completed a graduate or professional degree; Item Responses: 23% reported they had been a drug treatment program; 15% reported suicidal ideation; 61% reported they were in recovery; 80% reported a motivation for help or treatment; 52% reported no family problems in last 30 days.
Reliability
Test reliability refers to a scale's consistency of measurement. Cronbach's Alpha, a measure of reliability, measured the internal consistency of the items in each scale of the TII. Perfect reliability is 1.00. The

professionally accepted reliability standard for this type of instrument is .70- 80 (Murphy & Davidshofer, 2001).

Table 32. TII Reliability (N = 570, 2015)

Scales	Coefficient Alphas
Truthfulness	.88
Alcohol	.94
Drug	.92
Anxiety	.92
Depression	.90
Self-Esteem	.94
Distress	.88
Family Issues	.88
Stress Coping Abilities	.94

Reliability scores underscore the consistency of the TII scales to measure domains associated with behavioral health and relationship concerns. The scales met or exceeded professionally accepted standards for reliability coefficients.

Validity
In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems attain higher (more severe) scale scores than individuals known to have fewer or no problems, this supports test validity. In the following validity analysis, scores from individuals who responded they needed help (item #65) TII mean scale scores were compared to scores from individuals who said they did not need help. It is anticipated that those who *do not need help* will have higher mean scale scores than those who feel they do need help, with the exception of the Self-Esteem Scale and the Stress Coping Abilities Scale. These scales assesses prosocial and protective factors meaning that higher scores are associated with better stress management skills and higher self-esteem; those who need help were expected to score lower on this scale.

A comparison between the mean scores found higher scores on all scales for individuals who did not need help – except on the Self-Esteem and Stress Coping Scales where higher scores indicate better esteem and more skills. This confirmed construct validity.

T-test analyses were conducted and adjustments made to account for the differences in sample size and variance. Moreover, Bonferroni correction was made to minimize experimentwise error ($p = .007$). Results were statistically significant for all scales. The differences in scores were not the result of

chance but meaningful differences in perceived distress, relationship issues and substance abuse issues.

Table 33. TII Validity Findings (N = 570, 2015)

Scales	Help	No Help	t	p	d
Truthfulness	4.9	10.2	12.07	<.001	-1.28
Alcohol	16.9	5.2	14.40	<.001	1.07
Drug	15.7	7.1	9.93	<.001	.76
Anxiety	13.3	5.7	11.92	<.001	1.01
Depression	12.0	5.5	11.25	<.001	.90
Distress	22.6	9.5	20.17	<.001	1.93
Self-Esteem	1.8	20.2	10.7	<.001	-.86
Stress Coping Abilities	75.3	125.2	13.42	<.001	-1.35
Family Issues	9.0	3.2	10.51	<.001	.88

These results support the validity of the TII and demonstrate that the test effectively differentiates between individuals who are known to have more severe problems than those without severe problems.

37. Study of TII Accuracy, Reliability, and Validity with a Large Sample

This study (2019) examines TII statistics obtained from agencies that administered the TII to clients throughout the United States. Clients were tested throughout 2019. There were 848 clients included. TII accuracy, reliability, and validity were examined.

Method

Participants in this study (2019) consisted of 848. There were 572 (67.5%) males and 276 (32.5%) females. Demographic composition of the sample follows. Age: 20 & under (6.5%); 21-30 (30.5%); 31-40 (28.7%); 41-50 (18.0%); 51-60 (10.7%); 61 or older (5.5%). Ethnicity: Caucasian (64.2%); African American (7.3%); Hispanic (15.9%); Asian (0.2%); Native American (3.5%); responded "Other" (2.9%). Education: 8th grade or less (3.4%); Some High School (18.5%); GED (11.4%); Graduated High School (33.3%); Some College (2.6%); Trade/Technical School (17.8%); College Graduate (8.6%); Graduate School (1.0%). Marital Status: Single (47.4%); Married (24.2%); Divorced (14.6%); Separated (5.9%); Widowed (1.1%).

