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Assessment System

Validation Studies

THE BROOKS GROUP

Attitude/ Personal Skills

Validation Study

This compendium is a summary of twenty studies conducted on groups of people that took the Hartman Value Profile. This compendium is possible because of the countless hours and dedication of the researchers noted in this compendium and because of the cooperation of their subjects. It is designed to serve as a general introduction and index to studies that prove the validity and reliability of the Hartman Value Profile. The complete write-ups of these studies are available from the respective authors or from Kinsel Enterprises, Inc. when noted.

This compendium summarizes studies that measured sixteen different aspects of the Hartman Value Profile. They present clear, objective proof that the Hartman Value Profile is reliable, valid, and useful for applications in business, psychology, and human development.

CONTENTS

THE HARTMAN VALUE PROFILE

The Hartman Value Profile is the creation of the late Dr. Robert S. Hartman and is owned by the Robert S. Hartman Institute, university of Tennessee. It is a paper and pencil exercise[1] that requires that the subject rank order eighteen different statements in two different lists. This forced ranking of the statements requires that the subject evaluate each statement and compare it to every other statement. The resultant rankings demonstrate the subject's different capacities and biases in valuing. The Hartman Value Profile is based on the science of formal Axiology. Dr. Hartman's theory of formal Axiology is described in detail in his book, The Structure of Value: Foundations of Scientific Axiology, Southern Illinois University Press, 1967.

Axiology is the formal system of identifying and measuring value. The Hartman Value Profile is one means by which we are able to measure an individual person's propensity and capacity to value. It is the person's structure of value(the road map and filtration system a person uses to think, evaluate and make decisions) that results in personality, individual perceptions, and decisions. In common parlance, a person's structure of value is how that person thinks.

That we are able to simply and objectively measure a person's structure of value has significant ramifications for mental health and business. The Hartman Value Profile eliminates much of the need for arduous and expensive psychological testing for either clinical or business purposes. It provides an easy to use, objective, deductive, measurement which can be (and has been) used for counseling, training, and development. Businesses have used the Hartman Value Profile in candidate selection, designing of training, and measuring the efficacy of their training and development programs (before and after measurement of growth, change, or improved skills).

The most comprehensive book to date covering Dr. Robert Hartman, formal Axiology, and the uses of Axiology is Dr. Rem B. Edwards' and John W. Davis's book: Forms of Values and Valuation, University Press of America, 1991.

VALIDATION

Validating tests is the multi-faceted discipline that determines the accuracy, dependability and the consistency of an instrument with the scientific theories supporting it. Validation measures how closely a testing instrument's scores correspond to measurable behaviors or characteristics. It also establishes the reliability of the instrument, insuring that the nature of the instrument does not significantly effect the outcomes. The process of validating an instrument is compartmentalized with each different process measuring different aspects about the instrument.

This paper is a compilation of summaries of twenty validation tests on the Hartman Value Profile. These summaries outline specifically the Hartman Value Profile's viable, replicable, objective, and reliable findings. They also demonstrate that the Hartman Value Profile meets the requirements of the E.E.O.C. All the studies described within this paper comply with the American Psychological Association's guidelines for analysis of psychometric instruments and follow industry-standard procedures for statistical analysis.

EEOC REQUIREMENTS

The Equal Employment Opportunity Commission (E.E.O.C.) has established that screening instruments, psychological testing, personality tests, and all other evaluation procedures that are used in industry are to fulfill the Uniform Guidelines on Employment Selection Procedures (1978).

"Employer policies and practices which have an adverse impact on the employment opportunities of any age, race, sex, or ethnic group are illegal…

Employer decisions include, but are not limited to hiring, promotion, demotion, membership, referral, licensing, and certification."

[Federal Registry, Vol. 43, No. 166, 8/25/78]

The Conclusion from these studies is that the Hartman Value Profile does comply with the E.E.O.C. requirements insofar as it does not discriminate against persons of different racial origins, sexes or ages.

DISCRIMINATION BY AGE

The Age Discrimination in Employment Act of 1967 states that employers may not discriminate against employees and applicants older than 40 years old in their hiring and promotion practices. Therefore in order for a test to be legal, it must be found to have no statistical bias between people older than 40 years old and people under 40 years old.

Age: Study A

This study was conducted by Value, Inc. (Wayne Carpenter and Edward Martin), 1987.

Two separate sample populations of 200 persons were built from a group of more than 6,000 people by random selection. The groups represented adults below the age of thirty and adults above the age of 40. The two-sample parametric interval data T-test was used to measure statistical significance.

The Hartman Value Profiles generated 54 different scores on each participant. The T-test value would have to have been above 1.282 in order for there to be some discrimination between the ages (resulting in a p>.2). For all 54 items p<.01, thus proving that **the Hartman Value Profile does not discriminate against persons of particular ages or age groups.**

Age: Study B

This study was conducted by The Institute for the Study of Human Values (Dr. Charles McDonald, Ph.D., Wayne Carpenter, Edward Martin, William Panak, and Gary McDonald), and funded by a grant from the Dollar General Corporation, 1987.

The sample population was 1,075 persons who were either employed or seeking employment within a large corporation. The ages of the participants ranged in ages from below 18 to over 70 and were grouped into groups of <30 (421 persons), 30-39 (298 persons), 40-49 (200 persons), and >49 (156 persons). Analyses of the results were completed both according to the individual ages and on four clusters of age groupings.

The null hypothesis used was: "that mean ranks for different aged persons for the following normative items will not be significantly statistically different when using the Hartman Value Profile."

The results proved that the Hartman Value Profile does not discriminate between people of different ages. This is true with analysis being done either by individual ages

or as part of an age grouping. All means rankings were proven to not be different with a very high statistical significance of $.0395 > p < .0005$.

Title VII of the 1964 Civil Rights Act stipulates that an employer may not discriminate in hiring and promotion practices or the terms and conditions of employment because of the individual's sex.

Sex: Study A

This test was conducted by Value Inc.(Wayne Carpenter and Edward Martin), 1987.

Two separate sample populations of 200 people were built from a group of more than 6,000 people by random selection. The one group was males and the other females. The two-sample parametric interval data T-test was used to measure statistical significance.

