Pre/Post Inventory
Juvenile Pre/Post
An Inventory of Scientific Findings

TABLE OF CONTENTS

INTRODUCTION

PRE/POST 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 Pre/Post Inventory (PPI) was developed to help meet these needs. The PPI is designed for test-retest comparison at important stages of treatment intervention, e.g., intake, change of status, completion, and outcome. The PPI 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 Pre/Post 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 Pre/Post Inventory (PPI) 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 PPI.** No attempt has been made to incorporate all PPI research into this document. However, it is representative of the PPI's reliability, validity, and accuracy.

The Pre/Post Inventory (PPI) 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 PPI 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, PPI database ensures continued research and development. The PPI 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 25 to 30 minutes. The PPI contains seven, empirically-based scales: Truthfulness, Alcohol, Drug, Distress, Resistance, Self-esteem, and Stress Coping Abilities. The PPI has been researched on outpatients, inpatients, college students, and others.

The PPI report explains clients' attained scores and makes specific intervention and treatment recommendations. It also presents Truth-Corrected scores, significant items, a concise "structured interview," and much more. Comparison reports compare pre-test results with post-test results. This comparison report is an objective and standardized procedure for evaluating client change, program effectiveness, and outcome. The PPI is designed to measure the severity of problems in clinical settings. It is a risk and needs assessment instrument. The PPI has demonstrated reliability, validity, and accuracy. It correlates impressively with both experienced staff judgment and other recognized tests.

PPI users usually identify client risk, substance (alcohol and other drugs) abuse, and client need prior to recommending intervention, supervision levels and/or treatment. The PPI is to be used in conjunction with a review of available records and respondent interview. No decision or diagnosis should be based, solely, on PPI results. Client assessment is not to be taken lightly, as the decisions made can be vitally

important, as they affect people's lives. PPI research is ongoing in nature, so that evaluators can be provided with the most accurate information possible.

Information on the Pre/Post Inventory (PPI) is available in the PPI Orientation & Training Manual. Computer scoring information is contained in the PPI Computer Operating Guide. Each of these manuals can be obtained upon request.

The Pre/Post Inventory scales have also been standardized on juveniles (juvenile standardization studies are presented later within this document). Juveniles are tested with the Juvenile Pre/Post. The Juvenile Pre/Post incorporates the same scales (measures) as, and all other features of the Pre/Post Inventory.

PPI MEASURES (SCALES)

Users of the Pre/Post Inventory (PPI) should be familiar with each PPI scale. A description of each PPI scale follows.

SEVEN PPI SCALES (MEASURES)

   1. **Truthfulness Scale:** Measures the truthfulness of the client while they were completing the PPI. 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. **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.

   3. **Drug 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 Drug 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 Pre/Post Inventory (PPI) 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 Drug Scale provides insight into areas of inquiry that may need to be pursued in counseling and treatment.

4. 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. Symptoms such as nervousness, apprehension, melancholy, and dysphoria are measured.

5. Resistance Scale: Measures client defensiveness and uncooperativeness. This scale varies, directly, with the client's outlook and attitude.

6. 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.

7. 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.

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.

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

PPI 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 was 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)m 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**.

PRE/POST INVENTORY RESEARCH

Pre/Post Inventory is designed for intake assessment, as well as pre-treatment and post-treatment (or intervention) comparison. 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 PPI scales evolved from scale items represented in other, established assessment instruments. For example, the Truthfulness, Distress, Self-esteem, and Stress Coping Abilities items largely evolved from the Treatment Intervention Inventory, which is an established clinical or counseling screening instrument. The Alcohol, Drug, and Resistance items evolved from the Substance Abuse Questionnaire, which is an established, substance (alcohol and other drugs) abuse screening instrument. The PPI has a long history of research and development, much of which is contained in the following summary. **PPI research is reported in a chronological format, reporting studies as they occurred.** This gives the reader the opportunity to see how the PPI 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 PPI scale consideration. Consensual agreement, among three Ph.D. level psychologists and other experienced chemical dependency counselors familiar with PPI 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 PPI was, then, objectively standardized and normed on inpatient and outpatient chemical dependency, and a variety of counseling clients.

10. A Study of PPI 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 insure PPI 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.

Method

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 PPI in a paper-pencil test format. One week later, they were re-tested with the PPI.

Results

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 PPI. Test-retest consistency was very high, and indicates that the PPI scores are reproducible and reliable, over a one week interval.

11. Validation of the Truthfulness Scale

The Truthfulness Scale in the PPI is an important psychometric scale, as these scores establish how truthful the respondent was while completing the PPI. Truthfulness Scale scores determine whether or not PPI profiles are accurate, and are integral to the calculation of Truth-Corrected PPI 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 Pre/Post Inventory, to determine if these Truthfulness Scale items could differentiate between respondents who were honest and 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.

Method

Seventy-eight Arizona State University college students, (1985) who were 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 PPI 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 Five Pre/Post 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 five Pre/Post Inventory scales (Truthfulness, Alcohol, Drug, 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 PPI scales were validated with MMPI scales as follows: The Truthfulness Scale was validated with the L Scale. The Alcohol Scale was validated with the MacAndrews Scale. The Drug Scale was validated with the MacAndrews and Psychopathic Deviant scales. The Resistance Scale was validated with the Manifest Hostility and Authority Conflict. 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 were administered both the PPI and the MMPI. Tests were counterbalanced for order effects; half were given the PPI first and half the MMPI first.

Results and Discussion
Product-moment correlation coefficients were calculated for PPI scales and MMPI scales. These results are summarized in Table 1. Correlation results presented in Table 1 show that all PPI 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 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, correlated with the other, represented MMPI scales. Similarly, the MMPI L Scale correlates significantly, but negatively with the other PPI scales.

MMPI SCALES	PPI SCALES (MEASURES)				
(MEASURES)	Truthful-ness	Alcohol	Drug	Resistance	Stress Coping
L (Lie) Scale	0.72	-0.38	-0.41	-0.29	0.53
Psychopathic Deviant	-0.37	0.52	0.54	0.27	-0.59
Psychasthenia	-0.34	0.38	0.41	0.37	-0.68
Social Maladjustment	-0.25	0.34	0.26	0.35	-0.54
Authority Conflict	-0.43	0.31	0.47	0.55	-0.46
Manifest Hostility	-0.45	0.34	0.47	0.57	-0.58
Taylor Manifest Anxiety	-0.58	0.47	0.46	0.50	-0.78
MacAndrews	-0.40	0.58	0.62	0.26	-0.33
Social Alienation	-0.47	0.35	0.45	0.48	-0.67

Table 1. (1985) Product-moment correlations between MMPI scales and PPI scales

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 MacAndrews ($r = 0.58$) Scale and the Psychopathic Deviant ($r = 0.52$) Scale. High MacAndrews and Psychopathic Deviant scorers on the MMPI are often found to be associated with substance abuse. Similarly, the **Drug Scale** correlates, significantly, with the MacAndrews ($r = 0.62$) Scale and the Psychopathic Deviant ($r = 0.54$) Scale.

The **Resistance Scale** is most, significantly, correlated with the Manifest Hostility ($r = 0.57$) and the Authority Conflict ($r = 0.55$) scales. These findings are consistent with the conceptual definition of the Resistance Scale as measurement of willingness to work and cooperate with others.

The **Stress Coping Ability 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 Ability 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 Pre/Post Inventory scales. All of the PPI scales were highly correlated with the MMPI criterion scale they were tested against. The large correlation coefficients support the validity of the PPI. All product-moment correlation coefficients testing the relation between PPI scales and MMPI scales were significant at the $p < .001$ level.

13. Inter-item Reliability of the Pre/Post 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 measure 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 support the reliability of the PPI. The PPI is a highly reliable instrument.

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

In each of these subject samples, all PPI scales (measures) were found to be, significantly, independent of the other PPI 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 PPI scale, in each of the samples.

Table 2. Inter-item reliability, coefficient alpha. (1985) Outpatients, Substance Abuse Inpatients and Job Applicants (N = 389)				
PPI 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
Drug Scale	21	0.80	0.85	0.79
Resistance Scale	21	0.74	0.74	0.61
Stress Coping Abilities	40	0.81	0.84	0.73

Table 3. Within-test reliability, F statistic.				
PPI 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
Drug Scale	21	27.19	16.34	58.18
Resistance Scale	21	15.97	19.21	23.67
Stress Coping Abilities	40	46.74	16.20	195.86

All F statistics are significant at $p<.001$.

The F statistics show that each PPI scale measures, essentially, one factor (or trait). In addition, all PPI 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 PPI scale are, significantly, related and measure just one factor. In other words, each PPI 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 Drug 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 Drug 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).

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 PPI.

Table 4. Inter-item reliability, coefficient alpha. All data combined (N = 389).			
PPI SCALES MEASURES	**N ITEMS**	**COEFFICIENT ALPHA**	**F VALUE**
Truthfulness Scale	21	0.82	96.93
Alcohol Scale	21	0.94	26.68
Drug Scale	21	0.88	79.71
Resistance Scale	21	0.77	53.03
Stress Coping Abilities	40	0.85	150.78

All F statistics are significant at p<.001.

14. Relationships between Selected PPI 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 Pre/Post Inventory scales were chosen for this study: Truthfulness Scale, Alcohol Scale, and Drug Scale. The Truthfulness Scale was chosen, because it is used in the PPI to measure the truthfulness or honesty of the respondent while completing the PPI. The Alcohol and Drug 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 PPI. The respondent's attitude, emotional stability, and tendencies to fake good affect the Truthfulness Scale. It was expected that the Alcohol and Drug 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 PPI scales and the Polygraph examination. Tests were given in a counterbalanced order, half of the applicants were given the PPI scales first and the other half of the applicants were administered the polygraph first. The subjects were administered the PPI 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 PPI 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 Drug Scale ($r = 0.56$, p<.001).

In summary, this study supports the validity of the PPI Truthfulness Scale, Alcohol Scale, and Drug Scale. There were strong, positive relationships between the selected PPI scales and the Polygraph examination. The highly significant, product-moment correlations between PPI scales and Polygraph examinations demonstrate the validity of the PPI Truthfulness, Alcohol, and Drug 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 PPI. The fact that there was a very strong relationship between Polygraph results and PPI scales shows that this type of information can be obtained, accurately, in self-report instruments.

These results indicate that the PPI Truthfulness Scale is an accurate measure of the respondent's truthfulness or honesty while completing the PPI. 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 PPI 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 PPI is a valid assessment instrument.

15. Replication of PPI Reliability in a Sample of Inpatient Clients

In a replication of earlier PPI research, chemical dependency inpatients (1987) were used to evaluate the reliability of the PPI scales.

Method and Results
The PPI scales were 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 PPI.

In all, of the subject samples studied, the PPI 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 PPI scale. These analyses demonstrate that each PPI scale measures one factor or trait. All PPI scales demonstrate high, inter-item congruency, as reflected in the standardized Cronbach Coefficient Alpha. The items on each PPI scale are, significantly, related to the factor or trait each scale was designed to measure. In other words, each PPI scale measures one factor, and the factor (or trait) being measured differs from scale to scale.

PPI SCALES MEASURES	N ITEMS	COEFFICIENT ALPHA	F VALUE	P VALUE P<
Table 5. Inter-item reliability, coefficient alpha. Chemical dependency inpatients (1987, N = 192).				
Truthfulness Scale	21	0.79	13.28	0.001
Alcohol Scale	21	0.92	24.39	0.001
Drug Scale	21	0.87	22.23	0.001
Resistance Scale	21	0.81	10.92	0.001
Stress Coping Abilities	40	0.99	27.77	0.001

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

16. Validation of PPI Scales Using DWI Evaluator Ratings

This study (1987) was designed to demonstrate the relationship between PPI 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 PPI, 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 PPI 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 sown 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 PPI Scale Scores (1987, N=563)		
PPI 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			
PPI SCALES	**MAST**	**SANDLER**	**COURT PROCEDURE**
Alcohol Scale	.68	.46	.80
Drug Scale	.37	.11	.32

These results support the validity (criterion) of the PPI 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 Drug 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 statistic 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 PPI Scales Using the Mortimer-Filkins Test

In this study (1988), PPI 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 PPI Alcohol And Drug Scales		
PPI 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 PPI Alcohol Scale and Drug Scale. These high correlations support the validity of the Alcohol and Drug Scales.

18. Validation of PPI Scales Using the MacAndrews Scale

This study (1989) evaluated relationships between the MacAndrews Scale (in the Minnesota Multiphasic Personality Inventory) and the PPI 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 PPI Alcohol and Drug Scales		
PPI 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 PPI Alcohol Scale and Drug Scale. These results support the concurrent validity of the PPI Alcohol Scale and the Drug Scale.

19. Validation of PPI Scales Using DRI Scales as Criterion Measures

This study (1989) compared the Driver Risk Inventory (DRI) with the PPI. The DRI has been demonstrated to be a valid, reliable, and accurate, DWI offender assessment instrument. The PPI is designed for treatment intake assessment and pre-test/post-test comparisons. It contains seven measures

or scales: Truthfulness, Alcohol, Drug, Distress, Resistance, Self-Esteem, and Stress Coping Abilities. Four of these seven PPI scales are analogous (although independent) and directly comparable to DRI measures or scales. The DRI is designed for DWI offender evaluation. The DRI contains five measures or scales: Truthfulness, Alcohol, Drug, Driver Risk, and Stress Coping Abilities.

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

Method

The PPI and DRI 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 PPI and the DRI. 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 analogous PPI and DRI scales. The DRI has been shown to be a valid measure of substance abuse in DWI offenders; hence, these correlation results support the validity of the PPI.

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 PPI has been demonstrated on a sample of incarcerated offenders.

Table 10. Product-moment correlations 1988 study of male inmates (N = 154).	
DRI versus PPI Scales	**Agreement Coefficients**
Truthfulness Scale	.6405
Alcohol Scale	.3483
Drug Scale	.3383
Stress Coping Abilities	.7642

All product-moment correlations are significant at p<.001.

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

20. Validation of the PPI Self-Esteem Scale

This study (1990) evaluated ratings between experienced counselors and the PPI Self-Esteem Scale. These counselors had at least 8 years' experience and MA degrees in counseling. Two counselors rated each client's self-esteem. They reviewed client outpatient files containing court histories, 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 PPI Self-Esteem Scale (1990, N=89)		
Product-moment correlation coefficients significant at p<.05.		
PPI 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 PPI Self-Esteem Scale are, statistically, significantly correlated. These results support the accuracy of the PPI Self-Esteem Scale. Even though this study was completed over a six month period, all comparisons were significant.

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

This study (1990) validated PPI scales using analogous scales from the MMPI. The PPI Truthfulness Scale was correlated with the MMPI L (Lie) Scale. The PPI Alcohol Scale and Drug Scale were correlated with the MMPI MacAndrews Scale and Psychopathic Deviate Scale. The PPI Stress Coping Abilities Scale was correlated with the Hypomania (Mam) and Taylor Manifest Anxiety (MAS) Scales. The PPI 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 PPI 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 PPI - 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 **Stress Coping Abilities Scale** correlates, significantly, with the Hypomania (Mam r=0.37) and Taylor Manifest 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

PPI. Validity refers to a test measuring what it is purported to measure. The PPI is an accurate assessment instrument. The PPI measures what it is designed to measure.

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

The present study (1990) investigated the reliability of PPI scales 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)		
PPI Scales	**Coefficient Alpha**	**Significance Level**
Truthfulness Scale	.84	P<.001
Alcohol Scale	.86	P<.001
Drug Scale	.85	P<.001
Distress Scale	.81	P<.001
Resistance Scale	.82	P<.001
Self-Esteem Scale	.92	P<.001
Stress Coping Ability Scale	.88	P<.001

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

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

The present (1992) study was conducted to evaluate the statistical reliability of PPI scales 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)	
PPI Scales	**Coefficient Alpha**
Truthfulness Scale	.85
Alcohol Scale	.90
Drug Scale	.87
Distress Scale	.85
Resistance Scale	.85
Self-Esteem Scale	.91
Stress Coping Ability Scale	.95

All reliability coefficients are significant at p<.001.

This study supports the reliability of these scales of the Pre/Post Inventory (PPI). The coefficient alpha is the most, widely used statistic of internal consistency or reliability. The PPI produces similar results upon repetition. The PPI is reliable.

24. A Study of PPI Reliability in a Sample of Outpatients

The present study (1994) was conducted to investigate reliability of PPI scales, in a sample of outpatient participants.

<u>Method and Results</u>
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)		
PPI Scales	**Coefficient Alpha**	**Significance Level**
Truthfulness Scale	.87	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.89	P<.001
Distress Scale	.90	P<.001
Resistance Scale	.87	P<.001
Self-Esteem Scale	.95	P<.001
Stress Coping Ability Scale	.92	P<.001

These results are in close agreement with reliability coefficient alphas found in previous PPI studies. These results, again, demonstrate the internal consistency of the Pre/Post Inventory.

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

The purpose of the present study (1995) was to test the reliability of Pre/Post Inventory scales, in a large sample of outpatients.

Method and Results
The PPI was administered to 887 adult outpatient participants as part of routine evaluation programs. Subjects were administered PPI scales, 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 Pre/Post Inventory (PPI). The Alpha Coefficient is the most, widely used statistic of internal consistency or reliability. The PPI produces similar results upon repetition. The PPI is a reliable, adult assessment instrument.

Table 15. Reliability coefficient alphas. Outpatients (1995, N=887)		
PPI Scales	**Coefficient Alpha**	**Significance Level**
Truthfulness Scale	.89	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.91	P<.001
Distress Scale	.90	P<.001
Resistance Scale	.87	P<.001
Self-Esteem Scale	.91	P<.001
Stress Coping Ability Scale	.92	P<.001

26. Reliability Study on Three Samples of Outpatient Clients

This study (1996) examined the reliability of the PPI in three samples of outpatient clients. There were a total of 1,485 participants. The Pre/Post Inventory (PPI) 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)			
PPI Scales	**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
Distress Scale	.88	.85	.85
Resistance Scale	.86	.85	.83
Self-Esteem Scale	.95	.95	.95
Stress Coping Ability Scale	.90	.91	.92

These results support the reliability (internal consistency) of the PPI. The PPI 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 PPI is applicable, across different, national, adult outpatient samples. The PPI is a reliable, adult intake assessment instrument.

27. PPI Reliability in a Large Sample of Inpatient Clients

A study (1996) was conducted to determine the reliability of PPI scales, 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. All coefficient alphas are significant at p<.001.

Table 17. Reliability coefficient alphas. Inpatients (1996, N = 630).	
PPI Scales	**Coefficient Alphas**
Truthfulness Scale	.85
Alcohol Scale	.90
Drug Scale	.88
Distress Scale	.90
Resistance Scale	.89
Self-Esteem Scale	.95
Stress Coping Ability Scale	.94

These results support the internal consistency (reliability) of the PPI, 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. PPI test results are reliable.

28. PPI Reliability, Scale Risk Range Accuracy and Gender Differences

This study (1997) was conducted to examine the reliability, gender differences, and accuracy of Pre/Post Inventory scales, in a sample of adult participants. The participants completed the PPI pre-test at intake, prior to beginning their counseling programs. Reliability of the PPI, gender differences in client scale scores, and risk range percentile score accuracy was investigated in the present study.

