Adult Treatment Outcome

An Inventory of Scientific Findings

TABLE OF CONTENTS

Introduction 1
ATO Measures (Scales) 2
    Truthfulness 2
    Distress 2
    Outlook 2
    Depression 2
    Anxiety 2
    Self-Esteem 2
    Alcohol Scale 2
    Drugs 2
    Control 2
    Violence 3
    Suicide 3
    Stress Coping Abilities 3
Adult Treatment Outcome Research 3
Stress Quotient Research 4
ATO Research 7
    A Study of ATO Test-Retest Reliability 7
    Validation of the Truthfulness Scale 8
    Validation of Four Adult Treatment Outcome Scales Using Criterion Measures 9
    Inter-item Reliability of Four Adult Treatment Outcome Scales 10
    Relationships between Selected ATO Scales and Polygraph Examination 12
    Replication of ATO Reliability for Selected Scales in a Sample of Inpatient Clients 13
    Validation of ATO Scales Using DWI Evaluator Ratings 14
    Validation of ATO Alcohol and Drug Scales Using the Mortimer-Filkins Test 15
    Validation of ATO Alcohol and Drug Scales Using the MacAndrews Scale 15
    Validation of Four ATO Scales Using DRI Scales as Criterion Measures 15
    Validation of the ATO Self-Esteem Scale 17
    Validation of the ATO with MMPI Scales as Criterion Measures 17
    Reliability of Selected ATO Scales in a Sample of Outpatient Clients 18
    A Study of ATO Reliability in a Sample of Inpatient Clients 19
    A Study of ATO Reliability in a Sample of Outpatients 19
    Validation of the ATO Lethality (Violence) Scale with a Polygraph Examination 20
    Validation of the Antisocial Reaction and Lethality (Violence) Scales 20
    Reliability of Eleven ATO Scales in a Large Sample of Outpatients 21
    Reliability Study on Three Samples of Outpatient Clients 21
    ATO Reliability in a Large Sample of Inpatient Clients 23
Summary 24

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INTRODUCTION

Adult Treatment Outcome

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

The Adult Treatment Outcome (ATO) 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 ATO 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 ATO database ensures continued research and development. The ATO 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 ATO contains twelve empirically based scales: Truthfulness, Outlook, Depression, Anxiety, Control, Violence, Suicide, Alcohol, Drugs, Distress, Self-esteem, and Stress Coping Abilities. The ATO has been researched on outpatients, inpatients, college students and others.

The ATO 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 ATO is designed to measure the severity of problems in clinical settings. It is a risk and needs assessment instrument. The ATO has demonstrated reliability, validity and accuracy. It correlates impressively with both experienced staff judgment and other recognized tests.

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

provided with the most accurate information possible.

Information on the Adult Treatment Outcome (ATO) is available in the ATO Orientation & Training Manual. Computer scoring information is contained in the ATO Computer Operating Guide. Each of these manuals can be obtained upon request.

ATO MEASURES (SCALES)

Users of the Adult Treatment Outcome (ATO) should be familiar with each ATO scale. A description of each ATO scale follows.

TWELVE ATO SCALES (MEASURES)

1. **Truthfulness Scale:** measures the truthfulness of the client while they were completing the ATO. This scale identifies self-protective, defensive or guarded people who minimize or even fake answers.

2. **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.

3. **Outlook Scale:** measures a person's negation as reflected in their resistance, oppositional outlook and attitudes towards help. A positive attitude is often a prerequisite to behavioral change.

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

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

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. **Alcohol Scale:** measures alcohol use and the severity of abuse. Alcohol refers to beer, wine, and other liquors. This scale measures the severity of abuse while identifying alcohol-related problems.

8. **Drugs Scale:** measures the severity of drug (marijuana, crack, ice, LSD, ecstacy, amphetamines, barbiturates and heroin) use and abuse while identifying drug-related problems.

9. **Control Scale:** Control is a two-fold concept: control of others and control of oneself. The concept of control has emerged in violence literature as an important and in some cases a focal issue. Control refers to control of self and others. Some theorists maintain the loss of control can in fact be a way of controlling others. Other theorists emphasize the attitudes and behaviors inherent in control of others. Controlling behaviors vary from swearing and intimidation to battering.

