Alcohol-Drug-Screening

ADS: An Inventory of Scientific Findings

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PREFACE

The **Alcohol-Drug-Screen (ADS)** focuses entirely on adult alcohol and drug use or abuse. ADS incorporates its evidence-based Alcohol Scale and Drug Scale findings with the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) Substance Abuse, and Substance Dependency classifications.

The **Alcohol-Drug-Screen (ADS)** is a brief, self-administered, evidence-based substance (alcohol and other drugs) abuse, assessment instrument or test. It consists of 116 questions and takes 20 minutes to complete. From test data (answers) input, the ADS is scored, with reports printed within 2½ minutes, on-site.

The **Alcohol-Drug-Screen (ADS)** incorporates six scales (measures): **1.** Truthfulness Scale, **2.** Alcohol Scale, **3.** Drug Scale, **4.** DSM-IV Substance Abuse Scale, **5.** DSM-IV Substance Dependency Scale, and **6.** the Stress Management Scale.

INTRODUCTION
ALCOHOL-DRUG-SCREEN (ADS)

In 2010, an estimated 22.1 million people were classified with substance dependence or substance abuse (8.7%). Of these, 2.9 million were classified with dependence or abuse of both alcohol and illicit drugs; 4.2 million had dependence or abuse of illicit drugs, but not alcohol; 15 million had dependence or abuse of alcohol, but not illicit drugs (National Survey of Drug Use and Health [NSDUH, 2010]).

Public awareness of substance (alcohol and other drugs) abuse, as a nationwide health problem, has clarified the need for identification and treatment of these disorders. The Alcohol-Drug-Screen (ADS) is focused entirely upon substance (alcohol & drugs) abuse, and was, specifically, designed for substance abuse counseling and treatment screening, court related evaluations, and misdemeanor and felony assessments. The ADS should be used in conjunction with a review of available records and experienced staff judgment.

The ADS can be administered individually or in groups. The language is direct, non-offensive, and uncomplicated. Automated scoring and interpretive procedures help insure objectivity and accuracy. ADS reports are scored and printed onsite within 2½ minutes of data (answers) input.

UNIQUE FEATURES

The ADS has several, unique features that set it apart from other alcohol and drug abuse, assessment instruments. These features include: Truthfulness Scales, Risk Range Percentiles, ADS database, HIPPA Compliance, DSM-IV substance abuse/dependency classification scales, and compatibility with American Society of Addiction Medicine (ASAM) treatment placement recommendations.

Truthfulness Scales

There are many terms that address the notion of truthfulness within the context of assessment, treatment and rehabilitation, including *denial*, *problem minimization*, *misrepresentation*, and *equivocation*. The prevalence of denial among patients is extensively discussed in the psychological literature (Marshall, Thornton, Marshall, Fernandez, & Mann, 2001; Brake & Shannon, 1997; Barbaree, 1991; Schlank & Shaw, 1996). The impact the Truthfulness Scale score has on other scale or test scores is contingent upon the severity of denial or untruthfulness. In assessment, socially desirable responding impacts assessment results, when respondents attempt to portray themselves in an overly favorable light (Blanchett, Robinson, Alksnis & Sarin, 1997).

Awareness of truthfulness scales (measures) increased with the release of the Minnesota Multiphasic Personality Inventory (MMPI), almost six decades ago. Soon thereafter, socially desirable responding was demonstrated to impact assessment results (Stoeber, 2001; McBurney, 1994; Alexander, Somerfield & Ensminger, 1993; Paulhus, 1991). Truthfulness Scale conceptualization began, in earnest, with the idea of self-response accuracy. Test users wanted to be sure that respondents' self-report answers were truthful. **Evaluators and assessors need to know if they can rely upon test data being accurate.**

Research also shows that truthfulness is a factor in diagnosis, treatment effectiveness, and recidivism. Because denial is thought to be an important component of assessment and rehabilitative outcomes, various measures have been developed to augment its identification (Schneider & Wright, 2001; Eccles, Stringer, & Marshall, 1997). While some assessments focus on general truthfulness (denial) and others are specific to an offense or problem (Tierney & McCabe, 2001), before denial can be addressed and worked through, it must first be identified.

Client (patient) truthfulness has been associated with more positive, treatment outcomes in some individuals (Barber, et. al., 2001; Simpson 2004). Problem minimization has also been linked to lack of treatment progress (Murphy & Baxter, 1997); treatment dropout (Daly & Peloski, 2000; Evans, Libo & Hser, 2009); and client recidivism (Nunes, Hanson, Firestone, Moulden, Greenberg & Bradford, 2007; Kropp, Hart, Webster & Eaves, 1995; Grann & Wedin, 2002). Some researchers (Baldwin & Roys, 1998; Grossman & Cavanaugh, 1990 Haywood & Grossman, 1994; Haywood, Grossman & Hardy, 1993; Nugent & Kroner, 1996; Sefarbi, 1990) have suggested that client denial should be eliminated prior to commencing treatment, whereas others argue that clients should not be excluded from starting treatment due to their denial (Maletzky, 1996). Despite different views on the role of denial at treatment intake, reductions in denial are associated with increased likelihood of treatment success (O'Donohue & Letourneau, 1993). Denial reduction methods include use of survivor reports, directed group work, or addressing cognitive distortions that may cause denial (Schneider & Wright, 2004). Historically, traditional treatment methods (especially in substance abuse treatment) were intense, confrontational, and stress-inducing, with the goal of breaking down client denial and resistance. However, more contemporary treatment models often take a more non-threatening approach (Sciacca, 1997.)

In summary, truthfulness research has shown that Truthfulness Scales can determine whether-or-not respondents are truthful when completing assessment instruments or tests. And, this research has linked Truthfulness Scale scores with treatment programs, treatment outcome, and client (patient) recidivism.

Risk Range Percentile Scores

Each ADS scale is scored independently of the other scales and includes a combination of three elements:

1. Responses to scale items
2. Truthfulness Scale
3. Prior history responses that are contained on the ADS answer sheet

The Truthfulness Scale applies a truth-correction factor, so that each scale score is referred to as a Truth-Corrected scale score. The cumulative distribution of truth-corrected scale scores are converted to the percentile scores that are reported in the ADS report.

ADS scale percentile scores represent *degree of severity*, which are defined as follows: **Low Risk** (zero to 39th percentile), **Medium Risk** (40th to 69th percentile), **Problem Risk** (70th to 89th percentile), and **Severe Problem** or **Maximum Risk** (90th to 100th percentile). The cumulative distributions of truth-corrected scale scores determine the cut-off scores for each of the four risk range and severity categories.

HIPPA Compliance

Many agencies and programs are rightfully concerned about protecting respondent (patient, client) confidentiality. The ADS is fully, HIPPA compliant. Automatic encryption of names is available for online test users. Once patient (client) names have been deleted, they are gone and cannot be retrieved. Deleting respondent names will not delete demographic information or test data, which is downloaded into the ADS database for subsequent analysis. This "name deletion" procedure ensures confidentiality and compliance with HIPPA requirements.

DSM-IV Classification
Psychoactive substance use, abuse, and dependency are discussed and defined in the Diagnostic Statistical Manual of Mental Disorders (DSM-IV) and, it is from this source that the Substance Abuse and Substance Dependency classifications scales were adapted.

- *Substance Abuse Classification* incorporates four, DSM-IV substance abuse criteria, and classification is determined by respondent admission to one of the four, DSM-IV substance abuse items.
- *Substance Dependence Classification* incorporates seven, DSM-IV substance abuse criteria, and classification is determined by respondent admission to three or more of the seven, DSM-IV dependency items.

ASAM Recommendations
The Alcohol Scale and Drug Scale incorporate American Society of Addiction Medicine (ASAM) intervention and/or treatment placement recommendations. ASAM advocates matching patients' addiction severity to commensurate levels of intervention and treatment. The ADS scales identify problems, and scale scores represent problem severity. ADS reports provide treatment recommendations, based on problem severity.

ADS SCALES

ADS scales were developed from large item pools. Psychologists, familiar with each scale, selected initial items using a rational process, based upon clearly understood definitions of each scale. The original pool of potential test items was analyzed and the items with the best statistical properties were retained. Final test and item selection were based on each item's statistical properties. It is important that users of the ADS familiarize themselves with the definition of each scale. For that purpose, a description of each ADS scale follows.

- **Truthfulness Scale:** Measures denial, problem minimization and attempts to fake good. This provides a sound, empirical basis for decisions.

- **Alcohol Scale:** Measures alcohol use and the severity of abuse. This enables matching of alcohol/drinking severity with treatment, or intervention intensity.

- **Drug Scale:** Measures illicit or non-prescription drug use and the severity of abuse or dependency. Provides strong accountability of results.

- **DSM-IV Substance Abuse Scale:** Utilizes Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) to classify substance (alcohol and drugs) abuse.

- **DSM-IV Substance Dependency Scale:** Utilizes Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) to classify substance (alcohol and drugs) dependency.

- **Stress Management Scale:** Measures the client's (defendant or patient's) ability to manage their stress (anxiety, pressure, tension). Stress management techniques and strategies are learned.

The wealth of alcohol and drug-related information provided, in **Alcohol-Drug-Screen (ADS)** reports, facilitates alcohol and drug abuse/dependency identification, measures problem severity, and facilitates matching of problem severity with treatment intensity.

RESEARCH STUDIES

STRESS QUOTIENT

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

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

The Stress Quotient (SQ) 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 Management Scale**.

Validation Study 1: This study was conducted (1980) to compare Stress Management 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, Stress Management scores ranged from 32 to 97, with a mean of 64.2. Low Stress group, Stress Management 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 Stress Management scores than the Low Stress group ($t = 4.9$, $p < .001$). This study shows that the Stress Management Scale is a valid measure of stress coping. The Stress Management Scale, (hereinafter referred to as SM) significantly, discriminates between high stress individuals and low stress individuals.