Method and Results

The subjects in this study consisted of 174 adult counseling clients. Demographic composition of these participants is as follows: Males: 140 (80.5%); Females: 34 (19.5). Age: 19 & under (3%); 20-29 (35%); 30-39 (33%); 40-49 (20%); 50-59 (7%); and 60 & over (2%). Ethnicity: Caucasian (90%); Black (6%); Hispanic (2%); and Other (2%). Education: Eighth grade or less (3%); Some H.S. (15%); H.S. graduate (67%); and Some College (14%). Marital Status: Single (53%); Married (26%); Divorced (14%); Separated (5%); and Widowed (2%).

Accuracy of the PPI

Risk range percentile scores are calculated for each PPI scale. These risk range percentile scores are derived from scoring equations, based on responses to scale items and Truth-Corrections. Scores are 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 PPI risk range percentile scores involves comparing the risk range percentile scores obtained from PPI 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 174 participants administered the PPI are presented in Table 18. 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 18. Risk Range Percentile Scores, N = 174 adult clients (1997).

■ Low ▨ Medium ▢ Problem ▨ Severe Problem
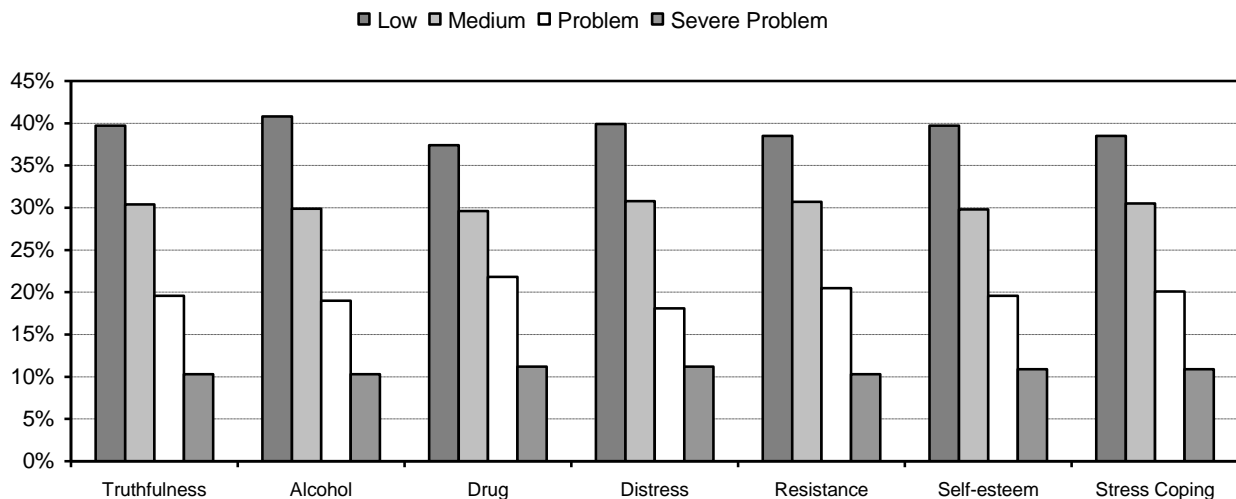
Risk Range	Truthful-ness	Alcohol	Drug	Distress	Resistance	Self-esteem	Stress Coping	Predicted
Low	39.7	40.8	37.4	39.9	38.5	39.7	38.5	**39%**
Medium	30.4	29.9	29.6	30.8	30.7	29.8	30.5	**30%**
Problem	19.6	19.0	21.8	18.1	20.5	19.6	20.1	**20%**
Maximum	10.3	10.3	11.2	11.2	10.3	10.9	10.9	**11%**

These results show that obtained, risk range percentile scores closely approximated the predicted, risk range percentile scores, for each of the seven PPI scales presented in Table 18, for the adult clients included in the study. **These results indicate that the PPI 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 1.9 percent of predicted. Only four (out of 28 possible) of the obtained scale risk range percentile scores deviated from predicted, by more than one percentage point. **This is very accurate assessment.**

Gender Differences
T-tests were calculated for PPI scales to assess possible sex differences. Results are presented in Table 19.

Table 19. T-test comparisons of sex differences. (1997, N=174) PPI Adult Client Sex Differences			
PPI Scales	**Males (N=140) Mean**	**Females (N=34) Mean**	**T-Test Comparisons**
Truthfulness Scale	37.74	40.47	n.s.
Alcohol Scale	17.81	15.65	n.s.
Drug Scale	11.39	10.97	n.s.
Distress Scale	10.10	9.65	n.s.
Resistance Scale	11.79	12.21	n.s.
Self-Esteem Scale*	26.41	30.50	n.s.
Stress Coping Abilities*	148.71	149.06	n.s.

*Note: the Self-Esteem and Stress Coping Abilities Scales are reversed, in that higher scores denote lower risk.

Significant sex differences were not demonstrated on any of the seven PPI scales. Males and females in this sample did not score differently on the PPI scales. This is an important consideration and gender differences will continue to be investigated in the PPI.

Reliability of the PPI
Reliability coefficient alphas are presented in Table 20.

Table 20. Reliability coefficient alphas (1997, N = 174).	
PPI Scales	**Coefficient Alphas**
Truthfulness Scale	.92
Alcohol Scale	.90
Drug Scale	.83
Distress Scale	.86
Resistance Scale	.80
Self-Esteem Scale	.94
Stress Coping Abilities	.92

All coefficient alphas are significant at p<.001.

The results of this study support the statistical reliability of the PPI. All coefficient alphas are significant at p<.001. Most scale reliability coefficients are well above the professionally accepted .80 level for assessment instruments. These results show that the PPI is a highly statistically reliable risk assessment instrument.

29. A Replication Study of Reliability, Validity and Accuracy of the PPI Pre-test

This study (1998) continued research of the PPI to investigate the reliability, validity, and accuracy of the PPI. Only PPI Pre-test results are summarized in this study. Adult counseling clients were included in this study, from different testing settings. Interest in pre-test/post-test comparisons or outcome assessment has increased in recent years, and it is important to continue to research the PPI in widely varied, assessment milieu. Probation and corrections settings have utilized the PPI to test their offender clients, and the PPI continues to be used in community corrections and counseling settings.

Method and Results
The subjects in this study consisted of 668 adult counseling clients. Demographic composition of these participants is as follows: Males: 565 (84.6%); Females: 103 (15.4). Age: 19 & under (18%); 20-29 (30%); 30-39 (29%); 40-49 (17%); 50-59 (5%); and 60 & over (2%). Ethnicity: Caucasian (81%); Black (8%); Hispanic (7%); Native American (1%); and Other (1%). Education: Eighth grade or less (16%); Some H.S. (19%); H.S. graduate (55%); and Some College (10%). Marital Status: Single (61%); Married (20%); Divorced (13%); Separated (5%); and Widowed (1%).

Accuracy
Client scale scores are classified according to the risk (degree of severity) they represent. 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 (90 to 100th percentile). By definition, the expected percentage of clients assigned to each risk category is, 39% in Low risk, 30% in Medium risk, 20% in Problem risk, and 11% in Severe Problem. The actual percentages of clients placed in the four risk categories, based on their scale scores, are compared to these expected percentages. Table 21 presents these comparisons. The differences between obtained and expected are shown in parentheses.

Table 21. Risk Range Percentile Scores, PPI Pre-test (1998, N = 668).

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness Scale	39.7	(0.7)	28.4	(1.6)	20.7	(0.7)	11.2	(0.2)
Alcohol Scale	39.8	(0.8)	29.7	(0.3)	19.3	(0.7)	11.2	(0.2)
Drug Scale	39.5	(0.5)	28.9	(1.1)	20.1	(0.1)	11.5	(0.5)
Distress Scale	37.7	(1.3)	31.3	(1.3)	19.8	(0.2)	11.2	(0.2)
Resistance Scale	39.5	(0.5)	29.7	(0.3)	18.8	(1.2)	12.0	(1.0)
Self-esteem Scale	38.8	(0.2)	29.9	(0.1)	20.8	(0.8)	10.5	(0.5)
Stress Coping Abilities	38.2	(0.8)	29.9	(0.1)	20.8	(0.8)	11.1	(0.1)

As shown in the table above, the PPI Pre-test scale scores are very accurate. The objectively obtained percentages of clients falling into each risk range are very close to the expected percentages for each risk category. All of the obtained, risk range percentages were within 1.6 percentage points of the expected percentages, and most (22 of 28 possible) were within 1 percentage point. Only six obtained percentages were more than 1% from the expected percentage.

For those clients who are identified as having problems (Problem and Severe Problem risk ranges or 31% of the clients), the obtained percentages were extremely accurate. The comparisons between obtained and expected percentages are shown in the following graph. The problem risk ranges for all PPI scales are in close agreement to the expected percentage.

Problematic Risk Profile (70-100 Percentile)
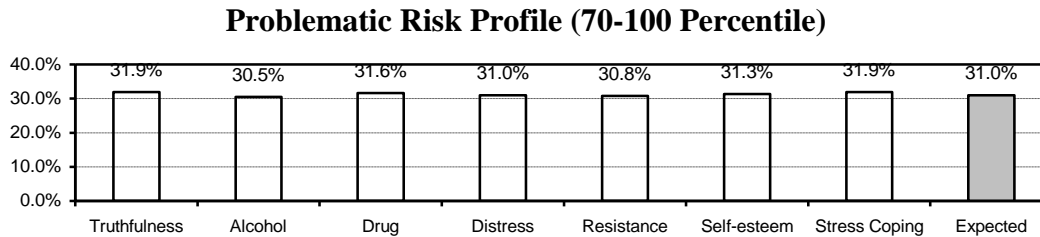
These results demonstrate that the PPI scale scores accurately identify client risk.

Reliability of the PPI

Reliability coefficient alphas are presented in Table 22.

Table 22. Reliability coefficient alphas. PPI Pre-test (1998, N = 668).	
PPI Scales	**Coefficient Alphas**
Truthfulness Scale	.92
Alcohol Scale	.89
Drug Scale	.90
Distress Scale	.88
Resistance Scale	.83
Self-Esteem Scale	.94
Stress Coping Abilities	.93

All coefficient alphas are significant at p<.001.

The results of this study support the statistical reliability of the PPI Pre-test. All coefficient alphas are significant at p<.001. Reliability coefficients are well above the professionally accepted .80 level. These results show that the PPI Pre-test is a highly, statistically reliable, risk assessment instrument.

Validity of the PPI

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 treatment. If an individual has been in treatment, then the individual is known to have had an alcohol problem. Therefore, the Alcohol Scale should predict if an individual has been in alcohol treatment.

Statistical decision-making is closely related to predictive validity. The quality of statistical decision-making and test validity are both assessed by the accuracy with which the test (Alcohol Scale) classifies "known" cases (alcohol treatment). In this study, predictive validity was evaluated, using PPI scale scores and treatment information obtained from clients' answers to PPI test items #142, regarding alcohol treatment, and #143, regarding drug treatment. It was predicted that clients who had alcohol treatment would score in the problem risk range on the PPI Alcohol Scale. Similarly, clients who have had drug

treatment would score in the problem risk range on the Drug Scale.

The results show that the PPI Alcohol Scale accurately identified clients who had alcohol treatment. Of the 177 clients who stated they had alcohol treatment, 130 individuals, or 73.4 percent had PPI Alcohol Scale Scores in the problem risk range (70th percentile or higher). Clients, who believe that after having been in alcohol treatment they no longer have an alcohol problem, may temper this result. Also, the time elapsed since treatment may represent a confounding variable. However, 90 percent of the clients who currently attend Alcoholics Anonymous meetings had Alcohol Scale scores in the problem risk range. Attending AA meetings is consistent with the here-and-now reference in PPI test items. The Alcohol Scale very accurately identifies clients who have alcohol problems. These results validate the PPI Alcohol Scale.

T-test comparison of Alcohol Scale scores, between the treatment group clients and "no treatment" clients, support the statistical significance of the predictive validity results. Treatment group clients scored, significantly, higher on the Alcohol Scale than no treatment clients, $t=10.62$, $p<.001$. The mean Alcohol Scale score for the treatment group was 27.18, and the mean score for the no treatment group was 17.06. This t-test result supports the discriminant validity of the Alcohol Scale. The PPI Alcohol Scale accurately identifies problem drinkers.

The Drug Scale correctly identified 82 percent of the clients who had drug treatment. Of the 149 clients who had drug treatment, 122 percent scored in the problem risk range on the PPI Drug Scale.

The Drug Scale correctly identified 94 percent of the clients who attend Narcotics Anonymous or Cocaine Anonymous. T-test comparison of Drug Scale scores between treatment and no treatment clients indicates that treatment clients scored, significantly, higher than no treatment clients, $t=15.46$, $p<.001$. The mean Drug Scale score for the treatment clients was 22.8, and the mean score for the no treatment clients was 10.07. These results strongly support the validity of the PPI Drug Scale

Taken together, these results strongly support the reliability, validity, and accuracy of the PPI. Reliability coefficient alphas were significant at $p<.001$ for all PPI scales. Validity of the Alcohol Scale and Drug Scale was shown by the accuracy with which the scales identified problem behavior (treatment or attending self-help groups).

The Alcohol Scale accurately identified 90 percent and the Drug Scale accurately identified 94 percent of the clients who attend alcohol and drug, self-help groups. These results support the reliability, validity, and accuracy of the PPI.

30. Reliability and Accuracy of the PPI Post-test

This study (1998) evaluated the reliability and accuracy of the PPI Post-test. Only PPI Post-test results are included in this study. The PPI Post-test is administered either at the end of treatment, or at certain time intervals during treatment. In this study, post-test data was obtained from several agencies, from different settings, and were administered at various intervals. In many cases, clients who were already in treatment were given the Post-test without having been given the Pre-test. Many agencies have not returned post-test data, due to retest intervals of one to two years.

Given these circumstances, pre/post comparisons could not be conducted. In addition, since all clients taking the post-test are currently in treatment or had prior treatment, no group comparisons could be made between treatment and no treatment groups, as was done in pre-test studies. Post-test reliability and accuracy were studied.

Method and Results
The subjects in this study consisted of 68 adult counseling clients. Demographic composition of these participants is as follows: Males: 35 (51.5%); Females: 33 (48.5). Age: 19 & under (53%); 20-29 (16%); 30-39 (19%); 40-49 (10%); and 50-59 (2%). Ethnicity: Caucasian (68%); Black (25%); Hispanic (4%); Native American (2%); and Other (2%). Education: Eighth grade or less (25%); Some H.S. (41%); and H.S. graduate (34%). Marital Status: Single (68%); Married (18%); Divorced (12%); and Separated (3%).

Reliability of the PPI Post-test
Reliability coefficient alphas are presented in Table 23.

Table 23. Reliability coefficient alphas. PPI Post-test (1998, N = 68).	
PPI Scales	**Coefficient Alphas**
Truthfulness Scale	.91
Alcohol Scale	.88
Drug Scale	.85
Distress Scale	.89
Resistance Scale	.82
Self-Esteem Scale	.90
Stress Coping Abilities	.94

All coefficient alphas are significant at p<.001.

The results of this study support the statistical reliability of the PPI Post-test. All coefficient alphas are significant at p<.001. Reliability coefficients are well above the accepted .80 level. These results show that the PPI Post-test is statistically reliable.

Accuracy of the PPI Post-test
PPI scale score risk classifications analysis was done on these Post-test results. Client PPI scale scores were classified according to four risk range classifications: Low risk (0-39th percentile), medium risk (40-69th percentile); problem risk (70-89th percentile), and maximum risk (90-100th percentile). The PPI Post-test, risk range percentages for each scale are presented in the table below. The difference between client obtained percentages and predicted percentages are presented in parentheses.

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness Scale	38.2	(0.8)	30.9	(0.9)	20.6	(0.6)	10.3	(0.7)
Alcohol Scale	38.2	(0.8)	30.9	(0.9)	19.1	(0.9)	11.8	(0.8)
Drug Scale	39.7	(0.7)	29.4	(0.6)	20.6	(0.6)	10.3	(0.7)
Distress Scale	39.4	(0.4)	28.8	(1.2)	19.7	(0.3)	12.1	(1.1)
Resistance Scale	41.2	(2.2)	27.9	(2.1)	20.6	(0.6)	10.7	(0.3)
Self-esteem Scale	39.7	(0.7)	29.4	(0.6)	20.6	(0.6)	10.3	(0.3)
Stress Coping Abilities	39.7	(0.7)	29.4	(0.6)	19.1	(0.9)	11.8	(0.8)

As shown in the above table, obtained risk range percentages were in close agreement to the predicted. Only two of the 28 comparisons had a difference between obtained and predicted of more than 2 percentage points. These occurred on the Resistance Scale, low and medium risk ranges. These results demonstrate the PPI Post-test risk range classifications are very accurate.

There was a significant difference between male and female scale scores on the Drug Scale, but not on any of the other PPI scales. However, due to the relatively small number of clients (about 30 of each males and females), gender differences in scale scores will continue to be investigated in future studies.

The results of this study demonstrate that the Post-test has very, high statistical reliability. Post-test reliability statistics are in close agreement with Pre-test reliability statistics. These results indicate that the Post-test can be given with the same high degree of confidence as Pre-tests, because test results achieve high statistical reliability. Similarly, Post-test scale score, risk range accuracy was shown to be very accurate. Nearly all of the Post-test scales are accurate to within one percent of predicted percentages. Post-test scale scores are as accurate as Pre-test scale scores. These results show that Post-test results are not influenced or contaminated by Pre-test administration. Post-test results are independent of Pre-test results. In a controlled study, procedures for pre-test administration, treatment interval, and post-test administration would be maintained for all clients participating in the study. In that way, pre-test/post-test comparisons could be studied. Due to the inconsistencies in post-test administrations, clients, time intervals, intervention programs, procedures, type of program, etc., pre-test/post-test comparisons could not be made. Many agencies utilize one to two year intervention intervals, prior to post-test administrations and, therefore, have not returned post-test results. Pre-test and Post-test administrations, from a single location, under control conditions will be studied, when sufficient data is collected.

31. PPI Reliability, Validity, and Accuracy in a Sample of Youths

This study (1999) summarizes Pre/Post Inventory findings in a sample of 117 youths. These youths were administered the PPI at intake, (pre-test) to treatment programs in a Midwestern state. Statistical analyses included reliability, validity, and PPI scale risk range accuracy.

The PPI is written at a fifth or sixth grade reading level or less. Most, if not all, juvenile clients are able to read and comprehend PPI test items. The PPI is a self-report, self-paced instrument that can be administered individually, or in groups. All participants in this study were able to complete the PPI without difficulty.

The PPI permits objective evaluation of client change. In addition to empirically-based scale scores, the PPI gives the client the opportunity to participate in program review. It is the patient's opinion, with all its biases, that is most relevant for the initiation and maintenance of treatment. This study enables evaluation of the PPI in a sample of youth participants.

