EB

Employment Barriers

An Inventory of Scientific Findings

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TABLE OF CONTENTS

Employment Barriers is designed for adult employment barrier screening.

Preface

Employment Barriers (EB) research and development began in 1980 and has continued to the present. The EB test is designed for accurate, inexpensive and timely on-site screening of employment-challenged individuals. The proprietary EB database ensures continued research and development. The EB is a brief, easily administered and automated (computer scored) test that is designed for screening barriers (problems) to employment. It includes true/false and multiple choice items and can be completed in 25 minutes. The EB has been standardized on college students, work rehabilitation clients, substance abuse clients, probationers, vocational rehabilitation participants and others. Future EB research will involve the cumulative EB database that stores administered EB tests (names have been deleted).

This document summarizes much of the validity and reliability research that contributed to EB development. The EB has demonstrated reliability, validity and accuracy. It correlates impressively with both experienced staff judgment and other recognized tests. EB tests can be administered directly on the computer screen or in paper-pencil test booklet format. All tests are computer scored on-site. EB reports are available within two minutes of test completion and data input. Diskettes contain all of the software needed to score tests, build a database and print reports. By merging the latest psychometrics with computer technology, the EB accurately assesses client attitudes and behavior and identifies client risk as well as need. Staff can now objectively gather a vast amount of relevant information, identify employment barriers and formulate specific remediation strategies.

EB assessment identifies employment-related problems like growing negativity, disgruntled attitude, low self-esteem, impaired stress management skills or substance (alcohol and other drugs) abuse problems. When obstacles (problems) are identified, specific interventions or ways to deal with these problems are offered. Objective assessment and specific problem-related recommendations often help. For these reasons EB research is ongoing, so that we can provide staff with the most accurate data possible.

The EB represents over three decades of research and development, and integrates the latest psychometric procedures with computerized technology to provide a state-of-the-art employment screening instrument. The copyrighted EB database ensures ongoing research. And, on an annual basis the EB is essentially restandardized.

This document describes the Employment Barriers (EB) test and gathers together EB research into one document. Its purpose is to provide understanding of the EB and the automated screening system it represents. EB research is ongoing; consequently no attempt was made to summarize all EB research. This document represents the evolution of the EB into a state-of-the-art employment assessment or screening instrument. It is emphasized that current studies are most representative of the present or revised EB.

Information on the Employment Barriers (EB) assessment is available in the **EB Orientation & Training Manual**. Computer scoring information is contained in the **EB Computer Operating Guide**. Each of these manuals can be obtained upon request.

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EMPLOYMENT BARRIERS (EB)

Employment Barriers (EB) research and development began in 1980 and has continued to the present. Initially large item pools were collected for each EB scale by a group of psychologists and counselors involved in employment selection and screening. Subsequently, these item pools were administered to work rehabilitation clients and the items with the best statistical properties were retained. Final scale-item configurations were administered to work rehabilitation clients, substance (alcohol and other drugs) abusers, college students and other population samples in a series of reliability and validity studies. The EB assessment's proven research continues to deliver the highest quality in employment barrier screening. And, the proprietary EB database ensures ongoing research and development.

The Employment Barriers (EB) test is designed for employment barrier screening. The EB has a fifth to sixth grade reading level, and requires 20 to 25 minutes to complete. It contains six scales: Degree of Confidence, Alcohol, Drugs, Work Attitude, Self-Esteem and Stress Management. These six scales represent important areas of screening employment-challenged individuals--many of which are missed by other testing procedures. The EB is appropriate for adult employment screening.

EMPLOYMENT BARRIERS
SIX MEASURES OR SCALES

1. Degree of Confidence Scale
2. Alcohol Scale
3. Drugs Scale
4. Work Attitude Scale
5. Self-Esteem Scale
6. Stress Management Scale

The EB assessment is designed for accurate, inexpensive and timely on-site screening of employment barriers. It is an objective employment barrier screening instrument designed to identify employment-related problems, or conversely, to recognize problem-free individuals. The EB can be administered on a computer screen or by using paper-pencil test booklets. Paper-pencil testing enables group testing which can be cost and time effective. Regardless of how the EB is administered, all tests are scored and interpreted with a computer which scores and generates EB reports.

The EB requires approximately 25 minutes for completion and is appropriate for adult males and females. The EB is composed of True-False and multiple-choice items. It 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. The EB is to be used in conjunction with experienced staff judgment.

How do you measure attitudes and complex behavior? The answer: You use a computer! By merging the latest psychometrics with computer technology, the EB test can accurately assess individuals that have difficulty finding or retaining work. Staff can now objectively gather a vast amount of important information and identify client problems so they can be worked through. The speed, accuracy and reliability of computers greatly increase client screening efficiency.

UNIQUE FEATURES

DEGREE OF CONFIDENCE SCALE: determines how truthful the client was while completing the test. This scale identifies guarded, defensive or recalcitrant clients who minimize or deny problems and concerns. The Degree of Confidence Scale is a Truthfulness Scale.

TRUTH-CORRECTED SCORES: A sophisticated psychometric technique permitted by computer technology involves *truth-corrected* scores which are calculated individually for each of the six EB scales each time a test is scored. Since it would be naive to assume everybody responds truthfully while completing any test or interview, the Degree of Confidence Scale was developed. **The Degree of Confidence Scale establishes how honest or truthful the client was while completing the EB.** Correlations between the Degree of Confidence Scale and all other EB scales permit identification of error variance associated with untruthfulness. This error variance is then added back into the scale score, resulting in more accurate *truth-corrected* scores. Unidentified denial produces inaccurate and distorted test results. Raw scores may only reflect what the client wants you to know. **Truth-corrected scores reveal what the client is trying to hide.** Truth-corrected scores are more accurate than raw scores.

This procedure permits identification of faking, malingering and falsification of answers. Available research indicates that many clients try to minimize their problems and concerns. The EB detects these guarded, recalcitrant and defensive clients.

Risk Range Percentile Scores: Each EB scale is scored independently of the other scales. EB scale scoring equations combines client's pattern of responding to scale items and Degree of Confidence Scale scores. The Degree of Confidence (Truthfulness) Scale applies a truth-correction factor so that each scale score is a truth-corrected scale score. These truth-corrected scale scores are converted to percentile scores which are then used in the EB report.

EB scale risk range percentile scores represent "degree of severity." Degree of severity is defined for all scales 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).

Standardization data is statistically analyzed. Percentile scale scores are derived from *obtained scale scores*. The cumulative distributions of truth-corrected scale scores determines cut-off scores for each of the four risk range or severity categories. Individual scale score calculations are automatically performed and results are presented in the EB report numerically (percentile), by attained risk category (narrative) and graphically (EB profile).

DATABASE: Every time an EB test is scored, the test data is automatically stored on the diskette for inclusion in the EB database. Completed EB tests administered on our internet testing platform (www.online-testing.com) are automatically stored in the EB database. When the preset number of tests are administered (or used up) on an EB diskette, the diskette is returned for replacement and the test data contained on these used diskettes is input, in a confidential (no names) manner, into the EB database for subsequent analysis. This database is statistically analyzed annually, at which time future EB diskettes are adjusted to reflect demographic changes or trends that might have occurred. This unique and proprietary database also enables the formulation of annual summary reports that are descriptive of the populations tested.

Confidentiality (Delete Client Names): Many agencies and programs are rightfully concerned about protecting their clients' privacy. The proprietary Delete Client Names option is provided to allow deletion of client names from test diskettes prior to their being returned. Online test users are also provided the Delete Client's Name option on the 'Supervisor Options' screen. Once the names have been deleted they are gone and cannot be retrieved. Deleting client names does not delete demographic information or test data. It only deletes the client names. This option is available at any time and can be used whether the diskette is full or not.