Fifty-four scores for each participant's profile were measured and compared. The results were that all 54 scores, using the T-test, were found to have a $p < .01$. The conclusion is: "in compliance with EEOC regulations, the Ho (null hypothesis) is that the mean ranks for men and women for the following normative items will not be significantly statistically different when using the Hartman Value Profile."

This study proves that the Hartman Value Profile does not discriminate between males and females.

Sex: Study B

This study was conducted by The Institute for the Study of Human Value (Dr. Charles McDonald, Ph.D., Wayne Carpenter, Edward Martin, William Panak, and Gary McDonald), and funded by a grant from the Dollar General Corporation, 1987.

A sample population was 1,075 persons who were either employed or seeking employment within a large corporation. There were 92 men and 983 women in the study. Analysis of the results were completed using the F ratio between the groups and the E ta² which measures the proportion of the total variability in the dependent variable that can be accounted for by knowing the values of the independent variables.

The null hypothesis used was: "that mean ranks for men and women for the following normative items will not be significantly statistically different when using the Hartman Value Profile."

The Results proved that the Hartman Value Profile does not discriminate between people of different sexes. Of the 36 items tested, 29 had no statistical significance at all and the other 7, where the mean ranks of the male and female subjects were significantly different, the E ta² indicated that less than 1% of the difference was due to sexual gender (with statistically significant p values ranging from $<.0490$ to $<.0086$).

DISCRIMINATION BY RACE

Title VII of the 1964 Civil Rights Act stipulates that an employer may not discriminate in hiring and promotion practices or the terms and conditions of employment because of the individual's race.

Race: Study A

This test was conducted by Value Inc.(Wayne Carpenter and Edward Martin), 1987.

Two separate sample populations of 200 participants were built from a group of more than 6,000 people by random selection. The groups represented adults of Caucasian race and of the African American race. The two-sample parametric interval data T-test was used to measure statistical significance.

54 scores for each participant's profile were used measured and compared. The results were that all 54 scores, using the T-test, were found to have a $p<.01$.

This statistically significant result proves that the Hartman value Profile does not discriminate among different races.

Race: Study B

This study was conducted by The Institute for the Study of Human Value (Dr. Charles McDonald, Ph.D., Wayne Carpenter, Edward Martin, William Panak, and Gary McDonald), and funded by a grant from the Dollar General Corporation, 1987.

A sample population was 1,075 persons who were either employed or seeking employment within a large corporation. There were five racial groups represented: Asian, African American, American Indian, Hispanic, and Caucasian. Analysis of the results were completed using the F ration between the groups and the E ta² which measure the proportion of the total variability in the dependent variable that can be accounted for by knowing the values of the independent variables.

The null hypothesis used was: "that mean ranks for persons of different racial origins for the following normative items will not be significantly statistically different when using the Hartman Value Profile."

The Results proved that the Hartman Value Profile does not discriminate between people of different races. Of the 36 items tested, 31 had no statistical significance at all and the other 5, where the mean ranks of the subjects were significantly different, the E ta² indicated that less than 1% of the difference was due to racial difference (with statistically significant p values ranging from $<.0144$ to $<.0001$).

FACE VALIDITY

Face validity is the measure of how the structure and content of each statement on the Hartman Value Profile is consistent with scientific, axiological theory. Unlike other validation studies, this study is more of an assessment as to whether each statement accurately expresses the value and valuation defined by Dr. Robert S. Hartman in the science of formal Axiology.

This study was conducted by The Institute for the Study of Human Value (Dr. Charles McDonald, Ph.D., Wayne Carpenter, Edward Martin, William Panak, and Gary McDonald), and funded by a grant from the Dollar General Corporation, 1987.

The procedure followed was for the axiologist to evaluate each statement according to:

1. the concept
2. the value dimension
3. the valuation
4. whether the concept is correct
5. whether the value dimension is correct
6. whether the valuation is correct

After completing these analyses for each of the 36 statements, the team then reviewed Dr. Hartman's analysis of those same statements to confirm agreement. **In every case, the validation team's analysis concluded that each statement was an accurate expression of the value and valuation for each of the intended combinations**. They also concluded that in every case, they arrived at the same conclusions as did Dr. Hartman.

This independent analysis along with the matching of conclusions with Dr. Hartman's provides high confidence that the structure and content of every statement in the Hartman Value Profile is axiologically valid.

RELIABILITY

Reliability is the measure of whether the results or assessments derived from an instrument are the result of chance. When an instrument is proven to be reliable, it can be used at different times, in different contexts with high confidence that the presiding conditions did not affect the results with any statistically significance. Reliability is usually proven with a test/retest procedure within a ten-day period. The longer the period, the more reliable the instrument is said to be.

Reliability: Study A

This study was conducted by John Davis, Ph.D., Glenn Graber, Ph.D., and Leon Pomeroy, Ph.D.

A population of 86 students at the University of Tennessee was given the Hartman Value Profile. Ten weeks later, the same students were again given the HVP. That the Hartman Value Profiles were given ten weeks apart with the subjects completing a medical ethics course in the interim added to the rigorousness of this testing of the stability of the Hartman Value Profile.

The results of the study prove the reliability and stability of the Hartman Value Profile. All forty dimensions measured were statistically the same between the first and second trials. "The reliability of the Hartman Value Profile was especially noteworthy in the most complex dimensions: value quotients, balance quotients, self quotients, integration scores, and differentiation scores." These more complex dimensions all had confidence above 99% with p<.01.

Reliability: Study B

This study was conducted by Wayne Carpenter and Edward Martin of Values, Inc., 1987.

A sample size of 200 adults was assembled from persons who either worked for or were applying for work with the Dollar General Corporation. These subjects took the Hartman Value Profile over a three-year period. This length of time for a test/retest would demonstrate superior stability. Value, inc. conducted two analyses of the results:

1. the raw scores themselves
2. the evaluated scores according to Hartman's scoring scheme

The results of both analyses provided a highly significant level of confidence: p<.001. The evaluated scores were analyzed using the Spearman Rank Order Correlation Analysis. Fir this study a rank order coefficient >.549 was all that was needed to secure a p<.001. The final rank order coefficient was .974, indicating **"an extremely high level of significance and confidence in the reliability of the instrument, which is far greater in significance than provided by a p<.001."**

CONSTRUCT VALIDITY

Construct validity measure whether an instrument in both its forms and results is consistent with the theory behind the instrument. In this case the measure will be to see if the ranks assigned the statements in the Hartman Value Profile (which for Hartman have fixed, universal order of value) provide support for the validity of Dr. Hartman's constructs.