Accuracy

Test accuracy is demonstrated by how close attained scale scores are to predicted scores. Four categories of risk are assigned: Low Risk (0 to 39th percentile), Moderate Risk (40 to 69th percentile), Problem Risk (70 to

89th percentile), and Severe Problem Risk (90 to 100th percentile). The top row of Tables 1 shows the percentages of clients that were predicted to score within each risk range. (These predicted percentages for each TII scale risk category were obtained from TII standardization data.) The body of Tables 1 presents actual attained risk category percentages. Differences between attained and predicted percentages are shown in bold in parentheses. For example, in terms of the Problem Risk range for the Truthfulness Scale: 20% of clients were predicted to score within this range; the attained percentage of clients who scored in this range was 17.4%, which is a difference of 2.6 percentage points from what was predicted.

Tables 34. TII Scales Risk Range Accuracy (N=848, 2019)
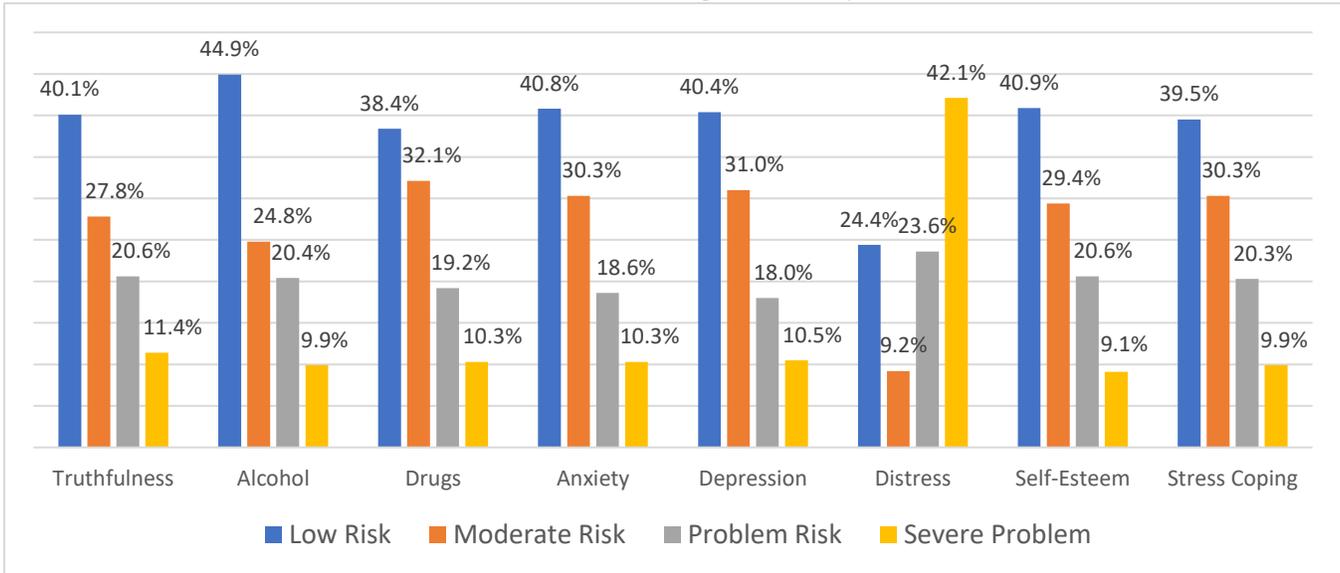
Scale	Low Risk (39%)		Moderate Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	40.1	**(1.1)**	27.8	**(2.2)**	20.6	**(0.6)**	11.4	**(0.4)**
Alcohol	44.9	**(5.9)**	24.8	**(4.2)**	20.4	**(0.4)**	9.9	**(1.1)**
Drugs	38.4	**(0.6)**	32.1	**(2.1)**	19.2	**(0.8)**	10.3	**(0.7)**
Anxiety	40.8	**(1.8)**	30.3	**(0.3)**	18.6	**(1.4)**	10.3	**(0.7)**
Depression	40.4	**(1.4)**	31.0	**(1.0)**	18.0	**(2.0)**	10.5	**(0.5)**
Distress	24.4	**(14.6)**	9.2	**(20.8)**	23.6	**(3.6)**	42.1	**(31.1)**
Family Issues	59.2	**(20.2)**	5.9	**(24.1)**	7.1	**(12.9)**	27.1	**(16.1)**
Self-Esteem	40.9	**(1.9)**	29.4	**(0.6)**	20.6	**(0.6)**	9.1	**(1.9)**
Stress Coping	39.5	**(0.5)**	30.3	**(0.3)**	20.3	**(0.3)**	9.9	**(1.1)**

The Distress and Family Issues Scales for this sample of TII tests show skewed results that weren't consistent with the expected percentage of offenders in the risk ranges. The Distress Scale shows a high percentage of offenders in the Severe Problem range. Family Issues scale showed a high percentage of offenders in the Low Risk range, a trend that has been shown in previous studies of the TII. These scales will continue to be studied in the future.