Method and Results
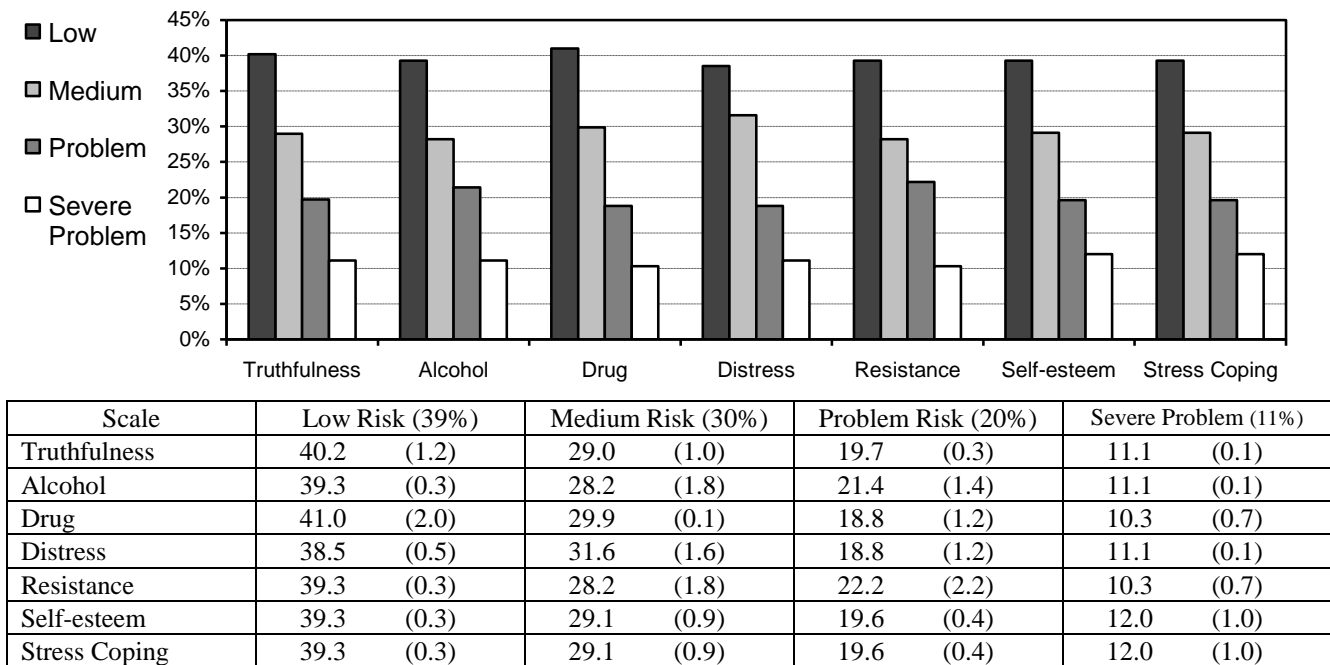There were 117 participants that completed the PPI. Demographic composition of these participants is as follows: Males: 101 (86.3%); Females: 16 (13.7). Age: 12 & under (1%); 13 (5%); 14 (14%); 15 (29%); 16 (39%); and 17 (13%). Ethnicity: Caucasian (70%); Black (27%); Hispanic (2%); and Native American (1%). Education: Eighth grade or less (60%); Some H.S. (40%); and H.S. graduate (1%).

<u>Accuracy of the Pre/Post Inventory</u>

Client scale scores are classified according to the risk (degree of severity) they represent. 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 (90 to 100th percentile). By definition, the expected percentage of clients assigned to each risk category is, 39% in Low risk, 30% in Medium risk, 20% in Problem risk, and 11% in Severe Problem. The actual percentages of clients placed in the four risk categories based on their scale scores are compared to these expected percentages. The following table presents these comparisons. The differences between obtained and expected are shown in parentheses.

Table 24. Pre/Post Inventory Scale Risk Ranges (1999, N = 117)

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	40.2	(1.2)	29.0	(1.0)	19.7	(0.3)	11.1	(0.1)
Alcohol	39.3	(0.3)	28.2	(1.8)	21.4	(1.4)	11.1	(0.1)
Drug	41.0	(2.0)	29.9	(0.1)	18.8	(1.2)	10.3	(0.7)
Distress	38.5	(0.5)	31.6	(1.6)	18.8	(1.2)	11.1	(0.1)
Resistance	39.3	(0.3)	28.2	(1.8)	22.2	(2.2)	10.3	(0.7)
Self-esteem	39.3	(0.3)	29.1	(0.9)	19.6	(0.4)	12.0	(1.0)
Stress Coping	39.3	(0.3)	29.1	(0.9)	19.6	(0.4)	12.0	(1.0)

As shown in the graph and table above, the Pre/Post scale scores are very accurate. The objectively obtained percentages of clients falling into each risk range are very close to the expected percentages for each risk category. All of the obtained, risk range percentages were within 2.2 percentage points of the expected percentages, and most, 23, were within 1.4 percentage points. Only two obtained percentages were more than 2% from the expected percentage.

For those clients who are identified as having problems (Problem and Severe Problem risk ranges or 31% of the clients), the obtained percentages were extremely accurate. The differences between obtained and expected percentages are as follows: Truthfulness (0.2), Alcohol (1.5), Drug (1.9), Distress (1.1), Resistance (1.5), Self-esteem (0.6), and Stress Coping Abilities (0.6). These results demonstrate that the Pre/Post Inventory scale scores accurately identify client risk.

<u>Reliability of the PPI</u>

Within-test reliability, or inter-item reliability coefficient alphas for the Juvenile Pre/Post are presented in Table 25. Generally, Alphas of .75 is the standard for reliability in assessment tests and, subsequently, alpha coefficients at or above .80 are considered to be very reliable. All coefficient alphas are significant at p<.001.

Table 25. Reliability of the PPI (1999, N = 117)	
PRE/POST SCALES	**Coefficient Alphas**
Truthfulness Scale	.82
Alcohol Scale	.85
Drug Scale	.84
Distress Scale	.88
Resistance Scale	.84
Self-Esteem Scale	.92
Stress Coping Abilities	.93

As demonstrated above, the Alpha coefficients for all of the Juvenile Pre/Post scales are above .82, with a majority of the scales at or near .90. These results show that the Juvenile Pre/Post is a reliable test for youth assessment.

Discriminant validity
The Juvenile Pre/Post scales measure severity and the extent to which clients have problems. It would be expected, then, that clients who admit to having problems have higher scale scores than clients who do not. Therefore, **discriminant validity** of the Juvenile Pre/Post is shown by significant differences between clients who admit problems and those who do not. The following analyses compare clients who attend and those who do not attend Alcoholics Anonymous (AA), Narcotics Anonymous (NA), and Cocaine Anonymous (CA), with the appropriate Alcohol and Drug scale scores. We also compared those clients, admitting to either an alcohol or drug problem, and those who admitted to not having a substance abuse problem, with clients Alcohol and Drug scale scores.

Mean Scale Scores by Comparison Groups

| ☐ No AA Meetings | N=92 |
| ■ Attends AA Meetings | N=25 |

Alcohol Scale Score: 13.65 / 21.88

| ☐ No NA/CA Meetings | N=83 |
| ■ Attends NA/CA Meetings | N=34 |

Drug Scale Score: 13.31 / 19.35
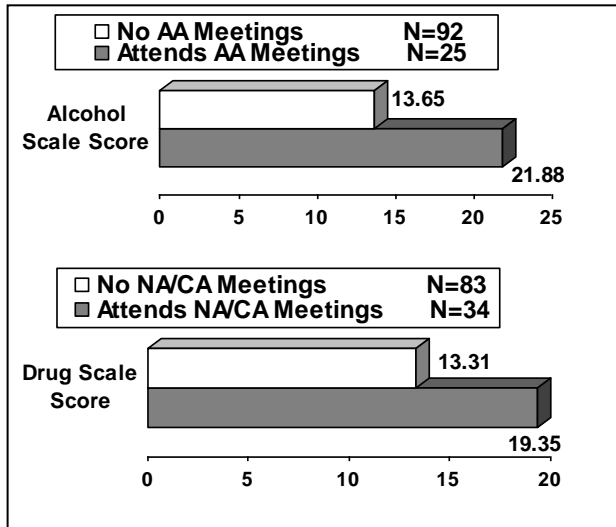
- These comparisons were done using Question #64, "I Attend AA Meetings" and #22, "I Attend NA or CA Meetings."

- As presented in the Charts, the mean, Alcohol Scale score for the attend group was 21.88, while the no attend group, mean score was 13.65. The mean, Drug Scale score for the attend group was 19.35, while the no attend group, mean score was 13.31.

- Both the Alcohol Scale and Drug Scale demonstrated a significant difference in scale scores, between the attending and not attending groups. The alcohol scale is significant at a $p<.001$ level and the drug scale, at a $p=.002$ level.

| ☐ Admitted No Alcohol Problem | N=85 |
| ■ Admitted Alcohol Problem | N=32 |

Alcohol Scale Score: 12.14 / 24.09

| ☐ Admitted No Drug Problem | N=64 |
| ■ Admitted Drug Problem | N=53 |

Drug Scale Score: 10.41 / 20.70
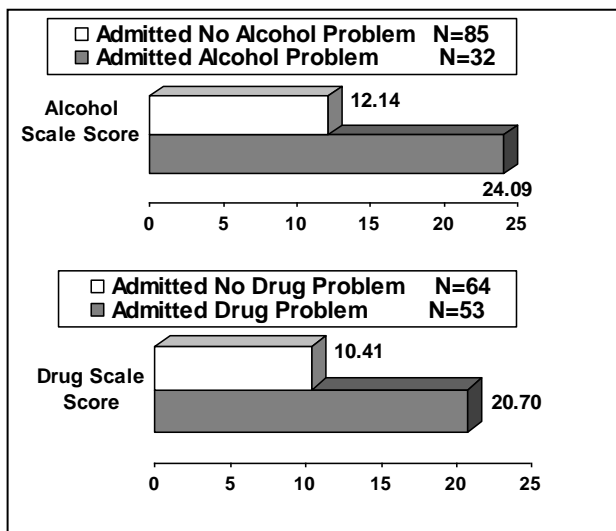
- These comparisons were done using the self admission to Question #38, "I have a drinking or alcohol related problem" and #46, "I have a drug problem."

- As presented in the Charts, the mean Alcohol Scale score for the admitted problem group was 24.09, while the no problem group, mean score was 12.14. The mean, Drug Scale score for the admitted problem group was 20.70, while the no problem, group mean score was 10.41.

- Both the Alcohol Scale and Drug Scale demonstrated a significant difference in scale scores, between the problem and no problem groups. Both scales are significant at a $p<.001$ level.

The results of this study (1999) demonstrate that the PPI is appropriate for juvenile clients. PPI scales maintain very, high reliability coefficients, and scale risk ranges accurately measure client risk. Validity analyses show that youths with problems score, significantly, higher than youths who are not identified as having problems. These results support discriminant validity of the PPI. This study demonstrates that the PPI is a reliable, valid, and accurate test for assessment of troubled youth.

32. PPI Pre-test/Post-test Comparison Study

This study (2000) compared pre-test and post-test results in a sample of treatment program youths. Statistical analyses of the pre-test data were conducted to study reliability, validity, and accuracy of the PPI at pre-test assessment. Reliability of the PPI Post-test data was also investigated.

PPI Pre-test data was analyzed for all clients who participated in the study, as well as all PPI Post-test data. However, not all participants who completed the pre-test also completed the post-test. A distinction is made between comparisons involving all pre-test and post-test, and those comparisons that involve pre/post comparisons, for the same participant.

Method and Results
Pre-test: There were 506 participants that completed the PPI at Pre-test. Demographic composition of these participants is as follows: Males: 443 (87.5%); Females: 63 (12.5). Age: 12 & under (2%); 13 (6%); 14 (15%); 15 (28%); 16 (41%); and 17 (8%). Ethnicity: Caucasian (72%); Black (23%); Hispanic (3%); Native American (1%); and Other (2%). Education: Eighth grade or less (60%); Some H.S. (40%); and H.S. graduate (1%).

Post-test: There were 209 participants that completed the PPI at Post-test. Of these 209, 122 individuals had both pre-test and post-test data. Demographic composition of these participants is as follows: Males: 197 (94.5%); Females: 12 (5.7). Age: 12 & under (0%); 13 (2%); 14 (9%); 15 (21%); 16 (40%); and 17 (29%). Ethnicity: Caucasian (71%); Black (26%); Hispanic (2%); Native American (0%); and Other (1%). Education: Eighth grade or less (42%); Some H.S. (56%); and H.S. graduate (2%).

Reliability of the PPI
Reliability coefficient alphas are presented in Table 26. All alpha coefficients; for all of the Juvenile Pre/Post scales, are at or above the .80 level.

Table 26. Reliability coefficient alphas. (2000, N = 506 Pre-test, 209 Post-test).		
PRE/POST SCALES	**Pre-test Alphas**	**Post-test Alphas**
Truthfulness Scale	.85	.86
Alcohol Scale	.86	.80
Drug Scale	.87	.81
Distress Scale	.85	.83
Resistance Scale	.82	.84
Self-esteem Scale	.91	.93
Stress Coping Abilities	.89	.89

All coefficient alphas are significant at $p<.001$.

These results demonstrate that the Juvenile Pre/Post is a very reliable instrument or test. Post-test results show that the Alcohol and Drug Scales had slightly, lower alphas than did the Pre-test results. The Pre-

test/Post-test interval varied from one to ten months. As a result of intervention/treatment, clients may vary somewhat, in their perceived substance use or abuse problem at Post-test. It is likely that each troubled youth progressed at different rates of understanding, acceptance and, where warranted, recovery. In contrast, clients' Pre-test scores reflect consistent, substance abuse problems perceptions. It should be noted that all PPI scales maintain high reliability coefficients. These scales are reliable. Intervention/treatment may contribute to the clients' understanding and clarification of his or her problems.

The results of this study support the statistical reliability of the PPI Post-test. By comparing Pre-test reliability coefficients with Post-test reliability coefficients, it can be seen that the PPI maintains high, test-retest reliability. The PPI can be re-administered because, as these results demonstrate, the retest reliability coefficients vary around pre-test reliability coefficients, which are impressive. In these pre-test/post-test comparisons, the interval varied from one to ten months.

Validity of the PPI
The Juvenile Pre/Post scales measure problem severity. It would be expected that clients who admit to having problems have higher scale scores than clients that do not make this admission. This would be true for youths entering a treatment or counseling program. Clients' Pre-test results are indicative of problem severity. After intervention/treatment, clients' problem severity should decrease, or be alleviated. The Juvenile Pre/Post makes this comparison and quantifies outcome. Earlier, Post-test comparisons were made that determined the amount of change between pre-test and post-test scale scores, which quantifies the effectiveness of intervention/treatment.

Validity of the PPI at the pre-test assessment is demonstrated by the correct identification of problem-prone clients. Youths, who responded positively to PPI test items #38 and #46, defined youths who admitted drinking problems and drug-related problems, respectively. Alcohol and Drug Scale scores in the Low risk (39th percentile and below) range were used to represent the no problem group, whereas scores in the Problem and Severe Problem (70th percentile and above) ranges represented the problem group. These analyses compared the no problem group and problem group clients' responses to #38 and #46. It was predicted that problem group clients would respond positively to test items #38 (I have a drinking problem.) and #46 (I have a drug problem.).

The PPI Pre-test Alcohol Scale scores identified nearly all of the youths who admitted to an alcohol problem. There were 107 clients who admitted having alcohol problems (question #38). **Of these 107 clients, 101 individuals, or 94.4 percent had Alcohol Scale scores at or above the 70th percentile.** In comparison to other assessment instruments, this is very accurate assessment. The Alcohol Scale correctly identified nearly all of the youths categorized as problem drinkers. **These results strongly support the validity of the Alcohol Scale.**

The Drug Scale is also very accurate in identifying youths who admitted to a drug problem. There were 141 Pre-test clients who admitted having drug-related problems (question #46). **Of these, 134 clients, or 95 percent had Drug Scale scores at or above the 70th percentile. These results are similar to those reported above for the Alcohol Scale, and represent very accurate assessment.** These results strongly support the validity and accuracy of the Drug Scale.

Accuracy of the PPI
The accuracy of the seven Juvenile Pre/Post measurement (or severity) scales is presented below in Table 27 for pre-test assessments. Client risk assessment is calculated for the Pre-test scores. Post-test results are then compared to these Pre-test scores, using the Pre-test cutoff scores for each risk range

category. The Pre-test percentages of clients scoring in the four risk categories (low, medium, problem, and severe problem) are compared to predicted percentages for each of the seven measurement scales. The differences between obtained and predicted percentages are shown in parentheses in the table. The closeness of obtained, Pre-test scale scores and the predicted, Pre-test scale scores determine accuracy. There were 506 Pre-test results included in this analysis. All of the 209 Post-test results were summarized in the comparison table, below the Pre-test results.

Table 27. Pre-test Scale Risk Ranges (2000, N = 506)
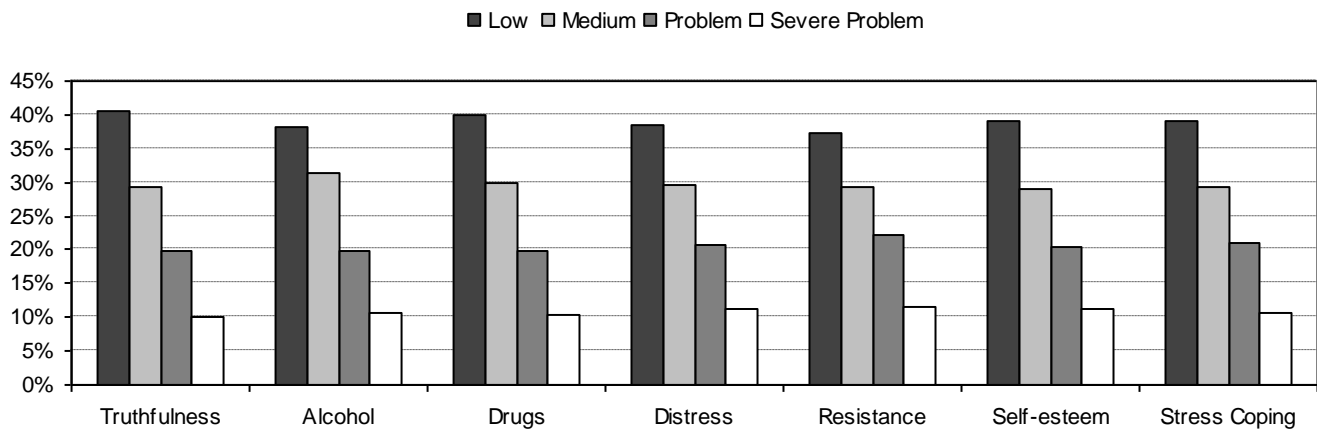
■ Low □ Medium ■ Problem □ Severe Problem

Pre-test Scale	Low Risk (39% predicted)		Medium Risk (30% predicted)		Problem Risk (20% predicted)		Severe Problem (11% predicted)	
Truthfulness	40.7	**(1.7)**	29.3	**(0.7)**	19.9	**(0.1)**	10.1	**(0.9)**
Alcohol	38.1	**(0.9)**	31.3	**(1.3)**	19.9	**(0.1)**	10.7	**(0.3)**
Drug	39.9	**(0.9)**	29.9	**(0.1)**	19.9	**(0.1)**	10.3	**(0.7)**
Distress	38.5	**(0.5)**	29.5	**(0.5)**	20.7	**(0.7)**	11.3	**(0.3)**
Resistance	37.2	**(1.8)**	29.2	**(0.8)**	22.1	**(2.1)**	11.5	**(0.5)**
Self-esteem	39.1	**(0.1)**	29.1	**(0.9)**	20.5	**(0.5)**	11.3	**(0.3)**
Stress Coping	39.1	**(0.1)**	29.3	**(0.7)**	20.9	**(0.9)**	10.7	**(0.3)**

As shown in the graph and table above, obtained Pre-test risk range percentages for all risk categories, and all PPI scales were within **2.1** percentage points of the predicted percentages. Of the 28 possible comparisons (7 scales x 4 risk ranges) between attained and predicted percentages, 24 were within one percentage point from the predicted percentage. Only four, obtained risk range percentages were greater than 1.0% from the predicted percentage, and these were within 2.1 percent. These results demonstrate the accuracy of the Juvenile Pre/Post at the pre-test, or before intervention and/or treatment. The above table demonstrates that the PPI accurately measures client risk for all risk categories and all PPI scales.

