

**Pre-Post Inventory**  
**An Inventory of Scientific Findings**

## TABLE OF CONTENTS

Introduction .....	1
PPI Measures (Scales) .....	2
Truthfulness .....	2
Alcohol Scale.....	2
Drugs Scale .....	2
Distress Scale.....	2
Resistance Scale .....	3
Self-Esteem Scale .....	3
Stress Coping Abilities Scale.....	3
PPI Research .....	3
Stress Quotient Research.....	3
Pre-Post Inventory Research .....	7
A Study of PPI Test-Retest Reliability .....	7
Validation of the Truthfulness Scale.....	8
Validation of Five Pre-Post Inventory Scales Using Criterion Measures.....	9
Inter-item Reliability of the Pre-Post Inventory .....	10
Relationships between Selected PPI Scales and Polygraph Examination.....	12
Replication of PPI Reliability in a Sample of Inpatient Clients .....	13
Validation of the PPI Scales Using DWI Evaluator Ratings .....	14
Validation of PPI Scales Using the Mortimer-Filkins Test .....	15
Validation of PPI Scales Using the MacAndrews Scale.....	15
Validation of PPI Scales Using DRI Scales as Criterion Measures .....	16
Validation of the PPI Self-Esteem Scale .....	17
Validation of the PPI with MMPI Scales as Criterion Measures .....	17
Reliability of the PPI in a Sample of Outpatient Clients .....	18
A Study of PPI Reliability in a Sample of Inpatient Clients.....	18
A Study of PPI Reliability in a Sample of Outpatients.....	19
Reliability of the PPI in a Large Sample of Outpatients.....	20
Reliability Study on Three Samples of Outpatient Clients.....	21
PPI Reliability in a Large Sample of Inpatient Clients .....	22
PPI Reliability, Scale Risk Range Accuracy and Gender Differences.....	23
A Replication Study of Reliability, Validity and Accuracy of the PPI-Pretest.....	25
Reliability and Accuracy of the PPI-Posttest .....	28
PPI Reliability, Validity and Accuracy in a Sample of Youths.....	30
PPI Pretest-Posttest Comparison Study .....	31
PPI Pre-Post Outcome Study .....	40
PPI Pre-Post Outcome Study in a Sample of Juvenile Clients .....	42
PPI: Assessing Treatment Outcome.....	47
Summary .....	50

## 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, Drugs, Distress, Resistance and Self-esteem, Stress Coping Abilities. The PPI has been researched on outpatients, inpatients, college students and others.

The PPI report explains client's attained scores and makes specific intervention and treatment recommendations. It also presents Truth-Corrected scores, significant items, a concise "structured interview" and much more. Comparison reports compare pretest results with posttest 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 effect peoples 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.

## **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. Drugs Scale:** The burgeoning awareness of the impact of illicit drugs emphasizes the need for any clinical assessment to differentiate between licit and illicit drugs. The Drugs Scale is an **independent** measure of the client's drug-related problems. Without this type of scale many drug abusers would remain undetected. Thus, the 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 Drugs 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 correlation's 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 correlation's were in predicted directions. The significant correlation's between SQ and SRRS as well as S and SRRS support the construct validity of the SQ or Stress Coping Abilities Scale.

**Validation Study 4:** This validation study (1982) evaluated the relationship between factor C (Ego

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

In a subsequent study the relationship between factor Q4 (Free Floating Anxiety) on the 16 PF Test and S (Stress) on the SQ scale was investigated. High Q4 scores reflect free floating anxiety and tension, whereas high S scores measure experienced stress. A high positive correlation between Q4 and S was predicted. There were 22 of the original 34 subjects included in this analysis since the remainder of the original files were unavailable. All 22 subjects were male. The results indicated that Factor Q4 scores were significantly correlated (product-moment correlation coefficient) with S scores ( $r = .584, p < .05$ ). Results were significant and in predicted directions. The significant correlation's 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 correlation's would be positive, since people experiencing high levels of manifest anxiety would also likely experience high levels of stress. The subjects were 51 psychotherapy outpatients ranging in age from 22 to 56 years with an average age of 34. There were 23 males and 28 females. The MMPI and the SQ were administered in counterbalanced order. The correlation (product-moment correlation coefficient) results indicated that ES and CS were positively significantly correlated ( $r = .29, p < .001$ ). MAS and S comparisons resulted in an  $r$  of .54, significant at the  $p < .001$  level. All results were significant and in predicted directions.

In a related study (1982) utilizing the same population data ( $N=51$ ) the relationship between the Psychasthenia (Pt) scale in the MMPI and the S component of the SQ scale was evaluated. The Pt scale in the MMPI reflects neurotic anxiety, whereas the S component of the SQ scale measures stress. Positive Pt and S correlations were predicted. The correlation (product-moment correlation coefficient) results indicated that the Pt scale and the S component of the SQ scale were significantly correlated ( $r = .58, p < .001$ ). Results were significant and in the predicted direction. The significant correlation's 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 (-0.068), 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, Drugs 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 insures 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 again.

#### 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 from those trying to fake good. It was hypothesized that the group trying to fake good would score higher on the Truthfulness Scale than the group instructed to be honest.

### Method

Seventy-eight Arizona State University college students (1985) enrolled in an introductory psychology class were randomly assigned to one of two groups. Group 1 comprised the "Honest" group and Group 2 comprised the "Fakers" group. Group 1 was instructed to be honest and truthful while completing the test. Group 2 was instructed to "fake good" while completing the test, but to respond "in such a manner that their faking good would not be detected." The test, which included the 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, Drugs and Stress Coping Abilities) were validated with comparable scales on the Minnesota Multiphasic Personality Inventory (MMPI). The MMPI was selected for this validity

study because it is the most researched, validated and widely used objective personality test in the United States. The 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 Drugs 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 (1985) 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 between 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 highly significant positive correlation with the MMPI Lie (L) Scale. A high L Scale score on the MMPI invalidates other MMPI scale scores due to untruthfulness. This helps in understanding why the Truthfulness Scale is significantly, but negatively, correlated with the other represented MMPI scales. Similarly, the MMPI L Scale correlates significantly, but negatively, with the other PPI scales.

Table 1. (1985) Product-moment correlations between MMPI scales and PPI scales					
MMPI SCALES (MEASURES)	PPI SCALES (MEASURES)				
	Truthful- ness	Alcohol	Drugs	Resistance	Stress Coping
<b>L (Lie) Scale</b>	0.72	-0.38	-0.41	-0.29	0.53
<b>Psychopathic Deviant</b>	-0.37	0.52	0.54	0.27	-0.59
<b>Psychasthenia</b>	-0.34	0.38	0.41	0.37	-0.68
<b>Social Maladjustment</b>	-0.25	0.34	0.26	0.35	-0.54
<b>Authority Conflict</b>	-0.43	0.31	0.47	0.55	-0.46
<b>Manifest Hostility</b>	-0.45	0.34	0.47	0.57	-0.58
<b>Taylor Manifest Anxiety</b>	-0.58	0.47	0.46	0.50	-0.78
<b>MacAndrews</b>	-0.40	0.58	0.62	0.26	-0.33
<b>Social Alienation</b>	-0.47	0.35	0.45	0.48	-0.67

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

The **Alcohol Scale** correlates significantly with all represented MMPI scales. This is consistent with the conceptual definition of the Alcohol Scale and previous research that has found that alcohol abuse is associated with mental, emotional and physical problems. Of particular interest are the highly significant correlations with the 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 **Drugs 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 correlation's 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 measures the particular trait (or factor) that scale was designed to measure. Within-test reliability measures are referred to as inter-item reliability. The most common method of reporting within-test (scale) inter-item reliability is with Coefficient Alpha.