The EB test is a self-report assessment that can be completed individually or in group testing settings. There are no forms or questionnaires to be completed by staff. EB reports eliminate the need for tedious, time consuming and error-prone manual scoring. Specific problem identification can cut the waste associated with over-evaluation and expensive drug tests.

DESCRIPTION OF EMPIRICALLY BASED MEASURES OR SCALES

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

Degree of Confidence Scale: This scale provides a measure of the client's truthfulness while completing the EB. As noted earlier, all interview and self-report tests are subject to the dangers of untrue answers. The Degree of Confidence Scale identifies these self-protective clients. As noted earlier, the Degree of Confidence Scale enables calculation of Truth-Corrected scores, which are more accurate than raw scores. A Degree of Confidence Scale is considered necessary - if not essential - to any self-report questionnaire or test.

Since the outcome of a client's test score could affect their employment status, it would be naive to believe that work rehabilitation clients answer all questions truthfully. Many attempt to minimize their problems and concerns.

Alcohol Scale: This scale measures a client's alcohol proneness and alcohol-related problems. Frequency and magnitude of alcohol use or abuse are important screening factors. Alcohol is a major licit or legal substance. Alcoholism is a significant problem in our society. Woolfolk and Richardson noted in their book *Stress, Sanity and Survival* that alcoholism costs industry over $15.6 billion annually due to absenteeism and medical expenses. In the new millennium, these expenses are much higher.

Drugs Scale: This empirically-based scale is an independent measure of clients' drug use and abuse-related problems. Without a drug scale, many drug abusers would remain undetected. Increased public awareness of illicit drug (marijuana, cocaine, crack, amphetamines, barbiturates, heroin, etc.) abuse emphasizes the importance of including an independent measure of drug use or abuse.

Work Attitude Scale: This scale is an adjustment and work appraisal measure. It incorporates the client's attitudes and overall work adjustment. Work attitude describes a client's attitudes regarding work and problem-free employment.

The Work Attitude Scale lends itself to incorporating various objective criteria, e.g., accidents, tardiness, sick leave, insurance payouts, early quit, grievance time, absenteeism, personal time off, misconduct, performance reviews, promotions, raises, etc. in future research.

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

Stress Management Scale: This scale is a measure of an individual's ability to manage stress. Stress exacerbates other symptoms of emotional problems. Seriously impaired stress coping or managing abilities are usually associated with other identifiable emotional and psychological problems.

Stress is an increasingly significant concept in our society. The National Institute for Occupational Safety and Health (NIOSH) evaluated the health records of 22,000 workers in 130 organizations. Their conclusion: **stress affects workers in all types of jobs at all levels**. Unskilled laborers are equally susceptible as are top-level executives.

How effectively individuals cope with stress determines whether or not stress is a significant factor in their lives. Two concepts, "stress" and "stress management abilities" dominate the literature on stress. The Stress Management Scale includes measures of both of these concepts in its Stress Quotient (SQ) equation. The better an individual's stress coping skills, compared to their amount of experienced stress, the higher the Stress Quotient (SQ) score. In contrast, if an individual is experiencing more stress than he or she can cope with, the lower the SQ score. In the EB profile, Stress Quotient (SQ) scores were inverted to conform to the established risk levels ranging from low to high risk categories.

Stress exacerbates other symptoms of emotional, attitudinal, interpersonal and substance abuse related problems. Frequency and magnitude of impaired stress coping abilities are important factors in understanding the substance abuser. **A Stress Management Scale score at or above the 90th percentile is typically indicative of a diagnosable emotional or mental health problem.** It is important to assess or measure the degree of severity of stress management problems. This is accomplished with the Stress Management Scale.

EMPLOYMENT BARRIERS (EB) DEVELOPMENT

Employment Barriers (EB) scales were developed from large item pools. Initial item selection was a rational process based upon clearly understood definitions of each scale. Subsequently, test items and scales were analyzed for scale item inclusion. Final item selection (and inclusion of scale items) was based upon each item's statistical properties.

In the beginning, large item pools were collected for each EB scale by a group of psychologists and counselors involved in employment selection and screening. Subsequently, these item pools were administered to work rehabilitation clients and the items with the best statistical properties were retained.

Final scale-item configurations were administered to work rehabilitation clients, substance (alcohol and other drugs) abusers, college students and other population samples in a series of reliability and validity studies. Thus, the EB test has been researched, normed and validated on various client populations.

The EB test provides employers with two kinds of information--qualitative and quantitative. Qualitative information is obtained by self-report items that reflect the clients' opinions, perceptions and beliefs. Quantitative information is obtained by eight empirically based measures or scales. EB language is direct, non-offensive and uncomplicated.

RESEARCH STUDIES

Reliability refers to consistency of results regardless of who uses the instrument. EB results are objective, verifiable and reproducible. Validity refers to a test measuring what it is purported to measure. The EB was validated in a series of studies that are summarized in this document. However, it should be emphasized that EB research is ongoing in nature.

The research which follows has been included in a chronological manner, so that the reader can observe the development of the EB into a state-of-the-art job client assessment instrument or test. More recent studies (represented at the end of this document) are most representative of the EB test's present or current statistical properties. For example the database research summarized on page 28 (1999, N = 3,513) demonstrates the EB test's present statistical properties.

STRESS QUOTIENT

The Stress Quotient (SQ) is based upon the following mathematical equation:

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

The Stress Quotient (SQ) scale is a numerical value representing a person's ability to manage 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 SQ scores between High Stress and Low Stress groups. The High Stress group (N=10) was comprised of 5 males and 5 females. Their average age was 39. Subjects for the High Stress group were randomly selected from outpatients seeking treatment for stress. The Low Stress group (N=10) was comprised of 5 males and 5 females (average age 38.7) randomly selected from persons not involved in treatment for stress. High Stress group SQ scores ranged from 32 to 97, with a mean of 64.2. Low Stress group SQ scores ranged from 82 to 156, with a mean of 115.7. The t-test statistical analysis of the difference between the means of the two groups indicated that the High Stress group had significantly higher SQ scores than the Low Stress group (t =

4.9, $p < .001$). This study shows that the SQ or Stress Management Scale is a valid measure of stress coping. The Stress Management Scale significantly discriminates between high stress individuals and low stress individuals.

Validation Study 2: This study (1980) evaluated the relationship between the SQ scale and two criterion measures: Taylor Manifest Anxiety Scale and Cornell Index. These two measures have been shown to be valid measures of anxiety and neuroticism, respectively. If the SQ or Stress Management Scale is correlated with these measures it would indicate that the SQ or 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 SQ were expected because high SQ scores indicate good stress coping abilities. The three tests were administered to forty-three (43) subjects selected from the general population. There were 21 males and 22 females ranging in age from 15 to 64 years. Utilizing a product-moment correlation, SQ scores correlated -.70 with the Taylor Manifest Anxiety Scale and -.75 with the Cornell Index. Both correlations were significant, in the predicted direction, at the $p < .01$ level. These results support the finding that the Stress Management Scale is a valid measure of stress coping abilities. The reliability of the SQ was investigated in ten subjects (5 male and 5 female) randomly chosen from this study. A split-half correlation analysis was conducted on the SQ items. The product-moment correlation coefficient (r) was .85, significant at the $p < .01$ level. This correlation indicates that the SQ or Stress Management Scale is a reliable measure. These results support the Stress Management Scale as a reliable and valid measure.