This study was conducted by The Institute for the Study of Human Value (Dr. Charles McDonald, Ph.D., Wayne Carpenter, Edward Martin, William Panak, and Gary McDonald), and funded by a grant from the Dollar General Corporation, 1987.

The sample size was 6,354 persons. Analysis was of the profile as a whole, the compositional items(18), the transpositional items (18), and each individual item. The null hypothesis were, "that the ranking of all items would be random, that the compositional and transpositional items would be ranked randomly, and that the normative rank and median obtained rank for each item would be zero."

The results of the test as a whole, using Friedman's Two way ANOVA by rank, Page's Test for Ordered Alternative, and Kendall's Coefficient of Concordance provided a 99% confidence level that the rankings did match the theoretical order of value. The Spearman Rank Order Correlation also provided a statistically significant indication that a correlation exists between the rank order of the model and the rank order of the obtained rankings.

"The results obtained support the contention that the Hartman Value Profile provide a valid description and explanation of the structure and dynamics of human value and human value judgements."

CONCURRENT VALIDITY

Concurrent validity is the test as to whether a particular instrument correlates significantly to other valid measures. This validation provides an alternative means of validating an instrument by "piggy- backing" on the reams of validation of previously benchmarked, psychometric instruments.

This study was conducted by Leon Pomeroy, Ph.D. and John Davis, Ph.D, 1982.

This study incorporated six different psychological instruments as measuring rods to establish concurrent validation. The instruments were the MMPI, the Cattell 16PF, the CAQ, Ellis's Personal Belief Inventory, the Cornell Medical Index, and the Auto Lethality Index. This study was completed in two phases over a period of more than a year. The first study had a sample size of 68 adults and compared the Hartman Value Profile with the MMPI, ALI, CMI, and the PBI. The second study had a sample size of 72 adults and compared the Hartman Value Profile to the 16PF and the CAQ.

The results of this two-part study are very comprehensive and can be summarized in the following manner:

Part I: The Hartman Value profile correlated with a high degree of significance (.05> p <.0001) in thirty-six different specific measurements to the MMPI, CMI, ALI, and PBI.

Part II: The Hartman Value Profile correlated with a high degree of significance (<.05 p <.0001) in thirty-two different specific measurements to the 16 PF and CAQ.

Dr. Pomeroy concluded: **"These data clearly establish a concurrent validity for the Hartman Value Profile…and that the Hartman Value Profile is a valid measure of various stress states that produce problems in living."**

CONSTRUCT AND CONCURRENT VALIDATION

This joint construct and concurrent validation study determines both the individual and comparative validity of the instrument. Because the Hartman Value Profile is axiological in nature and therefore has more robust and useful applications than psychological instruments, it is necessary to insure its axiological validity by validating it against benchmark axiological instruments.

This study was conducted by Drs. John Austin and Barbara Garwood, 1976.

This study incorporated three different values instruments as measuring rods to establish concurrent validation. The instruments were the Rokeach Value Survey (RVS), the Allport-Lindzey Study of Values (AVL), and Kohlberg's Theory of Moral Development (KMD). The population was comprised of 65 university students with an average age of 23.5 years.

The results were obtained by using the nonparametric Median test of the significance of differences between the number of persons in two more subgroups that scored above and below the median. The study indicated that the expected and obtained mean rankings was significant with a correlation of .95. For the compositional vs. transpositional items the confidence is highly significant with a p<.001. The individual items test indicated that no significant difference existed among the individual items (p=.911).

The findings of this study prove that the Hartman Value Profile measures what it claims to measure and that it is a valid axiological instrument.

Drs. Austin and Garwood presented this study and these findings at the National Association of School Psychologist Convention, March, 1977.

Business Necessity

The E.E.O.C. requires that any instrument used in candidate selection must be able to prove "business necessity":

That it measures those traits and/or abilities that directly relate to what is needed to do the particular job.

When an instrument has either predictive validity or criterion validity it fulfills the business necessity requirement.

PREDICTIVE VALIDITY

Predictive validity is a measure of an instrument's precision and usefulness in being able to predict whether given individuals will be successful, prior to the person's working in that position or acting in that specific role. It follows the process of predicting a person's future success in a particular job or position based on his/her test scores. This validation provides a foundation for using an instrument as both a candidate screen and a guide for training and managing employees in specific roles.

CRITERION VALIDITY

Criterion validity is a measure of the ability of an instrument to correspond to specific criteria or behaviors. This type of validation compares groups and analyzes the differences measured between the groups. When the analysis is statistically significant, then that instrument is a valid tool for distinguishing the characteristics that separate the members of those two groups.

This study was conducted by Dr. Robert K. Smith, and Virginia G. Harvey, Ph.D., 1996.

The study sample was 78 individuals seeking employment to manage independently operated retail outlets. Of the 78 candidates, 51 were hired and placed into management positions. While none of the 78 was excluded based on the results, all of the candidates' were categorized according to risk as a manager: low, medium and high.

At the end of the three-year study, the managers were defined to have been successful if they had successfully started and operated their own stores. Failure was defined as having not run their own stores profitably, having been fired for just causes, or having quit for any reason.

Risk Score	Number Hired	% Successful
LOW	20	90
MODERATE	26	65
HIGH	5	0

The results prove that "the overall risk scores determined by the Hartman Value Profile were found to be *highly predictive* of successful employment, at the $p < .0035$ level."

The Hartman Value Profile is a valid and very useful instrument for establishing predictive indicators of success in business applications. This predictive validation proves that the Hartman Value Profile fulfills the EEOC requirement of business necessity.

Customer Service

For the following customer service study all of the members of samples groups were employed as customer service personnel. They were distinguished as those who were successful from those who were not successful in customer service. The objective criterion for distinguishing these people were letters of commendation from satisfied customers and management's recognition of the person's success in this role.

Sales

For the sales study, the sample was divided into three groups, non-sales persons, moderately successful sales persons, and very successful sales persons. The objective criterion to separate the sales groups was commissions earned for the three previous years.

Management

The first management study compared managers who had succeeded with managers who had failed in the Sara Lee Corporation outlet stores. The second and third management studies compared those who had advanced into management positions with those who had not advanced into management positions.