#### Method

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

#### Results and Discussion

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

<b>Table 2. Inter-item reliability, coefficient alpha. (1985) Outpatients, Substance Abuse Inpatients and Job Applicants (N = 389)</b>				
<b>PPI SCALES MEASURES</b>	<b>N ITEMS</b>	<b>Outpatients (N = 100)</b>	<b>Inpatients (N = 100)</b>	<b>Job Applicants (N = 189)</b>
<b>Truthfulness Scale</b>	21	0.81	0.79	0.81
<b>Alcohol Scale</b>	21	0.86	0.93	0.83
<b>Drugs Scale</b>	21	0.80	0.85	0.79
<b>Resistance Scale</b>	21	0.74	0.74	0.61
<b>Stress Coping Abilities</b>	40	0.81	0.84	0.73

<b>Table 3. Within-test reliability, F statistic.</b>				
<b>PPI SCALES MEASURES</b>	<b>N ITEMS</b>	<b>Outpatients (N = 100)</b>	<b>Inpatients (N = 100)</b>	<b>Job Applicants (N = 189)</b>
<b>Truthfulness Scale</b>	21	21.73	53.15	45.91
<b>Alcohol Scale</b>	21	9.29	31.46	47.75
<b>Drugs Scale</b>	21	27.19	16.34	58.18
<b>Resistance Scale</b>	21	15.97	19.21	23.67
<b>Stress Coping Abilities</b>	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 Drugs Scale are in close agreement. The Stress Coping Abilities Scale shows similar results for the chemical dependency groups but the job applicant group had a slightly lower coefficient alpha. This difference might be accounted for by the fact that individuals applying for a job would not want to show themselves in a bad light by indicating they have an emotional, stress-related or mental health problem.

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

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.

<b>PPI SCALES MEASURES</b>	<b>N ITEMS</b>	<b>COEFFICIENT ALPHA</b>	<b>F VALUE</b>
<b>Truthfulness Scale</b>	21	0.82	96.93
<b>Alcohol Scale</b>	21	0.94	26.68
<b>Drugs Scale</b>	21	0.88	79.71
<b>Resistance Scale</b>	21	0.77	53.03
<b>Stress Coping Abilities</b>	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 Drugs 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 Drugs Scales are well suited for comparison with the polygraph exam because of the situation specific nature of the scales. Alcohol and drug items are direct and relate specifically to alcohol and drug use. The comparison with the Truthfulness Scale is less direct because of the subtle nature of the Truthfulness Scale items as used in the PPI. The respondent's attitude, emotional stability and tendencies to fake good affect the Truthfulness Scale. It was expected that the Alcohol and Drugs Scales would be highly correlated with the polygraph results and the Truthfulness Scale would show a somewhat less but nonetheless significant correlation.

##### Method

One hundred and eighty-nine (189) job applicants (1985) were administered both the 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 Drugs Scale ( $r = 0.56$ ,  $p < .001$ ).

In summary, this study supports the validity of the PPI Truthfulness Scale, Alcohol Scale and Drugs 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 demonstrates the validity of the PPI Truthfulness, Alcohol and Drugs measures.

These results are important because the Polygraph exam is a direct measure obtained from the individual being tested rather than a rating by someone else. This is similar to self-report such as utilized in the 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.

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

**PPI scales (measures) 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 shown in the table below, the product-moment correlation coefficients between staff ratings and scale scores are highly statistically significant at  $p < .001$ .

<b>PPI SCALES</b>	<b>AGREEMENT COEFFICIENT</b>	<b>SIGNIFICANCE LEVEL</b>
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.

<b>PPI SCALES</b>	<b>MAST</b>	<b>SANDLER</b>	<b>COURT PROCEDURE</b>
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 Drugs Scales.



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

And, any statistics has a variation from one sample to another. Even if subjects are drawn randomly from the same population, criterion coefficients between variables will differ from sample to sample. Using a large sample makes the correlation more dependable. Correlations between a test and criterion are called validity coefficients, coefficients of productivity and concurrent validity. Concurrent validity procedures involve administering a test and comparing test results with identifiable criterion of performance.

### 17. Validation of 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.

<b>Table 8. Product-moment correlations. (1988, N = 1,299)</b> <b>Mortimer-Filkins versus PPI Alcohol And Drug Scales</b>		
<b>PPI Measures</b>	<b>First Sample Coefficients</b>	<b>Second Sample Coefficients</b>
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.

<b>Table 9. Product-moment correlations. (1989, N = 1,181)</b> <b>MacAndrews Scale versus PPI Alcohol and Drug Scales</b>		
<b>PPI Measures</b>	<b>MacAndrews</b>	<b>Significance Level</b>
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 pretest-posttest comparisons. It contains seven measures or scales: Truthfulness, Alcohol, Drugs, 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, Drugs, Driver Risk and Stress Coping Abilities.

Although the scales designated Truthfulness, Alcohol, Drugs 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 ethnicity's. 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.

<b>Table 10. Product-moment correlations 1988 study of male inmates (N = 154).</b>	
<b>DRI versus PPI Scales</b>	<b>Agreement Coefficients</b>
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 an MA degree in counseling. Two counselors rated each client's self-esteem. They reviewed client outpatient files containing court history's, progress notes, diagnoses, MMPI and Incomplete Sentence materials. Each patient was interviewed for a minimum of 30 minutes. Product-moment correlation coefficients were calculated for each rater and are presented in Table 11.

<b>Table 11. Staff Ratings and PPI Self-Esteem Scale (1990, N=89)</b>		
<b>Product-moment correlation coefficients significant at <math>p&lt;.05</math>.</b>		
<b>PPI Scale</b>	<b>First Rater</b>	<b>Second Rater</b>
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 Drugs 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 **Drugs 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.

<b>PPI Scales</b>	<b>Coefficient Alpha</b>	<b>Significance Level</b>
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.

<b>PPI Scales</b>	<b>Coefficient Alpha</b>
Truthfulness Scale	.85
Alcohol Scale	.90
Drugs 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.

##### Method and Results

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

<b>Table 14. Reliability coefficient alphas. Inpatients (1994, N=227)</b>		
<b>PPI Scales</b>	<b>Coefficient Alpha</b>	<b>Significance Level</b>
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.

<b>PPI Scales</b>	<b>Coefficient Alpha</b>	<b>Significance Level</b>
Truthfulness Scale	.89	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.91	P<.001
Distress Scale	.90	P<.001
ResistanceScale	.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.

<b>Table 16. Reliability coefficient alphas. (1996, N = 1,485)</b>			
<b>PPI Scales</b>	<b>Group 1 N = 204</b>	<b>Group 2 N = 116</b>	<b>Group 3 N = 1,165</b>
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

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

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.

<b>Table 17. Reliability coefficient alphas. Inpatients (1996, N = 630).</b>	
<b>PPI Scales</b>	<b>Coefficient Alphas</b>
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 pretest 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%).