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

Validation Study 4: This validation study (1982) evaluated the relationship between factor C (Ego Strength) in the 16 PF Test as a criterion measure and the SQ in a sample of juveniles. High scores on factor C indicate high ego strength and emotional stability, whereas high SQ scores reflect good coping skills. A positive correlation was predicted because emotional stability and coping skills reflect similar attributes. The participants were 34 adjudicated delinquent adolescents. They ranged in age from 15 to 18 years with an average age of 16.2. There were 30 males and 4 females. The Cattell 16 PF Test and the SQ scale were administered in counterbalanced order. All subjects had at least a 6.0 grade equivalent reading

level. The correlation (product-moment correlation coefficient) results indicated that Factor C scores were significantly correlated with SQ scores ($r = .695$, $p<.01$). Results were significant and in the predicted direction. These results support the SQ or Stress Management Scale as a valid measure of stress coping abilities in juvenile offenders.

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

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

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

Reliability Study 6: The reliability of the Stress Quotient (SQ) or 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 SQ was administered soon after intake. The most common procedure for reporting inter-item (within test) reliability is with Coefficient Alpha. The reliability analysis indicated that the Coefficient Alpha of 0.81 was highly significant ($F = 46.74$, $p<.001$). Highly significant inter-item scale consistency was demonstrated.

Reliability Study 7: (1985) Reliability of the Stress Quotient (SQ) or Stress Management Scale was investigated in a sample of 189 work rehabilitation clients. There were 120 males and 69 females with an average age of 31. The SQ was administered at the time of client screening. The reliability analysis indicated that the Coefficient Alpha of 0.73 was highly significant ($F = 195.86$, $p<.001$). Highly

significant Cronbach Coefficient Alpha reveals that all SQ scale items are significantly ($p<.001$) related and measure one factor or trait.

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

The correlation (product-moment correlation coefficient) results between the Stress Quotient (SQ) and selected MMPI scales were significant at the $p < .001$ level and in predicted directions. The SQ correlation results were as follows: Psychopathic Deviate (-0.59), Psychasthenia (-.068), Social Maladjustment (-0.54), Authority Conflict (-0.46), Taylor Manifest Anxiety Scale (-0.78), Authority Problems (-0.22), and Social Alienation (-0.67). The most significant SQ correlation was with the Taylor Manifest Anxiety Scale. As discussed earlier, stress exacerbates symptoms of impaired adjustment as well as emotional and attitudinal problems. These results support the Stress Quotient or Stress Management Scale as a valid measure of stress coping abilities.

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

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

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

EMPLOYMENT BARRIERS (EB) RESEARCH

The EB has a long history of research and development, much of which is contained in the following summary. **EB research is reported in a chronological format, reporting studies as they occurred.** This gives the reader the opportunity to see how the EB evolved into a state-of-the-art job barriers to employment assessment instrument. However, for current information refer to the more recent studies near the end of this research document.

10. A Study of Employment Barriers (EB) Test-Retest Reliability

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

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

Method

College students (at two different educational institutions) enrolled in introductory psychology classes participated in this study (1984). A total of 115 students participated and received class credit for their participation. The students were administered the EB test in a paper-pencil test format. One week later they were re-assessed with the EB test again.

Results

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

In another test-retest study (1985), the EB was administered on two occasions to the same people. Seventy outpatients were re-tested with the EB after a ten-day interval. The Pearson Product Moment Correlation Coefficient of .87 was highly significant. This study again demonstrates that the EB is a reliable employment barrier screening instrument.

11. Validation of the Degree of Confidence Scale

The Degree of Confidence Scale in Employment Barriers (EB) is an important psychometric scale as these scores establish how truthful the respondent was while completing the EB. Degree of Confidence Scale scores determine whether or not EB profiles are accurate and are integral to the calculation of truth-corrected EB scale scores.

The Degree of Confidence Scale identifies respondents who are self-protective, recalcitrant and guarded, as well as those who minimized or even concealed information while completing the test. Degree of Confidence Scale items are designed to detect respondents who try to fake good or put themselves into a

favorable light. These scale items are statements about oneself that most people would agree to. The following statement is an example of a Degree of Confidence Scale item, “Sometimes I worry about what others think or say about me.”

This preliminary study used the 21 Degree of Confidence Scale items in the Employment Barriers to determine if these Degree of Confidence 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 Degree of Confidence Scale than the group instructed to be honest.

Method

Seventy-eight Arizona State University college students (1990) 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 EB Degree of Confidence Scale, was administered to the subjects and the Degree of Confidence Scale was embedded in the test as one of the five scales. Degree of Confidence Scale scores were made up of the number of deviant answers given to the 21 Degree of Confidence Scale items.

Results

The mean Degree of Confidence Scale score for the Honest group was 2.71 and the mean Degree of Confidence 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 Degree of Confidence Scale than the Honest group ($r = 0.27$, $p < .01$).

The Degree of Confidence Scale successfully measured how truthful the respondents were while completing the test. The results of this study reveal that the Degree of Confidence Scale accurately detects "Fakers" from those students that took the test without faking.

12. Validation of Six Employment Barriers (EB) Scales using Criterion Measures

In general terms, a test is valid if it measures what it is supposed to measure. The process of confirming this statement is called validating a test. A common practice when validating a test is to compute a correlation between it and another (criterion) test that purports to measure the same thing and that has been previously validated. For the purpose of this study, the six Employment Barriers scales (Degree of Confidence, Alcohol, Drugs, Work Attitude, Self-Esteem and 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 Employment Barriers (EB) scales were validated with MMPI scales as follows. The Degree of Confidence Scale was validated with the L Scale. The Alcohol Scale was validated with the MacAndrew Psychopathic Deviant scales. The Drug Scale was validated with the MacAndrew and Psychopathic Deviant scales. The Work Attitude Scale was validated with the Manifest Hostility and Authority Conflict scales. The Self-Esteem Scale was validated with the Psychasthenia and Social Alienation scales. The Stress Management Scale was validated with the Taylor Manifest Anxiety, Psychasthenia, Social Maladjustment and Social Alienation scales.

Content validity is a measure of how well test items (or scales) measure the factor they were designed to measure. As noted earlier, a large item pool was rationally developed for consideration. Consensual agreement among three psychologists and experienced personnel/selection staff familiar with EB scale definitions markedly reduced the initial item pool. Final item selection was empirical and based on each item's statistical properties. Selected items had acceptable reliability coefficients and correlated highest with their respective scales. The EB was then objectively normed and standardized.

Predictive validity measures how well a test can predict behavior the test was designed to measure. The Degree of Confidence Scale is important as these scores establish how truthful the respondent was while completing the EB. Degree of Confidence Scale scores determine whether or not EB profiles are valid, and are integral to the calculation of truth-corrected scores.

Concurrent validity (criterion-related validity) correlates the scales of the test being validated with similar scales or measures from an established test which has demonstrated reliability and validity. This was done in the following 1995 (N = 100) study.

Method

One hundred (100) vocational rehabilitation clients (1995) were administered both the EB and the MMPI. Tests were counterbalanced for order effects -- half were given the EB first and half were given the MMPI first.

Results and Discussion

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

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

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

The **Work Attitude Scale** attained the most significant correlation with the Manifest Hostility ($r = 0.57$) and the Authority Conflict ($r = 0.55$) MMPI scales. These findings are consistent with the conceptual description of the Work Attitude Scale that was cited earlier.

The **Self-Esteem Scale** correlates most significantly with the Psychasthenia (PT, r=0.34) and the Social Alienation (SOA, r=0.36) Scale.