Validation Study 2: This study (1980) evaluated the relationship between the SM 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 Stress Management (SM) Scale is correlated with these measures, it would indicate that the Stress Management 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 SM were expected, because high SM scores indicate good, stress management. 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, SM scores attained a correlation coefficient of -.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 Management Scale is a valid measure of stress management skills. The reliability of the SM was investigated in ten subjects, (5 male and 5 female) randomly chosen from this study. A split-half, correlation analysis was conducted on the SM items. The product-moment, correlation coefficient (r) was .85, significant at the $p < .01$ level. This correlation indicates that the Stress Management (SM) Scale is a reliable measure. These results support the Stress Management (SM) Scale as a reliable and valid measure.

Validation Study 3: In this study, (1981) the relationship between the SM 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 SM scores and, separately, with two components of the SM scale: Coping Skill (CS) scores and Stress (S) scores. It was hypothesized that the SM and SRRS correlation would be negative, since subjects with lower SM 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 SM and the SRRS were administered in counterbalanced order. The results showed there was a significant, positive correlation (product-moment correlation coefficient) between SM 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 SM and SRRS as well as S and SRRS support the construct validity of the Stress Management (SM) 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 SM in a sample of adults. High scores on factor C indicate high ego strength and emotional stability, whereas high SM 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 SM 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 SM scores ($r = .695$, $p<.01$). Results were significant and in the predicted direction. These results support the Stress Management Scale as a valid measure of stress management in adults.

In a subsequent study, the relationship between factor Q4 (Free Floating Anxiety), on the 16 PF Test and S (Stress) on the SM 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, because the remaining original files were unavailable. All 22 subjects were male. The results indicated that Factor Q4 scores were, significantly, correlated (product-moment correlation coefficient) with S scores ($r = .584$, $p<.05$). Results were significant and in predicted directions. The significant correlations between factor C and SM scores, as well as factor Q4 and S scores, support the construct validity of the SM scale.

Validation Study 5: Psychotherapy outpatient clients were used in this validation study (1982) that evaluated the relationship between selected Wiggins MMPI (Minnesota Multiphasic Personality Inventory) supplementary content scales (ES & MAS), as criterion measures, and the SM 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 SM 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 SM scale was evaluated. The Pt scale in the MMPI reflects neurotic anxiety, whereas the S component of the SM 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 SM scale were significantly correlated (r = .58, p<.001). Results were significant and in the predicted direction. The significant correlations, between MMPI scales (ES, MAS, Pt) and the SM scale components, (CS, S) support the construct validity of the Stress Management Scale.

Reliability Study 6: The reliability of the Stress Management 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 SM 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 Management Scale was investigated in a sample of 189 job applicants. There were 120 males and 69 females, with an average age of 31. The SM 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's Alpha reveals that all, SM 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 Management Scale. The SM 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 SM 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 SM and selected MMPI scales, were significant at the p < .001 level and in predicted directions. The SM 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 SM 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 Management Scale as a valid measure of stress and management skills.

Validation Study 9: In a replication of earlier research, a study (1986) was conducted to further evaluate the reliability and validity of the Stress Management Scale. The participants were 212 inpatients in chemical dependency programs. There were 122 males and 90 females, with an average age of 44. The SM and MMPI were administered in counterbalanced order. Reliability analysis of the SM 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 SM was 0.99**.

In the same study, (1986, inpatients) product-moment correlations were calculated between the Stress Management Scale (SM) and selected MMPI scales. The SM 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 SM correlations, with selected MMPI scales, were significant (at the .001 level of significance) and in predicted directions.** These results support the SM scale or Stress Management Scale as a valid measure of stress and stress management skills.

The studies cited above demonstrate empirical relationships between the SM scale (Stress Management Scale) and other, established measures of stress, anxiety, and coping skills. This research demonstrates that the Stress Management Scale is a reliable and valid measure of stress management. The SM has high, inter-item scale reliability. The SM also has high, concurrent (criterion-related) validity with other, recognized and accepted tests. The SM scale permits objective (rather than subjective) analysis of the interaction of these important variables.

10. Early Validation Studies Using ADS

Research studies were conducted with established Minnesota Multiphasic Personality Inventory (MMPI) scales, as well as Polygraph examinations, and other reports. Reliability and validity studies have been conducted on substance abuse inpatients, outpatients, college students, job applicants, defendants, diversion program attendees, probationers, inmates, and counseling patients.

Empirically-based, Alcohol-Drug-Screen scales (or measures) were developed by statistically relating scale item configurations to known, substance (alcohol and other drugs) abuse groups. The ADS was then normed against an adult outpatients, court client population, etc.

Classification Validation:

ADS risk level classification categories are presented below. These percentages are based on ADS respondent scale scores. This permits comparison of predicted percentages with obtained percentages, for each risk range category.

TRUTHFULNESS, VIOLENCE & STRESS MANAGEMENT SCALES

PREDICTED RISK RANGE PERCENTAGES FOR EACH SCALE		
RISK CATEGORY	RISK RANGE	**PREDICTED PERCENTAGE**
Low Risk	zero to 39th percentile	**39%**
Medium Risk	**40 to 69th percentile**	**30%**
Problem Risk	**70 to 89th percentile**	**20%**
Severe Problem	**90 to 100th percentile**	**11%**

Predicted percentages for each scales risk range category can be compared to actually, attained percentile scores. This comparison helps understand the accuracy of the assessment. Actual?

11. ASAM and Severity Range Validation:
The inclusion of the American Society of Addiction Medicine (ASAM) intervention and/or treatment recommendations in the Alcohol Scale and Drug Scale explanatory paragraphs required adjusting severity ranges for these two scales. The Substance Abuse/Dependency Scale incorporates DSM-IV criteria. The Alcohol and Drug Scales measure severity or level of risk. The explanatory scale score paragraphs, for these two scales, attempt to incorporate ASAM intervention and/or treatment placement recommendations, where appropriate.

ALCOHOL AND DRUG SCALES

SEVERITY RANGES	PERCENTAGES	RECOMMENDED INTERVENTION LEVELS
0 to 29th percent	29%	Non-pathological use
30 to 39th percent	10%	Substance (alcohol/drug) Education
40 to 54th percent	15%	Substance Education Program and AA, NA or CA
55 to 89th percent	35%	Level I (outpatient Treatment)
90 to 95th percent	6%	Level II (Intensive Outpatient/Partial Hospitalization)
96 to 100th percent	5%	Level III (Medically Monitored Intensive Inpatient) Level IV (Medically Managed Intensive Inpatient)

12. Validation Study:
Psychotherapy outpatients 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 SM 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 SM 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.

13. Truthfulness Scale Validation:
This preliminary study (1985) used the 21, Truthfulness Scale items in the ADS, 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, 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 ADS Truthfulness Scale, was administered to the subjects, and the Truthfulness Scale was embedded in the test as one of the six scales. Truthfulness Scale scores consisted 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 demonstrate that the Truthfulness Scale, accurately, detects "Fakers" from those students that took the test honestly.

14. Validation of Four 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 (1985), the four, ADS scales (Truthfulness, Alcohol, Drug, Stress Management) 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 ADS scales were validated with MMPI scales as follows: The Truthfulness Scale was validated with the L Scale. The Alcohol Scale was validated with the MacAndrew Scale. The Drug Scale was validated with the MacAndrew and Psychopathic Deviant scales. The Stress Management Scale was validated with the Taylor Manifest Anxiety, Psychasthenia, Social Maladjustment, and Social Alienation scales.

Method

One hundred (100) chemical dependency inpatients were administered both the Alcohol-Drug-Screen (ADS) scales and the MMPI. Tests were counterbalanced for order effects -- half were given the ADS scales first, and half the MMPI first. (1985)

Results and Discussion

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

Table 1. Product-moment correlations between MMPI scales and ADS scales (N=100, 1985)

MMPI SCALES	**ADS SCALES (MEASURES)**			
(MEASURES)	**Truthfulness**	**Alcohol**	**Drug**	**Stress Mgmt**
L (Lie) Scale	0.72	-0.38	-0.41	0.53
Psychopathic Deviant	-0.37	0.52	0.54	-0.59
Psychasthenia	-0.34	0.38	0.41	-0.68
Social Maladjustment	-0.25	0.34	0.26	-0.54
Authority Conflict	-0.43	0.31	0.47	-0.46
Manifest Hostility	-0.45	0.34	0.47	-0.58
Taylor Manifest Anxiety	-0.58	0.47	0.46	-0.78
MacAndrew	-0.40	0.58	0.62	-0.33
Social Alienation	-0.47	0.35	0.45	-0.67

15. Relationship Between Selected Scales and Polygraph Examinations:

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 Alcohol-Drug-Screen (ADS) scales were chosen for this study (1985); Truthfulness Scale, Alcohol Scale, and Drug Scale. The Truthfulness Scale was chosen, because it is used in the ADS to measure the truthfulness, or honesty of the respondent while completing the ADS. The Alcohol and Drug scales are well suited for comparison, with the polygraph exam, because of the situation-specific nature of the scales. Alcohol and Drug scale 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 ADS. The Truthfulness Scale is affected by the respondent's attitude, emotional stability, and tendencies to fake good. It was expected that the Alcohol and Drug scales would be highly correlated with the polygraph results, and the Truthfulness Scale would show a somewhat less, but, nonetheless, significant correlation.

Method

One hundred and eighty-nine (189) job applicants were administered both the ADS scales and the Polygraph examination (1985). Tests were given in a counterbalanced order; half of the applicants were given the ADS scales first, and the other half of the applicants were administered the polygraph first. The subjects were administered the ADS 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 ADS scales, indicated there was a significant, positive correlation between the Truthfulness Scale and Polygraph exam ($r = 0.23$, $p<.001$). Similarly, significant positive relationships were observed between the Polygraph exam and the Alcohol Scale ($r = 0.54$, $p<.001$) and the Drug Scale ($r = 0.56$, $p<.001$).

In summary, this study supports the validity of the ADS Truthfulness, Alcohol and Drug scales. There were strong positive relationships between the selected, ADS scales and the Polygraph examination. The highly, significant, product-moment correlations, between ADS scales and Polygraph examinations, demonstrate the validity of the ADS Truthfulness, Alcohol, and Drug abuse measures.