Customer Service Criterion Validity

This study was conducted by Dr. Robert K. Smith and Virginia Harvey, Ph.D. and commissioned by James River Corporation, 1990.

A study sample of 41 customer service personnel working for James River Corporation. The criterion used to distinguish one group from the other was success in the customer service role. The sample was divided into two groups: those who had been both commended for their service by customers and had been recognized by their colleagues within the company for their exemplary customer service, and those who had neither been commended by their customers nor their colleagues.

The marketplace distinguishes consistently good performers from mediocre and bad performers. This study measured the differences between those two groups as they functioned in customer service roles. General observations would lead one to conclude that those who are exemplary are better able to find practical solutions, communicate with others, instill confidence in their ability to perform, and be able to be persistent without being stubbornly insistent. To confirm the validity of the Hartman Value Profile, these abilities would have to be distinguished by statistically significant differences in the dimensional scores of measuring common sense, personal competence, and personal duty (E1, E2, and S2).

The results confirmed that those who were exemplary in customer service had greater abilities in all dimensions measured by the Hartman Value Profile and statistically higher abilities to reason in the three dimensional areas noted above (noted by * in the following chart).

	% Higher of Excellent	p value
Empathy	17%	.19
Common sense	21%	.02*
Logical solutions	15%	.18
Self esteem	13%	.26
Personal competence	30%	.05*
Personal duty	17%	.07*

This study proves that the Hartman Value Profile scores correlate directly to behaviors, abilities, and attitudes that are required for excellence in customer service.

Sales Criterion Validity

This study was conducted by Value, Inc. (Wayne Carpenter and Edward Martin) and Tim Garton & Associates, 1987.

The study sample was 237 persons with 137 being sales persons from the insurance and estate planning industry. The criteria for distinguishing these persons into three groups was:

100 non-sales persons randomly selected from a database of more than 5,000 general employment candidates.

87 sales persons earning commissions between $50-100K/yr. For a 3-year period: labeled moderately successful.

50 sales persons earning commissions between $100-500K/yr. For a 3-year period: labeled successful salespersons.

The methodology of analysis was the variance test resulting in an F ratio because of the three sample populations. Decision rules on interpreting the F ratio were values of 2.00 and above for a .05 level significance and 4.00 and above for a .01 level significance. For variables not deemed significant in the ANOVA test, the Kruskal-Wallis test was applied.

The hypothesis was that those who were successful would have a statistically higher "ego-drive," "empathy," and abilities in six other dimensional areas that the Hartman Value Profile measures.

Area Measured	Statistical Significance
Intuitive Insight (DimI1)	$p < .01$
Common Sense (DimE1)	$p < .01$
Realistic Goal Setting (DimS1)	$p < .01$
Self Esteem (DimI2)	$p < .01$
Self Confidence (DimE2)	$p < .01$
Self Control (DimS2)	$p < .01$
"Ego-drive" (I2/E2/S2 Val & Dims)	$p < .01$
"Empathy" (I1Dim & Valence)	$p < .01$

This study confirmed that the Hartman Value Profile does distinguish behaviors necessary for excellence in sales.

Management Criterion Validity

This study was conducted by Dr. Robert K. Smith in conjunction with the Sara Lee Corporation, 1990-92.

A sample of 150 managers of Sara Lee outlet stores was given the Hartman Value Profile in the Fall of 1990. All participants had been identified as qualified for management and had been managers of their respective stores for fewer than two years. They were given the Hartman Value Profile as part of their ongoing management training and education.

Two years later, in the Fall of 1992, the head of this division of Sara Lee divided the list of names from the three groups (excellent, good, and failures). The criteria he used to distinguish the excellent managers from the good managers were" operations, sales, turnover, and ability to function within budget. At that time, Sara Lee had an annual management assessment program (completed by peers, subordinates and corporate management) which scored all managers on a numeric scale. These scores provided further distinctions by which the excellent manager (28) were distinguished from the good managers (79). Managers who were identified to be failures (43) had been removed or had quit from their positions prior to the Fall of 1992. They had failed for various reasons ranging from an inability to effectively lead and manage people, an inability to effectively and efficiently oversee operations, and an inability to plan and effectively execute those plans.

The results of this study are bases on the differences between the excellent managers and failures. In this particular case, the unusual feature is that all participants (the excellent, good and failures) had been selected by management in 1990 as capable store managers. The profile scores that were compared are those from the testing completed prior to fall, 1990.

The final conclusions were reached by comparing the dimensional scores of the two groups. Previous management studies had shown that different personality types are able to function effectively in management roles. This was confirmed by this study, as well, in that the differences between the two groups were not those that manifest personality characteristics as much as they were those that manifest differences in functionality:

>A better ability to work with and be patient with people
>>(Excellent were 18% more empathic with a
>>valence of I1 of 54% positive vs. 54% negative),

>a greater tendency to work with others than do it herself
>>(Excellent were 53% more inclined to delegate
>>with a E1 valence of 28% vs. 43% positive),

a greater tendency to be proactive rather than reactive
        (Excellent were 17% more planning oriented
        with S2 Dim of 11 vs. 13),

greater personal courage (resulting in less defensiveness)
        (Excellent had 42% healthier self-esteems with
        and I2 Valence of 25% vs. 16% positive),

and greater resiliency when under stress
        (Excellent were 50% better able to function in
        stressful situations with BQRs of 1.1 vs. 1.65).

All of the differences noted above are statistically significant with a $p<.05$.

This study confirms that the Hartman Value Profile scores correlate directly to behaviors, abilities, and attitudes that are confirmed by the marketplace as crucial distinctions between those who succeed in managing a retail store from those who do not.

Management Criterion Validity (Study B)

This study was conducted by Dr. Robert K. Smith, 1993.

A sample of 257 managers from eight different companies was given the Hartman Value Profile between 1988 and 1993. All participants were in management positions when they took the profile. They were given the Hartman Value Profile as part of their ongoing management development.

The sample was divided into three groups: excellent managers, good managers, and poor managers. The criteria used to distinguish the excellent managers from the good managers were: superlative operations in their respective fields, effectiveness with their people, lack of turnover, and ability to function within a budget. All were also assessed by their peers, subordinates and superiors who identified them as excellent (70), good (100), or poor (87). In order for a manger to be identified as poor, s/he had to have ongoing unresolved problems, glaring ineffectiveness with her direct reports, or failures within business contexts in which others were succeeding.