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

Table 1. (1995) Product-moment correlations (N=100)
between MMPI scales and Employment Barriers (EB) scales

MMPI SCALES (MEASURES)	Employment Barriers Scales (Measures)					
	Truthfulness	Alcohol	Drugs	Self-Esteem	Work Attitude	Stress Management
L (Lie) Scale	0.72	-0.38	-0.41	-0.28	-0.29	0.53
Psychopathic Deviant	-0.37	0.52	0.54	0.35	0.27	-0.59
Psychasthenia	-0.34	0.38	0.41	0.34	0.37	-0.68
Social Maladjustment	-0.25	0.34	0.26	0.18	0.35	-0.54
Authority Conflict	-0.43	0.31	0.47	0.37	0.55	-0.46
Manifest Hostility	-0.45	0.34	0.47	0.37	0.57	-0.58
Taylor Manifest Anxiety	-0.58	0.47	0.46	0.48	0.50	-0.78
MacAndrew	-0.40	0.58	0.62	0.44	0.26	-0.33
Authority Problems	-0.32	0.36	0.42	0.35	0.18	-0.22
Social Alienation	-0.47	0.35	0.45	0.36	0.48	-0.67

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

These findings robustly support the validity of Employment Barriers (EB) scales. All of the EB scales were highly correlated with the MMPI criterion scale they were tested against. The large correlation coefficients support the validity of the EB. All product-moment correlation coefficients testing the relation between EB scales and MMPI scales were significant at the $p < .001$ level.

13. Inter-item Reliability of Employment Barriers (EB)

Within-test reliability measures to what extent a test with multiple scales measuring different factors, measures each factor independent of the other factors (scales) in the test. It also measures to what extent items in each scale consistently measures the particular trait (or factor) that scale was designed to measure. Within-test reliability measures are referred to as inter-item reliability. The most common method of reporting within-test (scale) inter-item reliability is with Cronbach's alpha coefficients. Coefficient alpha results are presented in this study (1995, N = 389).

Method

This study (1995) included three separate groups of subjects: 100 outpatients in private practice, 100 substance abuse inpatients, and 189 work rehabilitation clients -- totaling 389 subjects. Separate inter-item reliability analyses were conducted to compare results across the three groups.

Results and Discussion

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

Table 2. Inter-item reliability, coefficient alpha. (1995)
Outpatients, Substance Abuse Inpatients and Work rehabilitation clients (N = 389)

EB SCALES	N	Outpatients	Inpatients	Work rehabilitation clients
MEASURES	**ITEMS**	**(N = 100)**	**(N = 100)**	**(N = 189)**
Degree of Confidence Scale	21	0.81	0.79	0.81
Alcohol Scale	21	0.86	0.93	0.83
Drugs Scale	21	0.80	0.85	0.79
Work Attitude	21	0.74	0.74	0.78
Self-Esteem Scale	25	0.90	0.88	0.90
Stress Management	28	0.81	0.84	0.73

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

EB SCALES	N	Outpatients	Inpatients	Work rehabilitation clients
MEASURES	**ITEMS**	**(N = 100)**	**(N = 100)**	**(N = 189)**
Degree of Confidence Scale	21	21.73	53.15	45.91
Alcohol Scale	21	9.29	31.46	47.75
Drugs Scale	21	27.19	16.34	58.18
Work Attitude	21	15.97	19.21	28.67
Self-Esteem Scale	25	18.97	22.21	23.67
Stress Management	28	46.74	16.20	195.86

These results (Tables 2 and 3) demonstrate the impressive reliability of the EB. Reliability was demonstrated with three different groups of people (outpatients, inpatients and work rehabilitation clients) taking the EB test. In each of these subject samples, all EB scales (measures) were found to be significantly independent of the other EB scales as shown by the highly significant within-test F statistics. The F statistic is obtained in within-subjects between measures ANOVA performed on each individual EB scale in each of the samples. The F statistics show that each EB scale measures essentially one factor (or trait). In addition, all EB scales show high inter-item reliability. This is demonstrated by the Standardized Cronbach's Coefficient Alpha - a widely used test of inter-item reliability when using parallel models. This measure reveals that all items in each EB scale are significantly related and measure just one factor. In other words, each EB scale measures one factor, yet the factor being measured is different from scale to scale. The inter-item reliability coefficients show very similar results across the three subject samples. The Degree of Confidence Scale, Alcohol Scale and Drugs Scale are in close agreement. The Stress Management Scale shows similar results for the chemical dependency groups but

the work rehabilitation group had a slightly lower coefficient alpha. This difference might be accounted for by the fact that individuals looking for employment would not want to show themselves in a bad light by indicating they have an emotional, stress-related or mental health problem.

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

Table 4. Inter-item reliability, coefficient alpha. All data combined (N = 389).

EB SCALES MEASURES	N ITEMS	COEFFICIENT ALPHA
Degree of Confidence Scale	21	0.86
Alcohol Scale	21	0.94
Drugs Scale	21	0.88
Work Attitude	21	0.87
Self-Esteem Scale	25	0.90
Stress Management	40	0.89

These coefficient alphas in the combined data are very high and provide strong support for the reliability of the EB assessment.

14. Relationships between Selected EB Scales and 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 when the area of inquiry is more situation-specific. Conversely, the less specific the area of inquiry, the less reliable the Polygraph examination becomes.

Three Employment Barriers scales were chosen for this study: Degree of Confidence Scale, Alcohol Scale and Drugs Scale. The Degree of Confidence Scale was chosen because it is used in the EB to measure the truthfulness or honesty of the respondent while completing the EB. The Alcohol and Drugs Scales are well suited for comparison with the polygraph exam because of the situation specific nature of the scales. Alcohol and drug items are direct and relate specifically to alcohol and drug use. The comparison with the Degree of Confidence Scale is less direct because of the subtle nature of the Degree of Confidence Scale items as used in the EB. The respondent's attitude, emotional stability and tendencies to fake good affect the Degree of Confidence Scale. It was expected that the Alcohol and Drugs Scales would be highly correlated with the polygraph results and the Degree of Confidence Scale would show a somewhat less but nonetheless significant correlation. The following study (1995, N = 189) demonstrates the nature of these polygraph-EB relationships.

Method

One hundred and eighty-nine (189) work rehabilitation clients (1995) were administered both the EB scales and the Polygraph examination. Tests were given in a counterbalanced order, half of the clients

were given the EB scales first and the other half were administered the polygraph first. The clients were administered the EB test 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 EB scales demonstrated a significant positive correlation between the Degree of Confidence Scale and Polygraph exam ($r = 0.23$, $p<.001$). Similarly, significant positive relationships were observed between the Polygraph exam and the Alcohol Scale ($r = 0.54$, $p<.001$) and the Drugs Scale ($r = 0.56$, $p<.001$).

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

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

These results indicate that the EB Degree of Confidence Scale is an accurate measure of the respondent's truthfulness or honesty while completing the EB. The Degree of Confidence Scale is an essential measure in self-report instruments that measures truthfulness and then applies a correction to other scales based on the Degree of Confidence Scale score. The Degree of Confidence Scale ensures accurate assessment. The results of this study show that the EB is a valid assessment instrument.

15. Replication Study of Employment Barriers (EB) Reliability

After this first sequence of studies, EB database research enabled statistical reliability analysis of each scale item. The original pool of EB scale items was statistically analyzed and only the items with the best statistical properties (item-whole correlation coefficients) were retained. The following study (1997, N = 192) investigated the reliability of the revised EB.

This study (1997) was conducted to test the reliability (internal consistency) of the EB scales. In a replication of earlier EB research, the EB was administered to 192 chemical dependency inpatients. Age ranged from 18 to 56 years. This EB reliability study (1997) is summarized in Table 5.