Control is often synonymous with power. Controlling behaviors can represent subtle acts of

manipulation, influence and persuasion to gain power over others, or these behaviors can escalate to anger and aggression. There are many techniques of manipulation, influence and persuasion used to advantage in business and political arenas. However, when individuals go beyond these subtle techniques and become aggressive to gain power over others, then the controlling behaviors are deviant. People who lose their sense of power and ability to control others often resort to acts of anger and violence. In its extreme form, control can become an obsession. Power is found through the control of others. Unfortunately, deviant controlling behaviors can lead to serious acts of violence.

10. Violence Scale: measures propensity for using force to injure, damage or destroy. This scale identifies people that are dangerous to themselves and others.

11. Suicide Scale: measures a client's probability of committing suicide. Suicidal persons give many warnings regarding their intentions. Any elevated (70th percentile and higher) Suicidal Ideation Scale score should be taken seriously.

12. 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.

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

ADULT TREATMENT OUTCOME RESEARCH

Adult Treatment Outcome 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 ATO 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 and Drugs items evolved from the Substance Abuse Questionnaire, which is an established substance (alcohol and other drugs) abuse screening instrument. The ATO has a long history of research and development, much of which is contained in the following summary. **ATO research is reported in a chronological format, reporting studies as they occurred.** This gives the reader the opportunity to see how the ATO 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 ATO scale consideration. Consensual agreement among three Ph.D. level psychologists and other experienced chemical dependency counselors familiar with ATO 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 ATO was then objectively standardized and normed on inpatient and outpatient chemical dependency and a variety of counseling clients.

STRESS QUOTIENT RESEARCH

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

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

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

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

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

Validation Study 2: This study (1980) evaluated the relationship between the SQ scale and two criterion measures: Taylor Manifest Anxiety Scale and Cornell Index. These two measures have been shown to be valid measures of anxiety and neuroticism, respectively. If the SQ or Stress Coping Abilities Scale is correlated with these measures it would indicate that the SQ or Stress Coping Abilities Scale is a valid measure. In the Taylor Manifest Anxiety Scale, high scores indicate a high level of anxiety. Similarly, in the Cornell Index high scores indicate neuroticism. Negative correlation coefficients between the two measures and the SQ were expected because high SQ scores indicate good stress coping abilities. The three tests were administered to forty-three (43) subjects selected from the general population. There were 21 males and 22 females ranging in age from 15 to 64 years. Utilizing a

product-moment correlation, SQ scores correlated -.70 with the Taylor Manifest Anxiety Scale and -.75 with the Cornell Index. Both correlations were significant, in the predicted direction, at the $p < .01$ level. These results support the finding that the Stress Coping Abilities Scale is a valid measure of stress coping abilities. The reliability of the SQ was investigated in ten subjects (5 male and 5 female) randomly chosen from this study. A split-half correlation analysis was conducted on the SQ items. The product-moment correlation coefficient (r) was .85, significant at the $p < .01$ level. This correlation indicates that the SQ or Stress Coping Abilities Scale is a reliable measure. These results support the Stress Coping Abilities Scale as a reliable and valid measure.

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

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

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

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

ATO RESEARCH

10. A Study of ATO Test-Retest Reliability

Any approach to detection, assessment, or measurement must meet the criteria of reliability and validity. Reliability refers to an instrument's consistency of results regardless of who uses it. This means that the outcome must be objective, verifiable, and reproducible. Ideally, the instrument or test must also be practical, economical, and accessible. Psychometric principles and computer technology insure ATO 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 ATO in a paper-pencil test format. One week later they were re-tested with the ATO 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 ATO. Test-retest consistency was very high and indicates that the ATO scores are reproducible and reliable over a one week interval.

11. Validation of the Truthfulness Scale

The Truthfulness Scale in the ATO is an important psychometric scale as these scores establish how truthful the respondent was while completing the ATO. Truthfulness Scale scores determine whether or not ATO profiles are accurate and are integral to the calculation of Truth-Corrected ATO 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 Adult Treatment Outcome 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 ATO Truthfulness Scale, was administered to the subjects and the Truthfulness Scale was embedded in the test as one of the scales. Truthfulness Scale scores were made up of the number of deviant answers given to the 21 Truthfulness Scale items.

Results

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

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

12. Validation of Four Adult Treatment Outcome Scales using Criterion Measures

In general terms, a test is valid if it measures what it is supposed to measure. The process of confirming this statement is called validating a test. A common practice when validating a test is to compute a correlation between it and another (criterion) test that purports to measure the same thing and that has been previously validated. For the purpose of this study, the four Adult Treatment Outcome 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 ATO 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 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 ATO and the MMPI. Tests were counterbalanced for order effects.