The results of this study are based on the differences between the excellent and poor managers. The final conclusions were reached by comparing the dimensional scores of these two groups. Previous management studies had shown that different personality types are able to function effectively in management roles. This was confirmed by this study, as well, in that the differences between the two groups were not those that manifest personality characteristics as much as they were those that manifest functional capability. The poor managers did not score higher than the excellent managers in any dimension. The excellent managers were statistically superior to the poor managers in the following dimensions:

> A better ability to work with and be patient with people
> > (Excellent were 26% more empathic with a
> > I1 valence of 59% vs. 43% positive),

> A greater tendency to work with others than do it herself
> > (Excellent were 25% more inclined to delegate
> > with an E1 valence of 32% vs. 44% positive),

> greater personal courage (resulting in less defensiveness)
> > (Excellent had 13% healthier self-esteems
> > with I2 Dim of 11 vs. 13),

> and a greater degree of reasonability when confronted
> > (Excellent were 18% more reasonable and less
> > stubborn than the poor managers were with an
> > S2 dim and 12 vs. 14).

All of the differences noted above are statistically significant with a p<.05.

This study confirms that the Hartman Value Profile scores correlate directly to behaviors, abilities, and attitudes that are confirmed by businesses as critical distinctions between those who succeed in management from those who do not.

Management Criterion Validity (Study C)

This study was conducted by Kinsel Enterprises, Inc. (Dr. Robert K. Smith and Ken Bandy), 1996.

120 women in business were given the Hartman Value Profile from 1987 to 1991 as part of their ongoing training and development. They came from more than 20 different companies in 6 different states. Their ages ranged from mid-twenties to mid-fifties.

The sample was divided into two groups, those who were executive, currently serving in management roles in their companies (20), and those who were not in management roles (100).

The results of this study are based on the differences between the managers and non-managers. The final conclusions were reached by comparing the dimensional scores of the two groups. This study confirmed that the differences between the two groups were dramatic and significant in five areas. The non-manager group did not score higher than the managers in any category.

A greater ability to make decisions and use common sense
(Managers were 23% clearer in their decision making and common sense judgment with a Dim E1 of 7.25 vs. 8.9)

Greater personal courage (resulting in less defensiveness)
(Managers had 20% healthier self-esteems with an I2 Valence of 22% vs. 19% and Dim of 10.1 vs. 12.5),

A greater ability to make accurate self-assessments of their own strengths, limitations, and competencies.
(Managers were 12.5% clearer and more accurate in assessing their own abilities and roles with a Dim E2 of 12.75 vs. 14.25),

And a greater degree of personal freedom to make mistakes, risk loss, and shift one's own priorities.
(Managers were 13% more reasonable and less dogmatic than the non-managers were with a Dim S2 of 11.5 vs. 13.8)

All of the differences noted above are statistically significant with a p<.05

This study proves that the Hartman Value Profile scores correlate directly to behaviors, abilities, and attitudes that are confirmed by the marketplace as the significant distinctions between women who are not promoted into management positions and those who are not promoted.

Criminal vs. Non-Criminal Study

This criminal vs. non-criminal validation compares convicted criminals with the normal population and analyzes the differences between these two groups. When the analysis is statistically significant, then that instrument is a valid tool for distinguishing the characteristics that separate criminals from non-criminals.

For this study we assume that the judicial system of the State of Tennessee is a sound criteria selector in distinguishing violent criminals from the rest of the population. Criminals in general are people whose behavior stems from their inability to call upon strengths to overcome their weaknesses. Non-criminals are people who can and do rely on their strengths to overcome or to "hold in check" their weaknesses. To establish the validity of the Hartman Value Profile, an analysis of the profiles of the criminals and non-criminals should present a significant difference in their capacities to reason and function effectively in stressful situations.

This study was conducted by Drs. Mark Moore and Phil King, 1994.

The study included 44 convicted criminals serving their sentences at Brushy Mountain State Prison, the maximum-security state prison for the State of Tennessee. These criminals took the Hartman Value Profile while serving time for murder or violent rape. The normal population profiles were gathered from Dr. Moore's database of more than 500 functioning people, from all walks of life, throughout the United States. The null hypothesis was that no significant difference would exist between convicted criminals and the general population.

A summary of the results for the six key measures of the Hartman Value Profile (using Dr. Hartman's transfinite scoring methods [the lower the number the greater capacity and ability to reason and function effectively in stressful situations]):

Capacities to	Criminal	Non-Criminal
Empathize (I1)	11.85	8.42
Reason Practically (E1)	14.76	9.08
Reason Logically (S1)	17.43	13.63
Value One's Self (I2)	18.26	11.45
Compare One's Self (E2)	19.02	14.30
Define One's Self (S2)	17.80	13.49

A summary of the results for the same six key measures of the Hartman Value Profile using Dr. Moore's vector analysis scoring method are (the higher the number the greater the capacity and ability to reason and function effectively in stressful situations):

Capacities to	Criminal	Non-Criminal
Empathize (I1)	4.86	7.44
Reason Practically (E1)	2.68	6.94
Reason Logically (S1)	0.67	3.53
Value One's Self (I2)	0.05	5.16
Compare One's Self (E2)	-0.52	3.03
Define One's Self (S2)	0.40	3.63

For both scoring methods, the differences are statistically significant with a $p <$ .05.

This study is significant in that it establishes a high statistical difference between people who are able to be effective in society from those who are unable to do so. It provides an objective, resultant-behavioral criterion against which the scores are compared. In as much as few people will ever have cause to encounter or profile murderers or violent rapists, this study does confirm that the Hartman Value Profile accurately measures a person's capacity to value by assessing people at the severely dysfunctional end of the behavioral spectrum.

CONCLUSION

The theory behind the Hartman Value Profile is subject to scrutiny and testing as are all other scientific theories. Based on observations about the nature of our world, the scientist posits principles that define and categorize those observed behaviors or characteristics. Then a mathematical system with the same properties is associated to that system. That mathematical system is then able to model that world, without the scientist actually entering that world. This is why engineers on earth can design a ladder that will work on the moon. This establishing a theory and finding a mathematical system that has an isomorphic relationship to that theory is what Dr. Robert S. Hartman did from 1945 through 1973 in his discovery of formal axiology. One practical result of that work was the Hartman Value Profile. Dr. Hartman was nominated for the Nobel Peace Prize in 1973 because of the conclusions he reached using formal axiology.