Juvenile Pre/Post Comparisons: Post-test Scale Scores Using Pre-test Cutoff Scores
Risk range percentages for the Juvenile Pre/Post are established using Pre-test data. This is because Pre-test data serves as the baseline (or comparison standard) of attained test scores, prior to intervention/ treatment. This allows Post-test risk range percentages to be compared to Pre-test percentages. Improvement on the Post-test is indicated by a higher percentage of clients scoring in the low risk range. This sequence is summarized as follows: Pre-test – Intervention/Treatment – Post-test. It would be expected that more clients would score in the low risk range on the Post-test, because scale scores are obtained after intervention/treatment has occurred. Effective treatment is demonstrated by lower Post-

test scale scores. Higher Post-test scores (in comparison to Pre-test scores) are associated with no treatment or, possibly, ineffective treatment.

In Table 28 below, the percentage differences between Pre-test and Post-test scores are shown in parentheses. These differences are calculated as Post-test percentage – Pre-test percentage or post-test minus pre-test scores. The pre-test/post-test comparison that is of interest is the "Low risk" category, because it is this category that is most affected by intervention and treatment. Effective intervention/treatment results in more people shifting to the Low risk category, because clients have worked through their problems that existed at program intake. Positive differences in the Low risk category mean that Post-test percentages are higher than Pre-test percentage, which establishes that intervention/treatment was effective. Negative differences between Pre-test and Post-test mean that fewer clients score in that category on the Post-test than on the Pre-test. In other words, if the number of clients attaining Low risk scores does not increase, then intervention/treatment either wasn't given or wasn't, measurably, effective. Subtracting the Post-test percentages, shown in the table below, from the Pre-test percentages, (presented earlier) results in the differences shown in parentheses in the table below. All Pre-test data (N=506) and all Post-test data (N=209) are included in these comparisons.

Table 28. Pre-test – Post-test Risk Range Comparisons (2000, N = 506 Pre-test, 209 Post-test)								
Post-test Scales	**Low Risk**		**Medium Risk**		**Problem Risk**		**Severe Problem**	
	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference
Truthfulness	39.7	**(-1.0)**	30.6	**(1.3)**	19.2	**(0.7)**	10.5	**(0.4)**
Alcohol	43.1	**(5.0)**	36.3	**(5.0)**	19.6	**(-0.3)**	1.0	**(-9.7)**
Drug	70.3	**(30.4)**	25.4	**(-4.5)**	2.9	**(-7.0)**	1.4	**(-8.9)**
Distress	76.6	**(38.1)**	14.8	**(-14.7)**	6.2	**(-14.5)**	2.4	**(-8.9)**
Resistance	63.2	**(26.0)**	20.5	**(-9.3)**	9.1	**(-11.0)**	7.2	**(-4.3)**
Self-esteem	71.3	**(32.2)**	19.6	**(-9.5)**	7.2	**(-13.3)**	1.9	**(-9.4)**
Stress Coping	71.8	**(32.7)**	20.1	**(-9.2)**	6.2	**(14.7)**	1.9	**(-8.8)**

Lower percentages for Medium, Problem, and Severe Problem risk ranges are the result of clients being shifted down into the Low risk range at Post-test. That is why negative percentages are reported in Medium, Problem, and Severe Problem categories.

The results shown above demonstrate that there were dramatic, client improvements on Post-test scores for all PPI scales. The Truthfulness Scale is an exception. Clients' Post-test and Pre-test Truthfulness Scale scores were nearly the same. One theory, regarding elevated Truthfulness Scale scores, is "positive contagion" or the client's desire to respond as their counselor would like them to. Another interpretation might be that the intervention/treatment programs simply might not have addressed "honesty," in the youth's intervention/treatment program. Some degree of "open-honest" orientation is evident in most, if not all treatment programs. However, "honesty" may simply not have been focused upon as a treatment goal. This Truthfulness Scale outcome indicates that troubled youth were, equally, honest on post-test and pre-test settings. This outcome was unexpected and will be studied further in subsequent, Pre/Post Inventory studies.

The Distress Scale showed the largest, Post-test improvement (lower scores). Over 38 percent more of the clients scored in the low risk range on Post-test. The Drug, Self-esteem, and Stress Coping Abilities Scales also demonstrate a large improvement (lower scores) on Post-test. These scales improved by 30

percent or more on Post-test. The Alcohol Scale showed an improvement on Post-test of 5 percent for the low risk range and 5 percent for the medium risk range.

Mean Scale Scores Pre/Post Comparisons
There were 122 juveniles for whom both Pre-test and Post-test scores were available. Comparisons of these clients' Pre-test and Post-test scores are presented in Table 29. T-test comparisons of the means for each PPI scale (the one exception is the Truthfulness Scale) indicate that the differences between Pre-test and Post-test scores on all scales were, significantly, different. This means that Post-test scale scores were, on average, significantly lower than Pre-test scale scores for these clients.

PPI Scales	Pre-test Mean Score	Post-test Mean Score	T-value	Level of significance
Truthfulness Scale	20.9	20.5	$t = 0.16$	n.s.
Alcohol Scale	15.7	13.2	$t = 2.52$	p=.013
Drug Scale	19.8	12.4	$t = 6.54$	p<.001
Distress Scale	18.1	11.8	$t = 7.49$	p<.001
Resistance Scale	10.4	8.1	$t = 4.15$	p<.001
Self-esteem Scale	19.5	31.7	$t = 8.19$	p<.001
Stress Coping Abilities	101.8	128.2	$t = 6.83$	p<.001

Table 29. Pre-test/Post-test Scale Comparisons (2000, N=122)

Note: Scores on the Self-esteem and Stress Coping Abilities Scales are reversed, in that higher scores are associated with better self-esteem and stress coping abilities. There were 122 clients included in this analysis.

With the exception of the Truthfulness Scale, all PPI Post-test scale scores are lower than Pre-test scale scores. That is to say, clients showed improvement on all PPI scales (other than the Truthfulness Scale) after having been in treatment. There were 122 juveniles included in this study who had taken both the Pre-test and Post-test.

These Pre/Post scale comparisons are in agreement with the Pre/Post risk range comparisons. The largest, pre/post scale score differences occurred on the Self-esteem, Distress, Stress Coping Abilities, and Drug Scales. The Resistance Scale also demonstrated a large, pre/post scale score difference. The Alcohol Scale also had, significantly, different, pre/post scale score differences. These measures demonstrate that clients benefited from having been in treatment.

Earlier, while discussing Truthfulness Scale results, we referenced "positive contagion" as a possible explanation of this test data. The theory refers to a transmission of ideas and feelings, from person (counselor) to person, (troubled youth) by suggestion or sympathy. Perhaps the youths were subconsciously attempting to answer items the way they believed their counselor would want them to at the post-test. The other, possible explanation is that these intervention/treatment programs simply did not focus on "honesty" as a treatment objective. In contrast, at the pre-test, these troubled youth may have answered test items more candidly and spontaneously. Regardless of the theory, Truthfulness Scale answers were essentially the same at pre-test testing and post-test testing. And, as noted earlier, these unexpected results will be studied in subsequent, Pre/Post Inventory research.

Pre/Post Comparisons of Juvenile Client Self-Perceptions
The following table presents the percentages of clients who responded positively to each statement. The percentages represent the client's own opinions and perceptions. Each statement is summarized for all

clients. There were 506 Pre-test clients (443 males and 63 females) and 209 Post-test clients (197 males and 12 females). Results are summarized for Pre-test (506) clients and Post-test (209) clients for comparison.

Alcohol and Drug Problems	Pre-test		Post-test	
	Males %	**Females %**	**Males %**	**Females %**
#38. I have a drinking problem or alcohol-related problem.	27.5	23.8	27.4	33.3
#70. I use and abuse drugs.	46.3	34.9	20.3	0.0
#46. I have a drug problem.	43.8	39.7	41.6	33.3
#137. How would you describe your drinking?				
1. Serious Problem	8.1	12.7	9.1	25.0
2. Moderate Problem	11.3	15.9	9.1	0.0
3. Mild Problem	20.8	15.9	15.7	16.7
#136. How would you describe your drug use?				
1. Serious Problem	21.2	23.8	21.3	33.3
2. Moderate Problem	16.9	14.3	12.7	0.0
3. Mild Problem	23.3	23.8	18.8	16.7
Alcohol and Drug Treatment				
#64. I attend Alcoholics Anonymous (AA) meetings because of my drinking problem	12.4	11.1	26.4	16.7
#22. I attend Narcotics Anonymous (NA) or Cocaine Anonymous (CA) meetings for my drug problem	21.7	20.6	41.6	25.0
#144. How would you describe your desire to get (or continue in) alcohol treatment?				
1. Highly motivated (I want help)	16.9	22.2	24.9	41.7
2. Moderately motivated (I may need help)	11.5	6.3	11.7	0.0
3. Slightly motivated (maybe, not sure)	11.1	12.7	9.1	0.0
#145. How would you describe your desire to get (or continue in) drug treatment?				
1. Highly motivated (I want help)	28.0	28.6	38.6	50.0
2. Moderately motivated (I may need help)	16.9	9.5	13.7	8.3
3. Slightly motivated (maybe, not sure)	13.3	12.7	7.6	0.0
Emotional Problems				
#138. During the last month (30 days) I have had:				
1. Thoughts of harming myself	5.9	14.3	4.1	8.3
2. Thoughts of harming others	15.6	4.8	9.1	0.0
3. Both 1 and 2 (suicidal and homicidal thoughts)	9.5	11.1	2.0	0.0
#146. How would you describe your desire to get (or continue in) counseling, treatment or help for emotional or mental health problems?				
1. Highly motivated (I want help)				
2. Moderately motivated (I may need help)	26.0	49.2	32.0	58.3
3. Slightly motivated (maybe, not sure)	19.6	15.9	17.3	8.3
	19.4	15.9	15.2	16.7
#30. I frequently think about death, dying or suicide.	16.5	27.0	8.7	0.0
Recovering from Substance Abuse				
#11. I am a "recovering" drug abuser. I have not used drugs for at least a month, but I have a drug problem.	41.3	50.8	58.4	66.7
#61. I am a "recovering" alcoholic. I have an alcohol problem, but I have not had a drink for at least a month	26.2	41.3	43.1	58.3

These client self-perception results demonstrate some interesting findings. A close look at responses to substance use or abuse-related questions shows divergent results. Males and females responded differently to test item #38 (I have a drinking problem or alcohol-related problem.). The percentage of males that responded affirmatively did not change from pre-test (27.4%) to post-test (27.4%). However, the percentage of females increased, dramatically, at post-test, from 23.8% at Pre-test to 33.3% at Post-test. This may indicate that females came to better understand their alcohol involvement after intervention, and now accept that they really do have alcohol problems. This is supported by responses to item #137, which shows a much higher percentage of females who admitted to having a serious drinking problem at Post-test (25.0% compared to 12.7% at pre-test). Males showed little change between Pre-test and Post-test in the percentages, who admitted a serious drinking problem.

Drug Scale items tend to show a decrease at Post-test, in the percentage of clients who say they have drug-related problems. On test item #70, (I use and abuse drugs.) both males and females decreased dramatically at post-test in the percentage, who responded positively. Males went from 46% at pre-test to 20% at post-test and, females went from 35% to 0%. Yet, even though the percentage of youths using drugs decreased at post-test, the percentage of clients who admitted having a drug-related problem, (#46) modestly declined. Males went from 44% to 42%, and females went from 40% to 33%. Again, like the alcohol results, the percentage of clients who admitted a serious drug-related problem (#136) increased at Post-test. Males increased 1% from 8% at pre-test to 9% at post-test, and females increased from 13% to 25%. There is little doubt that youths' problem awareness benefited from their intervention/treatment programs.

With regard to alcohol and drug treatment, more clients at Post-test indicated they wanted to get or continue treatment, than at Pre-test. Test item #144 (desire to get or continue alcohol treatment) shows that at Pre-test, about 17% of males and 22% of females were highly motivated. At Post-test 25% of males and 42% of females desired alcohol treatment. This is a 50% increase for males and about a 100% increase for females. Test item #145 (desire to get or continue drug treatment) also showed dramatic increases in the percentages of males and females who desired drug treatment at Post-test. The Post-test responses also show that more clients attend Alcoholics Anonymous (item #64) and Narcotics Anonymous, or Cocaine Anonymous (item #22).

Emotional problems showed dramatic Post-test improvement. Test item #138 (thoughts of harming self or others) indicated that fewer clients were suicidal or homicidal after intervention/treatment. Females' Post-test responses showed that there was a dramatic decrease in the number of females who had suicidal ideation. The Pre-test percentage of females who were suicidal, homicidal, or both (30.2%) dropped to 8.3% (suicidal) at Post-test. Males declined by half, between Pre-test (31%) and Post-test (15.2%).

Fewer youths had thoughts of death, dying, or suicide at Post-test. Test item #30 (I frequently think of death, dying or suicide.) also had dramatic decreases in the percentages of males and females who responded positively at Post-test. Males declined by half and, none of the females responded positively at Post-test. A higher percentage of clients wanted to get or continue in counseling, treatment, or help for emotional or mental health problems (#146). These areas of inquiry may reflect some of the greatest benefits of having been in treatment.

Summary of Findings
The Pre/Post Inventory was administered to 506 clients for Pre-test assessment. There were 443 males (87.5%) and 63 females (12.5%). There were 209 youths included in Post-test assessments. There were

297 youth who completed the pre-test, but did not complete the post-test. The Pre-test client population profile is broadly defined as Caucasian (72%), 14 through 16 years of age (84%), and 8th Grade or less (59%) education level. The Post-test client profile is characterized as Caucasian (71%), 15 through 17 years of age (89%), and an education level of 8th Grade or less (42%).

PPI Accuracy, Reliability and Validity

- Of 28 possible (7 scales x 4 risk ranges) comparisons, between Pre-test attained and predicted scores, 24 were within one percentage point of the predicted

- Pre-test scale, risk range percentile scores were accurate for all comparisons, to within 2.1 percent of predicted for all PPI scales and all risk ranges

- All PPI scales reliability coefficients were .80 or higher

- Validity analyses demonstrated that PPI Alcohol and Drug Scales accurately identify problem drinkers and drug abusers

Alcohol and Drug Problems

- At Pre-test 27.5% males and 23.8% females admitted to a drinking or alcohol problem. At Post-test, 27.4% males and 33.3% females admitted a drinking problem. At post-test, (after intervention/treatment) more women admitted to drinking problems than at pre-test.

- At Pre-test, 43.8% males and 39.7% females indicated having a drug problem. At Post-test, 41.6% males and 33.3% females admitted a drug problem. At post-test, (after intervention/treatment) fewer males and females admitted to a drug problem than at pre-test.

- Pre-test: 16.9% males and 22.2% females were highly motivated to get or continue alcohol treatment. At Post-test, 24.9% males and 41.7% females were highly motivated for alcohol treatment. More males and females were highly motivated for alcohol treatment at post-test, than at pre-test.

- Pre-test: 28% males and 28.6% females were highly motivated to get or continue drug treatment. At Post-test, 38.6% males and 50% females were highly motivated for treatment. More males and females were highly motivated for drug treatment at post-test, than at pre-test.

Emotional Problems

- Pre-test: 156 individuals (137 males and 19 females) indicated that during the last month they have had thoughts of harming themselves, harming others, or both. At Post-test, 31 individuals (30 males and 1 female) had thoughts of suicide, homicide, or both. Intervention/treatment had a very positive impact on lowering suicidal/homicidal ideation.

- Pre-test: 16.5% males and 27% females indicated they frequently think about death, dying, or suicide. Post-test: 8.7% males and no females thought of death, dying, or suicide. Intervention/ treatment had a very positive impact on lowering death, dying, or suicidal ideation.

- Pre-test: 26% males and 49.2% females reported being highly motivated to get or continue in counseling, treatment, or help for mental health problems. Post-test: 32% males and 58.3% females were highly motivated for treatment. After intervention/treatment, more males and females were motivated for treatment.

Conclusions
Objective outcome assessment, with the Pre/Post Inventory, clearly shows the intervention/counseling/

treatment program is working. The Pre/Post Inventory is designed for objective pre-test – intervention/ treatment – post-test comparison. It was hypothesized that, in effective intervention/treatment programs, Pre/Post Inventory scale scores would be lower in post-test (after intervention/treatment) settings. And, this was observed.

However, as discussed earlier, the Truthfulness Scale score results were unexpected, in that clients didn't score, significantly, lower at post-test. Truthfulness Scale scores were, essentially, the same at pre-test and post-test. Two possible explanations of these findings were offered. And, it was noted that further Truthfulness Scale research would be undertaken to help clarify these results. In brief, are these Truthfulness Scale scores a result of the sample of troubled youth evaluated, or is there an unexpected intervention/treatment effect? This is an empirical question that deserves further study.
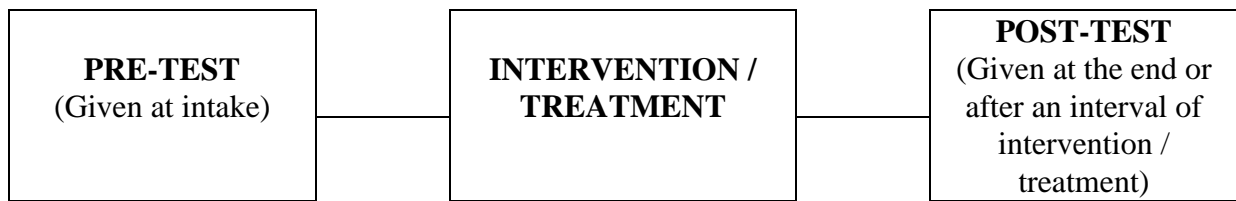
Overall Pre/Post Inventory results are summarized by low risk scale scores.			
Pre/Post Inventory Scales	Pre-test Low Risk	Post-test Low Risk	Outcome
Truthfulness	40.7%	39.7%	UNKNOWN FACTOR
Alcohol	38.1%	43.1%	+ EFFECTIVE PRGM
Drug	39.9%	70.3%	+ EFFECTIVE PRGM
Distress	38.5%	76.6%	+ EFFECTIVE PRGM
Resistance	37.2%	63.2%	+ EFFECTIVE PRGM
Self-Esteem	39.1%	71.3%	+ EFFECTIVE PRGM
Stress Coping Abilities	39.1%	71.8%	+ EFFECTIVE PRGM
Note: It is postulated that effective intervention/treatment will result in higher pre-test scores and lower post-test scores. Ineffective intervention/treatment will result in the same, or lower pre-test scores and higher post-test scores. The Truthfulness Scale results may be due to "positive contagion" or, simply, due to not focusing on "truthfulness" in treatment.			