Table 5. Inter-item Reliability (1997, N = 192)
Chemical Dependency Inpatients

EB Scales	Coefficient Alpha	P< Value
Degree of Confidence	.89	.001
Alcohol Scale	.90	.001
Drugs Scale	.89	.001
Work Attitude	.85	.001
Self-Esteem Scale	.90	.001

Stress Management	.91	.001

The results of this study demonstrate the reliability (internal consistency) of the EB test. All scales retained high reliability statistics. These results strongly support the reliability of Employment Barriers.

16. Validation of Employment Barriers (EB) in a Sample of Vocational Rehabilitation Clients

Reliability and validity of the revised EB scales continued to be studied in a sample of vocational rehabilitation clients. Consistently high reliability statistics of the EB assessment instrument have been found. Yet with the changes in scale items it was important to validate these changed scales. Vocational rehabilitation clients participated in this study; however, not all clients completed the MMPI that was used in the validation of the EB. This 2000 study involved 294 vocational rehabilitation clients.

Method

The participants in this study (2000) were vocational rehabilitation clients. 294 participants completed the EB and 171 completed the MMPI.

The demographic composition of this sample was as follows: 203 (69 percent) males, and 91 (31 percent) females. Age: 16 to 25 years (71 males, 16 females); 26 to 35 years (93 males, 42 females); 36 to 45 years (32 males, 17 females); and 46 to 55 years (7 males, 16 females). Ethnicity: Caucasian (55 males, 32 females); Black (130 males, 58 females); Hispanic (9 males); Native American (7 males); and other (2 males, 1 female). Education: 8th grade or less (13 males, 1 female); some High School (43 males, 19 females); GED (16 males, 7 females); High School graduates (83 males, 24 females); some College (26 males, 21 females); Business/Technical School (1 male, 1 female); College graduates (13 males, 15 females); and Graduate/Professional degrees (8 males, 3 females). Reliability coefficient alphas are presented in Table 6. There were 294 participants in this study (1990).

These results support the reliability of the EB. **All scale reliability coefficient alphas were at or above the 0.85 level.** All coefficient alphas are significant at the $p<.001$ level of significance. The EB is a reliable assessment instrument for screening employment barriers.

Table 6. EB Reliability Coefficient Alphas (2000, N=294)
Vocational Rehabilitation Clients

EB Scales	Cronbach Alpha	Significance Level
Degree of Confidence	.83	.001
Alcohol Scale	.86	.001
Drugs Scale	.87	.001
Work Attitude	.85	.001
Self-Esteem Scale	.91	.001
Stress Coping Abilities	.93	.001

In the validation part of this study (2000) there were 171 participants. Gender composition was 129 males and 42 females. This sample is described as follows. Age: Under 17 years (2); 18 to 21 (20); 22 to 25 (25); 26 to 29 (27); 30 to 33 (24); 34 to 37 (22); 38 to 41 (17); 42 to 45 (13); 46 to 49 (5); 50 to 53 (8); over 54 (8). Education: 8th grade or less (20); Partially completed High School (43); GED (16); High

School Graduate (53); Some College (36); and College Graduates (3). The results of this study are summarized in Table 7.

As found in earlier studies, all EB-MMPI correlations were significant and in predicted directions. These empirical findings further support the validity of the EB test. ER-MMPI results are presented in Table 7.

The EB Degree of Confidence Scale was invented and correlates most significantly with the MMPI-L Scale and MMPI-K scale. The EB Alcohol Scale correlates most significantly with the MMPI Psychopathic Deviant scale, MMPI Social Maladjustment scale, and MMPI Social Alienation scale. The EB Drug Scale correlates most significantly with the MMPI F scale, MMPI Psychopathic Deviant scale, and MMPI TSC-V (Resentment) scale. The EB Work Attitude Scale correlates most significantly with the MMPI F scale, MMPI TSC-III (Suspiciousness) scale and the MMPI Social Alienation scale. The EB test Stress Management Scale correlates most significantly with the MMPI F scale, MMPI Psychopathic Deviant scale, MMPI Psychasthenia scale, MMPI Taylor Manifest Anxiety scale, and MMPI Social Alienation scale.

Table 7. EB-MMPI Pearson Correlations
Vocational Rehabilitation Clients (N=171), 2000
Significance Level: ** p<.001, * p<.01

	MMPI SCALES				
(MEASURES)	**Degree of Confidence**	**Alcohol**	**Drugs**	**Work Attitude**	**Stress Management**
L (Lie) Scale	.511**	.022	-.186*	.089	-.065
F (Validity)	-293**	.379**	.269**	.276**	.462**
K (Validity)	.458**	-.201*	-.151	-.077	-.319**
Psychopathic Deviant	.241**	.312**	.190*	.065	.491**
Psychasthenia	-.279**	.202*	.115	.069	.470**
Taylor Manifest Anxiety	-.394**	.288**	.151	.031	.536**
MacAndrew	.005	.051	.090	.127	.076
Social Maladjustment	-.335**	.273**	.174	.033	.329**
Manifest Hostility	-.465**	.197*	.159	.176	.266**
TSC-III (Suspiciousness)	-.373**	.195*	.061	.209*	.247**
TSC-V (Resentment)	-.457**	.322**	.195*	.140	.402**
Social Alienation	-.377**	.283**	.171	.249**	.447**

Similar EB-MMPI correlations were demonstrated earlier. The present study further supports the validity of the EB. The EB measures what it purports to measure. EB scales correlate significantly and in predicted directions with selected MMPI scales.

17. Reliability of Employment Barriers (EB) in Two Samples of Work Rehabilitation Clients

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

In 2001, research studies on the EB continued. Two studies (2001) were conducted to test the reliability of the EB scale in two different samples of work rehabilitation clients. The total N of the two studies was 971 participants. 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. These studies (1991, Group1 = 177, Group 2 = 794) are summarized below.

Method

There were two samples of work rehabilitation clients included in these studies (2001). **The subjects in Group 1 consisted of 177 work rehabilitation clients.** Of the 177 respondents, 171 were men and 6 were women. The demographic composition of this sample is summarized as follows: Age: 16 to 25 years (31, 17.5%); 26 to 35 (93, 52.5%), 36 to 45 (35, 19.8%); 46 to 55 (14, 7.9%); and over 55 (4, 2.3%). Ethnicity: Caucasian (152, 85.9%); Black (11, 6.2%); Hispanic (3, 1.7%); Native American (2, 1.1%); and Other (9, 5.1%). Education: 8th grade or less (15, 8.5%); Some High School (36, 20.3%); GED (36, 20.3%); High School graduate (63, 35.6%); Some College (23, 13.0%); Business/Technical School (1, .6%); College Graduate (2, 1.1%); and Graduate/Professional Degree (1, .6%).

Group 2 consisted of 794 work rehabilitation clients. There were 677 (85.3%) males and 117 (14.7%) females. Age: Under 16 years of age (1 male); 16 to 25 years (229 males, 28 females); 26 to 45 years (460 males, 29 females); 46 to 55 years (33 males, 6 females); and over 55 (14 males, 4 females). Ethnicity: Caucasian (400 males, 71 females); Black (62 males, 14 females); Hispanic (151 males, 9 females); Native American (59 males, 21 females); Asian (1 female); and Other (5 males, 1 female). Education: 8th grade or less (8 males, 1 female); Some High School (182 males, 36 females); GED (69 males, 6 females); High School graduates (216 males, 34 females); some College (165 males, 34 females); Business/Technical School (8 males); College Graduates (27 males, 5 females); and Graduate/Professional degree (2 males 1 female).