Once a scientific theory is defined, the proofs of the theory are based on its consistency and ability to be applied to all relevant aspects and its consistency with previously proven tenants. This is why a physicist does not have to fly a plane or observe planes to be able to design one that flies. He mathematically models the flights of a large airplane by using previously proven formula of flight to model the new plane. He then proves his design (and thus the theories, as well) by having the actual plane fly.

The cornerstone axiological instrument is the Hartman Value Profile. The formulation of the Profile came from its consistency with previously established tenants. This was demonstrated by the middle three studies in this compendium. The proof comes in the validity and reliability of axiological instruments to real life, which was demonstrated by the final eight studies. **These studies, spanning 15 years, being competed by 19 individuals, validate the tenants of formal axiology and prove that the Hartman Value Profile is reliable, is valid, complies with the EEOC requirements, and is useful in multiple applications for industry and social sciences.**

Behaviors

Validation Study

Behaviors TECHNICAL REPORT

Introduction

Target Training International, Ltd. was founded in 1984 by Bill J. Bonnstetter and his son, Dave Bonnstetter. TTI is the worldwide leader in the assessment industry. With extensive research, the Bonnstetters continue to enhance, develop and validate assessment-based solutions that drive results.

Bill has been doing research on what makes normal people unique since 1979. His brother, Dr. Ron Bonnstetter, professor emeritus University of Nebraska Lincoln, has recently joined TTI to expand its research endeavors. TTI's research has discovered the importance of identifying the HOW and WHY of people as they relate to performance.

To better understand what people bring to the workplace, take a look at TTI's Dimensions of Superior Performance™.

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★ TTI MEASURES:
- Behavior
- World View
- Personal Skills (Competencies)
- Motivators
- Emotional Intelligence

▲ TTI ACKNOWLEDGES:
- Experiences
- Education & Training
- Intelligence

Executive Summary

The following pages will provide detailed information on TTI's Style Insights® assessment, its validity and how TTI is free of adverse impact. **Below is an executive summary of these findings.**

Validity

REVISED SCALE RELIABILITY

Scale reliabilities were calculated using Cronbach's alpha (α). Cronbach's α is considered the most appropriate statistical test for calculating reliability. The statistic models internal consistency, based on the average inter-item correlation. These evaluations are a more rigorous approach than a traditional split-half statistic. Cronbach's α is a statistic bounded by 0 to 1. In general an α equal to or greater than .6 is considered a minimum acceptable level, although some authorities argue for a stronger standard of at least .7.

The following table compares reliabilities using Cronbach's α. These findings document the Style Insights 2011.i as an instrument with solid scale construction and reliability. This revalidation is based on the new method of responding to the questionnaire by ranking 1, 2, 3, 4 rather than choosing "most" or "least".

Cronbach's Alpha (α) – Scale Reliabilities: N=16,950								
	Adaptive D	Natural D	Adaptive I	Natural I	Adaptive S	Natural S	Adaptive C	Natural C
SI.2011.i	.885	.884	.850	.845	.856	.834	.826	.826

Adverse Impact

Overall, TTI assessments are not pass/fail assessments. While on the surface some of the assessments appear to have ten as the best "score", this is not the case. Each factor of measurement can be a strength on either end of the scale (a zero all the way to a ten). This is because of our job-related process. TTI does not recommend using assessments in hiring unless you have completed our job benchmarking process.

The job benchmarking process is designed to provide clarity as to each position as requirements: key accountabilities, skills, behaviors and motivators. While TTI has over 10,000 job benchmarks available, it is recommended to complete the process within each organization for each position.

Because the TTI assessments are not pass/fail, the "80 percent" rule has to be applied differently. In order to illustrate TTI's compliance with this standard, we look at the mean of the measured factors for the general population as well as male/female, veteran status, disability status and ethnicity. The Adverse Impact section of this report will demonstrate that the TTI assessments do not have more than a 20 percent difference in how protected groups score versus the general population.

History

The DISC language is based on observable behavior. **The objective of this section is to show that long, long ago people were watching people and noting observable behavioral differences.** Throughout history, scientists and researchers have observed basic behavioral similarities, and now these have been validated by companies such as Target Training International, Ltd. Instruments have been developed to assist people in maximizing their personal potential and the potential of their human resources. The lineage of the DISC language, although not then called DISC, takes us all the way back to Empedocles in 444 B.C.

RESEARCHERS

EMPEDOCLES 444 B.C. Empedocles was the founder of the school of medicine in Sicily. He stated that everything was made up of four "roots" or elements. These were: earth, air, fire and water. These four elements, he stated, can be combined in an infinite number of ways, just as painters can create a great many pigments with only four different colors.

HIPPOCRATES 400 B.C. Hippocrates was an observer of people. He noticed the effect of the climate and the terrain on the individual. Defining four types of climates, he categorized behavior and appearance for each climate, even suggesting which people would conquer others in battle, based on the environmental conditions in which they were raised. Hippocrates believed the climate and terrain affected behavior and appearance.

1. CLIMATE & TERRAIN: Mountainous country. Rugged. Elevated and well watered. Changes of season are very great.
   PEOPLE: Savage and ferocious in nature. Many shapes. Warlike disposition.

2. CLIMATE & TERRAIN: Low-lying places. Meadows. Uses warm waters. More hot winds than cold, ill-ventilated. Seasons are fine.
   PEOPLE: Not of large stature. Not well proportioned. Broad and fleshy. Black-haired. Not courageous. Less phlegmatic and more bilious. Emotional. Not given to much labor. Short fused.

3. CLIMATE & TERRAIN: High country. Level. Well watered. Windy.
   PEOPLE: Of large stature. Like one another. Gentle and unmanly.

4. CLIMATE & TERRAIN: Thin, bare soils, ill-watered. Great changes of seasons. Not fenced. Blasted by the winter and scorched by the sun.
   PEOPLE: Hard. Well-braced. Blonde. Haughty and self-willed.