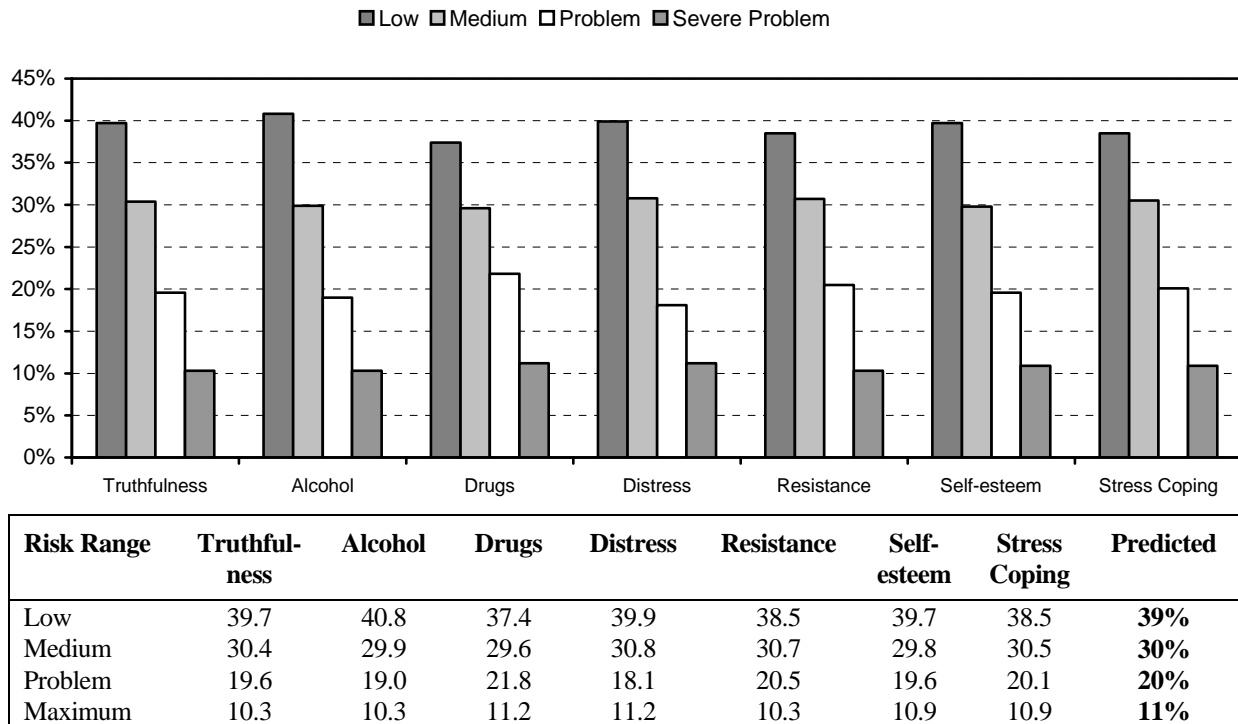
### Accuracy of the PPI

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, 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).**



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 one percentage point. **This is very accurate assessment.**

Gender Differences

T-tests were calculated for all PPI scales to assess possible sex differences. These results are presented in Table 19.

<b>PPI Scales</b>	<b>Males (N=140) Mean</b>	<b>Females (N=34) Mean</b>	<b>T-Test Comparisons</b>
Truthfulness Scale	37.74	40.47	n.s.
Alcohol Scale	17.81	15.65	n.s.
Drugs 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.

<b>Table 20. Reliability coefficient alphas (1997, N = 174).</b>	
<b>PPI Scales</b>	<b>Coefficient Alphas</b>
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-Pretest**

This study (1998) continued research of the PPI to investigate the reliability, validity and accuracy of the PPI. Only PPI-Pretest results are summarized in this study. Adult counseling clients were included in this study from different testing settings. Interest in pretest-posttest 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

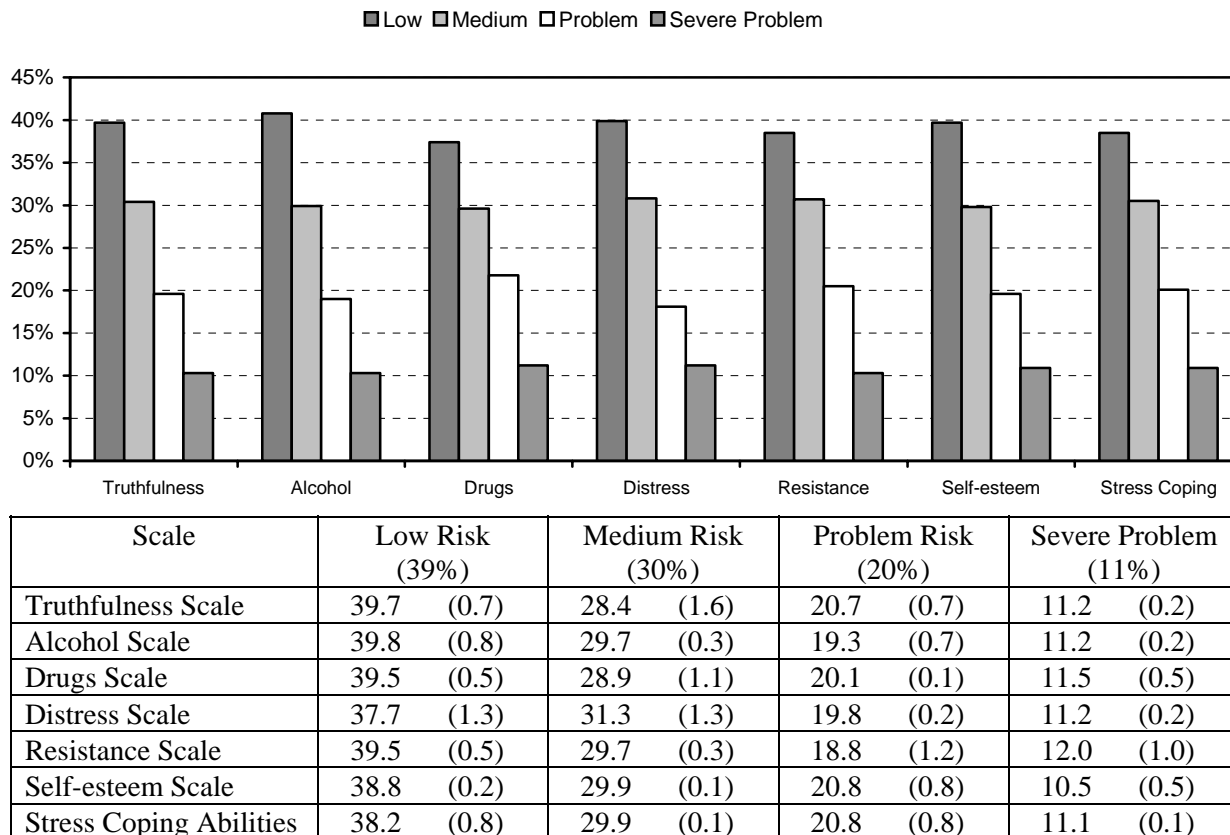
**The subjects in this study consisted of 668 adult counseling clients.** Demographic composition of these participants is as follows: Males: 565 (84.6%); Females: 103 (15.4). Age: 19 & under (18%); 20-29 (30%); 30-39 (29%); 40-49 (17%); 50-59 (5%) and 60 & over (2%). Ethnicity: Caucasian (81%); Black (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 39<sup>th</sup> percentile), Medium risk (40 to 69<sup>th</sup> percentile), Problem risk (70 to 89<sup>th</sup> percentile), and Severe Problem (90 to 100<sup>th</sup> 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

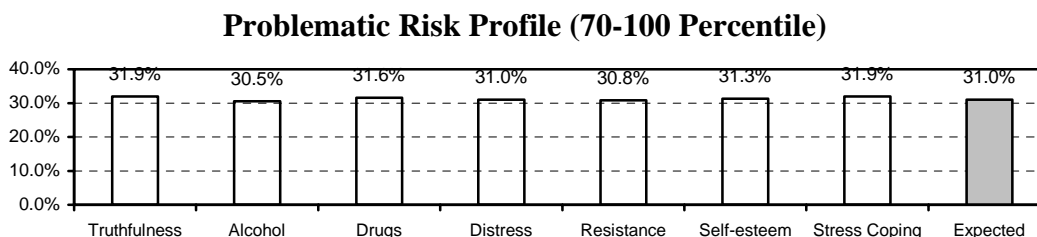
risk categories based on their scale scores are compared to these expected percentages. Table 21 presents these comparisons. The differences between obtained and expected are shown in parentheses.