Results and Discussion

Product-moment correlation coefficients were calculated between ATO scales and MMPI scales. These results are summarized in Table 1. Correlation results presented in Table 1 show that all ATO 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 ATO scales.

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

MMPI SCALES (MEASURES)	**ATO SCALES (MEASURES)**			
	Truthfulness	**Alcohol**	**Drugs**	**Stress Coping**
L (Lie) Scale	0.72	-0.38	-0.41	0.53
Psychopathic Deviant	-0.37	0.52	0.54	-0.59
Psychasthenia	-0.34	0.38	0.41	-0.68
Social Maladjustment	-0.25	0.34	0.26	-0.54
Taylor Manifest Anxiety	-0.58	0.47	0.46	-0.78
MacAndrews	-0.40	0.58	0.62	-0.33
Social Alienation	-0.47	0.35	0.45	-0.67

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

The **Alcohol Scale** correlates significantly with all represented MMPI scales. This is consistent with the conceptual definition of the Alcohol Scale and previous research that has found that alcohol abuse is associated with mental, emotional and physical problems. Of particular interest are the highly significant correlation's 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 **Stress Coping Abilities Scale** is inversely related to MMPI scales which accounts for the negative correlations shown in Table 1. The positive correlation with the L scale on the MMPI was discussed earlier, i.e., Truthfulness Scale. It should be noted that stress exacerbates symptoms of impaired adjustment and even psychopathology. The Stress coping 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 Adult Treatment Outcome scales. All of the ATO scales were highly correlated with the MMPI criterion scale they were tested against. The large correlation coefficients support the validity of the ATO. All product-moment correlation coefficients testing the relation between ATO scales and MMPI scales were significant at the $p < .001$ level.

13. Inter-item Reliability of Four Adult Treatment Outcome Scales

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 Coefficient Alpha.

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

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

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

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

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

Table 3. Within-test reliability, F statistic.				
ATO SCALES MEASURES	**N ITEMS**	**Outpatients (N = 100)**	**Inpatients (N = 100)**	**Job Applicants (N = 189)**
Truthfulness Scale	21	21.73	53.15	45.91
Alcohol Scale	21	9.29	31.46	47.75
Drugs Scale	21	27.19	16.34	58.18
Stress Coping Abilities	40	46.74	16.20	195.86

All F statistics are significant at p<.001.

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

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

All F statistics are significant at p<.001.

14. Relationships between Selected ATO 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 Adult Treatment Outcome scales were chosen for this study: Truthfulness Scale, Alcohol Scale and Drugs Scale. The Truthfulness Scale was chosen because it is used in the ATO to measure the truthfulness or honesty of the respondent while completing the ATO. 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 ATO. 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 ATO scales and the Polygraph examination. Tests were given in a counterbalanced order, half of the applicants were given the ATO scales first and the other half of the applicants were administered the polygraph first. The subjects were administered the ATO 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 ATO 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 ATO Truthfulness Scale, Alcohol Scale and Drugs Scale. There were strong positive relationships between the selected ATO scales and the Polygraph examination. The highly significant product-moment correlations between ATO scales and Polygraph examinations demonstrate the validity of the ATO 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 ATO. The fact that there was a very strong relationship between Polygraph results and ATO scales shows that this type of information can be obtained accurately in self-report instruments.

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

15. Replication of ATO Reliability for Selected Scales in a Sample of Inpatient Clients

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

Method and Results

The ATO 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 than in the previous study. The results of the present study support the reliability of the ATO.

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

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

ATO SCALES MEASURES	N ITEMS	COEFFICIENT ALPHA	F VALUE	P VALUE P<
Truthfulness Scale	21	0.79	13.28	0.001
Alcohol Scale	21	0.92	24.39	0.001
Drugs Scale	21	0.87	22.23	0.001
Resistance Scale	21	0.81	10.92	0.001
Stress Coping Abilities	40	0.99	27.77	0.001

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

16. Validation of ATO Scales Using DWI Evaluator Ratings

This study (1987) was designed to demonstrate the relationship between ATO 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 ATO, 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 ATO as part of normal DWI screening and evaluation procedures. Results of staff (evaluator) ratings and scale scores (Alcohol and Drug Scales) are presented in Table 6. As shown in the table below, the product-moment correlation coefficients between staff ratings and scale scores are highly statistically significant at $p<.001$.