16. Validation in a Sample of Substance Abuse Inpatients:

The ADS is an adult, chemical dependency and substance (alcohol and other drugs) abuse, assessment instrument. It is designed for use in court-related settings, diversion programs, and probation departments. The ADS is a specific test, designed for specific, substance abuse, client populations. The present study (1987) was conducted to validate the ADS scales, in a sample of substance abuse inpatients, in a chemical dependency facility.

Selected scales in the Minnesota Multiphasic Personality Inventory (MMPI) were used as criterion measures for the different, ADS scales. The Truthfulness Scale was validated with MMPI L Scale, F Scale, and K Scale. The Alcohol Scale was validated with MMPI MacAndrew Scale (MAC) and Psychopathic Deviate-Obvious (PD-O). The Drug Scale was validated with MMPI MacAndrew Scale and Psychopathic Deviate-Obvious. The Stress Management (SM) Scale was validated with MMPI Psychasthenia (PT), Anxiety (A), Taylor Manifest Anxiety (MAS), and Tension/Worry (TSC-VII). The MMPI scales were chosen to compare to the ADS scales, because they measure similar attributes.

<u>Method</u>

The subjects used in the study (1987) were 212, substance (alcohol and other drugs) abuse inpatients in chemical dependency facilities. The ADS and MMPI scales were administered in counterbalanced order.

Results and Discussion

The product-moment, correlation results are summarized in Table 2. Since this study is important in understanding ADS validity, each ADS scale is briefly summarized below. (N=212):

The **Truthfulness Scale** correlates, significantly, in predicted directions with selected MMPI criterion scales, L Scale (lie, p<.001), F Scale (validity, p<.001) and K Scale (validity correction, p<.001). Other significant correlations, with traditional MMPI scales, include: PD (Psychopathic deviate, p<.001), ES (Ego Strength, p<.001), and RE (Social responsibility, p<.001); Harris MMPI subscales: PD2 (Authority Problems, p<.001), PD4 (Social Alienation, p<.001), SCIA (Social Alienation, p<.001); Wiggins MMPI content scales: SOC (Social Maladjustment, p<.001), HOS (Manifest Hostility, p<.001); Wiener-Harmon MMPI subscales: PDO (Psychopathic Deviant-Obvious, p<.001); Tryon, Stein & Chu MMPI cluster scales: TSC-V (Resentment/Aggressive, p<.001).

The **Alcohol Scale** correlates, significantly, in predicted directions, with selected MMPI criterion scales: MAC (MacAndrew scale, p<.001), and PD-O (Psychopathic Deviate Obvious, p<.021).

The **Drug Scale** correlates, significantly, in predicted directions, with selected MMPI criterion scales: MAC (MacAndrew scale, p<.001), and PD-O (Psychopathic Deviate Obvious, p<.001).

The **Stress Management (SM) Scale** correlates, significantly, in predicted directions, with selected MMPI criterion scales: PT (Psychasthenia, p<.001), A (Anxiety, p<.001), MAS (Taylor Manifest Anxiety, p<.001), PD4 (Social Alienation, p<.001) and TSC-VII (Tension/Worry, p<.001).

Table 2. ADS-MMPI Product-moment Correlations
Inpatients, Chemical Dependency Facilities (N = 212, 1987)

MMPI SCALES	ADS SCALES (MEASURES)			
(MEASURES)	Truthfulness	Alcohol	Drug	Stress Mgmt
L	0.60	-0.24	-0.15	-0.30
F	-0.34	0.32	0.32	0.49
K	0.39	-0.28	-0.29	-0.51
MAC	-0.30	0.35	0.37	0.28
PD-O	-0.35	0.22	0.33	0.53
PD2	-0.26	0.18	0.17	0.07
PD	-0.33	0.21	0.33	0.39
HOS	-0.45	0.25	0.33	0.46
TSC-V	-0.46	0.34	0.28	0.58
ES	0.25	-0.27	-0.25	-0.51
RE	0.41	-0.27	-0.34	-0.45
SOC	-0.19	0.17	0.08	0.39
PD4	-0.41	0.20	0.28	0.55
SCIA	-0.36	0.27	0.32	0.39
PT	-0.39	0.27	0.24	0.58
A	-0.41	0.31	0.31	0.68
MAS	-0.44	0.25	0.18	0.65
TSC-VII	-0.41	0.33	0.29	0.66

17. Reliability Study of ADS Scales in Two Samples of Clients:
This study (1997) was conducted to test the reliability of the ADS scales in two samples of adult outpatients. Within-test reliability measures to what extent a test, with multiple scales measuring different factors, measures each factor, independent of the other factors (scales) in the test. It also measures to what extent items in each scale, consistently, measure the particular trait (or factor) that scale was designed to measure. Within-test reliability measures are referred to as inter-item reliability. The most, common method of reporting within-test (scale) inter-item reliability is with coefficient alpha.

Method and Results
There were two samples of adult outpatients included in this study (1997). **The subjects in Group 1 consisted of 850, adult outpatients.** There were 663 males (78%) and 187 females (22%). Demographic composition of these clients is as follows: Age: 19 & under (21%); 20-29 (43%); 30-39 (23%); 40-49 (9%); 50-59 (2%); and 60 & over (1%). Ethnicity: Caucasian (74%); Black (11%); Hispanic (10%); Asian (1%); Native American (3%); and Other (1%). Education: Eighth grade or less (7%); Some H.S. (30%); H.S. graduate (47%); Some college (11%); and College graduate (4%). Marital Status: Single (61%); Married (19%); Divorced (13%); Separated (5%); and Widowed (1%).

Group 2 consisted of 2,331, adult outpatients. There were 1,847 males (79%) and 484 females (21%). Demographic composition of these clients is as follows: Age: 19 & under (15%); 20-29 (40%); 30-39 (28%); 40-49 (13%); 50-59 (3%); and 60 & over (1%). Ethnicity: Caucasian (58%); Black (25%); Hispanic (15%); Asian (1%); Native American (1%); and Other (1%). Education: Eighth grade or less (9%); Some H.S. (31%); H.S. graduate (44%); Some college (9%); and College graduate (3%). Marital Status: Single (55%); Married (25%); Divorced (12%); Separated (5%); and Widowed (1%).

Reliability coefficient alphas for the two groups (total N = 3,181) are presented in Table 3.

Table 3. Reliability coefficient alphas (N = 3,181, 1997)

SCALES	1 Clients N = 850	2 Clients N = 2,331
Truthfulness Scale	.87	.88
Alcohol Scale	.95	.95
Drug Scale	.93	.92
Stress Management	.93	.92

The results of the study support the reliability of the ADS scales. All coefficient alphas are significant at $p<.001$. All scale reliability coefficients attained very high levels. These results show that the ADS is a reliable, risk assessment instrument.

18. Validity, Reliability, and Scale Risk Range Accuracy of the assessment in Drug Courts:
The assessment is designed for court use and measures substance (alcohol and drugs) use and abuse. The present study (1998) was conducted to analyze the reliability of the assessments in a drug court sample. The study also involved analysis of risk assessment and summary of client self-perceptions of alcohol and drug problems.

Method and Results
The ADS was administered to 100, court clients, (1998) as part of routine evaluation in a municipal, substance abuse, screening program. There were 86 (86%) males and 14 (14%) females. Demographic composition of the subjects was as follows: Age in years: 19 & under (15%); 20-29 (38%); 30-39 (28%); 40-49 (12%); 50-

59 (5%); 60 & over (1%). Ethnicity: Caucasian (10.5%); Black (4.2%); Hispanic (78.9%); Native American (5.3%); Other (1.1%). Education: 8th grade or less (9%); Some High School (25%); H.S. graduate (52%); Some college (2%); College graduate (7%). Marital Status: Single (76.1%); Married (18.2%); Divorced (3.4%); Separated (2.3%).

Reliability coefficient alphas are presented in Table 4.

Table 4. Reliability coefficient alphas (N = 100, 1998)

SCALE	Drug court clients
Truthfulness Scale	.89
Alcohol Scale	.93
Drug Scale	.89
Stress Management	.93

These results support the reliability of the assessment. All reliability coefficient alphas were significant at $p<.001$. The drug court clients, used in the present study, reveal similar reliability statistics that have been found in clients used in other studies. The assessment is a statistically reliable, screening instrument for assessment of client, court, and substance (alcohol and drugs) abuse respondents.

Risk analysis is presented in Table 5.

Table 5. Risk Range Percentile Scores for Drug Court Clients (N = 100, 1998).

Risk Range	Truthfulness	Alcohol	Drug	Violence	Stress Mgmt	**Predicted**
Low	36.0	39.0	38.0	39.0	39.0	**39%**
Medium	30.0	29.0	31.0	29.0	30.0	**30%**
Problem	24.0	21.0	20.0	21.0	20.0	**20%**
Maximum	10.0	11.0	11.0	11.0	11.0	**11%**

The results of the comparisons, between obtained risk percentages and predicted percentages, shows that all, obtained scale risk range, percentile scores were within 4.0 percent of predicted. The largest difference between obtained and predicted risk range percentages occurred on the Truthfulness Scale. All other scales were within one percentage point of predicted. This is very, accurate, risk assessment.

The t-test comparisons between first clients and multiple clients for each scale are presented in Tables 6 and 7. There were 100, substance abuse clients used in this analysis. Client status was defined by the number of alcohol and drug arrests reported by respondents.