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



As shown in the graph and table above, the PPI-Pretest scale scores are very accurate. The objectively obtained percentages of clients falling in 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.



These results demonstrate that the PPI scale scores accurately identify client risk.

Reliability of the PPI

Reliability coefficient alphas are presented in Table 22.

<b>PPI Scales</b>	<b>Coefficient Alphas</b>
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-Pretest. All coefficient alphas are significant at  $p < .001$ . Reliability coefficients are well above the professionally accepted .80 level. These results show that the PPI-Pretest 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 (70<sup>th</sup> 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 Drugs 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 Drugs 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 Drugs 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 Drugs 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 Drugs 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-Posttest**

This study (1998) evaluated the reliability and accuracy of the PPI-Posttest. Only PPI-Posttest results are included in this study. The PPI-Posttest is administered either at the end of treatment or at certain time intervals during treatment. In this study posttest 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 Posttest without having been given the Pretest. Many agencies have not returned posttest 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 posttest are currently in treatment or had prior treatment no group comparisons could be made between treatment and no treatment groups as was done in pretest studies. Posttest reliability and accuracy was 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-Posttest

Reliability coefficient alphas are presented in Table 23.

<b>PPI Scales</b>	<b>Coefficient Alphas</b>
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-Posttest. All coefficient alphas are significant at  $p < .001$ . Reliability coefficients are well above the accepted .80 level. These results show that the PPI-Posttest is statistically reliable.

#### Accuracy of the PPI-Posttest

PPI scale score risk classifications analysis was done on these Posttest results. Client PPI scale scores were classified according to four risk range classifications: low risk (0-39<sup>th</sup> percentile), medium risk (40-69<sup>th</sup> percentile); problem risk (70-89<sup>th</sup> percentile) and maximum risk (90-100<sup>th</sup> percentile). The PPI-Posttest risk range percentages for each scale is 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)
Drugs 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-Posttest 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 Posttest has very high statistical reliability. Posttest reliability statistics are in close agreement with Pretest reliability statistics. These results indicate that the Posttest can be given with the same high degree of confidence as Pretests because test results achieve high statistical reliability. Similarly, Posttest scale score risk range accuracy was shown to be very accurate. Nearly all of the Posttest scales are accurate to within one percent of predicted

percentages. Posttest scale scores are as accurate as Pretest scale scores. These results show that Posttest results are not influenced or contaminated by Pretest administration. Posttest results are independent of Pretest results.

In a controlled study, procedures for pretest administration, treatment interval and posttest administration would be maintained for all clients participating in the study. In that way pretest-posttest comparisons could be studied. Due to the inconsistencies in posttest administrations, clients, time intervals, intervention programs, procedures, type of program, etc., pretest-posttest comparisons could not be made. Many agencies utilize one to two year intervention intervals prior to posttest administrations and, therefore, have not returned posttest results. Pretest and Posttest 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 (pretest) 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 youth participants.

#### Method and Results

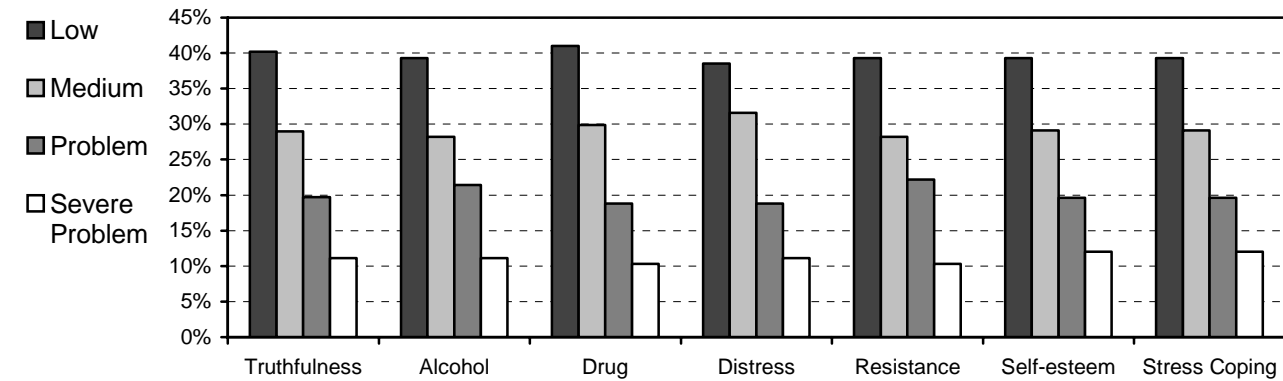
There were 117 participants that completed the PPI. Demographic composition of these participants is as follows: Males: 101 (86.3%); Females: 16 (13.7). Age: 12 & under (1%); 13 (5%); 14 (14%); 15 (29%); 16 (39%) and 17 (13%). Ethnicity: Caucasian (70%); Black (27%); Hispanic (2%) and Native American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

#### Accuracy of the Pre-Post Inventory

Client scale scores are classified according to the risk (degree of severity) they represent. Four categories of risk are assigned: Low risk (zero to 39<sup>th</sup> percentile), Medium risk (40 to 69<sup>th</sup> percentile), Problem risk (70 to 89<sup>th</sup> percentile), and Severe Problem (90 to 100<sup>th</sup> 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.

Reliability of the PPI

Within-test reliability, or inter-item reliability coefficient alphas for the Pre-Post Inventory 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.

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

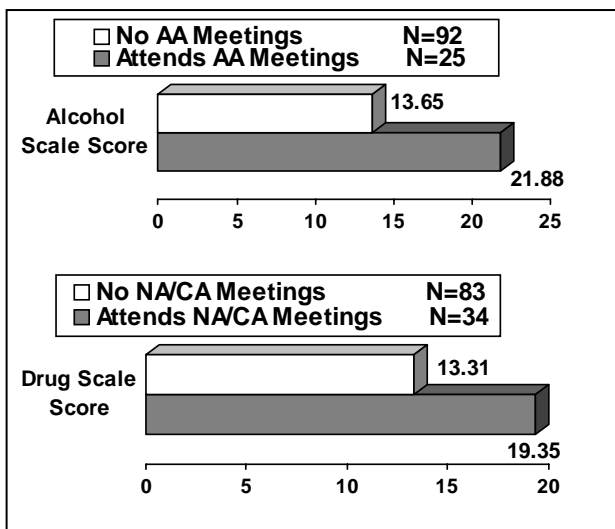
All coefficient alphas are significant at  $p < .001$ .