Final assessment: It is reasonable to conclude that an effective, troubled youth intervention/ treatment program is in place.

FUTURE EXPLORATION: Now that the Pre/Post Inventory has been standardized on the troubled youth (males and females) population, it is reasonable to conclude that this assessment instrument could be used to screen youth's problems and concerns, and also provide agency/provider outcome results. Meaningful, objective, and standardized assessment can identify juvenile problems and risk, so that clients can be guided to appropriate intervention/treatment services. Now, the Pre/Post Inventory gives staff the capability of reviewing intervention/treatment program effectiveness, on an agency-by-agency basis. Such outcome review involves many levels of study. However, the Pre/Post Inventory objectively measures several factors that are believed to vary, according to the youth's adjustment and self-acceptance.

The Rationale: Some attitudes/behaviors reflect a person's adjustment, or the degree of successful adaptation to one's environment. In other words, there are many attitudes and behaviors that help us effectively meet life's demands. The Pre/Post Inventory enables us to establish where the client is, with regard to 7 important adjustment indicators. The client's adjustment history is not included, because it could set a limit below which scale scores could not fall. Indeed, court history is, deliberately, not included in the Pre/Post Inventory, so that we can assess where the person is at -- at the time of testing. This, in turn, allows us to use pre-test results as the standard or baseline for subsequent post-test comparison. Again, no solicited history influences Pre/Post Inventory scoring. Thus, we can compare where the client is, during pre-test screening and at post-test assessment.

PRE-TEST (Given at intake)	INTERVENTION / TREATMENT	POST-TEST (Given at the end or after an interval of intervention / treatment)

If the reason for troubled youth assessment is to determine the severity of problems, in contrast to pre-test/post-test outcome, we would recommend consideration of another assessment instrument, called the ACDI-Corrections Version II. Each test is designed for a specific, client population and collects different types of information. Additional information can be provided upon request.

33. PPI Pre/Post Outcome Study

This study (2001) examined treatment outcome. Adult clients, who were administered both the Pre/Post Inventory (PPI) Pre-test and Post-test, participated in this study. Pre-test scale scores represent the severity of client problems going into treatment, whereas, Post-test scale scores represent clients' level of problem severity, after having had treatment or at some time, during treatment. The PPI can be administered, again, after 30 days or longer; for example, 3 months, 6 months, etc. The 30-day time referent in the PPI enables giving the test to the same client after 30 days. The outcome analyses presented in this study are the scale score comparisons between Pre-test and Post-test. PPI Pre-test scale scores are expected to be higher than Post-test scale scores, because participants are expected to improve after having been in treatment. Outcome analyses help determine treatment program effectiveness.

Method and Results
There were 69 participants who completed the PPI Pre-test and Post-test. Demographic composition of these participants is as follows: Males: 57 (82.6%); Females: 12 (17.4). Age: 19 & under (1.4%); 20-29 (43.5%); 30-39 (33.3%); 40-49 (15.9%); and 50-59 (5.8%). Ethnicity: Caucasian (67.2%); Black (11.9%); Hispanic (1.5%); Native American (13.4%); and Other (6.0%). Education: Some H.S. (19.1%); H.S. graduate (55.9%); Some college (7.3%); and College graduate (17.6%). Marital Status: Single (45.8%); Married (29.0%); Divorced (7.2%); Separated (10.1%); and Widowed (1.4%).

Pre/Post Outcomes
Pre-test and Post-test scale scores are presented in Table 30. The table presents mean scale scores, maximum score, and t-values for the difference between the means and level of significance for each, pre/post comparison.

On average, clients lowered their level of problem severity, after having been in treatment. All post-test scale scores were lower than Pre-test scale scores. The Alcohol and Resistance Scales were not, statistically, significantly different.

Table 30. Pre-test/Post-test Scale Comparisons (2001, N=69)						
	Pre-test		**Post-test**			**Level of**
PPI Scales	**Mean Score**	**Maximum**	**Mean Score**	**Maximum**	**T-value**	**Significance**
Truthfulness Scale	28.3	52	25.2	44	t = 3.54	p<.001
Alcohol Scale	14.8	53	12.9	40	t = 1.56	n.s.

Drug Scale	11.7	33	8.1	30	t = 3.81	p<.001
Distress Scale	12.5	38	10.0	31	t = 3.07	p<.003
Resistance Scale	8.4	25	7.4	23	t = 1.68	n.s.
Self-esteem Scale	20.5	52	26.8	52	t = 2.88	p<.005
Stress Coping Abilities	108.7	198	126.3	214	t = 3.09	p<.003

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

Maximum scale scores also demonstrate that post-test maximum scores were lower than pre-test maximum scores, except the Self-esteem Scale, which had equal maximum scores. These results further demonstrate that clients improved after having been in treatment. Comparisons of scale scores are a straightforward way of evaluating treatment program effectiveness. And, these comparisons quantify treatment outcome in an objective and standardized way. Not only can it be shown that participants improve after treatment, but the level of improvement is quantified. Some participants improve more than others. These outcome comparisons are highly individualized.

PPI Reliability

Reliability coefficient alphas for pre-test results are presented in Table 31. All alpha coefficients for all of the Pre/Post Inventory scales are above the .80 level. PPI scales are reliable.

Table 31. Reliability coefficient alphas. (2001, N = 69 Pre-test).		
PRE/POST SCALES	**Pre-test Alphas**	**Level of Significance**
Truthfulness Scale	.89	p<.001
Alcohol Scale	.85	p<.001
Drug Scale	.88	p<.001
Distress Scale	.87	p<.001
Resistance Scale	.81	p<.001
Self-esteem Scale	.92	p<.001
Stress Coping Abilities	.92	p<.001

PPI Accuracy

PPI accuracy is based on Pre-test scores. The percentages of clients scoring in the four risk categories (low, medium, problem, and severe problem) are compared to predicted percentages for each of the seven measurement scales. These results are presented in Table 32. Predicted percentages are shown in the top row of the table. The differences between attained and predicted percentages are shown in parentheses in the table. Small differences between attained and predicted percentages mean the scale is accurate.

Table 32. Pre-test Scale Risk Ranges (2001, N = 69)
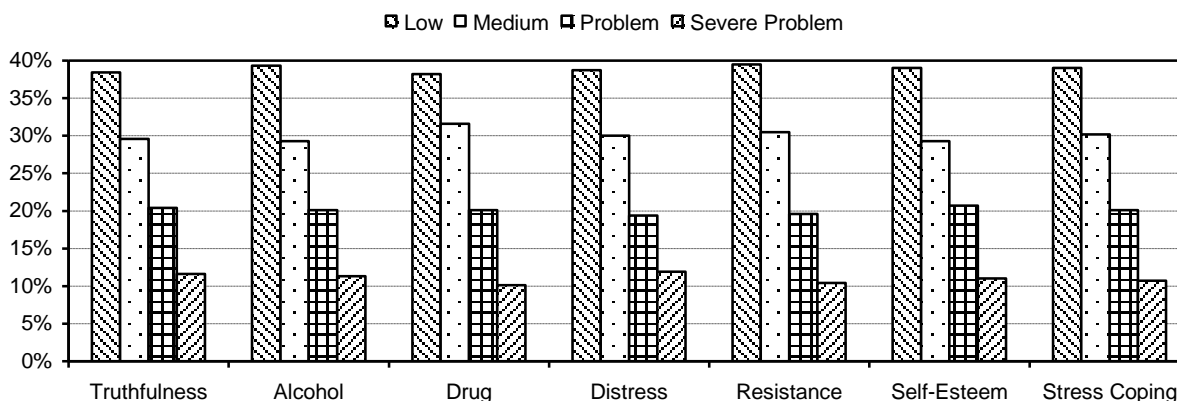
Low □ Medium □ Problem ☒ Severe Problem

Pre-test Scale	Low Risk (39% predicted)		Medium Risk (30% predicted)		Problem Risk (20% predicted)		Severe Problem (11% predicted)	
Truthfulness	38.4	**(0.6)**	29.6	**(0.4)**	20.4	**(0.6)**	11.6	**(0.6)**
Alcohol	39.3	**(0.3)**	29.3	**(0.7)**	20.1	**(0.1)**	11.3	**(0.3)**
Drug	38.2	**(0.8)**	31.6	**(1.6)**	20.1	**(0.1)**	10.1	**(0.9)**
Distress	38.7	**(0.3)**	30.0	**(0.0)**	19.4	**(0.6)**	11.9	**(0.9)**
Resistance	39.5	**(0.5)**	30.5	**(0.5)**	19.6	**(0.4)**	10.4	**(0.6)**
Self-esteem	39.0	**(0.0)**	29.3	**(0.7)**	20.7	**(0.7)**	11.0	**(0.0)**
Stress Coping	39.0	**(0.0)**	30.2	**(0.2)**	20.1	**(0.1)**	10.7	**(0.3)**

Starting with the Low Risk column, the largest difference between attained and predicted was 0.8 percent. Attained, Low Risk PPI scale scores were within 0.8 percent of their predicted 39 percent. This means that Low Risk scores are 99 percent accurate. Medium Risk scores were within 1.6 percent of their predicted 30 percent. This means that Medium Risk scale scores are 98 percent accurate. Problem Risk scores were within 0.7 percent of their predicted 20 percent and are 99 percent accurate. Severe Problem scores were within 0.9 percent of their predicted 11 percent and are 99 percent accurate. These small differences, between attained and predicted risk range scores, demonstrate the accuracy of the PPI. It seems reasonable to conclude that PPI scales are 99 percent accurate.

The Pre/Post Inventory (PPI) is an objective, outcome assessment test. The same test given at pre-test or intake is re-administered after treatment or at specified intervals during treatment. The pre-test sets the standard or baseline for subsequent comparison, after or during treatment. The PPI has a 30-day time referent and can be re-administered to the same client after 30 days. PPI scales assess important client attitudes and behavior that can change after treatment. The amount of change that clients experience after treatment is determined by pre-test and post-test, scale score comparisons. The amount of change a client experiences (treatment outcome) helps determine the client's treatment program effectiveness.

34. PPI Pre/Post Outcome Study in a Sample of Juvenile Clients

This study (2002) examined Pre/Post Inventory (PPI) test results for a sample of juvenile treatment clients. There were 175 youths who had both Pre-test and Post-test data. These Pre-test/Post-test comparisons are presented and discussed. Included in this study are PPI test statistics on the reliability, validity, and accuracy of the PPI for these juvenile clients.

Method and Results
There were 175 participants that completed the PPI at Pre-test and Post-test. Demographic

43

composition of these participants is as follows: Males: 157 (89.7%); Females: 18 (10.3). Age: 13 & under (2.9%); 14 (10.9%); 15 (24.0%); 16 (50.9%); and 17 (11.4%). Ethnicity: Caucasian (74.3%); Black (22.9%); Hispanic (2.3%); and Other (0.6%). Education: 7th grade or less (12.3%); 8th grade (36.4%); 9th grade (42.0%); 10th grade (6.8%); 11th grade (1.9%); and H.S. graduate (0.6%).

Reliability statistics are presented for both Pre-test and Post-test data. Slight reductions in Post-test reliability coefficients indicate that clients changed, to a varying extent, their perception of "problem." They tend to redefine their interpretation of what constitutes a "problem." PPI validity and accuracy statistics are presented for Pre-test data. This was done; because Pre-test scores set baseline performance, upon which to compare Post-test scores. The interval between Pre-test and Post-test administrations varied from 0 months to 23 months.

Juvenile risk is conceptualized as low risk (zero to 39th percentile), medium risk (40 to 69th percentile), problem risk (70 to 89th percentile), and severe problem (90 to 100th percentile) risk. The expected percentage of youths scoring in each risk range (for each PPI scale) is low risk (39%), medium risk (30%), problem risk (20%), and severe problem risk (11%). A problem is not identified until a juvenile's scale score is at (or exceeds) the 70th percentile. The scores associated with the 39th, 69th and 89th percentiles are referred to as cut-off scores. Scores above the cut-off score fall into the next, higher risk range.

Accurate identification of problems is necessary to make appropriate referral to intervention and treatment. Andrews, Bonta & Hoge concluded that placing low risk offenders in wrong treatment levels can be detrimental to society and the offenders (Andrews, DA, Bonta, J, & Hoge, RD. Classification for Effective Rehabilitation: Rediscovering Psychology. Criminal Justice and Behavior, 1990, 17(1): 19-52.). Thus, it is important to identify offender problems and determine their severity, so offenders can be placed in appropriate levels of intervention and treatment. Similar logic is applicable to youth counseling clients. Identification of youths' problems is the first step in intervention and treatment.

PPI risk range percentile scores are obtained by adding test item points and truth correction, if applicable. These raw scores are then converted to percentile scores, by using cumulative percentage distributions. Each scale has its own distribution and risk range cut-off scores. Pre-test results are summarized in Table 33. Juvenile obtained, Pre-test scores are compared to the predicted percentage for each risk range. The predicted percentages are presented in parentheses, under the name (low, medium, problem, severe problem) of each risk range. Differences between predicted and obtained scores are presented in parentheses (in bold type). The smaller the difference, the more accurate the scale is.

Post-test data use risk range cut-off scores established by Pre-test data. The percentage of clients that fall into each risk range at Post-test is due entirely by Pre-test/Post-test differences. Post-test results are presented in Table 34. Post-test scores are expected to be lower than Pre-test scores, with the biggest difference being an increase in the Low risk range at Post-test. Differences between Pre-test and Post-test, risk range percentages are shown in parentheses in Table 34. Positive differences in these percentages mean there are more clients in that risk range at Post-test, than there were at Pre-test. Negative differences signify more clients at Pre-test than Post-test. ?

Table 33 presents the graph and table of juvenile, Pre-test risk range percentages. As shown in this graph and related table, obtained risk range percentages are within 1.7 percentage points of the predicted percentages. Of the 28 possible comparisons, (7 scales x 4 risk ranges) 21 were within one percentage point of the predicted percentages. These results demonstrate that PPI scale scores are 98% accurate. The

PPI is an accurate, (98%) juvenile risk assessment test. Placement of youths into appropriate risk ranges is 98 percent accurate.

Table 33. Pre-test Scale Risk Ranges (N = 175, 2002)
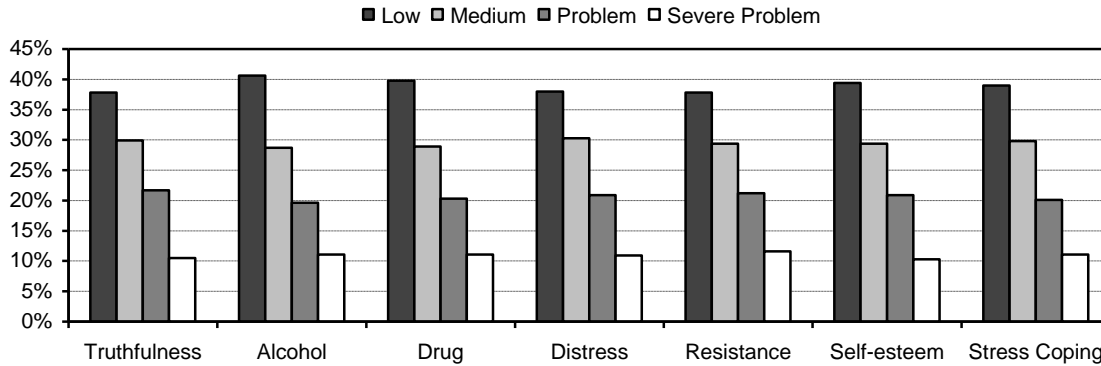
■ Low ■ Medium ■ Problem □ Severe Problem

Pre-test Scale	Low Risk (39% predicted)		Medium Risk (30% predicted)		Problem Risk (20% predicted)		Severe Problem (11% predicted)	
Truthfulness	37.8	**(1.2)**	29.9	**(0.1)**	21.7	**(1.7)**	10.5	**(0.5)**
Alcohol	40.6	**(1.6)**	28.7	**(1.3)**	19.6	**(0.4)**	11.1	**(0.1)**
Drug	39.8	**(0.8)**	28.9	**(1.1)**	20.3	**(0.3)**	11.1	**(0.1)**
Distress	38.0	**(1.0)**	30.3	**(0.3)**	20.9	**(0.9)**	10.9	**(0.1)**
Resistance	37.8	**(1.2)**	29.4	**(0.6)**	21.2	**(1.2)**	11.6	**(0.6)**
Self-esteem	39.4	**(0.4)**	29.4	**(0.4)**	20.9	**(0.9)**	10.3	**(0.3)**
Stress Coping	39.0	**(0.0)**	29.8	**(0.2)**	20.1	**(0.1)**	11.1	**(0.1)**

The percentage differences between Pre-test and Post-test scores are presented in Table 34. These differences (shown in parentheses) are calculated by subtracting the Post-test percentage from the Pre-test percentage. Positive differences in risk range percentages between Pre-test and Post-test mean that Post-test percentages are higher than Pre-test percentages. In general, clients' scores on Post-test are lower than on Pre-test, resulting in risk range percentages shifting toward the lower end. This would be expected in good or effective treatment/intervention programs. The Low risk range percentage increases at Post-test, as a result of clients scoring lower at Post-test than they did at Pre-test. This result indicates that intervention and treatment were effective. Negative percentages for Medium, Problem, and Severe Problem categories are the result of fewer youths scoring in those risk ranges at Post-test, compared to Pre-test.

Table 34. Post-test Scale Risk Ranges (N=175)								
Post-test Scales	Low Risk		Medium Risk		Problem Risk		Severe Problem	
	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference	Attained Post-test %	Pre/Post Difference
Truthfulness	21.2	**(-15.6)**	31.3	**(1.4)**	27.5	**(5.8)**	19.9	**(9.4)**
Alcohol	48.4	**(7.8)**	32.0	**(3.3)**	18.7	**(-0.9)**	0.9	**(-10.2)**
Drug	71.8	**(32.0)**	23.7	**(-5.2)**	3.2	**(-17.1)**	1.3	**(-9.8)**
Distress	73.7	**(35.7)**	17.4	**(-12.9)**	6.6	**(-14.3)**	2.2	**(-8.7)**
Resistance	57.6	**(19.8)**	23.7	**(-5.7)**	11.4	**(-9.8)**	7.3	**(-4.3)**
Self-esteem	68.7	**(29.3)**	18.7	**(-10.7)**	9.8	**(-11.1)**	2.8	**(-7.5)**
Stress Coping	67.4	**(28.4)**	20.9	**(-8.9)**	7.7	**(-12.5)**	4.1	**(-7.0)**

The Truthfulness Scale results show just the opposite. Post-test scores were higher than Pre-test scores. One possible explanation for this outcome is that youths fake good at Post-test; they give the response they think the counselor wants them to give. This phenomenon has been called "therapeutic contagion." Consequently, their Truthfulness Scale scores go up, in comparison to their Pre-test scores. Truthfulness Scale scores apply truth-correction to other scale scores; consequently, Post-test scores are being truth-

corrected more than Pre-test scores. Pre-test/post-test differences could be even greater than what is shown in the table below, if truth-correction were the same for Pre-test and Post-test.