Table 6. First clients and Multiple clients mean score comparisons

ADS Scale	First Clients Mean (N=45)	Multiple Clients Mean (N=55)	T-value	Level of significance
Alcohol Scale	14.27	21.29	t = 2.56	p=.012

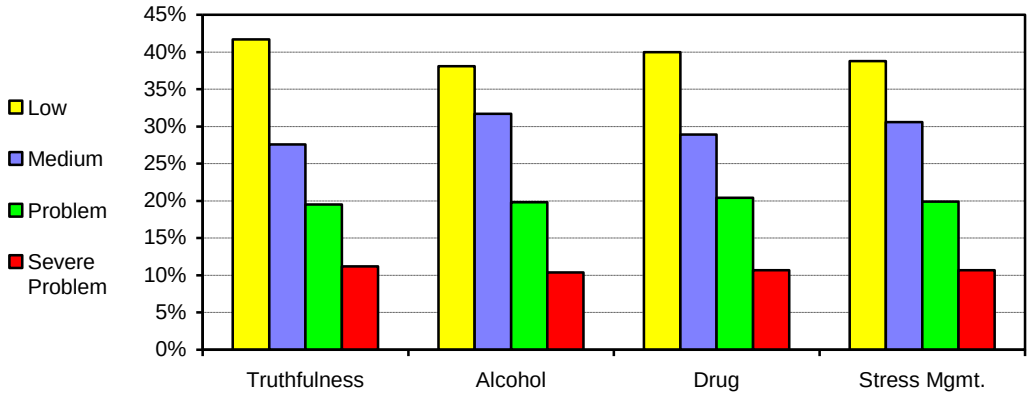
Table 7. First clients and Multiple clients mean score comparisons

ADS Scale	First Clients Mean (N=96)	Multiple Clients Mean (N=4)	T-value	Level of significance
Drug Scale	9.97	24.5	t = 2.74	p<.007

19. Accuracy of the ADS

The percentages of clients scoring in the four, risk categories (low, medium, problem, and severe problem) are presented in Table 8. These percentages are compared to the predicted percentages for each of the five measurement scales. The differences between obtained and predicted percentages are shown in parentheses in the table below the graph.

Table 8. ADS Accuracy (2000, N=6,697)



Alcohol-Drug-Screen (ADS) Accuracy

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	41.7	**(2.7)**	27.6	**(2.4)**	19.5	**(0.5)**	11.2	**(0.2)**
Alcohol	38.1	**(0.9)**	31.7	**(1.7)**	19.8	**(0.2)**	10.4	**(0.6)**
Drug	40.0	**(1.0)**	28.9	**(1.1)**	20.4	**(0.4)**	10.7	**(0.3)**
Stress Mgmt.	38.8	**(0.2)**	30.6	**(0.6)**	19.9	**(0.1)**	10.7	**(0.3)**

Note: The Substance Abuse/Dependency Scale is a classification, not a measurement scale and is not included in this analysis. The differences between obtained percentages and predicted percentages are given in parentheses.

As shown in the graph and table above, obtained risk range percentages, for all risk categories and all ADS scales, were within 2.7 percentage points of the predicted percentages. Of the 20 possible comparisons (5 scales x 4 risk ranges) between attained and predicted percentages, 15 were within one percentage point from the predicted percentage. Only three, obtained risk range percentages were 1.7% or greater, from the predicted percentage, and these were within 2.7 percent. These results demonstrate the accuracy of the ADS.

20. Validity of the ADS

Database validity analyses are presented in Table 9. ADS scale scores are compared between first clients and multiple clients. The answer sheet item, "Number of DUI arrests" was used to operationally define first clients (1 DUI) and multiple clients (2 or more DUIs). There were 5,042 first clients and 1,655

multiple clients. It was expected that multiple clients would score, significantly, higher on ADS scales than first clients. The Substance Abuse/Dependency Scale is not a measurement scale, consequently it is not included in this analysis.

Table 9. T-test comparisons between first clients and multiple clients. (2000, N=6,697)
Client status defined by number of lifetime DUI arrests.

ADS Scale	First Clients Mean (N=32,483)	Multiple Clients Mean (15,740)	T-value	Level of significance
Truthfulness Scale	10.89	10.07	t = 4.87	p<.001
Alcohol Scale	7.67	17.77	t = 29.79	p<.001
Drug Scale	3.31	5.15	t = 9.61	p<.001
Stress Management Scale	138.59	130.35	t = 6.38	p<.001

These results show that multiple clients scored, significantly, higher on the Alcohol, Drug, and Stress Management Scales, than did first clients. First clients scored, significantly, higher, than did multiple clients, on the Truthfulness Scale. This finding has been found in previous research and appears to be trend in DUI client assessment. First offense clients try to minimize their problems more often, than do multiple clients.

These t-test results support the discriminant validity of the Alcohol, Drug, and Stress Coping Abilities Scales. We expected multiple clients would score higher on these scales than first clients. Having a prior arrest is indicative of problem behavior. These results show that clients, who have a prior arrest, score higher on these scales than first time clients. These results strongly support the discriminant validity of the Alcohol, Drug, and Stress Management Scales.

21. Study of ADS in a Midwest Program

This study (2004) examined the ADS test statistics in a Midwest program. The analyses used in the previous studies were replicated. Data was obtained from the agencies that administered the ADS. There were 3,802 DUI clients included. ADS reliability, validity and accuracy were studied.

Method and Results

The participants in this study (2004) consisted of 3,802 DUI clients. There were 2,981 (78.4%) males and 821 (21.6%) females. Demographic composition of this sample is as follows. Age: 19 & under (6.9%); 20-29 (37.7%); 30-39 (23.9%); 40-49 (21.3%); 50-59 (8.0%); and 60 & Over (2.3%). Ethnicity: Caucasian (83.5%); African American (8.0%), Hispanic (6.1%), Native American (0.6%); and Other (1.8%). Education: Eighth grade or less (2.1%); Some H.S. (10.4%); H.S. graduate/G.E.D. (45.6%); Some college (26.0%); and College graduate (15.9%). Marital Status: Single (54.5%), Married (23.8%), Divorced (17.0%), Separated (3.7%); and Widowed (1.0%).

22. Accuracy of the ADS (2004)

The accuracy of the four, Alcohol-Drug-Screen (ADS) measurement scales is presented in Table 10. Refer to previous studies for a discussion of this analysis.

Table 10. ADS Scales Risk Range Accuracy (2004, N = 3,802)

Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	37.4	**(1.6)**	29.3	**(0.7)**	21.5	**(1.5)**	11.8	**(0.8)**
Alcohol	38.7	**(0.3)**	29.3	**(0.7)**	20.0	**(0.0)**	12.0	**(1.0)**
Drug	25.6	**(13.4)**	34.7	**(4.7)**	18.8	**(1.2)**	20.9	**(9.9)**
Stress Coping	39.3	**(0.3)**	29.7	**(0.3)**	19.8	**(0.2)**	11.2	**(0.2)**

Note: The Substance Abuse/Dependency Scale is a classification, not a measurement scale and is not included in this analysis. The differences between obtained percentages and predicted percentages are given in parentheses.

Client-obtained risk range percentages were within 13.4 percentage points of the predicted percentages. Clients scale scores were 87 percent accurate. These results empirically demonstrate that ADS scales accurately measure client risk.

23. Reliability of the ADS (2004)

Within-test reliability, or inter-item reliability, coefficient alphas for the ADS are presented in Table 11.

Table 11. ADS Reliability Coefficient Alphas (2004, N = 3,802)

ADS Scale	**Coefficient Alpha**	**Significance Level**
Truthfulness Scale	.89	.001
Alcohol Scale	.94	.001
Drug Scale	.92	.001
Stress Coping Abilities	.88	.001
Substance Abuse/ Dependency Scale*	.93	.001

*The Substance Abuse/Dependency Classification Scale is a classification derived from DSM-IV criteria.

Alpha coefficients for all scales were .88 and above. These results are similar to those reported in previous studies for entirely, different populations of clients, and empirically demonstrate that the ADS is a highly reliable, risk assessment test.

24. Validity of the ADS (2004)

Construct validity compared scale scores between first (no or one DUI arrest), multiple clients (2 or 3 DUI arrests), and chronic clients (4 or more DUI arrests). Predictive validity compared scale scores between clients who had treatment versus no treatment. There were 3,568 first clients, 210 multiple clients, and 9 chronic clients. The analysis of variance (ANOVA) comparisons for each ADS scale are presented in Table 12. The Substance Abuse/Dependency Scale is not a measurement scale, consequently it is not included in this analysis.

Table 12. ANOVA Comparisons between First Clients and Multiple Clients. (2004, N = 3,787) Client Status Defined by Number of Lifetime DUI Arrests.

ADS Scale	First Clients Mean (N=3,568)	Multiple Clients Mean (N=210)	Chronic Clients Mean (N=9)
Truthfulness Scale	10.00	9.16	11.89
Alcohol Scale	7.03	21.75	25.67
Drug Scale	3.60	6.39	5.22
Stress Coping Abilities	140.71	121.83	135.67

Note: Scores on the Stress Coping Abilities Scale are reversed in that higher scores are associated with better stress coping abilities.

On the Truthfulness Scale, no statistically, significant differences between groups were observed. Significantly higher scores for chronic and multiple clients were obtained on the Alcohol Scale. On the Drug and Stress Coping Abilities Scales, statistically, significant differences were observed between first clients and multiple clients. These results are somewhat mixed, compared to previous findings, with the chronic client group exhibiting the most, atypical pattern of scores. It should be noted, however, that there were only 9 chronic clients. This small sample of chronic clients may contribute to non-representative results for the Alcohol Scale, Drug Scale, and Stress Coping Abilities Scale, supporting the discriminant validity of the ADS.

The validity analysis, also, involved comparing clients who have had treatment (either at present or in the past) with clients who have never had treatment, on the basis of ADS percentile scale scores. Clients who have had treatment are expected to score significantly higher on the ADS scales than those who have never had treatment.

The results of these analyses were as follows. Clients who had been treated for drinking problems scored, significantly, higher on the Alcohol Scale, than those who had never had treatment (average score of 87 for the treatment group, compared to average score of 57 for the non-treatment group). Similarly, clients who had been treated for drug problems scored, significantly, higher on the Drug Scale, than those who had never had treatment (average score of 78 for the treatment group, compared to average score of 28 for the non-treatment group).

25. Reliability Study of ADS (2008)

Test reliability refers to a scale's consistency of measurement. A scale is reliable if a person gets the same score when re-tested as he/she did when originally tested. Table 13 shows the reliability scores for each ADS scale. Perfect reliability is 1.00.