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

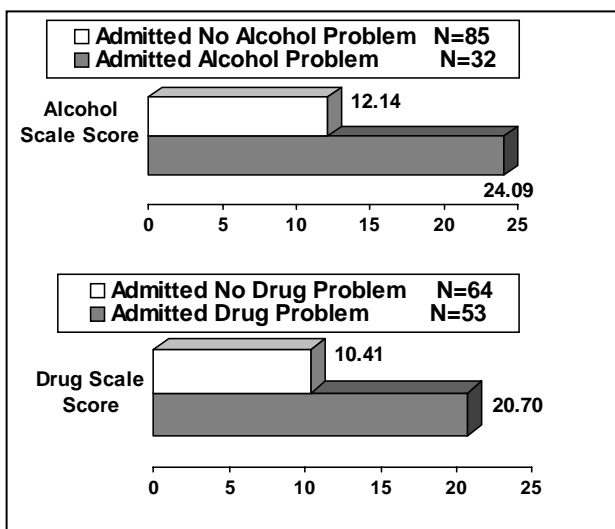
Discriminant validity

The Pre-Post Inventory 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 Pre-Post Inventory is shown by significant differences between clients who admit problems and those who do not. The following analyses compare clients that 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**



- 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.



- 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 Pretest-Posttest Comparison Study

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

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

#### Method and Results

**Pretest: There were 506 participants that completed the PPI at Pretest.** 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%).

**Posttest: There were 209 participants that completed the PPI at Posttest. Of these 209, 122 individuals had both pretest and posttest 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 Pre-Post Inventory scales are at or above the .80 level.

<b>Table 26. Reliability coefficient alphas. (2000, N = 506 Pretest, 209 Posttest).</b>		
<b>PRE-POST SCALES</b>	<b>Pretest Alphas</b>	<b>Posttest Alphas</b>
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 Pre-Post Inventory is a very reliable instrument or test. Posttest results show that the Alcohol and Drugs Scales had slightly lower alphas than did the Pretest results. The Pretest-Posttest 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 Posttest. It is likely that each troubled youth progressed at different rates of understanding, acceptance and, where warranted, recovery. In contrast, clients' Pretest 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-Posttest. By comparing Pretest reliability coefficients with Posttest 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 pretest reliability coefficients, which are impressive. In these pretest-posttest comparisons the interval varied from one to ten months.

### Validity of the PPI

The Pre-Post Inventory 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' Pretest results are indicative of problem severity. After intervention/treatment clients' problem severity should decrease or be alleviated. The Pre-Post Inventory makes this comparison and quantifies outcome. Earlier, Posttest comparisons were made that determined the amount of change between pretest and posttest scale scores which quantifies the effectiveness of intervention/treatment.

**Validity** of the PPI at the pretest 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 Drugs Scale scores in the Low risk (39<sup>th</sup> percentile and below) range were used to represent the no problem group, whereas scores in the Problem and Severe Problem (70<sup>th</sup> 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 Pretest 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.**

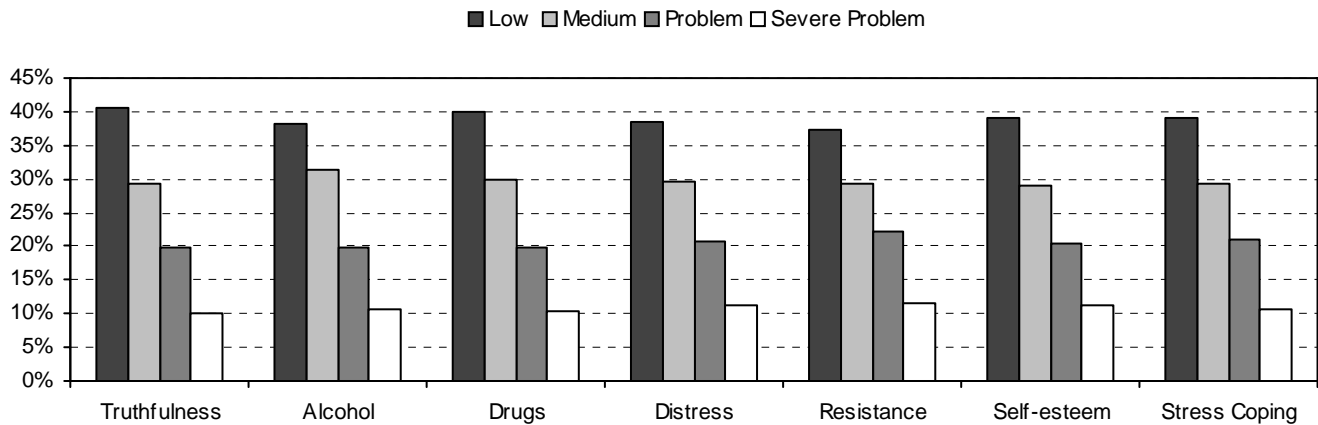
The Drugs Scale is also very accurate in identifying youths who admitted to a drug problem. There were 141 Pretest clients who admitted having drug-related problems (question #46). **Of these, 134 clients, or 95 percent, had Drugs Scale scores at or above the 70th percentile. These results are similar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

### Accuracy of the PPI

The accuracy of the seven Pre-Post Inventory measurement (or severity) scales is presented below in Table 27 for pretest assessments. Client risk assessment is calculated for the Pretest scores. Posttest results are then compared to these Pretest scores using the Pretest cutoff scores for each risk range category. The Pretest 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 Pretest scale scores and the predicted Pretest scale scores determines accuracy. There were 506 Pretest results included in this analysis. All of the 209 Posttest results were summarized in the comparison table below the Pretest results.

**Table 27. Pretest Scale Risk Ranges (2000, N = 506)**



Pretest 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)
Drugs	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 Pretest 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 Pre-Post Inventory at the pretest 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.

Pre-Post Comparisons: Posttest Scale Scores Using Pretest Cutoff Scores

Risk range percentages for the Pre-Post Inventory are established using Pretest data. This is because Pretest data serves as the baseline (or comparison standard) of attained test scores prior to intervention/treatment. This allows Posttest risk range percentages to be compared to Pretest percentages. Improvement on the Posttest is indicated by a higher percentage of clients scoring in the low risk range. This sequence is summarized as follows: Pretest – Intervention/Treatment – Posttest. It would be expected that more clients would score in the low risk range on the Posttest because scale scores are obtained after intervention/treatment has occurred. Effective treatment is demonstrated by lower Posttest scale scores. Higher Posttest scores (in comparison to Pretest scores) are associated with no treatment or possibly ineffective treatment.

In Table 28 below, the percentage differences between Pretest and Posttest scores are shown in parentheses. These differences are calculated as Posttest percentage – Pretest percentage or posttest minus pretest scores. The pretest-posttest 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 Posttest percentages are higher than Pretest percentages which means intervention/treatment was effective. Negative differences between Pretest and Posttest mean that fewer clients score in that category on the Posttest than on the Pretest. In other words, if the Low risk category does not increase then intervention/treatment either wasn’t given or wasn’t effective. Subtracting the Posttest percentages shown in the table below from the Pretest percentages (presented earlier) results in the differences shown in parentheses in the table below. All Pretest data (N=506) and all Posttest data (N=209) are included in these comparisons.