The results shown in Table 34 demonstrate that there were dramatic, client improvements on Post-test scores for all PPI scales. The Truthfulness Scale is an exception. The Distress Scale showed the largest, Post-test improvement (lower scores). Nearly 36 percent more of the youths scored in the low risk range at Post-test. The Drug, Self-esteem, and Stress Coping Abilities Scales also demonstrate a large improvement (lower scores) at Post-test. These scales improved by about 30 percent at Post-test. The Resistance Scale showed about a 20 percent improvement, which signifies that the youths were more willing to work out their problems with staff. The Alcohol Scale showed an improvement at Post-test of 8 percent (increase) for the low risk range, and 10 percent (decrease) for the severe problem risk range. Of the 11 percent of youths who had scored in the severe problem range on the Alcohol Scale at Pre-test, only 1 percent remained in the severe problem range at Post-test.

There were 175 youths for whom both Pre-test and Post-test data were available. Mean or average scale score for each PPI scale, for these clients, is presented in Table 35. These results indicate that all scales were, statistically, significantly different. Post-test scale scores were, on average, significantly lower (the one exception is the Truthfulness Scale) than Pre-test scale scores, for these youths.

Table 35. Pre-test/Post-test Scale Comparisons (N=175)				
PPI Scales	Pre-test Mean Score	Post-test Mean Score	T-value	Level of significance
Truthfulness Scale	22.46	26.60	t = 4.31	**p<.001**
Alcohol Scale	15.17	12.97	t = 2.77	**p=.006**
Drug Scale	19.54	11.99	t = 8.13	**p<.001**
Distress Scale	17.53	11.75	t = 8.41	**p<.001**
Resistance Scale	10.35	8.25	t = 4.45	**p<.001**
Self-esteem Scale	20.52	30.41	t = 7.60	**p<.001**
Stress Coping Abilities	101.70	124.77	t = 7.11	**p<.001**

Note: Scores on the Self-esteem and Stress Coping Abilities Scales are reversed, in that higher scores are associated with better self-esteem and stress coping abilities. There were 175 clients included in this analysis.

With the exception of the Truthfulness Scale, all PPI scale comparisons demonstrate that Post-test scale scores are lower than Pre-test scale scores. The juveniles showed improvement on all PPI treatment scales, after having been in treatment. However, the Pre-test/Post-test intervals were not the same for all clients. It is likely that higher Pre-test/Post-test intervals would result in higher or greater differences between Pre-test and Post-test scores

The largest, pre/post scale score differences occurred on the Self-esteem, Distress, Stress Coping Abilities, and Drug Scales. The Resistance and Alcohol Scales also demonstrated significant, pre/post scale score differences. These treatment measures demonstrate that clients benefited from having been in treatment.

Truthfulness Scale results present an interesting phenomenon. Clients scored, significantly, higher at Post-test than at Pre-test. "Therapeutic contagion" is a possible explanation of this test data. The theory refers to a transmission of ideas and feelings from person (counselor) to person, (troubled youth) by suggestion, identification, or transference. Perhaps the youths were subconsciously attempting to answer

items the way they believed their counselors would want them to, at post-test. In contrast, at pre-test these troubled youth may have answered test items more candidly and defensively. They had more "characterological armor." Regardless of the theory, Truthfulness Scale answers were, significantly, different at pre-test and post-test testing. These results will be studied in subsequent, Pre/Post Inventory research.

Within-test reliability, or inter-item reliability coefficient alphas for the Pre/Post Inventory are presented in Table 36. As demonstrated in the table, Alpha coefficients for all PPI scales are well above the professionally accepted standard of .80. Indeed, all of the PPI scales are at or above .82. These high, reliability statistics are very impressive for a juvenile assessment test. These results show that the PPI is a very reliable assessment test.

Table 36. PPI Reliability		
PRE/POST SCALES	**Pre-test Alphas**	**Post-test Alphas**
Truthfulness Scale	**.86**	**.86**
Alcohol Scale	**.86**	**.84**
Drug Scale	**.87**	**.84**
Distress Scale	**.85**	**.82**
Resistance Scale	**.83**	**.83**
Self-esteem Scale	**.91**	**.93**
Stress Coping Abilities	**.88**	**.90**

All coefficient alphas are significant at $p<.001$. Pre-test/post-test reliability coefficients demonstrate that the PPI maintains high, test-retest reliability. The PPI can be re-administered, because the Post-test reliability coefficients are just as high as Pre-test reliability coefficients.

Predictive validity is shown by nearly 100% correct identification of juveniles who have problems. The Alcohol and Drug Scales accurately identified youths who admitted to drinking and drug problems. The PPI Alcohol Scale identified nearly all (98.1%) of the youths who admitted having an alcohol problem These youths are classified as problem drinkers, and 98.1 percent of them had Alcohol Scale scores at or above the 70th percentile. The Alcohol Scale correctly identified almost all of the juveniles categorized as problem drinkers. The Drug Scale identified nearly all (97.6%) of the youths who admitted to a drug problem. These youths had Drug Scale scores at or above the 70th percentile. These results substantiate the accuracy of the Drug Scale.

The PPI correctly identified nearly all juveniles who had substance abuse problems. PPI scale scores at or above the 70th percentile identify youths as having problems. These results support the accuracy and comprehensiveness of the Alcohol Scale and the Drug Scale. The PPI scale scores do not identify a problem until a score is at or above the 70th percentile. With this problem identification threshold and scores, nearly 100 percent of problem youths are identified. Seventy percent is a clear indication that a problem exists. These results support using this risk range percentile cutoff for problem identification.

In summary, the PPI accurately identifies juveniles who have identified (serious) problems. Validity analyses clearly demonstrate that the PPI impressively meets these criteria. PPI Alcohol and Drug Scales identify almost all juveniles who have alcohol or drugs problems. The PPI measures what it purports to measure, i.e., juvenile risk. Furthermore, these reliability statistics demonstrate that the PPI is a very, reliable juvenile test. And, scale score risk range percentages are demonstrated to be 98% accurate. The results of this study validate the PPI.

35. PPI: Assessing Treatment Outcome

Assessing treatment **outcome** involves answering the question: Has the client improved, stayed the same or gotten worse? Many practitioners, referral sources, and treatment agencies have wanted an accurate and standardized way to objectively assess counseling and treatment effectiveness or outcome. On the surface, this outcome question appears straightforward. But, what should be used as the criteria for treatment program effectiveness?

Some experts believe that there should be a national standard for assessing treatment outcome. While all agree that outcomes are important, there is a lack of consensus among experts on the advantages of national standardization of the program evaluation process. The issue of outcome criteria will, likely, always be controversial.

The Pre/Post Inventory (PPI) was developed to answer juvenile treatment outcome questions. The PPI provides test-retest comparisons at important stages of treatment, for example, intake, and change of status, completion, and outcome. The PPI compares a youth's post-test scores against their pre-test scores. It compares a person, upon counseling/treatment completion, with the person they were when they were admitted to the program. This type of comparison, then, focuses on outcome issues, i.e., did the client get better, stay the same, or get worse?

To assess treatment outcome, the outcome criteria must be defined and accepted. The Pre/post Inventory (PPI) measures traditional areas of counseling inquiry: Truthfulness, Self-Esteem, Resistance, Distress (anxiety and depression), Alcohol Abuse, Illicit Drug Abuse, and Stress Coping Abilities. These seven, Pre/post Inventory scales are PPI outcome criteria. Clients' pre-test scores serve as the basis for subsequent, post-test comparison. It is assumed that all of the PPI scales will improve or stay the same, in "successful" counseling programs. If scales are not problematic at pre-test, they should not vary that much, upon post-test.

The Pre/Post Inventory (PPI) has a "here-and-now" time referent. This present tense time reference enables administering the PPI at 30-day intervals. Because of this time referent, the same test can be administered at intake (pre-test), at 3, 6, or 12 month intervals, and at program completion (post-test). Court history is eliminated from the PPI, because such history may set limits below which scale scores cannot go. Eliminating history allows scale scores to vary. For example, they can stay the same, get better, or become worse.

In sum, Pre/post Inventory scales are objective, treatment outcome criteria that have a here-and-now time reference. Scale scores vary according to the client's perception of problems, concerns, and needs. It is the patient's opinion, with all its biases, that is most relevant for the initiation and continuation of treatment. The PPI gives the client a voice in the evaluation of their treatment program, and its outcome. The following study (2003) demonstrates Pre/Post Inventory effectiveness, by comparing participants' Pre-test and Post-test scores.

Method and Results
There were 232 participants that completed the PPI Pre-test and Post-test. Demographic composition of these participants is as follows: Males: 210 (90.5%); Females: 22 (9.5). Age: 13 & under (2.6%); 14 (12.5%); 15 (23.7%); 16 (51.7%); and 17 (9.5%). Ethnicity: Caucasian (72.0%); Black (25.9%); Hispanic (1.7%); and Other (0.4%). Education: 7th grade or less (17.2%); 8th grade (32.3%); 9th grade (37.9%); 10th

grade (10.3%); 11th grade (1.7%); and High School graduate (0.4%).

The primary measure of treatment outcome in the Pre/post Inventory (PPI) is the Comparison Index. This index compares pre-test (first test administration) scale scores with post-test (second or subsequent test administration) scale scores. All PPI scales are represented in the Comparison Index. For each scale, the index is determined by subtracting the post-test scale score from the pre-test scale score (pre-test minus post-test). A positive difference represents client improvement, that is, their scale score was lower at post-test than it was at pre-test. If the difference between pre-test and post-test scale scores is zero, the youth stayed the same. And, a negative difference means that the youth got worse, i.e., their post-test scale score was higher than their pre-test score.

The pre-test/post-test Comparison Index is presented in the following table. For each PPI scale the mean or average scale score is presented for pre-test and post-test scores, along with the difference, (pre-test/post-test) presented in the right-hand column. There are 232 youths included in this analysis. These youths had both pre-test and post-test data.

Table 37. Pre/post Comparison Index (N=232, 2003)			
PPI Scales	Pre-test Mean Score	Post-test Mean Score	Pre-test/Post-test Difference
Truthfulness Scale	23.22	21.47	1.75
Alcohol Scale	15.27	12.60	2.69
Drug Scale	19.65	11.70	7.95
Distress Scale	17.56	11.75	5.81
Resistance Scale	10.63	8.37	2.26
Self-Esteem Scale	20.60	30.68	10.08
Stress Coping Abilities	98.78	124.45	25.67

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

For all PPI scales, post-test scores were lower than pre-test scores. Youths, on average, improved at post-test. Post-test scores were, significantly, lower than pre-test scores at the p < 0.001 level of significance. Lower scale scores at post-test mean that treatment programs were effective. And, this great degree of significance (p<.001) demonstrates that treatment programs were very effective.

Truthfulness Scale score, pre/post comparison demonstrates that the youths became, significantly, more open and honest while completing the PPI at post-test. The youths were less inclined to deny, minimize problems, or attempt to fake good. Youths' alcohol and drug problem severity was, positively, changed after treatment. Lower, post-test Alcohol Scale scores show that these youths significantly reduced their alcohol problem severity, after being in treatment. Drug Scale scores were lower by a wide margin, at post-test, compared to pre-test scores. Treatment helped youth significantly lower their severity of drug abuse. Results of the Distress Scale score comparisons show that, after treatment, the youths had significantly, less distress, anxiety, and depression. Treatment helped the youths re-establish their emotional well-being. Positive treatment experience is demonstrated by Resistance Scale score comparisons. Youths became, significantly, more open and cooperative, and less resistant. The Self-Esteem Scale, pre/post comparison demonstrates that the youths significantly improved their perceived self-worth and value. Treatment helped youth positively change their self-esteem. Stress Coping Abilities Scale, pre/post comparison indicates that the youths were better able to cope with stress, after

having been in treatment, compared to what their coping skills were prior to treatment. All of these pre/post scale comparisons demonstrated statistically, significant differences (at the p<.001 level) between pre-test and post-test scale scores.

The Pre/Post Comparison Index is an outcome measure. It demonstrates that treatment outcome can be evaluated objectively. Pre/Post Inventory (PPI) scale scores are objective and accurate measures. The 30-day time referent in the PPI enables the same test to be administered, again, to the same youth, at 30 day or longer intervals. Comparisons between pre-test and post-test scores provide an objective and accurate way to compare scores.

PPI scale comparisons represent outcome criteria. Pre-test scores are the standard or baseline for comparison. Prior history is eliminated from scale scores and the 30-day time referent enables us to use the same test at post-test. This procedure holds testing (and outcome) variables constant, so that change in youth responses can be attributed to treatment programs. The Pre/Post Comparison Index table, which is presented above, demonstrates that treatment programs were very effective.

Discussion
Pre/Post Inventory outcome analyses demonstrate that treatment programs reduced youths' problem severity. PPI outcome criteria (Truthfulness Scale, Alcohol Scale, Drug Scale, Distress Scale, Resistance Scale, Self-Esteem Scale, and Stress Coping Abilities Scale) all had, significantly, lower scores at post-test. Lower scale scores represent lower problem severity.

Assessing outcome can also be done on an individual basis, to determine how effective a treatment program is for a specific youth. This is an important area for outcome research. It evaluates treatment program effectiveness, while enabling staff to identify youth that still need help.

Outcome research will, likely, be emphasized in the U.S., in the coming decade. We can now accurately identify problem severity, so that youths can be referred to appropriate treatment programs. Andrews, Bonta and Hoge noted that problem severity must match treatment intensity, for maximum outcome effectiveness (Andrews, D.A., Bonta, J. & Hoge, R.D., 1990, Classification for effective rehabilitation: Rediscovering Psychology, Criminal Justice and Behavior, 17, 19-52.). Andrews et al. (1990) reviewed literature that showed clients, with identified problems, benefited most from having been placed in high level intervention programs, while lower risk cases did as well or better with low intensity intervention and treatment programs. This "matching" intervention and risk levels can only happen with accurate tests and outcome measures. The PPI automates identification of treatment severity need and outcome assessment. Pre/Post comparisons are automatically generated by the PPI software, saving staff time and resources.

36. Pre/Post Inventory Reliability and Accuracy in a Large Sample of Youths
Reliability and accuracy of the Pre/Post Inventory (PPI) were examined in a large sample of youths (2005). The PPI was administered to youths in a Midwest, state juvenile services department.

Method and Results
There were 3,394 participants that completed the PPI Pre-test and/or Post-test. Demographic composition of these participants is as follows: Males: 2,394 (86.4%); Females: 460 (13.6%). Age: 13 & under (6.1%); 14 (13.1%); 15 (26.4%); 16 (39.3%); 17 (14.9%); and 18 (0.1%). Ethnicity: Caucasian (66.4%); Black (30.3%); Hispanic (1.6%); and Other (1.8%).

Inter-item reliability was calculated for the seven PPI scales. Cronbach's alpha (α) coefficients are presented in Table 38. All, attained reliability coefficients exceed the professionally accepted standard for reliability (.75), by a considerable margin.

Table 38. Reliability coefficient alphas. (N =3,394, 2005).

PRE/POST SCALES	PPI Alphas	Level of Significance
Truthfulness Scale	.85	p<.001
Alcohol Scale	.80	p<.001
Drug Scale	.85	p<.001
Distress Scale	.84	p<.001
Resistance Scale	.81	p<.001
Self-Esteem Scale	.93	p<.001
Stress Coping Abilities	.91	p<.001

Risk range accuracy of the Pre/Post Inventory was examined by determining the differences between predicted and attained risk range percentages. The smaller the difference between the predicted and actual percentages, the higher the accuracy is for the Pre/Post Inventory Scales. Table 39 provides accuracy calculations for each Pre/Post Inventory scale, for this sample of juvenile respondents.

Table 39. Pre/Post Inventory Risk Range Accuracy (N=3,394, 2005)

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness Scale	42.5	**(3.5)**	28.1	**(1.9)**	18.7	**(1.3)**	10.7	**(0.3)**
Alcohol Scale	40.8	**(1.8)**	29.1	**(0.9)**	20.0	**(0.0)**	10.1	**(0.9)**
Drug Scale	40.1	**(1.1)**	30.7	**(0.1)**	19.3	**(0.7)**	9.9	**(1.1)**
Distress Scale	43.3	**(4.3)**	27.7	**(2.3)**	19.4	**(0.6)**	9.6	**(1.4)**
Resistance Scale	42.2	**(3.2)**	30.5	**(0.5)**	16.6	**(3.4)**	10.7	**(0.3)**
Self-Esteem Scale	32.5	**(6.5)**	33.6	**(3.7)**	23.4	**(3.4)**	10.5	**(0.5)**
Stress Coping Abilities	39.1	**(0.1)**	30.2	**(0.2)**	19.8	**(0.3)**	10.9	**(0.1)**

As shown in Table 39, Pre/Post scale scores are highly accurate. The objectively obtained percentages of youths falling into each risk range are very close to the expected percentages for each risk category. Only two of the obtained, risk range percentages were more than 3.5 points from the expected percentage.

In terms of the youths in this sample, who are identified as having problems (youths falling in the Problem and Severe Problem risk range categories), the obtained percentages were extremely accurate. The differences between obtained and expected percentages are as follows: Truthfulness (0.3), Alcohol (0.9), Drugs (1.1), Distress (1.4), Resistance (0.3), Self-esteem (0.5), and Stress Coping Abilities (0.1). These results demonstrate that the Pre/Post Inventory scale scores accurately identify risk.

37. Pre/Post Inventory Reliability and Accuracy in a Large Sample of Adults
Reliability and accuracy of the Pre/Post Inventory (PPI) were examined in a large sample of adult counseling clients (2006).

Method and Results

There were 600 participants who completed the PPI Pre-test and/or Post-test. Demographic composition of these participants is as follows: Males: 478 (79.7%); Females: 122 (20.3%). Age: 20 & under (8.3%); 21-29 (33.0%); 30-39 (31.2%); 40-49 (19.8%); 50-59 (6.2%); and 60 and over (1.5%). Ethnicity: Caucasian (77.9%); Black (6.5%); Hispanic (4.0%); Asian (0.5%); Native American (5.5%); and Other (5.5%).

Inter-item reliability was calculated for the seven PPI scales. Cronbach's alpha (α) coefficients are presented in Table 40. All attained reliability coefficients exceed the professionally accepted standard for reliability (.75), by a considerable margin.