Twenty-nine out of 36 attained risk range percentiles were with 5.0 points of the predicted percentages. These results strongly support the accuracy of the TII.

Reliability

Test reliability refers to a scale's consistency of measurement. A scale is reliability if a person gets the same score when re-tested as he/she did when originally tested. Table 35 shows the reliability scores for each TII scale. Perfect reliability is 1.00.

Table 35. TII Reliability Coefficient Alphas (N=848, 2019)

Scales	Coefficient Alphas
Truthfulness	.89
Alcohol	.93
Drug	.87
Anxiety	.93
Depression	.89
Self-Esteem	.94
Distress	.91
Family Issues	.86
Stress Coping Abilities	.94

All TII scales have a reliability of **.86** or higher, and five of the nine scales have reliability greater than **.90**. The professionally accepted reliability standard of .70-.80. All TII scales exceed this standard and demonstrate very impressive reliability.

Validity

Validity refers to a test's ability to measure what it is purported to measure. The quality of a test is largely determined by its validity. Concurrent validity correlates the independent scales of the test being validated with corresponding measures from another established test. This type of validation (concurrent validation) has been conducted in numerous studies, which are presented earlier in this document.

Predictive validity refers to a test's ability to predict observable "criterion" behaviors. In this analysis, our prediction criterion was whether or not clients considered themselves to have significant problems pertaining to each of the constructs measured by TII scales. Direct self-admissions were utilized. It was predicted that clients who admitted to having serious problems would be identified by their higher scores on the relevant TII Scales. More specifically, it was predicted that a large percentage of these clients would have Scale scores that fell within the 70th and 100th percentile range (the High Risk range). In contrast, it was predicted that clients who claimed to have no problems would be identified by their lower scores on the relevant TII scales; i.e. their scale scores would fall below the 70th percentile (the Low Risk range). The possibility that clients would score in the risk range that was opposite from what was predicted (e.g., a problem-drinker scores in

the Low Risk range) was not discounted altogether; however, it was expected that a significantly higher percentage of these individuals would score with the predicted scale risk ranges.

The results of the analysis confirmed these predictions. More than half (**69.7%**) of clients who rated their current alcohol use as gotten worse scored in the High Risk range on the Alcohol Scale, and more than half (**83.1%**) of clients who rated their current alcohol use as gotten better scored in the Low Risk range. The majority (**66.8%**) of clients who rated their current drug use as a serious problem scored in the High Risk range on the Drug Scale, and the majority (**80.9%**) of clients who rated their current drug use as no problem scored in the Low Risk range. Most clients (**80.2%**) who described their present family situation as having serious problems scored in the High Risk range on the Family Issues Scale. Most clients (**72.8%**) who described their present family situation as having no problems scored in the Low Risk range on the Family Issues Scale.

Results indicate that the TII Alcohol Scale, Drugs Scale, and Family Issues Scale accurately identify both clients who admit to having serious (scale specific) problems and clients who claim to have no problems pertaining to the constructs measured by the scales. These finding support the predictive validity of the TII.

The Anxiety, Depression, Stress, Distress, and Stress Coping Abilities Scales were excluded from analysis because there were no individuals test items directly addressing clients' ratings of problems concerning these areas.

SUMMARY

In conclusion, this document is not intended as an exhaustive compilation of TII research. Yet, it does summarize many studies and statistics that support the reliability and validity of the TII. Based on this research, the TII presents an increasingly accurate picture of counseling clients and the risk they represent. The TII provides a sound empirical foundation for responsible decision making.

Summarized research demonstrates that the TII is a reliable, valid and accurate instrument for client assessment. It is reasonable to conclude that the TII does what it purports to do. The TII acquires a vast amount of relevant information for staff review prior to decision making. Empirically based scales are objective and accurate. Assessment has shifted from subjective opinions to objective accountability.

The Treatment Intervention Inventory is not a personality test, nor is it a clinical diagnostic instrument. Yet, it is much more than just another assessment test. The TII is designed specifically for screening clients for emotional/mental health problems, as well as alcohol and drug problems and referral to appropriate treatment services.