According to Hippocrates, a seldom-changing climate brings forth indolence whereas a climate with great changes causes the mind to labor, causing for courage. Frequent excitement of the mind induces "wildness, extinguishing sociableness and mildness of disposition." Current research validates Hippocrates' thinking, in the sense that environment can cause change in behavior.

- **SANGUINE**   - **MELANCHOLIC**

- **CHOLERIC**   - **PHLEGMATIC**

Hippocrates pursued his thinking further. After identifying four types of climate and terrain and their effect on behavior, he identified four temperaments (sanguine, melancholic, choleric, phlegmatic) and associated them with four bodily fluids (blood, black bile, bile, mucous). He then made this statement, "I think the inhabitants of Europe to be more courageous than those of Asia." In the history of conflict throughout the world, does history prove him to be correct?

GALEN 130 A.D. - 200 A.D. Galen, of Rome, spoke of four body fluids and their effect on behavior and temperament. They were: blood, yellow bile, black bile and phlegm. He also stated that our bodies act upon and are acted upon by warm, cold, dry and moist.

Carl G. JUNG 1921. In 1921, Jung published *Psychological Types* in Germany. He identified and described four "types". These four types are primarily oriented by the four psychological functions: thinking, feeling, sensation and intuition. These four are further divided into two divisions that Jung called "libido" or "energy." These two divisions are "extroverted" and "introverted." Jung believed the extroverted and introverted types were categories over and above the other four functions.

WILLIAM MOULTON MARSTON 1893-1947. The major developer of the DISC language is Dr. William Moulton Marston. Born in Cliftondale, Massachusetts, in 1893, Dr. Marston was educated at Harvard University. He received three degrees from that institution, an A.B. in 1915, and LL.B in 1918 and a Ph.D. in 1921.

Most of Dr. Marston's adult life was spent as a teaching and consulting psychologist. Some of his assignments included lecturing at The American University, Tufts, Columbia and New York University. A prolific writer, Dr. Marston was a contributor to the *American Journal of Psychology*, the *Encyclopedia Britannica*, and the *Encyclopedia of Psychology* all while authoring and/or co-authoring five books.

Marston's most well-known contribution was his success in lie detection. His work was done at Harvard University, and in 1938 his book, The Lie Detector, was published. Lie detectors, including Dr. Marston's, have been used by law enforcement and crime detection officials in various countries for many years. **Here are some facts that you will find interesting:**

• Marston is acknowledged by most as the inventor of the lie detector.

• He invented (1915) the systolic blood pressure test for deception (first published in 1917).

• He interviewed 4200 criminals in Texas penitentiaries and found only three of them who believed themselves to be dishonest.

• A committee of prominent psychologists gave Marston's deception test a 97 percent reliability rating.

• Marston stated that when the lie detector has convinced a criminal (consciously or subconsciously) that he can no longer lie, it becomes easy to break down that criminal's habits of lying and build up, instead, mental habits of telling the truth.

• Marston stated the ultimate use of the lie detector was not for crime detection but for crime elimination by changing criminals into honest individuals.

• Marston worked on the Carl Jung Reaction Time Test and proved it was not reliable for determining deception. This proves that Marston was well aware of Carl Jung's work that is the foundation of the Myers-Briggs test. So the question remains, why Marston never mentioned Carl Jung's work in his book *Emotions of Normal People*?

• Marston said, "Only the truth can bring about a real emotional adjustment."

• The lie detector test offers a new tool to consulting psychologists in making personality adjustments.

• Marston wrote articles on how to apply the lie detector test to marital, social and personality adjustments.

Marston was ahead of the times and his book *Emotions of Normal People* must have been written for professional psychologists, as his other writings are easy to read and understand. Perhaps he had so much knowledge that his profession was not ready for his ideas.

Every day TTI Value Added Associates are touching the lives of people in a way that was only a dream for Marston in 1915.

Marston continued his career as a consulting psychologist; but using the pen name of Charles Moulton, he spent most of his time during the last five years of his life as the originator, writer and producer of Wonder Woman. First published in book form, this endeavor turned out to be a most successful and enduring comic strip. After having been stricken with polio in 1944, Dr. Marston was partially paralyzed until his death at age 53 in 1947.

In 1928 he published *Emotions of Normal People* in which he described the theory we use today. **He viewed people as behaving along two axes with their actions tending to be active or passive depending upon the individual's perception of the environment as either antagonistic or favorable.**

Dr. Marston believed that people tend to learn a self-concept, which is basically in accord with one of the four factors. It is possible, therefore, using Marston's theory, to apply the powers of scientific observation to behavior and to be objective and descriptive rather than subjective and judgmental.

Marston did not invent the DISC behavioral measurement system, nor did he foresee the potential applications of his work. In the last 100 years since Marston published his research findings and observations, behavioral research has modified his ideas considerably. To the modern scientist, much of Marston's work may seem stilted and antiquated. Yet, the importance of his contribution in dividing human behavior into four distinct categories and using measurements of the strength of these responses as a means to predict human behavior remains undiminished.

By placing these axes at right angles, four quadrants were formed with each circumscribing a behavioral pattern.

1. **Dominance (D)** – Produces activity in an antagonistic environment.

2. **Influence (I)** – Produces activity in a favorable environment.

3. **Steadiness (S)** – Produces passivity in a favorable environment.

4. **Compliance (C)** – Produces passivity in an antagonistic environment.

Despite the contributions made to the field of behavioral research since Marston, the modern categories of DISC (Dominance, Influence, Steadiness and Compliance) owe much to his research. Thus it is helpful in understanding the working of the DISC system to keep Marston's categories and their original meaning in mind. The premise of the modern day DISC system is that all people demonstrate some behavior in each dimension. **The four dimensions used as the basis for the Style Insights instrument (and its various forms and applications) fall into the following categories:**

DOMINANCE – CHALLENGE
How you approach and respond to problems and challenges and exercise power.

INFLUENCE – CONTACTS
How you interact with and attempt to influence others to your point of view.

STEADINESS – CONSISTENCY
How you respond to change, variation and pace of your environment.

COMPLIANCE – CONSTRAINTS
How you respond to rules and procedures set by others and to authority.

The DISC measurement system analyzes all of these factors and reveals one's strengths and weaknesses, one's actual behavior, and tendencies toward certain behavior. Behavioral research suggests that the most effective people are those who understand themselves and others. The more one understands his or her personal strengths and weaknesses coupled with the ability to identify and understand the strengths and weaknesses of others, the better one will be able to develop strategies to meet the demands of the environment. The result will be success on the job, at home or in society at large.