Reliability coefficient alphas are presented in Table 8 for studies #1 and 2 combined (N = 971).

Table 8. Reliability coefficient alphas. Work rehabilitation clients. (2001, N=971)
All coefficient alphas are significant at p<.001.

	1 Work rehabilitation clients	2 Work rehabilitation clients
EB Scales	**N = 177**	**N = 794**
Degree of Confidence	.85	.85
Alcohol Scale	.84	.90
Drugs Scale	.91	.89
Work Attitude	.89	.88
Self-Esteem Scale	.88	.89
Stress Management	.92	.94

The results of these studies support the reliability (internal consistency) of the EB. All coefficient alphas are significant at p<.001. All scale reliability coefficients attained very high levels. In both of these samples of work rehabilitation clients EB reliability coefficient alphas were very high and very similar between samples. These results show that the EB is a reliable employment barrier assessment instrument. EB scales are objective, verifiable, reproducible and reliable. The internal consistency (reliability) of the EB has been demonstrated. The EB test has impressive and empirically demonstrated reliability.

18. Reliability of Employment Barriers (EB) in a Sample of Vocational Rehabilitation Clients

This study (2002) tested the reliability of the EB in a sample of vocational rehabilitation clients. The reliability of the EB test continues to be investigated in different samples of work rehabilitation clients or individuals being assessed for employment. This study explored the applicability of the EB assessment for different types of work rehabilitation clients. Vocational rehabilitation clients usually have special concerns regarding their employability. High reliability statistics (with vocational rehabilitation clients) would suggest that the EB test has broad applicability for assessing a variety of work rehabilitation clients. This study (2002, N = 446) is summarized below.

Method

There were 446 vocational rehabilitation clients included in this study (2002). There were 347 (77.8%) males and 99 (22.2%) females. Age: 221 (16 to 25 years); 143 (26 to 35); 46 (36 to 45); 31 (46 to 55); and 5 (over 55 years). Ethnicity: Caucasian (370); Black (18); Hispanic (14); Asian (1); Native American (39); and Other (4). Education: Below 8th grade (24); Some High School (71); GED (64); High School graduates (155); Some College (92); Business/Technical School (9); and College Graduates (31).

Reliability coefficient alphas are presented in Table 9 for 446 vocational rehabilitation clients.

Table 9. Reliability coefficient alphas. Vocational rehabilitation clients (2002, N=446)
All coefficient alphas are significant at p<.001.

EB Scales	Cronbach's Alpha
Truthfulness	.84
Alcohol Scale	.88
Drugs Scale	.90
Work Attitude	.85
Self-Esteem Scale	.90
Stress Management	.91

This study supports the reliability (internal consistency) of the EB in vocational rehabilitation clients. All scales have highly significant reliability coefficient alphas. Cronbach Alpha is considered the most important index of internal consistency or reliability. Reliability refers to consistency of test results regardless of who uses the test. EB scales have been demonstrated in a number of studies to be both mutually exclusive and have high inter-item scale consistency. EB scales are objective; verifiable, reproducible and reliable. The internal consistency (reliability) of the EB has been demonstrated. The EB is a reliable assessment instrument for vocational rehabilitation clients.

19. Reliability of Employment Barriers (EB)

Method

In this study (2004), the EB was administered to 191 New Employees and 54 Rehires (N=245). There were 126 males (51.4%) and 119 females (48.6%). Rehires had worked for the participating company, had been laid off, and were designated as appropriate for rehiring. New Employees had never been employed at the participating company. The **demographic composition of the New Employees** sample is described as follows: Gender: There were 98 males (51.3%) and 93 females (48.7%). Age: 16-20 (54, 28.3%), 21-25 (49, 25.7%), 26-30 (32, 16.8%), 31-35 (20, 10.5%), 36-40 (15, 7.9%), 41-45 (11, 5.8%), 46-50 (4, 2.1%), 51-55 (3, 1.6%), over 55 (3, 1.5%). Ethnicity: Caucasian (57, 29.8%), Black (39,

20.4%), Hispanic (81, 42.4%), Asian (5, 2.6%), Native American (7, 3.7%), Other (1, 0.5%). Education: 8th Grade or Less (16, 8.4%), Some HS (59, 30.9%), GED (10, 5.2%), HS Graduate (82, 42.9%), Some College (14, 7.3%), Technical/Business School (3, 1.6%), College Graduate (1, 0.5%). Marital Status: Single (143, 74.9%), Married (44, 23%), Divorced (4, 2.1%), Separated (0).

The **demographic composition of the Rehires** sample is described as follows: Gender: There were 28 males (51.9%) and 26 females (48.1%). Age: 16-20 (15, 27.8%), 21-25 (8, 14.8%), 26-30 (11, 20.4%), 31-35 (6, 11.1%), 36-40 (4, 7.4%), 41-45 (5, 9.3%), 46-50 (3, 5.6%), 51-55 (1, 1.9%), over 55 (1, 1.9%). Ethnicity: Caucasian (17, 31.5%), Black (9, 16.7%), Hispanic (21, 38.9%), Asian (3, 5.6%), Native American (4, 7.4%), Other (0). Education: 8th Grade or Less (3, 5.6%), Some HS (19, 35.2%), GED (1, 1.9%), HS Graduate (21, 38.9%), Some College (7, 13.0%), Technical/Business School (0), College Graduate (0). Marital Status: Single (33, 61.1%), Married (19, 35.2%), Divorced (0), Separated (1, 1.9%), Widowed (1, 1.9%).

Gender comparisons indicated that age, race and education were not significantly different between males and females. However, marital status was significantly different where males were more often single and females were more often married, $t=2.29$, $p=.02$. Also, there was a gender difference in US citizenship status where more females than males were not US citizens. There was no difference between genders for possessing a driver's license. Comparisons between Rehires and New Employees indicated that the groups differed only in marital status where Rehires were more often married and New Employees were more often single.

The average age of all participants was 27.8 years. The youngest age was 18 and the oldest age was 63. The average age for Rehires was 29.3, and the youngest and oldest ages were 18 and 56, respectively. The average age for New Employees was 27.4, and the youngest and oldest ages were 18 and 63, respectively. Males were a little older (2 years on average) than females, however, the t-test comparison between gender groups showed that the difference was not significant. The Rehires were also 2 years older than New Employees, but again, the difference was not significant. A test for homogeneity of variance indicated that the distributions of age of the groups were not significantly different.

A t-test comparison between groups indicated that education level or ethnicity were not significantly disproportional between Rehires and New Employees. The groups did differ in terms of marital status, where Rehires were more often married and New Employees were more often single.

An analysis of variance was performed on each EB Work Attitude Scale item to determine Rehires and New Employees differences. Those items that discriminated between these two groups (significant difference of .10 or less) were selected for inclusion in the Work Attitude Scale. As noted earlier, the Work Attitude Scale is a work appraisal measure incorporating the employee's attitude, work history and overall work adjustment. It is important that this scale discriminates between "acceptable" and "unacceptable" employees. Since Rehires were identified as meeting the "rehire criteria", they were representative of the desired hiring criteria. All items on the Work Attitude Scale discriminate between the Rehire and New Employee groups at the .10 significance level or less. This discriminating ability is a very desirable feature of the EB.

Reliability coefficient alphas are presented in Table 10.

Table 10. Reliability coefficient alphas. New Employees and Rehires (2004, N=245)
All coefficient alphas are significant at p<.001.