Table 13. ADS Reliability (N=4,677, 2008)

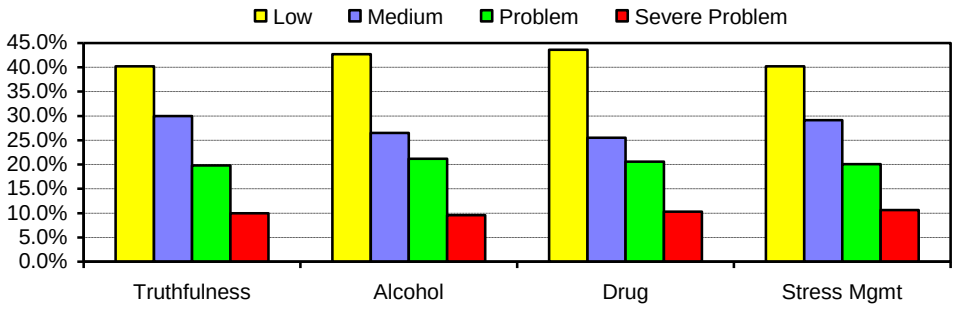
ADS Scale	Alpha coefficient
Truthfulness Scale	**.88**
Alcohol Scale	**.91**
Drug Scale	**.91**
Stress Coping Abilities	**.92**
Substance Abuse/Dependency Scale is a classification scale.	

All ADS scales have a reliability of .88 or higher. The professionally accepted, reliability standard is .75. All ADS scales exceed this standard and demonstrate very, impressive reliability.

26. Accuracy of ADS (2008)

Test accuracy is demonstrated by how close attained scale scores are, to predicted scores. Four categories of risk are assigned: Low Risk (zero to 39th percentile), Medium Risk (40 to 69th percentile), Problem Risk (70 to 89th percentile), and Severe Problem Risk (90 to 100th percentile). The top row of Table 14 shows the percentages of clients that were predicted to score within each risk range. (These predicted percentages, for each ADS scale risk category, were obtained from ADS standardization data.) The body of Table 14 presents actual, attained risk category percentages. Differences between attained and predicted percentages are shown in bold in parentheses. For example, in terms of the Low Risk range for the Truthfulness Scale: 39% of clients were predicted to score within this range; the attained percentage of clients who scored in this range was 40.2%, which is a difference of 1.2 percentage points, from what was predicted.

Table 14. ADS Accuracy (N=4,677, 2008)



Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Truthfulness	40.2	**(1.2)**	30.0	**(0.0)**	19.8	**(0.2)**	10.0	**(1.0)**
Alcohol	42.7	**(3.7)**	26.5	**(3.5)**	21.2	**(1.2)**	9.6	**(1.4)**
Drug	43.6	**(4.6)**	25.5	**(4.5)**	20.6	**(0.6)**	10.3	**(0.7)**
Stress Coping Abilities	40.2	**(1.2)**	29.1	**(0.9)**	20.1	**(0.1)**	10.6	**(0.4)**

Note: The Substance Abuse/Dependency Scale is a classification, not a measurement scale; consequently it is not included in this analysis.

Eighteen out of 20 attained risk range percentiles were within **4.0** points of the predicted percentages**.** (The two exceptions -- the Low Risk and Medium Risk percentiles for the Drug Scale -- were both within 4.6 points of the predicted percentages.) The average difference between attained percentages and predicted percentages was **1.6** points. These results strongly support the accuracy of the ADS as a valid, client assessment instrument.

27. Validity Study of ADS (2008)

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

Predictive validity refers to a test's ability to predict observable "criterion" behaviors. In this analysis, our prediction criterion was whether or not clients considered themselves to have alcohol and/or drug problems. Direct self-admissions were utilized. It was predicted that the self-admitted "problem drinkers" and self-admitted "problem drug users" would be identified by their higher scores on the Alcohol and/or Drug Scales. More specifically, it was predicted that a large percentage of these clients would have Alcohol and/or Drug Scale scores that fell within the 70th and 100th percentile range (the High Risk range). The possibility of these clients scoring in the Low Risk range (zero to 69th percentile) was not discounted

altogether; however, it was expected that a, significantly, higher percentage of these individuals would score within the High Risk range on the Alcohol and/or Drug Scales, than the Low Risk range. The results of the analysis confirmed these predictions. Almost all (**95.7%)** of the clients who admitted to having alcohol problems scored in the High Risk range on the Alcohol Scale. Additionally, almost all (**98.1%)** of the clients who admitted to having drug problems scored in the High Risk range on the Drug Scale. These findings indicate that the Alcohol and Drug Scales accurately identify clients who admit to having alcohol and/or drug problems.

28. Analysis of the Substance Abuse/Dependency Scale (2008)

The ADS Substance Abuse/Dependency Scale classifies clients as "substance dependent," "substance abuse," or non-problematic, according to their responses regarding DSM-IV criteria. Clients are classified "substance abuse" if they admit to one or more of the four, abuse criteria (symptoms). These DSM-IV criteria are discussed in the ADS Training Manual. Clients are classified "substance dependent" if they admit to three or more of the seven, dependency criteria (symptoms), or if they have ever been diagnosed "substance dependent" in the past. (According to DSM-IV methodology, once an individual is diagnosed "dependent," that diagnosis applies for the rest of his/her life.) The DSM-IV substance abuse and substance dependency criteria, literally, reflect these scales, as presented in the DSM-IV, and are widely used for classification purposes.

Table 15. DSM-IV Classification

Classification	Males %	Females %	Total N	%
Non-Problematic	24.6	34.5	1,255	26.8
Substance Abuse	46.1	40.5	2,096	44.8
Substance Dependent	28.4	24.2	1,280	27.4
Diagnosed dependent in past	14.7	14.9	2,162	14.7

*Note: There were 46 cases of missing information.

The table above shows that just over one quarter of the total population was classified as "substance dependent" according to DSM-IV criteria. Approximately, 15 percent of the population had been diagnosed "substance dependent" in the past. Approximately, 45 percent of clients were classified as substance abusers and approximately one quarter or 25 percent were classified as non-problematic. Almost 75% of clients were classified as either "substance dependent" or "substance abuse."

When client status is considered: 46.5% of Multiple Clients were diagnosed "substance abuse," and 43.7% were diagnosed "substance dependent." One quarter (26.0%) had been diagnosed "substance dependent" in the past. Approximately, ten percent (9.4%) of Multiple Clients were classified as non-problematic.

The percentage of First Clients, who were diagnosed "substance abuse," (44.7%) was comparable to that of Multiple Clients. However, unlike Multiple Clients, the second largest proportion (34.6%) of First Clients was classified as non-problematic. Only 20.6 percent were diagnosed "substance dependent." A considerably, smaller percentage of First Clients (9.9%) had been diagnosed "substance dependent" in the past, than Multiple Clients.

The results of chi-square analyses indicated that the differences between the percentages of First Clients and Multiple Clients who were classified "substance dependent" (χ^2 = 258.45, p <.001, V= .24), "substance dependent" in the past (χ^2 = 201.59, p <.001, V= .21), and non-problematic, (χ^2 = 306.66, p <.001, V= .26) were all, statistically significant.

29. Reliability Analysis (2012)

The Alcohol Drug Screen (ADS measures substance (alcohol and drugs) use and abuse. The present study (2012) was conducted to analyze the reliability of the assessments, using online data received from September 1, 2012 and October 10, 2012.

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

Method and Results

ADS data was received from 133 respondents, retrieved from the Online-Testing database. There were 99 (74%) males and 34 (26%) females. The average age of respondents was 34.8, with an age range of 16 – 83. Respondent ethnicity was: Caucasian (60%); African American (19%); Hispanic (5%); Native American (14%); and Other (<1%). Education: Some High School (20%); H.S. graduate (43%); Some college (18%); College graduate (6%); Graduate or Professional (6%). Marital Status was: Single (58%); Married (25%); Divorced (12%); Separated (3%); and Widowed (2%).

Reliability coefficient alphas are presented in Table 16.

Table 16. Reliability coefficient alphas (N = 133, 2012)

Scale	Cronbach's Alpha
Truthfulness Scale	.92
Alcohol Scale	.93
Drug Scale	.94
Substance Abuse Scale	.83
Substance Dependency Scale	.92
Stress Management	.92

Results exceed the professionally accepted standard and confirm the Alcohol Drug Screen as a statistically, reliable instrument for assessment of substance (alcohol and drugs) abuse clients/patients.

30. ADS Reliability Analysis Using a Moderate Sized Sample (2012)

The present study (2012) was conducted to analyze the reliability of the assessments, using online data received from September 1, 2012 and November 28, 2012. As noted above, test reliability refers to a scale's consistency of measurement.

Method and Results

ADS data was received from 308 respondents, retrieved from the Online-Testing database. There were 216 (70%) males and 92 (30%) females. The average age of respondents was 33.8, with an age range of 16 – 83. Respondent ethnicity was: Caucasian (61%); African American (17%); Hispanic (9%); Asian (1%); Native American (11%); and Other (1%). Education: 8th grade or less (3%); Some High School (22%); H.S. graduate (48%); Some college (18%); College graduate (5%); Graduate or Professional (2%). Marital Status was: Single (63%); Married (21%); Divorced (11%); Separated (3%); and Widowed (2%).

Reliability coefficient alphas are presented in Table 17.

Table 17. Reliability coefficient alphas (N = 308, 2012)

Scale	Cronbach's Alpha
Truthfulness Scale	.90
Alcohol Scale	.94
Drug Scale	.95
Substance Abuse Scale	.94
Substance Dependency Scale	.88
Stress Management	.92

Results exceed the professionally accepted standard and confirm the Alcohol Drug Screen as a statistically, reliable instrument for assessment of substance (alcohol and drugs) abuse clients/patients.

31. Validity Analysis (2012)

The Alcohol Drug Screen (ADS measures substance (alcohol and drugs) use and abuse. The present study (2012) was conducted to analyze the validity of the assessments, using online data received from September 1, 2012 and November 28, 2012.