Table 40. Reliability coefficient alphas. (N =600, 2006).

PRE/POST SCALES	PPI Alphas	Level of Significance
Truthfulness Scale	.91	p<.001
Alcohol Scale	.86	p<.001
Drug Scale	.86	p<.001
Distress Scale	.86	p<.001
Resistance Scale	.85	p<.001
Self-Esteem Scale	.94	p<.001
Stress Coping Abilities	.93	p<.001

Risk range accuracy of the Pre/Post Inventory was examined by determining the differences between predicted and attained, risk range percentages. Small differences between predicted and attained scale scores represent high accuracy. Table 41 provides accuracy calculations for each Pre/Post Inventory scale, for this sample of adult respondents.

Table 41. Pre/Post Inventory Risk Range Accuracy (N=600, 2006)

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness Scale	40.7	**(1.7)**	31.8	**(1.8)**	17.6	**(2.4)**	9.9	**(1.1)**
Alcohol Scale	42.0	**(3.0)**	28.2	**(1.8)**	19.9	**(0.1)**	9.9	**(1.1)**
Drug Scale	40.5	**(1.5)**	30.9	**(0.9)**	18.6	**(1.4)**	10.0	**(1.0)**
Distress Scale	39.8	**(0.8)**	32.3	**(2.3)**	18.0	**(2.0)**	9.9	**(1.1)**
Resistance Scale	41.3	**(2.3)**	30.4	**(0.4)**	17.9	**(2.1)**	10.4	**(0.6)**
Self-Esteem Scale	42.2	**(3.2)**	26.9	**(3.1)**	21.4	**(1.4)**	9.5	**(1.5)**
Stress Coping Abilities	40.1	**(1.1)**	29.6	**(0.4)**	19.7	**(0.3)**	10.6	**(0.4)**

As shown in Table 41, Pre/Post scale scores are highly accurate. The objectively obtained percentages of adults falling into each risk range are very close to the expected percentages for each risk category. All attained, risk range percentages were within 3.1 percentage points of the predicted percentages. This is accurate, adult treatment effectiveness assessment.

38. Establishing Treatment Effectiveness with Pre/Post Inventory Pre-test and Post-test Score Comparisons

The Pre/Post Inventory Pre-test and Post-test were administered to a group of youths before and after treatment (2007). The same youths were administered the Pre-test, prior to undergoing treatment and the Post-test, after completing treatment.

Method and Results

There were 464 participants that completed both the PPI Pre-test and the PPI Post-test. Demographic composition of these participants is as follows: Males: 405 (87.3%); Females: 59 (12.7%). Age: 13 & under (9.9%); 14 (17.0%); 15 (27.6%); 16 (37.6%); and 17 (8.0%). Ethnicity: Caucasian (66.7%); Black (30.4%); Hispanic (0.2%); and Other (2.7%).

Mean Scale Scores Pre/Post Comparisons

There were 464 youths for which both Pre-test and Post-test scores were available. Pre-test and Post-test score comparisons are presented in Table 40.

T-tests results, comparing the average; Pre-test and Post-test scores of each PPI scale, indicate that the score differences, found for all scales, (excepting the Self-Esteem Scale) were statistically significant. The Post-test scale scores were, on average, significantly lower than Pre-test scale scores for these respondents. Lower scores at Post-test represent decreased problem severity, which is interpreted as positive treatment outcome or treatment effectiveness.

As shown in Table 42, with the exception of the Self-Esteem Scale, for which average Pre-test and Post-test scores were nearly identical, all mean, PPI Post-test scale scores are lower than mean, Pre-test scale scores. This means that clients showed improvement in all areas measured by PPI scales, (other than the Self-Esteem Scale) after completing treatment. A lower score upon Post-test (after treatment) can be interpreted by evaluators as a quantitative measure of treatment effectiveness.

Table 42. Pre-test/Post-test Scale Score Comparisons (2007, N=464)

PPI Scales	Pre-test Mean Score	Post-test Mean Score	T-value	Level of significance
Truthfulness Scale	29.54	18.99	12.54	p<.001
Alcohol Scale	51.94	44.31	10.19	p<.001
Drug Scale	52.27	37.12	18.10	p<.001
Distress Scale	44.34	15.60	31.75	p<.001
Resistance Scale	10.81	8.32	3.73	p<.001
Self-Esteem Scale	24.80	24.34	4.38	n.s.
Stress Coping Abilities	48.17	31.27	19.49	p<.001

Note: Scores on the Self-Esteem and Stress Coping Abilities Scales are reversed, in that higher scores are associated with better self-esteem and stress coping abilities. There were 464 clients included in this analysis.

Correlation analyses were also performed for Pre-test and Post-test scores for each scale (N=424). The Pearson's *r* coefficients attained for each scale (all significant at p<.001) are as follows: *Truthfulness Scale*, r=.107; *Alcohol Scale*, r=.438; *Drug Scale*, r=.381; *Distress Scale*, r=.317; *Resistance Scale*, r=.268; *Self-Esteem Scale*, r=.326; and *Stress Coping Abilities Scale*, r=.419. These strong and significant correlations mean that the Pre/Post Inventory administered at Pre-test effectively measures the same constructs that are measured at Post-test. In other words, the PPI Scales hold to what they are designed to measure, both before and after treatment. This is important, because as client mindset and risk levels change (prior to, during, and after treatment), the assessment must be able to account for these changes, while still effectively measuring what it is purported to measure.

39. Reliability of the Pre/Post Inventory in a Sample of Pre-Treatment Clients

Pre/Post Inventory, inter-item reliability was calculated for a sample of 1,884 youths who were administered the Pre-test prior to treatment (2008). Because the Pre-test is the baseline from which to determine treatment effectiveness, it is important that the PPI scales consistently measure what they are supposed to. Table 43 gives Pre-test scale reliability coefficients.

Table 43. Reliability coefficient alphas. (N =1,884, 2008).		
PRE/POST SCALES	**Pre-test Alphas**	**Level of Significance**
Truthfulness Scale	.85	p<.001
Alcohol Scale	.83	p<.001
Drug Scale	.87	p<.001
Distress Scale	.83	p<.001
Resistance Scale	.81	p<.001
Self-Esteem Scale	.91	p<.001
Stress Coping Abilities	.89	p<.001

As shown in table 43, all scale alphas for this sample of juveniles taking the PPI Pre-test exceeded the professionally accepted standard of .75. These results establish the excellent reliability of the Pre/Post Inventory.

40. Gender Differences in the Pre/Post Inventory
Assessments should account for possible gender differences. The Pre/Post Inventory has been standardized on both male and female respondents.

Gender Differences
T-tests were calculated for all PPI scales to assess possible, sex differences (2010). These results are presented in Table 44. Differences in scores were significant at the p<.001. The two exceptions were the Alcohol Scale and Drug Scale scores, for which the average scores of males and females were comparable.

Table 44. T-test comparisons of sex differences. (2010, N=308)			
PPI Scales	**Males (N=140) Mean**	**Females (N=34) Mean**	**T-Value**
Truthfulness Scale	26.76	16.35	3.78
Alcohol Scale	21.06	20.71	n.s.
Drug Scale	23.65	21.89	n.s.
Distress Scale	19.50	30.24	-4.52
Resistance Scale	11.13	6.71	2.68
Self-Esteem Scale*	23.50	35.82	-2.44
Stress Coping Abilities*	99.51	74.18	2.35

*Note: the Self-Esteem and Stress Coping Abilities Scales are reversed, in that higher scores represent lower risk.

Significant sex differences were seen on the PPI Truthfulness, Distress, Resistance, Self-Esteem, and Stress Coping Abilities Scale scores. Males averaged higher Truthfulness Scale scores, which means, in the case

of this sample, males were more likely to deny or minimize problems than their female counterparts. For both the Distress Scale and the Stress Coping Abilities scales, females' average scores were more problematic, (severe) than the average scores of males. Females in this sample had more pronounced distress and less ability to, effectively, manage stress. In regards to the Resistance and Self-Esteem Scales, males averaged more problematic scale scores than females. Males in this sample may have had more, impaired self-esteem and were more resistant to receiving help or treatment. Sex differences will continue to be explored in future, PPI and Juvenile Pre/Post research.

41. **Annual Database Research: Pre/Post Inventory Update**
PPI Update (2011)
Annual database research findings prompted an upgrade to the PPI. The PPI (adult and juvenile version) was improved in 2011; this revised version of the PPI replaced the previous version. The current (revised) PPI consists of 161 items. Individual scale items were revised or replaced with new items. The Resistance Scale was deleted and two additional scales, **Anxiety Scale and Depression Scale** were added. The PPI-Revised now has the following eight (8) scales: 1) **Truthfulness Scale**, 2) **Anxiety Scale** 3) **Depression Scale**, 4) **Distress Scale**, 5) **Self-Esteem Scale**, 6) **Alcohol Scale**, 7) **Drug Scale,** and 8) **Stress Management Scale**. As test data is gathered, the revised versions of the PPI and Juvenile Pre/Post will be examined.

42. Initial Examination of PPI Revised Psychometric Properties
The Pre/Post Inventory was recently updated to better accommodate the needs of our test users, and to improve test performance. The Pre/Post Inventory is now suitable for use in an even wider range of clinical settings. The Resistance Scale in the PPI has been removed and two additional scales are included: Anxiety Scale and Depression Scale. The other scales remain intact.

In this study, there were 388 clients who completed the pre- and post-test versions of the PPI-Revised.

Reliability
The ability of a scale (measure) to generate consistent results is known as its reliability. Perfect reliability is 1.00. The professionally accepted standard for this type of reliability score is .70 - .80 (Murphy & Davidhofer, 2001).

The inter-item reliability (alpha) coefficients for six Pre/Post Inventory scales are presented in Table 1. Reliability statistics were examined for both Pre-test and Post-test data. All of the alpha reliability coefficients, for all Pre/Post Inventory scales, at pre-test and post-test scales, were above the professionally accepted standard.

Table 45: PPI Reliability Coefficients (N=388, 2011)

Scales	Pre-test Alphas	Post-test Alphas
Truthfulness Scale	.86	.85
Alcohol Scale	.86	.86
Drug Scale	.87	.86
Distress Scale	.85	.85
Self-Esteem Scale	.90	.89

Stress Management	.92	.91

Reliability analysis of the Anxiety Scale and Depression Scale, in a sample of 1,129 treatment clients, yielded impressive reliability coefficients of **.92** and **.90**, respectively. Inclusion of the accurate, research-based Anxiety Scale and Depression Scale will expand the utility of the Pre/Post Inventory.

The interval between pre- and post- test administrations varied from 0 months to 43 months. The mean number of months between pre-test and post-test was seven months, (approximately 218 days) with a median of 199 days (6.6 months). Fixed, retest intervals would be desirable for research purposes, but were not possible for this study.

T-tests results, comparing the average Pre-test and Post-test scores of each PPI scale, indicate that the score differences found for all scales (excepting the Self-Esteem Scale) were statistically significant. The Post-test scale scores were, on average, significantly lower than Pre-test scale scores, for these respondents. Lower scores at Post-test represent a decrease in problem severity. This is interpreted as positive treatment outcome (the treatment had its desired result).

As shown in Table 45, with the exception of the Self-Esteem Scale, for which average Pre-test and Post-test scores were nearly identical, all mean, PPI Post-test scale scores are lower than mean, Pre-test scale scores. This means that clients showed improvement in all areas measured by PPI scales, (other than the Self-Esteem Scale) after completing treatment. A lower score upon Post-test (after treatment) can be interpreted by evaluators as a quantitative measure of treatment effectiveness.

Correlation analyses were also performed for Pre-test and Post-test scores for each scale (N=388). The Pearson's *r* coefficients attained for each scale (all significant at p<.001) are as follows: *Truthfulness Scale*, r=.347; *Alcohol Scale*, r=.429; *Drugs Scale*, r=.434; *Distress Scale*, r=.493; *Resistance Scale*, r=.228; *Self-Esteem Scale*, r=.163; and *Stress Management Scale*, r=.406. These significant, robust correlations mean that the Pre/Post Inventory, administered at Pre-test, effectively measures the same constructs that are measured at Post-test. In other words, Pre/Post Inventory scales adhere to what they are designed to measure, both before and after treatment. This is important, because as client mindset and risk levels change (prior to, during, and after treatment), the assessment must be able to account for these changes while still, effectively measuring what it is purported to measure.

Table 46. Pre-test/Post-test Scale Score Comparisons (2011, N=388)

PPI Scales	Pre-test Mean Score	Post-test Mean Score	T-value	Level of significance
Truthfulness Scale	24.99	14.56	13.73	p<.001
Alcohol Scale	22.02	17.57	3.97	p<.001
Drug Scale	25.19	16.32	7.77	p<.001
Distress Scale	19.75	15.32	5.81	p<.001
Resistance Scale	10.63	8.32	3.48	p<.001
Self-Esteem Scale	22.94	24.22	-.700	n.s.
Stress Management	98.22	130.95	-8.64	p<.001

Treatment effect is a key area of inquiry for counselors, therapists, and other professionals working with clients in substance abuse and mental health treatment settings. The Pre/Post Inventory scales were developed to facilitate determining treatment outcome. Statistics presented in this report demonstrate the

statistical soundness of the Pre/Post Inventory scales. Ongoing database research and test standardization ensure optimum, Pre/Post Inventory scales' accuracy and performance.

43. Reliability Study of PPI-Revised

This study represents an update of earlier research on the reliability of the PPI-Revised, with the addition of the Anxiety Scale and Depression Scale. This study focuses on the reliability of pre-test and post-test scores, for 140 clients.

<u>Participants</u>

Gender: 15% were male, 85% were female; Race: 65% were Caucasian; <1% African-American; 7% were Hispanic; 1% were Asian; 20% were Native American; 6% reported Other. Marital: 50% were single; 21% were married; 19% were divorced; 8% were separated; and 1% widowed; Education: 4% completed less than 8th grade; 18% completed some high school; 51% graduated from high school; 18% completed some college, 9% graduate college or a professional/graduate degree. Age: the average age for all offenders was 35. Length of treatment: Average length of treatment was 223 days; the range was 1 day – 483 days.

Table 47: PPI Reliability Coefficients (N=140, 2014)

Scales	Pre-test	Post-test
Truthfulness	.88	.88
Alcohol	.94	.91
Drug	.93	.87
Distress	.88	.83
Self-Esteem	.79	.81
Anxiety	.93	.90
Depression	.89	.85
Stress Management	.84	.87

The ability of a scale (measure) to generate consistent results is known as its reliability. Perfect reliability is 1.00. The professionally accepted standard for this type of reliability score is .70 - .80 (Murphy & Davidhofer, 2001).

The reliability (alpha) coefficients for Pre/Post Inventory scales administration time are presented in Table 46. All coefficients for both pre-test and post-test scales were above the professionally accepted standard. This consistency between test administration ensures score reliability, across treatment time/length.

The Pre/Post Inventory demonstrated excellent score reliability, across time. Reliability is an essential feature in assessment and reassures professionals that the instrument is consistently measuring constructs, associated with client risk and offender treatment.

44. Treatment Outcome Study

The Pre/Post Inventory scales were developed to facilitate the evaluation of treatment outcomes. The Pre-test is administered as part of the client intake process; then, the inventory is administered a second

time, (post-test) during or after treatment. Scores from pre-test administration and post-test administration are compared. Lower scores at post-test scores represent a decrease in problem severity, with the exception of the Stress Management Scale and Self-Esteem Scales. These two scales measure prosocial and protective factors, so a *higher* score would represent a decrease in problem severity. Changes in post-test scores (decreased problem severity) are interpreted as positive treatment outcomes; the treatment had its desired result. Data from 140 clients, who had completed both the pre-test and post-test, w as included in this analysis.

Participants
Gender: 15% were male, 85% were female; Race: 65% were Caucasian; <1% African-American; 7% were Hispanic; 1% were Asian; 20% were Native American; 6% reported Other. Marital: 50% were single; 21% were married; 19% were divorced; 8% separated; and 1%, widowed. Education: 4% completed less than 8th grade; 18% completed some high school; 51% graduated from high school; 18% completed some college; 9% graduate college or a professional/graduate degree. Age: the average age for all offenders was 35. Length of treatment: Average length of treatment was 223 days; the range was 1 day – 483 days.

Procedures
T-test analyses were conducted to explore treatment outcomes for the 140 clients. Average Pre-test and Post-test scores for each PPI scale were compared. A lower score upon Post-test (after treatment) can be interpreted by evaluators as a quantitative measure of treatment effectiveness. Adjustments were made for unequal variance, and a Bonferroni correction was applied to control for experimentwise error (*p = <.006).*

Results
Mean score comparisons found that post-test scores demonstrated positive treatment outcomes (reduced problem severity) on all scales, except the Truthfulness Scale and Alcohol Scale. There was a slight increase in Truthfulness Scale and Alcohol Scale scores on the post-test administration. These results were not, statistically, significant and may be the result of extreme scores, acting on a relatively small sample size, or the small mean difference between test administrations. Results are presented in Table 46.

As noted in Table 48, statistically significant results were found for the Drug Scale, Distress Scale, Depression Scale, Anxiety Scale, Self-Esteem Scale, and Stress Management Scale, again, suggesting that there were meaningful differences in pre-test and post-test problem severity and treatment effectiveness.

Table 48. Pre-test/Post-test Scale Mean Score Comparisons (N=140, 2014)

Scales	Pre-test Mean Score	Post-test Mean Score	*t*	*p*
Truthfulness	6.23	7.50	-1.53	n.s
Alcohol	20.34	22.01	-1.49	n.s
Drug	35.86	27.99	6.96	.001
Distress	15.68	8.77	7.08	.001

Depression	19.16	9.39	8.79	.001
Anxiety	28.65	14.23	10.23	.001
Self-Esteem	1.02	12.32	-6.75	.001
Stress Management	85.63	115.24	-7.63	.001

This study examined treatment outcomes for 140 clients who completed the PPI-Revised Pre-test and Post-test. Treatment outcomes are a key area of inquiry for counselors, therapists, and other professionals working with clients in substance abuse and mental health treatment settings. The Pre/Post Inventory scales were developed to help clinical professionals determine whether clients have made changes, positive or negative, as a result of treatment participation. Results from this study have demonstrated that meaningful and positive changes occurred for this group of clients.

42. Initial Examination of PPI-Revised Psychometric Properties

The Pre/Post Inventory was recently updated to better accommodate the needs of our test users, and to improve test performance. The Pre/Post Inventory is now suitable for use in an even, wider range of clinical settings. The Resistance Scale in the PPI has been removed, and two, additional scales are included: Anxiety Scale and Depression Scale. The other scales remain intact.

In this study, there were 388 clients who completed the pre and post-test versions of the PPI-Revised.

Reliability

The ability of a scale (measure) to generate consistent results is known as its reliability. Perfect reliability is 1.00. The professionally accepted standard for this type of reliability score is .70 - .80 (Murphy & Davidhofer, 2001).

The inter-item reliability (alpha) coefficients for six Pre/Post Inventory scales are presented in Table 49. Reliability statistics were examined for both Pre-test and Post-test data. All of the alpha reliability coefficients, for all Pre/Post Inventory scales at pre-test and post-test scales, were above the professionally accepted standard.