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

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

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

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

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

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

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

17. Validation of ATO Alcohol and Drug Scales Using the Mortimer-Filkins Test

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

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

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

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

18. Validation of ATO Alcohol and Drug Scales Using the MacAndrews Scale

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

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

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

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

19. Validation of Four ATO Scales Using DRI Scales as Criterion Measures

This study (1989) compared the Driver Risk Inventory (DRI) with the ATO. The DRI has been demonstrated to be a valid, reliable and accurate DWI offender assessment instrument. The ATO is designed for treatment intake assessment and pretest-posttest comparisons. It contains twelve measures or scales: Truthfulness, Outlook, Depression, Anxiety, Control, Violence, Suicide, Alcohol, Drugs,

Distress, Self-Esteem and Stress Coping Abilities. Four of these twelve ATO 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 ATO and DRI, they were designed to measure similar behaviors or traits. Thus, although essentially composed of different test questions in the ATO and DRI test booklets, these comparable measures or scales do have similarity.

Method

The ATO 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 ethnic groups. 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 ATO 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 ATO 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 ATO.

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 four sets of scale comparisons were highly significant. The validity of the ATO has been demonstrated on a sample of incarcerated offenders.

Table 10. Product-moment correlations 1988 study of male inmates (N = 154).

DRI versus ATO Scales	**Agreement Coefficients**
Truthfulness Scale	.6405
Alcohol Scale	.3483
Drug Scale	.3383
Stress Coping Abilities	.7642

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

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

Abilities Scale. These ATO scales measure what they were intended to measure.

20. Validation of the ATO Self-Esteem Scale

This study (1990) evaluated ratings between experienced counselors and the ATO 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, progress notes, diagnoses, MMPI and Incomplete Sentence materials. Each patient was interviewed for a minimum of 30 minutes. Product-moment correlation coefficients were calculated for each rater and are presented in Table 11.

Table 11. Staff Ratings and ATO Self-Esteem Scale (1990, N=89)		
Product-moment correlation coefficients significant at p<.05.		
ATO Scale	**First Rater**	**Second Rater**
Self-Esteem	.11	.18

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

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

This study (1990) validated ATO scales using analogous scales from the MMPI. The ATO Truthfulness Scale was correlated with the MMPI L (Lie) Scale. The ATO Alcohol Scale and Drugs Scale were correlated with the MMPI MacAndrews Scale and Psychopathic Deviate Scale. The ATO Stress Coping Abilities Scale was correlated with the Hypomania (Mam) and Taylor Manifest Anxiety (MAS) Scales. The ATO Self-Esteem Scale was correlated with the Psychasthenia (PT) and the Social Alienation (SOA) Scales. The ATO Depression Scale was correlated with the MMPI Depression Scale. The ATO Anxiety Scale was correlated with the Taylor Manifest Anxiety (MAS) Scale. The ATO Outlook 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 ATO 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 ATO - Truthfulness Scale are conceptually similar. Each consists of items that most people agree or disagree with. And, they both determine client honesty. The ATO Suicide Scale was correlated with the Taylor Manifest Anxiety (MAS) Scale, and the Psychasthenia (PT) Scale. 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 **Depression Scale** correlates significantly with the MMPI Depression (D, r=0.57) Scale. The **Anxiety Scale** correlates significantly with the Taylor Manifest Anxiety (MAS, r=.56), and the Psychasthenia (PT, r=0.47) Scales. 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) Scales. The **Suicide Scale** correlates significantly with the Taylor Manifest Anxiety (MAS, r=.56), and the Psychasthenia (PT, r=0.47) Scale. The **Outlook 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 ATO. Validity refers to a test measuring what it is purported to measure. The ATO is an accurate assessment instrument. The ATO measures what it is designed to measure.

22. Reliability of Selected ATO Scales in a Sample of Outpatient Clients

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

Method and Results

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

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

ATO Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.84	P<.001
Alcohol Scale	.86	P<.001
Drug Scale	.85	P<.001
Suicide Scale	.85	P<.001
Outlook Scale	.92	P<.001
Distress Scale	.81	P<.001
Anxiety Scale	.81	P<.001
Depression Scale	.83	P<.001
Self-Esteem Scale	.92	P<.001
Stress Coping Ability Scale	.88	P<.001

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

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

The present (1992) study was conducted to evaluate the statistical reliability of ATO scales in an inpatient

adult sample. As the population of substance abuse clients could conceivably consist of widely varying people, it is important to continue to investigate statistical (reliability) properties on the various substance abuse client population databases.