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. Validity was established by using contrast groups. When individuals known to have more severe problems attain higher (more severe) scale scores, than individuals known to have fewer or no problems, the validity of the test is supported. Offenders were categorized into First-time and Multiple Offenders, based on the total number of arrests (alcohol, drug, and DUI arrests) that test takers reported. First-time offenders (55%) were defined as having one arrest; Multiple Offenders (45%) had two or more arrests. It is anticipated that Multiple Offenders' mean scale scores would be higher than First-Time offenders, indicating more severe symptoms or problems. On the Stress Management Scale, scoring is reversed, thereby a lower score for Multiple offenders would indicate more, severe problems and poorer, stress management skills.

Method and Results

ADS data was received from 308 respondents, retrieved from the Online-Testing database. There were 216 (70%) males and 92 (30%) females. The average age of respondents was 33.8, with an age range of 16 – 83. Respondent ethnicity was: Caucasian (61%); African American (17%); Hispanic (9%); Asian (1%); Native American (11%); and Other (1%). Education: 8th grade or less (3%); Some High School (22%); H.S. graduate (48%); Some college (18%); College graduate (5%); Graduate or Professional (2%). Marital Status was: Single (63%); Married (21%); Divorced (11%); Separated (3%); and Widowed (2%). Diagnosis results were: Alcohol dependence diagnosis (13%); Drug dependence diagnosis (14%); and Substance Abuse dependence diagnosis (17%).

Table 18. ADS Validity Findings (N= 308, 2012)

Scales	First-time Offender Mean Score	Multiple Offender Mean Score	t-value	Significance
Truthfulness	10.1	10.0	.035	**Not significant**
Alcohol	12.46	29.47	-7.10	**<.001**
Drug	20.65	28.82	-2.89	**<.001**
Stress Management	122.40	120.75	1.58	**Not significant**

A comparison between the mean scores of first-time offenders and multiple offenders found higher mean scale scores for multiple offenders on the Alcohol, and Drug Scales. First-time offenders had slightly higher, mean scale scores on the Truthfulness Scale and, as expected, on the Stress Management Scales. Higher scores for first-time offenders on the Truthfulness Scale have been seen in previous findings and may be associated with offenders' level of experience with assessments. These individuals may engage in more denial and minimizing behaviors, whereas, multiple offenders may have learned that denial and minimizing are, usually, detected.

T-test analyses were conducted to examine whether the differences between mean scores were statistically significant. Adjustments were made to the *t* and df to account for differences in variance. **Results indicated that for the Alcohol and Drug Scales, the differences were statistically significant.** The non significant results for the Truthfulness and Stress Management Scales are likely the result of small differences in mean scores. As a general rule, higher ADS scores were obtained by multiple offenders when compared to first-time offenders.

These results support the validity of the ADS and demonstrate that the ADS, effectively, differentiates between test takers who are known to have more severe substance abuse problems, (multiple offenders) than first time offenders.

32. Validity and Reliability Confirmation Study Using a Large Sample

The Alcohol Drug Screen (ADS) measures substance (alcohol and drugs) use and abuse. The present study (2013) was conducted to analyze the reliability and validity of the assessments, using online data received from July 2012 and September 10, 2013.

Participants

Data from 1, 141 participants were retrieved for analysis. There were 816 (71.5%) males and 325 (28.5%) females. The average age of participants was 33.9, with an age range of 16 – 85. Respondent ethnicity was: Caucasian (73.5%); African American (11.3%); Hispanic (8.6%); Asian (<1%); Native American (4.6%); and Other (1.7%). Education: 8th grade or less (2.3%); Some High School (19.6%); H.S. graduate (50.8%); Some college (17.3%); College graduate (7.0%); Graduate or Professional (3.0%). Marital Status was: Single (62.0%); Married (20.1%); Divorced (13.1%); Separated (2.9%); and Widowed (1.8%).

Using DSM-IV criteria: 71.8% of participants met the criteria for substance abuse; 49.4% met the criteria for substance dependence.

Reliability

Reliability coefficient alphas are presented in Table 19. As noted above, test reliability refers to a scale's consistency of measurement.

Table 19. Reliability coefficient alphas (N = 1, 141, 2013)

Scale	Cronbach's Alpha
Truthfulness Scale	.91
Alcohol Scale	.94
Drug Scale	.95
Stress Management	.94

Results exceed professionally accepted standards and confirm the Alcohol Drug Screen as a statistically, reliable instrument for assessment of substance (alcohol and drugs) abuse.

Validity

Validity was established by using contrast groups. When individuals known to have more severe problems attain higher (more severe) scale scores, than individuals known to have fewer or no problems, the validity of the test is supported. Participants were categorized based on their responses to answer sheet items about a previous, alcohol abuse diagnosis, drug abuse diagnoses, or substance abuse diagnosis. It was anticipated that participants with previous diagnoses would have higher mean scale scores, than those without a prior diagnosis, thus indicating more, severe symptoms or problems. On the Stress Management Scale, scoring is reversed, thereby a lower score for participants with previous diagnoses would indicate more, severe problems and poorer, stress management skills.

Table 20. Alcohol Abuse Diagnosis Validity Findings (N= 1, 141, 2013)

Scales	Prior Alcohol Abuse Diagnosis	No Diagnosis	t-value	*p*
Alcohol	71.70	22.49	-28.94	**.000**
Stress Management	91.29	114.13	.256	**.000**

A comparison between the mean scores found higher, mean scale scores, for participants with a prior diagnosis on the Alcohol Scale and, as expected, a lower score on the Stress Management Scale.

T-test analyses were conducted to examine whether the differences between mean scores were statistically significant. Adjustments were made to the *t* and df to account for differences in variance. **Results indicated that for the Alcohol Scale, the difference was statistically significant.** The non-significant results, for Stress Management Scales, are likely the result of small differences between group means.

Table 21. Drug Abuse Diagnosis Validity Findings (N= 1, 141, 2013)

Scales	Prior Drug Abuse Diagnosis	No Diagnosis	t-value	*p*
Drug	79.14	27.81	-37.19	**.000**
Stress Management	82.20	116.84	10.81	**.000**

A comparison between the mean scores on the Drug Scale found higher mean scale scores for participants with a prior diagnosis and, as expected, a lower score on the Stress Management Scale, indicating poor stress management and coping skills.

T-test analyses were conducted to examine whether the differences between mean scores were statistically significant. Adjustments were made to the *t* and df to account for differences in variance. **For the Drug Scale and the Stress Management Scale, the results were statistically significant.**

Table 22. Substance Abuse Diagnosis Validity Findings (N= 1, 141, 2013)

Scales	Prior Substance Abuse Diagnosis	No Diagnosis	t-value	*p*
Alcohol	46.16	25.80	-9.20	**.000**
Drug	73.77	28.60	-23.12	**.000**
Stress Management	82.67	117.00	10.79	**.000**

A comparison between the mean scores found higher mean scale scores for participants with a prior substance abuse diagnosis, on the Alcohol Scale, Drug Scale, and, as expected, lower scores on the Stress Management Scale, indicating poor, stress management and coping skills.

T-test analyses were conducted to examine whether the differences between mean scores were statistically significant. Adjustments were made to the *t* and df to account for differences in variance. **Results indicated that all scales were statistically significant.**

These results support the validity of the ADS and demonstrate that the ADS, effectively, distinguishes test takers who are known to have more, severe substance abuse problems, (multiple offenders) than first time offenders.

Table 23. (N=1, 141, 2013)

Prior Diagnosis	Substance Abuse				Substance Dependence			
	Criteria Met		Criteria Not Met		Criteria Met		Criteria Not Met	
	N	%	N	%	N	%	N	%
Previous Alcohol Diagnosis	158	98.8	2	1.3	150	93.8	10	6.3
Previous Drug Diagnosis	193	99.0	2	1.0	187	95.9	8	4.1
Substance Abuse Diagnosis	200	99.0	2	1.0	191	94.6	11	5.4

DSM-IV Validity

Using the criteria established in the previous validity study, DSM-IV criteria and previous diagnoses were examined to establish construct validity. It was expected that participants with a prior diagnosis of alcohol, drug, or substance abuse would be, accurately, identified by the DSM-IV criteria.

In Table 23, findings for the participants, who acknowledged previous diagnoses, are presented. There were 160 participants who had a prior, alcohol abuse diagnoses; of those participants, 98% met the criteria for substance abuse and 93% met the criteria for substance dependence. For drug abuse diagnoses, there were 195 participants who reported previous diagnoses; of those respondents, 99% met the criteria for substance abuse and 96% met the criteria for substance dependence. There were 202 participants who received a diagnosis of substance abuse. Of those respondents, 99% met the criteria for substance abuse and 95% met the criteria for substance dependence.

The participants in these categories are not mutually exclusive, meaning several offenders with a previous alcohol diagnosis, also, reported a substance abuse diagnosis. The accuracy of the findings is noteworthy; 95-99% of participants, who reported a previous diagnosis, were classified as having met the DSM-IV criteria for Substance Abuse and Substance Dependence, underscoring the validity of the ADS.

33. Reliability and Validity Confirmation of ADS (2014)

This study uses a test scores from a community mental health in the Midwest region of the United States.

Participants: Gender: 75% were male, 25% were female. Race/Ethnicity: 87% were White, 13% were non-White. Marital Status: 62% were single, 27% were married, 8% were divorced, 2% were separated. Education: 8% completed some high school, 51% graduated high school, 25% completed some college, 14% graduated college. Arrest history: 37% of offenders had one or more DUI arrests, 22% of offenders had one or more non-driving related alcohol arrests, and 30% of offenders had one or more non-driving drug related arrests.

Reliability

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

Table 24. Reliability Coeffiecients (N = 237, 2014)

Scales	Coefficient Alpha
Truthfulness Scale	**.89**
Alcohol Scale	**.92**
Drug Scale	**.91**
Stress Management Scale	**.94**

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

Validity

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems or symptoms receive higher scale scores than individuals known to have fewer problems or symptoms, the test is said to have evidence of construct validity (DeVon et al., 2007). Offenders were categorized into first-time and repeat offenders. First-time offenders are defined as having one arrest; repeat offenders have two or more arrests. It is anticipated that repeat offenders' mean scale scores would be higher than first-time offenders, indicating more severe symptoms or problems. On the Stress Management Scale scoring is modified to reflect prosocial and protective factors; a lower score for repeat offenders would indicate more severe problems and poorer stress management skills.