Table 49: PPI Reliability Coefficients (N=388, 2011)

Scales	**Pre-test Alphas**	**Post-test Alphas**
Truthfulness Scale	.86	.85
Alcohol Scale	.86	.86
Drug Scale	.87	.86
Distress Scale	.85	.85
Self-Esteem Scale	.90	.89
Stress Management	.92	.91

Reliability analysis of the Anxiety Scale and Depression Scale, in a sample of 1,129 treatment clients, yielded impressive reliability coefficients of **.92** and **.90**, respectively. Inclusion of the accurate,

research-based Anxiety Scale and Depression Scale will expand the utility of the Pre/Post Inventory.

The interval between pre- and post- test administrations varied from 0 months to 43 months. The mean number of months between pre-test and post-test was seven months, (approximately 218 days) with a median of 199 days (6.6 months). Fixed retest intervals would be desirable for research purposes, but were not possible for this study.

T-tests results, comparing the average pre-test and post-test scores of each PPI scale, indicate that the score differences found, for all scales, (excepting the Self-Esteem Scale) were statistically significant. The post-test scale scores were, on average, significantly lower than pre-test scale scores for these respondents. Lower scores at post-test represent a decrease in problem severity. This is interpreted as positive treatment outcome (the treatment had its desired result).

As shown in Table 50, with the exception of the Self-Esteem Scale, for which average pre-test and post-test scores were nearly identical, all mean PPI post-test scale scores are lower than mean, pre-test scale scores. This means that clients showed improvement in all areas measured by PPI scales, (other than the Self-Esteem Scale) after completing treatment. A lower score upon post-test (after treatment) can be interpreted by evaluators as a quantitative measure of treatment effectiveness.

Correlation analyses were also performed for Pre-test and Post-test scores for each scale (N=388). The Pearson's *r* coefficients attained for each scale (all significant at p<.001) are as follows: *Truthfulness Scale*, r =.347; *Alcohol Scale*, r =.429; *Drugs Scale*, r=.434; *Distress Scale*, r =.493; *Resistance Scale*, r =.228; *Self-Esteem Scale*, r =.163; and *Stress Management Scale*, r =.406. These significant, robust correlations mean that the Pre/Post Inventory; administered at pre-test; effectively measures the same constructs that are measured at Post-test. In other words, Pre/Post Inventory scales adhere to what they are designed to measure, both before and after treatment. This is important, because as client mindset and risk levels change (prior to, during, and after treatment), the assessment must be able to account for these changes, while still effectively measuring what it is purported to measure.

Table 50. Pre-test/Post-test Scale Score Comparisons (2011, N=388)

PPI Scales	Pre-test Mean Score	Post-test Mean Score	T-value	Level of significance
Truthfulness Scale	24.99	14.56	13.73	p<.001
Alcohol Scale	22.02	17.57	3.97	p<.001
Drug Scale	25.19	16.32	7.77	p<.001
Distress Scale	19.75	15.32	5.81	p<.001
Resistance Scale	10.63	8.32	3.48	p<.001
Self-Esteem Scale	22.94	24.22	-.700	n.s.
Stress Management	98.22	130.95	-8.64	p<.001

Treatment effect is a key area of inquiry for counselors, therapists, and other professionals working with clients in substance abuse and mental health treatment settings. The Pre/Post Inventory scales were developed to facilitate determining treatment outcome. Statistics presented in this report demonstrate the

statistical soundness of the Pre/Post Inventory scales. Ongoing, database research and test standardization ensures optimum, Pre/Post Inventory scales' accuracy and performance.

43. Reliability Study of PPI-Revised
This study represents an update of earlier research on the reliability of the PPI Revised, with the addition of the Anxiety Scale and Depression Scale. This study focuses on the reliability of pre-test and post-test scores, for 140 clients.

Gender: 15% were male, 85% were female. Race: 65% were Caucasian; <1% African-American; 7% were Hispanic; 1% were Asian; 20% were Native American; 6% reported Other. Marital: 50% were single; 21% were married; 19% were divorced; 8% were separated; and 1% widowed. Education: 4% completed less than 8th grade; 18% completed some high school; 51% graduated from high school; 18% completed some college; 9% graduate college or a professional/graduate degree. Age: The average age for all offenders was 35. Length of treatment: Average length of treatment was 223 days; the range was 1 day – 483 days.

Table 51: PPI Reliability Coefficients (N=140, 2014)

Scales	Pre-test	Post-test
Truthfulness	.88	.88
Alcohol	.94	.91
Drug	.93	.87
Distress	.88	.83
Self-Esteem	.79	.81
Anxiety	.93	.90
Depression	.89	.85
Stress Management	.84	.87

The ability of a scale (measure) to generate consistent results is known as its reliability. Perfect reliability is 1.00. The professionally accepted standard for this type of reliability score is .70 - .80 (Murphy & Davidhofer, 2001).

The reliability coefficients for Pre/Post Inventory scales, by administration type, are presented in Table 51. All coefficients for both pre-test and post-test scales were above the professionally accepted standard. This consistency between test administration ensures score reliability, across treatment time/length.

The Pre/Post Inventory demonstrated excellent score reliability, across time. Reliability is an essential feature in assessment, and reassures professionals that the instrument is consistently measuring constructs, associated with client risk and offender treatment.

44. Treatment Outcome Study

The Pre/Post Inventory scales were developed to facilitate the evaluation of treatment outcomes. The pre-test is administered as part of the client intake process; then, the inventory is administered a second time, (post-test) during or after treatment. Scores from pre-test administration and post-test administration are compared. On most scales, lower scores on the post-test represent a decrease in problem severity. The Stress Management Scale and Self-Esteem Scales measure prosocial and protective factors, so *higher scores* represent a reduction in problem severity. Changes in post-test scores (decreased problem severity) are interpreted as positive treatment outcomes -- the treatment had its desired result. Data for 140 clients, who had completed both the pre-test and post-test were included in this analysis.

Gender: 15% were male, 85% were female. Race: 65% were Caucasian, <1% African-American; 7% were Hispanic; 1% were Asian; 20% were Native American; 6% reported Other. Marital: 50% were single; 21% were married; 19% were divorced; 8% were separated; and 1% were widowed. Education: 4% completed less than 8th grade; 18% completed some high school; 51% graduated from high school; 18% completed some college; 9% graduated college or a professional/graduate degree. Age: The average age for all offenders was 35. Length of treatment: Average length of treatment was 223 days; the range was 1 day – 483 days.

Procedures
T-test analyses were conducted to explore treatment outcomes for the 140 clients. Average Pre-test and Post-test scores for each PPI scale were compared. A lower score, upon Post-test, (after treatment) can be interpreted by evaluators as a quantitative measure of treatment effectiveness. Adjustments were made for unequal variance, and a Bonferroni correction was applied to control, for experimentwise error (*p = <.006)*.

Results
Mean score comparisons found that post-test scores demonstrated positive treatment outcomes (reduced problem severity) on all scales, except the Truthfulness Scale and Alcohol Scale. There was a slight increase in Truthfulness Scale and Alcohol Scale scores on the post-test administration. These results were not, statistically, significant and may be the result of small sample size, extreme post-test score, or small mean difference between administrations. Results are presented in Table 52.

Statistically significant results were found for the Drug Scale, Distress Scale, Depression Scale, Anxiety Scale, Self-Esteem Scale, and Stress Management Scale, again, suggesting that there were meaningful differences between pre-test and post-test problem severity and treatment effectiveness.

Table 52. Pre-test/Post-test Scale Mean Score Comparisons (N=140, 2014)

Scales	Pre-test Mean Score	Post-test Mean Score	*t*	*p*
Truthfulness	6.23	7.50	-1.53	n.s
Alcohol	20.34	22.01	-1.49	n.s
Drug	35.86	27.99	6.96	.001
Distress	15.68	8.77	7.08	.001
Depression	19.16	9.39	8.79	.001
Anxiety	28.65	14.23	10.23	.001
Self-Esteem	1.02	12.32	-6.75	.001
Stress Management	85.63	115.24	-7.63	.001

This study examined treatment outcomes for 140 clients who completed the PPI-Revised pre-test and

post-test administrations. Treatment outcomes are a key area of inquiry for counselors, therapists, and other professionals working with clients in substance abuse and mental health treatment settings. The Pre/Post Inventory scales were developed to help clinical professionals determine whether clients have made changes, positive or negative, as a result of treatment participation. Results from this study have demonstrated that meaningful and positive changes occurred for this group of clients.

45. PPI Reliability (N = 319, 2014)

This study represents the first comparison of Pre/Post Inventory (PPI) reliability, across test administrations. The method for establishing score reliability was Cronbach's alpha, a measure of internal consistency. Internal consistency is used to identify consistency, redundancy, and homogeneity of items. Internal consistency is preferred over the test-retest reliability method, because treatment effects are expected and, likely, to impact scores. Also, in this instance, internal consistency was preferred over split-half method, because the PPI has 8 scales and it presents some difficulty in splitting the test, to ensure that items from each scale are, equally, represented in the halves.

There were 319 total tests; 193 pre-test scores and 126 post-test scores were used in this analysis. All clients were female. The average age was 33; the majority was single, white, and had at least a high school education. The average number of days in between test administrations was 246, approximately 8 months.

Table 53. Reliability Comparison

Scale	Pre-test Coefficient	Post-test Coefficient
Truthfulness	.839	.850
Alcohol	.939	.902
Drug	.857	.791
Anxiety	.924	.912
Depression	.908	.887
Distress	.864	.822
Esteem	.854	.802
Stress Management	.840	.886

As noted above, internal consistency was selected as the measure of reliability, specifically, Cronbach's alpha. Cronbach's alpha can range from $0 - 1$; 1 equals perfect reliability and lower values signify poorer reliability. The generally accepted range for clinical tools like the PPI is .70 - .90 (Murphy & Davidshofer, 2001). As observed in Table 53, the reliability coefficients remained fairly stable, with several reliability estimates decreasing on post-test administration. These changes may be related to the characteristics of the individuals who took the post-test -- participation in treatment may alter clients' relationships to the construct that the PPI scale is measuring (Murphy & Davidshofer, 2001).

Confidence intervals for each scale, pre-test and post-test, were created to examine the accuracy of the scale scores. The post-test reliability coefficients were within the pre-test confidence intervals, except on the Self-Esteem and Stress Management Scales. In general, these findings indicate that the post-test reliability fluctuations were a result of measurement error and not a fundamental problem with the items, scores, or PPI test. Table 54 presents the results.

The fluctuation seen on the Self-Esteem and Stress Management Scale may, indeed, be due interactions between clients and some items. Both of these scales measure protective factors and sources of support. Involvement in a treatment program, by its nature, serves as a source of support -- scores may reflect this.

Table 54. Pre-test and Post-test Confidence Intervals

| Scales	*Pre-test*		*Post-test*	
	Lower Limit	Upper Limit	Lower Limit	Upper Limit
Truthfulness	.775	.903	.824	.876
Alcohol	.368	1.00	.498	1.00
Drug	.269	1.00	.247	1.00
Anxiety	.303	1.00	.772	1.00
Depression	.444	1.00	.841	.933
Distress	.542	1.00	.787	.857
Esteem	.852	.856	.798	.806
Stress Management	.827	.853	.882	.890

These results support the reliability of PPI pre-test and post-test scores, as well as the accuracy of the PPI. Most important for evaluators and clinicians, participation in treatment does not alter the accuracy or reliability of clients' scores. Score reliability, validity, and accuracy retained their strong statistical features, when pre-test and post-test results were compared.

46. PPI Outcome Study (2015)

In this study there were 425 pre and posttests administered during this time frame. There were 251 pretests completed and 174 posttests completed; 171 pretests and posttests were matched for a treatment center in Western United States. The matched group (N=171) was used to evaluate client outcomes.

All clients were female and their average age was 34. The range was 18 – 57 years old; 59% were Caucasian, 8% were African-Americans, 4% were Hispanic, 8% were Asian, 32% were Native

American and 2% reported Other in the race/ethnicity category; 49% graduated high school; 51% were single, 24% were married, 16% were divorced, 6% separated and 2% were widowed.
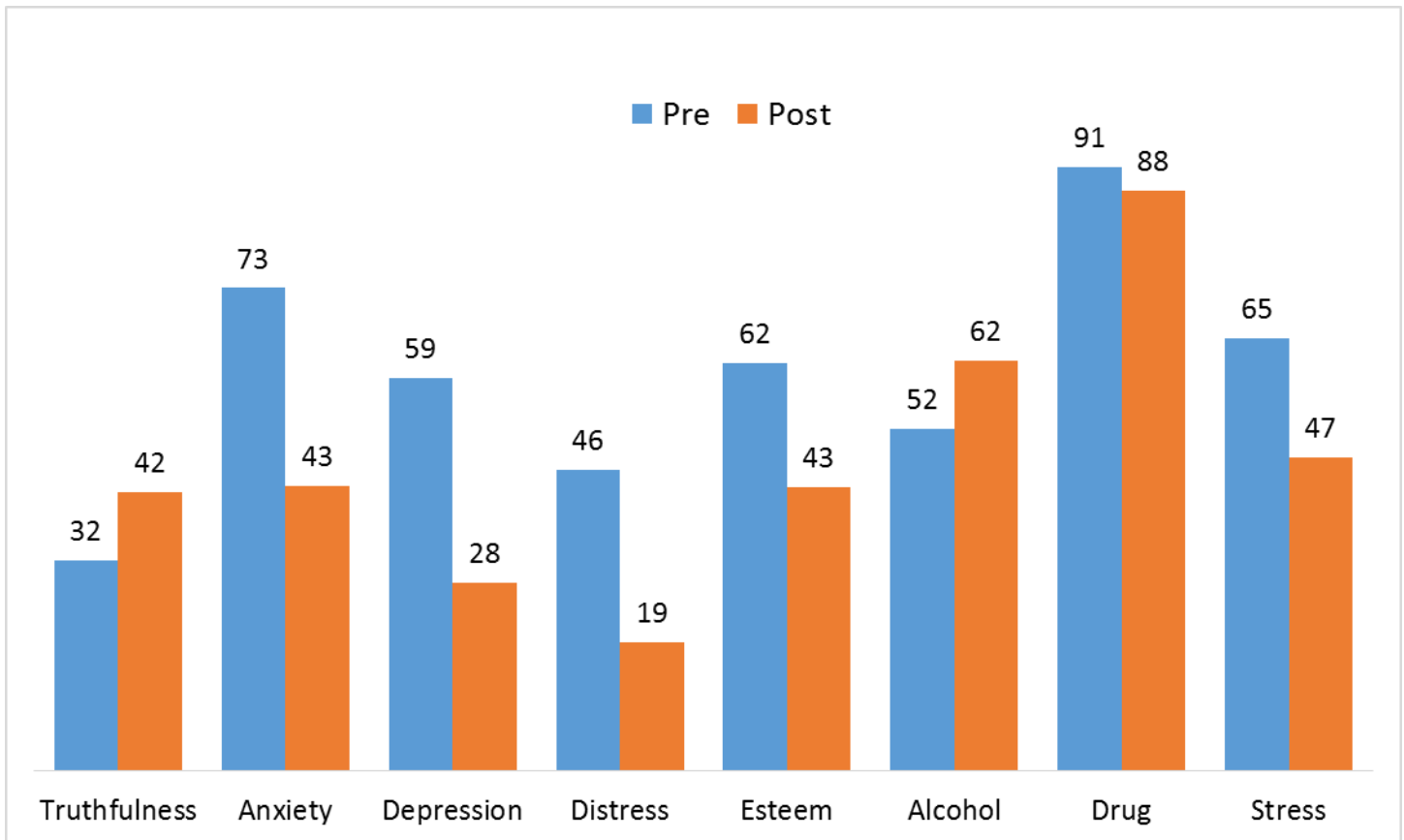
Lower posttest percentile scores were found on the Anxiety Scale, Depression Scale, Distress Scale, Esteem Scale, Drug Scale and Stress Coping Abilities Scale—indicating a reduction in symptoms and risk severity. Alcohol scores were higher on the posttest indicating an increase in problem severity. Higher scores on the posttest Alcohol Scale was unexpected but consistent with previous Elkhorn Treatment Center findings—the cause for the increase in unknown. This result may be the due to the impact of a higher score on the overall average. Higher scores for posttest scores on the Truthfulness Scale have been seen in previous findings and are associated with positive changes in problem recognition (e.g., reduced denial) as a result of their treatment versus greater problem minimization.

In addition to score comparisons, dependent measure t-test analyses were conducted to examine whether the differences between pretest and posttest mean scores were statistically significant. Adjustments were made to control for unequal variance and Bonferroni adjustment was applied to control experimentwise error. **Results were statistically significant for all scales.**

The findings from the outcome analysis demonstrate statistically significant changes in behavior for these 171 clients as measured by the Pre-Post Inventory (PPI). Treatment has been successful in addressing anxiety and depression, reducing distress, treating drug-related issues, and improving self-esteem along with stress management skills. The treatment approach does not seem to have had an impact on alcohol-related problems as demonstrate by increased Alcohol Scale posttest scores.

SUMMARY

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

Summarized research demonstrates that the PPI is a reliable, valid. and accurate instrument for client assessment. It is reasonable to conclude that the PPI does what it purports to do. The PPI 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 PPI is a research-based assessment instrument or test. Its pre/post design is uniquely advantageous to counseling/treatment research. Using the Pre-test as a baseline for Post-test comparison ensures accurate outcome or counseling, and/or treatment effectiveness measures. The same test is administered twice; once before treatment (Pre-test) and once after treatment (Post-test).

The PPI cumulative database was built with ongoing research in mind. Each PPI that is administered is included (via test answers) in its cumulative database, so each test users' client population is included in annual standardization research. As always, test data is utilized in a confidential (no names) manner. This proprietary database provides a large and continually expanding amount of data, ideal for research purposes. Ongoing database research and test standardization ensure optimum PPI accuracy and performance.

The PPI was standardized on both adults and juveniles. Adult and juvenile versions of the PPI are available to our test users, and as outlined within this document, the PPI is statistically robust, regardless of whether it is administered to adults or juveniles. It is important to continue to standardize treatment effectiveness assessments on both adults and juveniles who are undergoing treatment, so that any differences between the two types of respondents are examined and, as warranted, accounted for.

Areas for future PPI research are varied and complex. Behavior Data Systems, Ltd. will continue its research and development efforts. Database research is a primary focus. Consistent with the foregoing, Behavior Data Systems, Ltd. encourages other scientists to participate in PPI research. Few fields of assessment represent such important opportunities for research and creative discovery. Treatment effectiveness is a key area of inquiry for counselors, therapists, and other professionals working with clients in substance abuse and mental health treatment settings.

Parties interested in using the Pre/Post Inventory (PPI) in future research should contact Herman Lindeman, Ph.D. at Behavior Data Systems, Ltd., P.O. Box 44256, Phoenix, Arizona 85064-4256. Our email address is hl@bdsltd.com and our toll-free telephone number is 1 (800) 231-2401. Our office hours are 7:30AM to 4:30PM Mountain Standard Time.

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