<b>Posttest Scales</b>	<b>Low Risk</b>		<b>Medium Risk</b>		<b>Problem Risk</b>		<b>Severe Problem</b>	
	Attained Posttest %	Pre-Post Difference	Attained Posttest %	Pre-Post Difference	Attained Posttest %	Pre-Post Difference	Attained Posttest %	Pre-Post Difference
Truthfulness	39.7	<b>(-1.0)</b>	30.6	<b>(1.3)</b>	19.2	<b>(0.7)</b>	10.5	<b>(0.4)</b>
Alcohol	43.1	<b>(5.0)</b>	36.3	<b>(5.0)</b>	19.6	<b>(-0.3)</b>	1.0	<b>(-9.7)</b>
Drugs	70.3	<b>(30.4)</b>	25.4	<b>(-4.5)</b>	2.9	<b>(-7.0)</b>	1.4	<b>(-8.9)</b>
Distress	76.6	<b>(38.1)</b>	14.8	<b>(-14.7)</b>	6.2	<b>(-14.5)</b>	2.4	<b>(-8.9)</b>
Resistance	63.2	<b>(26.0)</b>	20.5	<b>(-9.3)</b>	9.1	<b>(-11.0)</b>	7.2	<b>(-4.3)</b>
Self-esteem	71.3	<b>(32.2)</b>	19.6	<b>(-9.5)</b>	7.2	<b>(-13.3)</b>	1.9	<b>(-9.4)</b>
Stress Coping	71.8	<b>(32.7)</b>	20.1	<b>(-9.2)</b>	6.2	<b>(14.7)</b>	1.9	<b>(-8.8)</b>

Lower percentages for Medium, Problem and Severe Problem risk ranges are the result of clients being shifted down into the Low risk range at Posttest. 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 Posttest scores for all PPI scales. The Truthfulness Scale is an exception. Clients’ Posttest and Pretest 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 focussed upon as a treatment goal. This Truthfulness Scale outcome indicates that troubled youth were equally honest on posttest and pretest settings. This outcome was unexpected and will be studied further in subsequent Pre-Post Inventory studies.

The Distress Scale showed the largest Posttest improvement (lower scores). Over 38 percent more of the clients scored in the low risk range on Posttest. The Drugs, Self-esteem and Stress Coping Abilities Scales also demonstrate a large improvement (lower scores) on Posttest. These scales improved by 30 percent or more on Posttest. The Alcohol Scale showed an improvement on Posttest 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 youths for which both Pretest and Posttest scores were available. Comparisons of these clients' Pretest and Posttest scores are presented in Table 29. T-test comparisons between the means for each PPI scale (the one exception is the Truthfulness Scale) indicate that all scales were statistically significantly different. This means that Posttest scale scores were, on average, significantly lower than Pretest scale scores for these clients.

<b>PPI Scales</b>	<b>Pretest Mean Score</b>	<b>Posttest Mean Score</b>	<b>T-value</b>	<b>Level of significance</b>
Truthfulness Scale	20.9	20.5	t = 0.16	n.s.
Alcohol Scale	15.7	13.2	t = 2.52	p=.013
Drugs 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

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 scale comparisons demonstrate that Posttest scale scores are lower than Pretest 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 youths included in this study who had taken both the Pretest and Posttest.

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 Drugs 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 posttest. The other possible explanation is that these intervention/treatment programs simply did not focus on “honesty” as a treatment objective. In contrast, at the pretest these troubled youth may have answered test items more candidly and spontaneously. Regardless of the theory, Truthfulness Scale answers were essentially the same at pretest testing and posttest testing. And as noted earlier these unexpected results will be studied in subsequent Pre-Post Inventory research.

### Pre-Post Comparisons of Client Self-Perceptions

The following table presents the percentages of client's 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 Pretest clients (443 males and 63 females) and 209 Posttest clients (197 males and 12 females). Results are summarized for Pretest (506) clients and Posttest (209) clients for comparison.

<b><u>Alcohol and Drug Problems</u></b>	<b><u>Pretest</u></b>		<b><u>Posttest</u></b>	
	<b>Males %</b>	<b>Females %</b>	<b>Males %</b>	<b>Females %</b>
#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
<b><u>Alcohol and Drug Treatment</u></b>				
#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
<b><u>Emotional Problems</u></b>				
#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).....	26.0	49.2	32.0	58.3
2. Moderately motivated (I may need help).....	19.6	15.9	17.3	8.3
3. Slightly motivated (maybe, not sure).....	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
<b><u>Recovering from Substance Abuse</u></b>				
#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 questions show 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 positively did not change from pretest (27.4%) to posttest (27.4%). However, the percentage of females increased dramatically at posttest, from 23.8% at Pretest to 33.3% at Posttest. This may indicate that females came to understand their alcohol involvement better after intervention and now



accept that they really do have alcohol problems. This is supported by #137 that shows a much higher percentage of females that admitted to having a serious drinking problem at Posttest (25% compared to 12.7% at pretest). Males showed little change between Pretest and Posttest in the percentage that admitted a serious drinking problem.

Drugs Scale items tend to show a decrease at posttest in the percentage of clients that say they have drug-related problems. On test item #70 (I use and abuse drugs.) both males and females decreased dramatically at posttest in the percentage that responded positively. Males went from 46% at pretest to 20% at posttest and females went from 35% to 0%. Yet, even though the percentage of youths using drugs decreased at posttest, the percentage of clients that 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 that admitted a serious drug-related problem (#136) increased at Posttest. Males increased 1% from 8% at pretest to 9% at posttest 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 Posttest indicated they wanted to get or continue in treatment than at Pretest. Test item #144 (desire to get or continue alcohol treatment) shows that at Pretest about 17% of males and 22% of females were highly motivated. At Posttest 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 that desired drug treatment at Posttest. The Posttest responses also show that more clients attend Alcoholics Anonymous (item #64) and Narcotics Anonymous or Cocaine Anonymous (item #22).

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

Fewer youths had thoughts of death, dying or suicide at Posttest. Test item #30 (I frequently think of death, dying or suicide.) also had dramatic decreases in the percentages of males and females that responded positively at Posttest. Males declined by half and none of the females responded positively at Posttest. 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 Pretest assessment. There were 443 males (87.5%) and 63 females (12.5%). There were 209 youths included in Posttest assessments. There were 297 youth that completed the pretest, but did not complete the posttest. The Pretest 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 Posttest clients profile is characterized as Caucasian (71%), 15 through 17 years of age (89%) and had 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 Pretest attained and predicted scores, 24 were within one percentage point of the predicted

- Pretest 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 Drugs Scales accurately identify problem drinkers and drug abusers

#### Alcohol and Drug Problems

- At Pretest 27.5% males and 23.8% females admitted to a drinking or alcohol problem. At Posttest 27.4% males and 33.3% females admitted a drinking problem. At posttest (after intervention/treatment) more women admitted to drinking problems than at pretest.
- At Pretest 43.8% males and 39.7% females indicated having a drug problem. At Posttest 41.6% males and 33.3% females admitted a drug problem. At posttest (after intervention/treatment) fewer males and females admitted to a drug problem than at pretest.
- Pretest: 16.9% males and 22.2% females were highly motivated to get or continue alcohol treatment. At Posttest 24.9% males and 41.7% females were highly motivated for alcohol treatment. More males and females were highly motivated for alcohol treatment at posttest than at pretest.
- Pretest: 28% males and 28.6% females were highly motivated to get or continue drug treatment. At Posttest 38.6% males and 50% females were highly motivated for treatment. More males and females were highly motivated for drug treatment at posttest than at pretest.

#### Emotional Problems

- Pretest: 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 Posttest 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.
- Pretest: 16.5% males and 27% females indicated they frequently think about death, dying or suicide. Posttest: 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.
- Pretest: 26% males and 49.2% females reported being highly motivated to get or continue in counseling, treatment or help for mental health problems. Posttest: 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 pretest – intervention/treatment – posttest comparison. It was hypothesized that in effective intervention/treatment programs Pre-Post Inventory scale scores would be lower in posttest (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 posttest. Truthfulness Scale scores were essentially the same at pretest and posttest. 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.