Two separate analyses were conducted: 1) Using self-reported alcohol arrests, first-time offenders' and repeat offenders' Alcohol Scale mean scale scores were compared, 2) using self-reported drug arrests offenders Drug Scale mean scores were compared, and finally using DUI arrests, offenders scores on the Alcohol Scale were compared.

Alcohol Scale by Offender Status Using Alcohol Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	208	51.08	2.62	n.s.
	REPEAT	28	65.43		

Drug Scale by Offender Status Using Drug Arrests

	Offender Status	N	Mean	t	Sig.
Drug Scale	FIRST TIME	208	86.61	4.42	<.001
	REPEAT	28	95.11		

Results found higher mean scale scores for repeat offenders on the Alcohol, and Drug Scales. *T*-test analyses were conducted and results were not statistically significant for the Alcohol Scale; results were statistically significant for the Drug Scale.

These findings underscore the reliability of the ADS to identify offenders who pose greater risk (repeat offenders) and consequently have greater needs.

34. Reliability and Validity Confirmation of ADS (2014)

This study uses test scores submitted by a substance abuse treatment and recovery center in the Pacific Northwest Region of the United States.

Participants: Gender: 60% were male, 40% were female. Race/Ethnicity: 91% were White, 8% were non-White. Education: 38% completed some high school, 41% graduated high school, 13% completed some college, 4% graduated college. Arrest history: 42% of offenders had one or more DUI arrests, 37% of offenders had one or more non-driving related alcohol arrests, and 29% of offenders had one or more non-driving drug related arrests.

Reliability

Test reliability refers to a scale's consistency of measurement. Cronbach's Alpha, a measure of reliability, measured the internal consistency of the items in each scale of the ADS. Perfect reliability is 1.00. The professionally accepted reliability standard for this type of instrument is .70- 80 (Murphy & Davidshofer, 2001).

All scales exceed the professionally accepted standard and support the reliability of the ADS scores for substance abuse client screening.

Table 25. ADS Reliability (N =262)

Scales	Cronbach's Alpha
Truthfulness	.90
Alcohol	.94
Drug	.94
Stress Coping Abilities	.94

Validity

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems attain higher (more severe) scale scores than individuals known to have fewer or no problems, this supports test validity.

Two separate analyses were conducted: 1) Using self-reported alcohol arrests, first-time offenders' and repeat offenders' Alcohol Scale mean scale scores were compared, 2) using self-reported drug arrests offenders Drug Scale mean scores were compared, and finally using DUI arrests, offenders scores on the Alcohol Scale were compared.

Alcohol Scale by Offender Status Using Alcohol Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	210	66.27	-6.11	<.001
	REPEAT	52	88.81		

Drug Scale by Offender Status Using Drug Arrests

	Offender Status	N	Mean	t	Sig.
Drug Scale	FIRST TIME	210	72.32	9.21	<.001
	REPEAT	52	93.37		

Adjustments were made to account for unequal variance and to control for experimentwise error. Results found higher mean scale scores for repeat offenders on the Alcohol, and Drug Scales. *T*-test analyses were conducted and results were not statistically significant for the Alcohol Scale; results were statistically significant for the Drug Scale.

These findings underscore the evidence of construct validity present in the ADS and its ability to identify offenders who pose greater risk (repeat offenders) and consequently have greater needs.

35. Reliability, Validity, and Risk Range Analyses of the ADS

This study summarizes reliability and validity studies, as well as risk range analyses, using a clinical sample from the Northwestern region of the United States. There were 143 participants in this study from the 2016 reporting period.

Participants

Average Age: 38 years.
Gender: Male (62%), Female (38%).
Race/Ethnicity: Caucasian (88%), Hispanic (4%), Native American (3%), Other (4%).
Marital Status: Single (58%), Married (12%), Divorced (22%), Separated (4%), Widowed (2%).

Education: Up to 8th grade (2%), partially completed high school (32%), graduated high school (39%), attended college (18%), graduated college or attended schooling beyond college (11%).
Arrest history: First-time offenders (46%), repeat offenders (54%); reported one or more alcohol-related arrests (34%), reported one or more drug-related arrests (41%), reported one or more DUI arrests (48%).
DSM-5: Severe Risk (64%), Moderate Risk (6%), Mild Risk (11%), Did not meet criteria (19%).
Prior Diagnoses: Alcohol dependent (37%), Drug dependent (38%), Substance dependent (39%).

Reliability

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

Table 26. ADS Reliability (N = 143, 2016)

Scales	Coefficient Alpha
Truthfulness Scale	.90
Alcohol Scale	.95
Drugs Scale	.94
Stress Coping Abilities Scale	.95

All scale scores exceeded accepted reliability standards for this type of instrument.

Validity

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems or symptoms receive higher scale scores than individuals known to have fewer problems or symptoms, the test is said to have evidence of construct validity (DeVon et al., 2007).

Offenders were categorized into first-time and repeat offenders. First-time offenders are defined as having up to one arrest; repeat offenders have two or more arrests. Arrests was calculated by summing the alcohol, drug, and DUI arrests together. It is anticipated that repeat offenders' mean scale percentile scores would be higher than first-time offenders, indicating more severe symptoms or problems. The Stress Coping Abilities Scale measures protective and prosocial factors so first-time offenders are expected to have a higher scale score than repeat offenders.

Table 27. ADS Scale Validity (N = 143, 2016)

Scales	First-time Mean Scores	Repeat Mean Scores	*t*-value	*p*
Truthfulness	6.95	9.36	-1.53	.129
Alcohol	27.89	43.12	-3.75	<.001
Drugs	36.95	46.31	-2.09	.038
Stress Coping Abilities	87.67	105.65	-2.17	.032

First-time offenders and repeat offenders mean percentile scale scores were compared. Results found higher scale scores for repeat offenders on all four scales.

Two separate analyses were also conducted: 1) Using self-reported alcohol arrests and DUI arrests, first-time offenders' and repeat offenders' Alcohol Scale mean scale scores were compared, and 2) using self-reported drug arrests offenders Drug Scale mean scores were compared.

Alcohol Scale by Offender Status Using Alcohol Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	120	32.03	-7.70	<.001
	REPEAT	23	57.30		

Alcohol Scale by Offender Status Using DUI Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	110	31.89	-3.79	<.001
	REPEAT	33	50.09		

Drug Scale by Offender Status Using Drug Arrests

	Offender Status	N	Mean	t	Sig.
Drug Scale	FIRST TIME	111	36.28	-5.13	<.001
	REPEAT	32	61.81		

Results found higher mean scale scores for repeat offenders on both the Alcohol, and Drug Scales for these analyses.

***T*-test** analyses were conducted to examine whether the differences between mean scores were statistically significant. Bonferroni adjustments were made to control for experimentwise inflation. Results were

statistically significant for the Alcohol Scale when compared to overall offender status. Results were statistically significant for the Alcohol and Drugs Scales when compared to separated offender status (alcohol, drug, and DUI). The non-significant findings were likely the result of the small differences between offender groups and small sample size.

In general, these findings underscore the evidence of construct validity present in the ADS and its ability to identify offenders who pose greater risk (repeat offenders) and consequently have greater needs

Risk Range Analyses

A secondary analysis was conducted using selected risk ranges for each of the behavioral scales. The expected percentage of offenders for the Low Risk is 39%, Moderate Risk is 30%, Problem Risk is 20%, and Severe Problem is 11%. Percentage frequencies are presented in Table 28.

Table 28. ADS Respondent Risk Range Summary (N = 143, 2016)

Scale*	Low Risk **(39%)**	Moderate Risk **(30%)**	Problem Risk **(20%)**	Severe Problem **(11%)**
Truthfulness	**45.5**	25.9	15.4	13.3
Alcohol	39.2	30.1	20.3	10.5
Drugs	40.6	28.7	20.3	10.5
Stress Coping Abilities	39.9	30.1	19.6	10.5

As displayed in Table 28, most of the obtained percentages of offenders in each risk category were consistent with expected percentages. Consistency is defined by obtained percentages being less than 5% away from the expected percentages, in either direction. The exception was the obtained percentage for the Low Risk range on the Truthfulness Scale, which was almost 6% higher than expected. Inconsistencies like this could be the result of having a small sample size. Overall, this provides evidentiary support for the accuracy of the ADS.

36. Reliability, Validity, and Risk Range Analyses of the ADS

This study summarizes reliability and validity studies, as well as risk range analyses, using a clinical sample from the Midwestern region of the United States. There were 91 participants in this study from the 2016 reporting period.

Participants

Average Age: 33 years.
Gender: Male (66%), Female (34%).
Race/Ethnicity: Caucasian (92%), Black (1%), Hispanic (2%), Native American (1%), Other (2%).
Marital Status: Single (60%), Married (21%), Divorced (10%), Separated (2%), Widowed (1%).
Education: Partially completed high school (10%), graduated high school (52%), attended college (23%), graduated college or attended schooling beyond college (15%).
Arrest history: First-time offenders (63%), repeat offenders (37%); reported one or more alcohol-related arrests (18%), reported one or more drug-related arrests (22%), reported one or more DUI arrests (33%).
DSM-5: Severe Risk (87%), Moderate Risk (3%), Mild Risk (4%), Did not meet criteria (6%).
Prior Diagnoses: Alcohol dependent (19%), Drug dependent (58%), Substance dependent (56%).

Reliability

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

Table 29. ADS Reliability (N = 91, 2016)

Scales	Coefficient Alpha
Truthfulness Scale	.84
Alcohol Scale	.94
Drugs Scale	.90
Stress Coping Abilities Scale	.93

All scale scores exceeded accepted reliability standards for this type of instrument.

Validity

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems or symptoms receive higher scale scores than individuals known to have fewer problems or symptoms, the test is said to have evidence of construct validity (DeVon et al., 2007).