Method and Results

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

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

Table 13. Reliability coefficient alphas. Inpatients (1992, N=365)

ATO Scales	Coefficient Alpha
Truthfulness Scale	.85
Alcohol Scale	.90
Drugs Scale	.87
Suicide Scale	.85
Outlook Scale	.91
Distress Scale	.85
Anxiety Scale	.85
Depression Scale	.87
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 Adult Treatment Outcome (ATO). The coefficient alpha is the most widely used statistic of internal consistency or reliability. The ATO produces similar results upon repetition. The ATO is reliable.

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

The present study (1994) was conducted to investigate reliability of ATO 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 Table 14.

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

ATO Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.87	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.89	P<.001
Suicide Scale	.90	P<.001
Outlook Scale	.95	P<.001
Distress Scale	.90	P<.001
Depression Scale	.88	P<.001
Anxiety Scale	.90	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 ATO studies. These results again demonstrate the internal consistency of the Adult Treatment Outcome.

25. Validation of the ATO Lethality (Violence) Scale with a Polygraph Examination

The Lethality (Violence) Scale measures physical force to injure, damage or destroy. The Violence Scale identifies people that are dangerous to themselves and others. This study (1994) was conducted to evaluate the validity of the Violence Scale in the ATO.

Method and Results

One hundred and seven (107) halfway house male resident volunteers participated in the study. The Violence Scale and a Polygraph "violence" examination were alternately administered. The Product-moment correlation coefficient of $r = .25$ was significant at $p<.01$. This means the ATO Lethality (Violence) Scale and polygraph examination on violence were in agreement most of the time. This significant correlation was in the predicted direction. This study supports the validity of the Violence Scale.

26. Validation of the Antisocial Reaction and Lethality (Violence) Scales

The present study (1994) utilized selected MMPI scales as criterion measures to validate the Lethality (Violence) Scale. Ninety-seven (97) male chemical dependency outpatients were alternately administered the MMPI and the Violence scale. The results demonstrated that the Violence Scale correlated significantly in the predicted direction with the following MMPI scales: Hypomania (MA, $r = 0.49$) and Manifest Hostility (HOS, $r = 0.44$). All correlations were significant at $p<.01$. These results support the validity of the Lethality (Violence) Scale.

27. Reliability of Eleven ATO Scales in a Large Sample of Outpatients

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

Method and Results

The ATO was administered to 887 adult outpatient participants as part of routine evaluation programs. Subjects were administered ATO 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 Adult Treatment Outcome (ATO). The Alpha Coefficient is the most widely used statistic of internal consistency or reliability. The ATO produces similar results upon repetition. The ATO is a reliable adult assessment instrument.

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

ATO Scales	Coefficient Alpha	Significance Level
Truthfulness Scale	.89	P<.001
Alcohol Scale	.90	P<.001
Drug Scale	.91	P<.001
Suicide Scale	.90	P<.001
Outlook Scale	.91	P<.001
Control Scale	.85	P<.001
Distress Scale	.90	P<.001
Depression Scale	.89	P<.001
Anxiety Scale	.90	P<.001
Self-Esteem Scale	.91	P<.001
Stress Coping Ability Scale	.92	P<.001

28. Reliability Study on Three Samples of Outpatient Clients

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

Marital Status: Single (141, 69.1%); Married (34, 16.7%); Divorced (7, 3.4%); Separated (4, 2.0%); and Missing (18, 8.8%).

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

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

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

Table 16. Reliability coefficient alphas. (1996, N = 1,485)

ATO Scales	Group 1 N = 204	Group 2 N = 116	Group 3 N = 1,165
Truthfulness Scale	.85	.85	.86
Alcohol Scale	.88	.88	.89
Drug Scale	.85	.86	.88
Distress Scale	.88	.85	.85
Control Scale	.85	.86	.85
Depression Scale	.87	.84	.84
Anxiety Scale	.88	.85	.85
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 ATO. The ATO 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 ATO is applicable across different national adult outpatient samples. The ATO is a reliable adult intake assessment instrument.

29. ATO Reliability in a Large Sample of Inpatient Clients

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

Reliability coefficient alphas are represented in Table 17. All coefficient alphas are significant at $p<.001$.

Table 17. Reliability coefficient alphas. Inpatients (1996, N = 630).

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

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

SUMMARY

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

Summarized research demonstrates that the ATO is a reliable, valid and accurate instrument for client assessment. It is reasonable to conclude that the ATO does what it purports to do. The ATO 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 Adult Treatment Outcome is not a personality test, nor is it a clinical diagnostic instrument. Yet, it is much more than just another assessment test. The ATO is designed specifically for screening clients for emotional/mental health problems, treatment evaluation, and referral to appropriate treatment services.