<b>Overall Pre-Post Inventory results are summarized by low risk scale scores.</b>			
<b>Pre-Post Inventory Scales</b>	<b>Pretest Low Risk</b>	<b>Posttest Low Risk</b>	<b>Outcome</b>
<b>Truthfulness</b>	<b>40.7%</b>	<b>39.7%</b>	UNKNOWN FACTOR
<b>Alcohol</b>	<b>38.1%</b>	<b>43.1%</b>	+ EFFECTIVE PRGM
<b>Drugs</b>	<b>39.9%</b>	<b>70.3%</b>	+ EFFECTIVE PRGM
<b>Distress</b>	<b>38.5%</b>	<b>76.6%</b>	+ EFFECTIVE PRGM
<b>Resistance</b>	<b>37.2%</b>	<b>63.2%</b>	+ EFFECTIVE PRGM
<b>Self-Esteem</b>	<b>39.1%</b>	<b>71.3%</b>	+ EFFECTIVE PRGM
<b>Stress Coping Abilities</b>	<b>39.1%</b>	<b>71.8%</b>	+ EFFECTIVE PRGM

Note: It is postulated that effective intervention/treatment will result in higher pretest scores and lower posttest scores. Ineffective intervention/treatment will result in the same or lower pretest scores and higher posttest 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 at 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 pretest results as the standard or baseline for subsequent posttest comparison. Again, no solicited history influences Pre-Post Inventory scoring. Thus, we can compare where the client is at during pretest screening and at posttest assessment.



If the reason for troubled youth assessment is to determine the severity of problems, in contrast to pretest-posttest outcome, we would recommend consideration of another assessment instrument called the ACIDI-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) Pretest and Posttest participated in this study. Pretest scale scores represent the severity of client problems going into treatment, whereas, Posttest 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 Pretest and Posttest. PPI Pretest scale scores are expected to be higher than Posttest 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 that completed the PPI Pretest and Posttest.** 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

Pretest and Posttest 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 posttest scale scores were lower than Pretest scale scores. The Alcohol and Resistance Scales were not statistically significantly different.

**Table 30. Pretest-Posttest Scale Comparisons (2001, N=69)**

PPI Scales	Pretest		Posttest		T-value	Level of Significance
	Mean Score	Maximum	Mean Score	Maximum		
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.
Drugs 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 posttest maximum scores were lower than pretest 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 pretest 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.

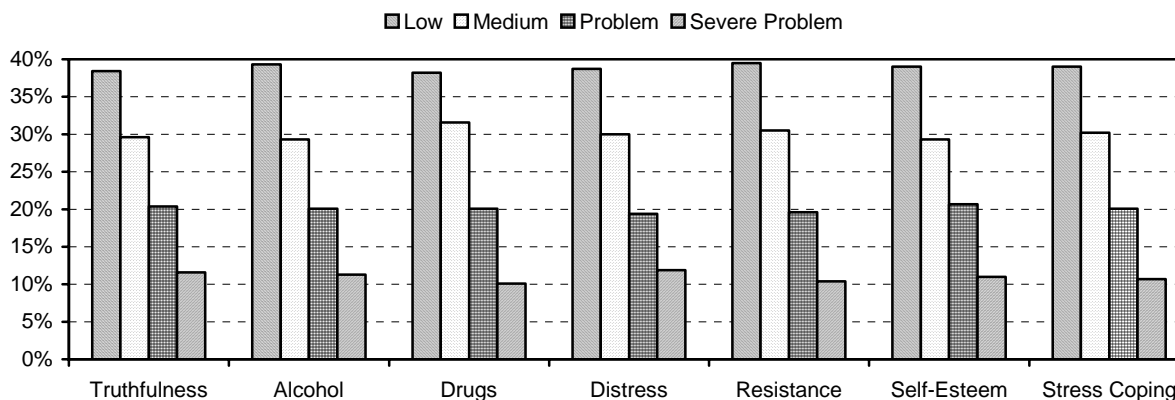
**Table 31. Reliability coefficient alphas. (2001, N = 69 Pretest).**

PRE-POST SCALES	Pretest 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 Pretest 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. Pretest Scale Risk Ranges (2001, N = 69)**



Pretest 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)
Drugs	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 pretest or intake is re-administered after treatment or at specified intervals during treatment. The pretest 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 pretest and posttest 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 Pretest and Posttest data. These Pretest—Posttest 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 Pretest and Posttest.** Demographic 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: 7<sup>th</sup> grade or less (12.3%); 8<sup>th</sup> grade (36.4%); 9<sup>th</sup> grade (42.0%); 10<sup>th</sup> grade (6.8%); 11<sup>th</sup> grade (1.9%) and H.S. graduate (0.6%).

Reliability statistics are presented for both Pretest and Posttest data. Slight reductions in Posttest 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 Pretest data. This was done because Pretest scores set baseline performance upon which to compare Posttest scores. The interval between Pretest and Posttest administrations varied from 0 months to 23 months.

Juvenile risk is conceptualized as low risk (zero to 39<sup>th</sup> percentile), medium risk (40 to 69<sup>th</sup> percentile), problem risk (70 to 89<sup>th</sup> percentile) and severe problem (90 to 100<sup>th</sup> 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 70<sup>th</sup> percentile. The scores associated with the 39<sup>th</sup>, 69<sup>th</sup> and 89<sup>th</sup> percentiles are referred to as cut-off scores. Scores above the cut-off score fall in 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 youth’s problems is the first step in intervention and treatment.

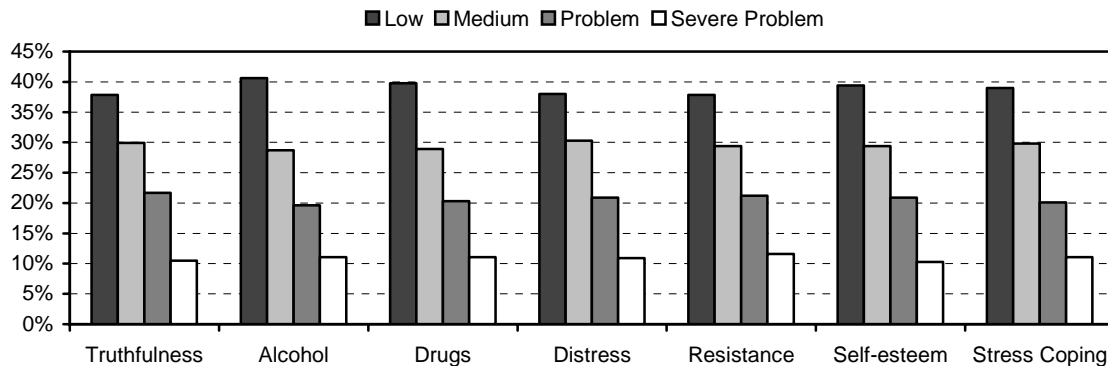
PPI risk range percentile scores are obtained by adding test item points and truth correction, if applicable. These raw scores are then converted to percentile scores by using cumulative percentage distributions. Each scale has its own distribution and risk range cut-off scores. Pretest results are summarized in Table 33. Juvenile obtained Pretest 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.