Offenders were categorized into first-time and repeat offenders. First-time offenders are defined as having up to one arrest; repeat offenders have two or more arrests. Arrests was calculated by summing the alcohol, drug, and DUI arrests together. It is anticipated that repeat offenders' mean scale percentile scores would be higher than first-time offenders, indicating more severe symptoms or problems. The Stress Coping Abilities Scale measures protective and prosocial factors so first-time offenders are expected to have a higher scale score than repeat offenders.

Table 30. ADS Scale Validity (N = 91, 2016)

Scales	First-time Mean Scores	Repeat Mean Scores	*t*-value	*p*
Truthfulness	6.86	4.41	1.06	.292
Alcohol	15.02	33.82	-4.66	<.001
Drug	60.51	66.35	-1.28	.203
Stress Coping Abilities	73.61	69.94	0.48	.632

First-time offenders and repeat offenders mean percentile scale scores were compared. Results found higher scale scores for repeat offenders on the Alcohol and Drugs scales.

On the Truthfulness Scale, first-time offenders had higher mean scores which may be associated with an offender's level of experience with law enforcement and assessment procedures. These individuals may, naively, engage in more denial and minimizing behaviors whereas, repeat offenders (who have more experience with law enforcement and the courts) may be aware that denial, minimization, and deception will be detected.

Two separate analyses were also conducted: 1) Using self-reported alcohol arrests and DUI arrests, first-time offenders' and repeat offenders' Alcohol Scale mean scale scores were compared, and 2) using self-reported drug arrests offenders Drug Scale mean scores were compared.

Alcohol Scale by Offender Status Using Alcohol Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	82	20.18	-2.92	.004
	REPEAT	9	39.00		

Alcohol Scale by Offender Status Using DUI Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	76	17.96	-3.93	.001
	REPEAT	15	42.73		

Drug Scale by Offender Status Using Drug Arrests

	Offender Status	N	Mean	t	Sig.
Drug Scale	FIRST TIME	81	60.57	-2.84	.006
	REPEAT	10	79.90		

Results found higher mean scale scores for repeat offenders on both the Alcohol, and Drug scales for these analyses.

***T*-test** analyses were conducted to examine whether the differences between mean scores were statistically significant. Bonferroni adjustments were made to control for experimentwise inflation. Results were statistically significant for the Alcohol Scale when compared to overall offender status. Results were statistically significant for the Alcohol and Drugs Scales when compared to separated offender status (alcohol, drug, and DUI). The non-significant findings were likely the result of the small differences between offender groups and small sample size.

In general, these findings underscore the evidence of construct validity present in the ADS and its ability to identify offenders who pose greater risk (repeat offenders) and consequently have greater needs

Risk Range Analyses

A secondary analysis was conducted using selected risk ranges for each of the behavioral scales. The expected percentage of offenders for the Low Risk is 39%, Moderate Risk is 30%, Problem Risk is 20%, and Severe Problem is 11%. Percentage frequencies are presented in Table 31.

Table 31. ADS Respondent Risk Range Summary (N = 91, 2016)

Scale*	Low Risk **(39%)**	Moderate Risk **(30%)**	Problem Risk **(20%)**	Severe Problem **(11%)**
Truthfulness	**46.2**	19.8	**25.3**	8.8
Alcohol	39.6	29.7	19.8	11.0
Drugs	39.6	30.8	18.7	11.0
Stress Coping Abilities	39.6	29.7	20.9	9.9

As displayed in Table 31, most of the obtained percentages of offenders in each risk category were consistent with expected percentages. Consistency is defined by obtained percentages being less than 5% away from the expected percentages, in either direction. The exceptions were the obtained percentages for the Low Risk and Problem Risk ranges on the Truthfulness Scale, which were 7% and 5% higher than expected, respectively. Inconsistencies like this could be the result of having a small sample size. Overall, this provides evidentiary support for the accuracy of the ADS.

37. Reliability, Validity, and Risk Range Analyses of the ADS

This study summarized reliability and validity studies, as well as risk range analyses, using a sample from offenders tested by clients of Behavior Data Systems. This sample is composed of 5,431 tests between 2017 and 2019.

Participants

Average Age: 33 years.
Gender: Male (59.0%), Female (41.0%).
Race/Ethnicity: Caucasian (65.5%), African American (11.0%), Hispanic (16.8%), Asian, (1.1%), Native American (2.1%), Other (2.4%).
Marital Status: Single (59.3%), Married (23.0%), Divorced (11.8%), Separated (4.3), Widowed (1.1%).
Education: Completed 8th grade or less (3.1%), some high school (18.7%), graduated high school (44.2%), obtained a GED (14.0%), completed trade or technical school (8.6%), some college (9.0%), graduated college (1.4%), advanced degree (0.3%).
Arrest History: First-time offenders (69.8%), repeat offenders (29.3%); reported one or more alcohol-related arrests (17.0%); reported one or more drug-related arrests (30.3%); reported one or more DUI arrests (45.8%).
DSM-5: Severe Risk (20.7%), Moderate Risk (8.5%), Mild Problem (16.8%), Did not meet criteria (54.0%).

Reliability

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

Table 32. ADS Reliability (N = 5,431, 2019)

Scales	Coefficient Alpha
Truthfulness Scale	.91
Alcohol Scale	.95
Drugs Scale	.94
Stress Coping Abilities Scale	.94

All scale scores exceeded accepted reliability standards for this type of instrument.

Validity

In testing, the term *validity* refers to the extent that a test measures what it was designed to measure. A test cannot be accurate without being valid. When individuals known to have more severe problems or symptoms receive higher scale scores than individuals known to have fewer problems or symptoms, the test is said to have evidence of construct validity (DeVon, et al, 2007).

Offenders were categorized into first-time and repeat offenders. First-time offenders are defined as having up to one arrest; repeat offenders have two or more arrests. Arrests were calculated by summing the alcohol, drug, and DUI arrests together. It is anticipated that repeat offenders' mean scale percentile scores would be higher than first-time offenders, indicating more severe symptoms or problems. The Stress Coping Abilities Scale measures protective and prosocial factors so first-time offenders are expected to have a higher scale score than repeat offenders.

Table 33. ADS Scale Validity (N = 5,431, 2019)

Scales	First-time Mean Scores	Repeat Mean Scores	*t*-value	*p*
Truthfulness	10.75	10.00	3.374	.001
Alcohol	10.76	25.17	-27.85	<.001
Drug	16.13	31.15	-23.53	<.001
Stress Coping Abilities	127.04	116.89	7.05	<.001

First-time offenders and repeat offenders mean percentile scale scores were compared. Results found higher scale scores for repeat offenders on the Alcohol and Drug Scale.

On the Truthfulness Scale, first-time offenders had higher mean scores which may be associated with an offender's level experience with law enforcement and assessment procedures. These individuals may, naively, engage in more denial and minimizing behaviors whereas, repeat offenders (who have more experience with law enforcement and the courts) may be aware that denial, minimizations, and deception will be detected.

Two separate analyses were also conducted: 1) Using self-reported alcohol arrests and DUI arrests, first-time offenders' and repeat offenders' Alcohol Scale mean scale scores were compared, and 2) using self-reported drug arrests offenders' Drug Scale mean scores were compared.

Alcohol Scale by Offender Status Using Alcohol Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	5010	13.31	-27.44	<.001
	REPEAT	347	39.69		

Alcohol Scale by Offender Status Using DUI Arrests

	Offender Status	N	Mean	t	sig
Alcohol Scale	FIRST TIME	4773	13.02	-18.35	<.001
	REPEAT	586	31.37		

Drug Scale by Offender Status Using Drug Arrests

	Offender Status	N	Mean	t	Sig.
Drug Scale	FIRST TIME	4864	17.58	-32.42	<.001
	REPEAT	494	50.00		

Results found higher mean scale scores for repeat offenders on both the Alcohol, and Drug Scales for these analyses.

T-test analyses were conducted to examine whether the differences between mean scores were statistically significant. Bonferroni adjustments were made to control for experimentwise inflation. Results were statistically significant for the Alcohol Scale when comparted to overall offender status. Results were statistically significant for the Alcohol and Drugs Scales when compared to separated offender status (alcohol, drug, and DUI).

In general, these finding underscore the evidence of construct validity present in the ADS and its ability to identify offenders who pose greater risk (repeat offenders) and consequently have greater needs.

Risk Range Analyses

A secondary analysis was conducted using selected risk ranges for each of the behavioral scales. The expected percentage of offenders for the Low Risk is 39%, Moderate Risk is 30%, Problem Risk is 20%, and Severe Problem is 11%. Percentage frequencies are presented in Table 34.

Table 34. ADS Respondent Risk Range Summary (N = 5431, 2019)

Scale*	Low Risk **(39%)**	Moderate Risk **(30%)**	Problem Risk **(20%)**	Severe Problem **(11%)**
Truthfulness	35.4	30.5	19.0	14.3
Alcohol	54.1	18.0	8.4	18.7
Drugs	43.8	14.1	14.3	27.0
Stress Management	27.6	25.2	21.5	25.0

As displayed in Table 34, most of the obtained percentages of offenders in each risk category were consistency with expected percentages. Consistency is defined by obtained percentages being less within 5% of the expected percentages, in either direction. The exceptions were the obtained percentages for the Low Risk range on the Alcohol Scale and the Severe Problem ranges on the Drug and Stress Management Scales. These were each at least 10 percentage points above the expected percent of offenders for the respective ranges. Overall, this provides evidence to support the accuracy of the ADS.

SUMMARY

In conclusion, this document is not intended as an exhaustive compilation of research. Yet, it does summarize many studies and statistics that support the reliability and validity of the ADS. Empirically- based scales are objective and accurate. Assessment has shifted from subjective opinions to objective accountability. Based on this research, the ADS provides an accurate picture of substance (alcohol and other drugs) abusers, the risk they represent, and a sound, empirical foundation for responsible decision making.

Summarized research demonstrates that the ADS is a reliable, valid, and accurate instrument for client, patient, court defendant, and substance abuse assessment. It is reasonable to conclude that the ADS does what it purports to do. The ADS acquires a vast amount of relevant information, for staff review prior to decision making.

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