EB Scales	Cronbach Alpha
Degree of Confidence Scale	.88
Alcohol Scale	.91
Drugs Scale	.89
Work Attitude	.87
Self-Esteem Scale	.90
Stress Management	.92

These results strongly support the reliability (internal consistency) of the EB. All reliability coefficient alphas were significant at p<.001. The EB is an objective, standardized and reliable assessment instrument.

EB scales were found to be significantly independent of other EB scales. This mutual exclusivity was demonstrated by within-subjects between measures ANOVA test performed on each EB scale. Each EB scale measures one factor. Also, all EB scales demonstrate high inter-item consistency. This is demonstrated with the Cronbach Coefficient Alpha, which is the most widely used test of inter-item reliability. Items in each EB scale are highly related and each scale measures one factor, yet the factor being measured differs from scale to scale.

20. Reliability of the EB in a Large Sample of Work rehabilitation clients

The reliability of the EB was studied (2005) in a large sample of work rehabilitation clients. As the EB becomes more widely used it is important to continue to investigate the reliability of EB in large samples of participants. This study (2005) involved 1,014 work rehabilitation clients.

Method

This study (1995) included 1,014 work rehabilitation clients. There were 406 males and 608 females. All clients completed the Employment Barriers (EB) assessment as part of their rehabilitation procedures. The demographic composition of this sample was summarized as follows: Age: 16 to 20 years (males 111, 27.3%; females 107, 17.6%); 21 to 25 (males 111, 27.3%; females 144, 23.7%); 26 to 30 (males 69, 17.0%; females 88, 14.5%); 31 to 35 (males 48, 11.8%; females 89, 14.6%); 36 to 40 (males 27, 6.7%; females 53, 8.7%); 41 to 45 (males 15, 3.7%; females 57, 9.4%); 46 to 50 (males 9, 2.2%; females 37, 6.1%); 51 to 55 (males 7, 1.7%; females 16, 2.6%); 56 to 60 years (males 3, 0.7%; females 12, 2.0%); and Over 60 (males 4, 1.0%; females 5, 0.8%). Ethnicity or Race: Caucasian (males 149, 36.7%; females 176, 28.9%); Black (males 54, 13.3%; females 105, 17.3%); Hispanic (males 160, 39.4%; females 232, 38.2%); Asian (males 8, 2.0%; females 15, 2.5%); Native American (males 24, 5.9%; females 66, 10.9%); and Other (males 10, 2.5%; females 11, 1.8%). Education: 8th grade or less (males 28, 6.9%; females 51, 8.4%); Some High School (males 103, 28.4%; females 157, 25.8%); GED (males 25, 6.2%; females 40, 6.6%); High School Graduate (males 197, 48.5%; females 280, 46.1%); Some College (males 43, 10.6%; females 68, 11.2%); Technical/Business School (males 3, 0.7%; females 1, 0.2%); College Graduate (males 7, 1.7%; females 9, 1.5%); Professional/Graduate School (males 0; females 1, 0.2%). Marital status: Single (males 288, 70.9%); females 327, 53.8%); Married (males 93, 22.9%; females 197, 31.9%); Divorced (males 17, 4.2%; females 51, 8.4%); Separated (males 6, 1.5%; females 27, 4.4%); and Widowed (males 0; females 7, 1.2%). There were 1,014 client s included and 406 were males (40.0%)

and 608 were females (59.9%). Gender comparisons indicated that education was not significantly different between males and females. However, age, ethnicity and marital status were significantly different for males and females. Males were younger than females ($t = 5.49$, $p < .001$). More males were Caucasian than females ($t = 2.37$, $p < .018$). Males were more often single and females more often married ($t = 6.02$, $p < .001$).

Reliability coefficient alphas are presented in Table 11 for 1,014 work rehabilitation clients that completed the EB test.

Table 11. Reliability coefficient alphas. Work rehabilitation clients (2005, N=1,014)
All coefficient alphas significant at p<.001.

EB Scales	Cronbach's Alpha
Degree of Confidence Scale	.887
Alcohol Scale	.906
Drugs Scale	.885
Self-Esteem Scale	.896
Work Attitude	.866
Stress Management	.906

These results show that all EB scales demonstrate high inter-item consistency. All coefficient alphas were significant at the p<.001 level. In this study (2005) a large sample (N=1,014) of work rehabilitation clients was used to investigate EB reliability. This study strongly supports the reliability (internal consistency) of the EB.

21. EB Reliability and Scale Risk Range Accuracy

This study (2008) was conducted to test the reliability and accuracy of the EB assessment. Risk range percentile scores are calculated for each EB scale. These risk range percentile scores are derived from scoring equations based on responses to scale items and Truth-Correction. These scores are then converted to percentile scores. There are four risk range categories: **Low Risk** (zero to 39th percentile), **Medium Risk** (40 to 69th percentile), **Problem Risk** (70 to 89th percentile) and **Severe Problem or Maximum Risk** (90 to 100th percentile). Risk range percentile scores represent degree of severity.

Analysis of the accuracy of EB risk range percentile scores involves comparing the risk range percentile scores obtained from clients' EB test results to the predicted risk range percentages as defined above. The percentages of clients expected to fall into each risk range are the following: Low Risk (**39%**), Medium Risk (**30%**), Problem Risk (**20%**) and Severe Problem or Maximum Risk (**11%**). The actual percentage of respondents falling in each of the four risk ranges, based on their risk range percentile scores, was compared to these predicted percentages in the following 1998 (N = 2,446) study.

Method

This study (2008) included 2,446 work rehabilitation clients from two geographical areas. There were 119 participants from a southeastern location and 2,327 participants were from the southwest. The test sites were temporary employment services that administered the EB as part of routine screening procedures.

Accuracy

Participant scale scores are classified according to the risk (degree of severity) they represent. Four categories of risk are assigned: Low risk (zero to 39th percentile), Medium risk (40 to 69th percentile), Problem risk (70 to 89th percentile), and Severe Problem (90 to 100th percentile). By definition the expected percentage of participants assigned to each risk category is, 39% in Low risk, 30% in Medium risk, 20% in Problem risk and 11% in Severe Problem. The actual percentages of participants placed in the four risk categories based on their scale scores are compared to these expected percentages. Table 12 presents these comparisons. The differences between obtained and expected are shown in parentheses.

Table 12. EB Risk Range Percentile Scores (2008, N = 2,446).

EB Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Degree of Confidence Scale	38.3	(0.7)	31.7	(1.7)	20.1	(0.1)	9.9	(1.1)
Alcohol Scale	41.1	(2.1)	28.0	(2.0)	21.4	(1.4)	11.7	(0.7)
Drugs Scale	37.4	(1.6)	29.5	(0.5)	21.4	(1.4)	11.7	(0.7)
Work Attitude	39.1	(0.1)	28.6	(1.4)	21.1	(1.1)	11.2	(0.2)
Self-Esteem Scale	41.2	(2.2)	28.2	(1.8)	19.7	(0.3)	10.8	(0.2)
Stress Management	39.7	(0.7)	30.0	(0.0)	20.2	(0.2)	10.7	(0.3)

As shown in the graph and table above, the EB scale scores are very accurate. The objectively obtained percentages of participants falling in each risk range are very close to the expected percentages for each risk category. **All of the obtained risk range percentages were within 2.2 percentage points of the expected percentages and half were within one percentage point.** This is very accurate assessment. Reliability coefficient alphas are presented in Table 13.

Table 13. Reliability coefficient alphas. Work rehabilitation clients (2008, N=2,446)
All coefficient alphas significant at p<.001.