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

Table 33 presents the graph and table of juvenile Pretest 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. Pretest Scale Risk Ranges (N = 175, 2002)**



Pretest 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)
Drugs	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 Pretest and Posttest scores are presented in Table 34. These differences (shown in parentheses) are calculated by subtracting the Posttest percentage from the Pretest percentage. Positive differences in risk range percentages between Pretest and Posttest mean that Posttest percentages are higher than Pretest percentages. In general, clients' scores on Posttest are lower than on Pretest 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 Posttest as a result of clients scoring lower at Posttest than they did at Pretest. 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 Posttest compared to Pretest.

**Table 34. Posttest Scale Risk Ranges (N=175)**

Posttest Scales	Low Risk		Medium Risk		Problem Risk		Severe Problem	
	Attained Posttest %	Pre-Post Difference	Attained Posttest %	Pre-Post Difference	Attained Posttest %	Pre-Post Difference	Attained Posttest %	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)
Drugs	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. Posttest scores were higher than Pretest scores. One possible explanation for this outcome is that youths fake good at Posttest, they give the response they think the counselor wants them to give. This phenomenon has been called “therapeutic contagion.” Consequently, their Truthfulness Scale score goes up in comparison to their Pretest score. Truthfulness Scale scores apply truth-correction to other scale scores, consequently, Posttest scores are being truth-corrected more than are Pretest scores. Pretest-posttest differences could be even greater than what is shown in the table below if truth-correction were the same for Pretest and Posttest.

The results shown in Table 34 demonstrate that there were dramatic client improvements on Posttest scores for all PPI scales. The Truthfulness Scale is an exception. The Distress Scale showed the largest Posttest improvement (lower scores). Nearly 36 percent more of the youths scored in the low risk range at Posttest. The Drugs, Self-esteem and Stress Coping Abilities Scales also demonstrate a large improvement (lower scores) at Posttest. These scales improved by about 30 percent at Posttest. 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 Posttest 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 Pretest, only 1 percent remained in the severe problem range at Posttest.

There were 175 youths for whom both Pretest and Posttest 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. Posttest scale scores were, on average, significantly lower (the one exception is the Truthfulness Scale) than Pretest scale scores for these youths.

**Table 35. Pretest-Posttest Scale Comparisons (N=175)**

<b>PPI Scales</b>	<b>Pretest Mean Score</b>	<b>Posttest Mean Score</b>	<b>T-value</b>	<b>Level of significance</b>
Truthfulness Scale	22.46	26.60	t = 4.31	<b>p&lt;.001</b>
Alcohol Scale	15.17	12.97	t = 2.77	<b>p=.006</b>
Drugs Scale	19.54	11.99	t = 8.13	<b>p&lt;.001</b>
Distress Scale	17.53	11.75	t = 8.41	<b>p&lt;.001</b>
Resistance Scale	10.35	8.25	t = 4.45	<b>p&lt;.001</b>
Self-esteem Scale	20.52	30.41	t = 7.60	<b>p&lt;.001</b>
Stress Coping Abilities	101.70	124.77	t = 7.11	<b>p&lt;.001</b>

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 Posttest scale scores are lower than Pretest scale scores. The juveniles showed improvement on all PPI treatment scales after having been in treatment. However, the Pretest-Posttest intervals were not the same for all clients. It is likely that higher Pretest-Posttest intervals would result in higher or greater differences between Pretest and Posttest scores

The largest pre-post scale score differences occurred on the Self-esteem, Distress, Stress Coping Abilities and Drugs 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 Posttest than at Pretest. “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 posttest. In contrast, at pretest 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 pretest and posttest 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.

<b>Table 36. PPI Reliability</b>		
<b>PRE-POST SCALES</b>	<b>Pretest Alphas</b>	<b>Posttest Alphas</b>
Truthfulness Scale	<b>.86</b>	<b>.86</b>
Alcohol Scale	<b>.86</b>	<b>.84</b>
Drugs Scale	<b>.87</b>	<b>.84</b>
Distress Scale	<b>.85</b>	<b>.82</b>
Resistance Scale	<b>.83</b>	<b>.83</b>
Self-esteem Scale	<b>.91</b>	<b>.93</b>
Stress Coping Abilities	<b>.88</b>	<b>.90</b>

All coefficient alphas are significant at  $p < .001$ . Pretest-posttest reliability coefficients demonstrate that the PPI maintains high test-retest reliability. The PPI can be re-administered because the Posttest reliability coefficients are just as high as Pretest reliability coefficients.

Predictive validity is shown by nearly 100% correct identification of juveniles who have problems. The Alcohol and Drugs 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 Drugs Scale identified nearly all (97.6%) of the youths who admitted to a drug problem. These youths had Drugs Scale scores at or above the 70th percentile. These results substantiate the accuracy of the Drugs Scale.

The PPI correctly identified nearly all juveniles who had substance abuse problems. PPI scale scores at or above the 70<sup>th</sup> percentile identifies youths as having problems. These results support the accuracy and comprehensiveness of the Alcohol Scale and the Drugs Scale. The PPI scale scores do not identify a problem until a score is at or above the 70<sup>th</sup> 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 Drugs

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, change of status, completion and outcome. The PPI compares a youth's posttest scores against their pretest 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' pretest scores serve as the basis for subsequent posttest 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 pretest, they should not vary that much upon posttest.

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 (pretest), at 3, 6 or 12 month intervals and at program completion (posttest). 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.

#### Method and Results

**There were 232 participants that completed the PPI Pretest and Posttest.** 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: 7<sup>th</sup> grade or less (17.2%); 8<sup>th</sup> grade (32.3%); 9<sup>th</sup> grade (37.9%); 10<sup>th</sup> grade (10.3%); 11<sup>th</sup> 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 pretest (first test administration) scale scores with posttest (second or subsequent test administration) scale scores. All PPI scales are represented in the Comparison Index. For each scale, the index is gotten by subtracting the posttest scale score from the pretest scale score (pretest minus posttest). A positive difference represents client improvement, that is, their scale score was lower at posttest than it was at pretest. If the difference between pretest and posttest scale scores is zero, the youth stayed the same. And, a negative difference means that the youth got worse, i.e., their posttest scale score was higher than their pretest score.

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

<b>Pre-Post Comparison Index</b>			
<b>PPI Scales</b>	<b>Pretest Mean Score</b>	<b>Posttest Mean Score</b>	<b>Pretest-Posttest Difference</b>
Truthfulness Scale	23.22	21.47	1.75
Alcohol Scale	15.27	12.60	2.69
Drugs 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, posttest scores were lower than pretest scores. Youths, on average, improved at posttest. Posttest scores were significantly lower than pretest scores at the  $p < 0.001$  level of significance. Lower scale scores at posttest means 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 posttest. The youths were less inclined toward denial, problem minimization and attempts to fake good. Youths' alcohol and drug problem severity was positively changed after treatment. Lower posttest Alcohol Scale scores shows that youths significantly reduced their alcohol problem severity after being in treatment. Drugs Scale scores were lower, by a wide margin, at posttest compared to pretest 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 pretest and posttest 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 pretest and posttest scores provide an objective and accurate way to compare scores.

PPI scale comparisons represent outcome criteria. Pretest 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 posttest. 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, Drugs Scale, Distress Scale, Resistance Scale, Self-Esteem Scale and Stress Coping Abilities Scale) all had significantly lower scores at posttest. 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.

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

Donald D. Davignon, Ph.D.

Behavior Data Systems, Ltd.  
P.O. Box 44256, Phoenix, Arizona 85064-4256  
Pre-Post Inventory Copyright (c) 1998  
**ALL RIGHTS RESERVED**

120103