EB Scales	Cronbach's Alpha
Degree of Confidence Scale	0.86
Alcohol Scale	0.85
Drugs Scale	0.84
Work Attitude	0.88
Self-Esteem Scale	0.93
Stress Management	0.92

These results support the reliability of the EB. All coefficient alphas were significant at p<.001. All coefficient alphas for EB scales are above the generally accepted level of 0.80 for assessment tests. The EB is a reliable employment barrier screening instrument.

Taken together, these results demonstrate that the EB is a reliable and accurate employment barrier assessment instrument. All EB scales have very high reliability coefficient alphas and EB scale risk range percentile scores closely approximate their predicted percentages. The EB is an accurate employment barrier assessment tool.

22. Reliability, Validity and Accuracy of Employment Barriers (EB)

Research on many Behavior Data Systems assessment instruments has revealed gender differences on some of their scales. For this reason gender information has been included on the EB answer sheet. When gender differences exist on any test scale, separate male/female scoring methodologies are developed. When appropriate, separate scoring procedures for males and females helps ensure fairness and accuracy. Similarly, recent research has concluded that race or ethnicity accounts for some differences in scale scores. Race information has also been included on the EB answer sheet.

A study (2009) was conducted to investigate the reliability and accuracy of the EB test. EB test data were compiled from agencies located in the Southwest, Midwest and Southeast. There were a total of 3,513 work rehabilitation clients participating in this study.

Method

There were 3,513 work rehabilitation clients included in this study (2009). The participants were from three geographical areas: Southwest, Southeast and Midwest. Each participant completed the EB on a voluntarily for EB research purposes.

Accuracy

Accuracy of the EB is determined by the close approximation of obtained risk range percentages to predicted percentages. There are four risk range percentages that clients are assigned to based on their scale scores. The risk range percentages and the predicted (shown in parentheses) are: **Low Risk** (39%), **Medium Risk** (30%), **Problem Risk** (20%) and **Severe Problem or Maximum Risk** (11%).

Table 14. EB Risk Range Percentile Scores (2009, N = 3,513).

EB Scale	Low Risk (39%)		Medium Risk (30%)		Problem Risk (20%)		Severe Problem (11%)	
Degree of Confidence Scale	38.7	(0.3)	32.6	(2.6)	17.5	(2.5)	10.2	(0.8)
Alcohol Scale	41.6	(2.6)	29.6	(0.4)	17.8	(2.2)	11.0	(0.0)
Drugs Scale	39.1	(0.1)	33.2	(3.2)	18.7	(1.3)	9.0	(2.0)
Work Attitude Scale	39.1	(0.1)	29.3	(0.7)	21.1	(1.1)	10.5	(0.5)
Self-Esteem Scale	40.2	(1.2)	28.2	(1.8)	20.7	(0.7)	10.9	(0.1)
Stress Management	39.1	(0.1)	30.0	(0.0)	20.2	(0.2)	10.7	(0.3)

These results show that obtained risk range percentages closely approximated the predicted percentages for each of the six EB scales. All obtained risk range percentages were within 3.2 percentage points of the predicted percentages. This is very accurate assessment. The EB accurately measured risk in this sample of work rehabilitation clients. The EB is an accurate barriers-to-employment assessment instrument.

Reliability coefficient alphas are presented in Table 15 for the 3,513 work rehabilitation clients studied.

Table 15. Reliability coefficient alphas. Work rehabilitation clients (2009, N=3,513)
All coefficient alphas significant at p<.001.

EB Scales	Cronbach's Alpha
Degree of Confidence Scale	0.86
Alcohol Scale	0.85
Drugs Scale	0.84
Work Attitude	0.88
Self-Esteem Scale	0.90
Stress Management	0.92

Validity

The EB Alcohol and Drugs Scales are measures of alcohol and drug abuse or severity of abuse. Alcohol and Drugs Scales scores predict when an individual has an alcohol or drug problem. **The criteria in this analysis for identifying clients as problem drinkers and drug users is prior treatment (for alcohol or drug abuse).** Having been in treatment identifies clients as having had an alcohol or drug problem. If a person has never had an alcohol or drug problem it is very likely they have not been treated for an alcohol or drug problem. In this EB study, treatment information was obtained from EB treatment-related item responses. Thus, clients are separated into two groups, those who had treatment and those who have not had treatment. Then, client scores on the Alcohol and Drugs Scales were compared. It is predicted that clients with a treatment history will score in the problem risk range (70^{th} percentile and above) or higher on the Alcohol and Drugs Scales.

Predictive validity results for the Alcohol Scale (using scale scores) and alcohol treatment show that for the 124 clients who reported having had alcohol treatment, all 124 individuals, or 100 percent, had Alcohol Scale scores at or above the 70th percentile. These results show that the EB Alcohol Scale accurately identified clients with alcohol problems. There is a very strong positive correlation between Alcohol Scale scores and alcohol treatment. **These results strongly validate the EB Alcohol Scale.**

The predictive validity of the Drugs Scale was done in the same way using drug treatment as the criterion. Of the 195 respondents that reported having had drug treatment all 195 individuals, or 100 percent, had Drugs Scale scores in the 70th percentile or higher (Problem Risk and above). **These results strongly validate the EB Drugs Scale.**

These results strongly support the reliability, validity and accuracy of the EB test. The EB test achieves very high statistical reliability. It accurately classifies clients into risk range categories and it accurately identifies clients who have drinking and/or drug abuse problems. Employment Barriers does what it purports to do: it accurately screens hard-to-employ individuals.

23. Validation of the Employment Barriers (EB) Self-Esteem Scale

This study (2010) evaluated ratings between experienced counselors and the EB Self-Esteem Scale. These counselors had at least 8 years experience and an MA degree in counseling. Two counselors rated each client's self-esteem. They reviewed client outpatient files containing court histories, progress notes, diagnoses, MMPI and Incomplete Sentence materials. Each patient was interviewed for a minimum of 30 minutes. Product-moment correlation coefficients were calculated for each rater and are presented in Table 16.

Table 16. Staff Ratings and EB Self-Esteem Scale (2010, N=79)
Product-moment correlation coefficients significant at p<.05.

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

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

SUMMARY

This document "EB: An Inventory of Scientific Findings" is not intended as an exhaustive compilation of EB research. Yet it does summarize many research studies supporting the reliability, validity and accuracy of the Employment Barriers (EB) test. Moreover, ongoing EB database research ensures an increasingly accurate picture of employment-challenged clients. The EB does what it purports to do.

The EB acquires a vast amount of relevant information for staff review prior to decision making. Empirically based scales are objective and accurate. Assessment has shifted from subjective opinions to objective accountability. It should be noted that in this research document studies are presented chronologically – when the research was done. This enables the reader to see the evolution of the EB into a state-of-the-art screening instrument or test. The EB is a reliable, valid and accurate instrument for employment barrier screening.

Areas for future research are varied and complex. EB research will continue to be ongoing in nature. Wherever possible, emphasis will be placed on local standardization research. The advantages of local test standardization are many and include accuracy, reliability, validity and fairness. When Behavior Data Systems (BDS) standardizes a test on a client population, the instrument becomes uniquely appropriate to that user's needs. BDS offers to standardize the EB on a new (or prospective) test user's client population. This unique and very desirable feature is only possible because of BDS' proprietary EB test database. Consistent with the foregoing, BDS encourages other scientists to participate in EB research. Few fields of assessment represent such important opportunities for creative discovery.

In summary, this document is a cumulative record of the evolution of the Employment Barriers (EB) test. Studies are presented chronologically – in the same sequence they were completed. Current studies are most representative of the EB. Behavior Data Systems is committed to ongoing research. Interested parties should contact Behavior Data Systems, PO Box 44256, Phoenix, Arizona 85064-4256.

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