WALTER CLARKE 1950s. Walter Clarke was the first person to build a psychological device based on the Marston theory. His instrument is called the "Activity Vector Analysis." Some of Clarke's original associates subsequently left his company, further refining the format as they created their own "adjective check-list forms."

The following individuals and companies have contributed to the DISC model:

1960s

- J.P. Cleaver

- Leo McManus

1970s

- Bill J. Bonnstetter

- John Geier

1980s

- Michael O'Conner

- Judy Suiter

- Target Training International, Ltd.

1990s

- Dr. David Warburton

WHY STUDY BEHAVIORS?

GAINING COMMITMENT AND COOPERATION. People tend to trust and work well with those people who seem like themselves. **The most effective way to gain the commitment and cooperation of others is to "get into their world" and "blend" with their behavioral style.** Observe a person's body language, "how" they act and interact with others. Notice clues in their work or living area. By applying the DISC language, you will immediately be able to adapt to their style.

BUILDING EFFECTIVE TEAMS. People tend to be too hard on each other, continually judging behavior; therefore, team development tends to be slowed or halted due to people problems. An awareness of behavioral differences has an immediate impact on communication, conflict resolution and motivation for the team. Investment always precedes return. Investment in training the team on the DISC language gets an immediate return in team development. **According to specialists in team development, most teams never make it to high performance without training in a behavioral model and commitment to using it from the top management down.**

RESOLVING AND PREVENTING CONFLICT. Understanding style similarities and differences will be the first step in resolving and preventing conflict. By meeting the person's behavioral needs, you will be able to diffuse many problems before they even happen. People prefer to be managed a certain way. Some like structure and some don't. Some like to work with people and some prefer to work alone. "Shot in the dark" management does not work in the 21st century. **The DISC language, combined with TTI Success Insights® Reports, will teach you more about a person in 10 minutes than you can learn in a year without DISC.**

GAINING ENDORSEMENT. Other words for endorsement are "credibility" or "influence". Every interaction you have with a person either increases or decreases your endorsement. Have you ever met a person who won't stop talking and relates his whole life story to you? When you see that person coming, do you dread the interaction? If so, it is because their behavior has caused them to lose endorsement with you and, therefore, that person does not get the benefit of your time. Conversely, a person who you can't wait to see daily has gained your endorsement and therefore, is deserving of your time. **The DISC language allows you to "stack the deck" in your favor.** By knowing a person's behavioral style, you can immediately adapt to their style and gain endorsement.

THE IMPORTANCE OF ENDORSEMENT. Through emails, texting, Internet surfing, reading and other media, our brains are being bombarded with increasing quantities of information. Overwhelmed by this scale, scope, and complexity of information, the masses depend on others for advice and support. As a result, more and more personal decisions are being made based on the perception and credibility of individuals, organizations, and countries. **In other words, most individuals rely on the words and actions of other people, organizations, and countries for help in making their decisions.** To stand above all others, leaders must have endorsement. To gain endorsement, you must understand the DISC language.

WHAT IS ENDORSEMENT? Endorsement is "the approval, backing, or support of a person or thing by means of the pledging of one's own assets." Assets individuals can pledge can include their contacts, money, reputation, time and energy.

- If an individual has endorsement, they will always be provided the resources necessary to maintain or improve their own lifestyle.

- If an organization has endorsement, it will always be provided the resources necessary to maintain or improve its own growth.

- If a nation has endorsement, it will always be provided the resources necessary to maintain or improve its standard of living.

Gaining endorsement takes time. It starts with understanding the DISC language. **DISC is a prerequisite for learning who you are and, more importantly, how others see you.** Being seen as credible starts with using the DISC language. It is essential for your success.

Validity

STYLE INSIGHTS® DISC INSTRUMENT VALIDATION

Since 1984, TTI has always used outside, independent statisticians to validate all their questionnaires. Revalidation takes place every few years and the following study was completed in 2011. The intent is to provide a verifiable pattern of evidence that establishes the Style Insights instrument as a sound, reliable, valid, and usable instrument for a variety of purposes in personal and organizational development and for organizational and corporate use in a number of venues.

The research and statistics have been written and conducted to the specifications published in Standards for Educational and Psychological Testing (1999) cooperatively by the American Educational Research Association, American Psychological Association and the National Council on Measurement in Education. The guidelines provide the standards against which many US-based and international assessments are designed and validated. It is the purpose to respect those specifications and to encourage the reader to explore the standards in more detail. The reader is also encouraged to ask active questions about other assessments in the marketplace and to discover the extent to which those assessments followed similar guidelines to the Style Insights instrument and reports.

MEASUREMENT OF ONE'S "STYLE"—A BRIEF HISTORY

The Style Insights instrument is generically loaded into a category of assessments sometimes called "personality tests." TTI prefers the use of the term "style" instead of "personality" for a variety of reasons. First, the term "personality" is a very complex and global term indicating a wide bandwidth of behavior and applications of the entire individual. Second, the term "style" as originally suggested by Fritz Perls, relates more to the specifics of how someone does something, and is therefore more applicable to the purposes and goals of the Style Insights instrument and reports.

Historically, there are a variety of ways by which one's "personality" and "style" have been measured. Early work by Kraepelin (1892) with the free association test involved the subject being given a list of stimulus words to which the subject was asked to provide the first word that came to mind. The free association methodology has been used for a variety of assessment purposes and it remains in use today.

Some criticism of the method remains with issues of scoring, inter-rater reliability, and malingering by the subject.

In answer to the critical issues of scoring and inter-rater reliability came the self- report inventory. A very early form of this assessment technique was developed by Woodworth during World War I (DuBois, 1970; Goldberg, 1971; Symonds, 1931). The original purpose was that of a screening test for identifying those unfit for military service. The war ended before the model was deployed; however, civilian forms were developed for both adults and children. The Woodworth Personal Data Sheet served as a prototype and early model for many inventories to follow. Some designs explored specific areas such as vocational adjustment, school adjustment, home, etc. Other assessments explored interpersonal responses in social settings, and later came assessments focused on interests and attitudes. It is in the self-report genre that the Style Insights® instrument and reports are based.

The "performance" or situational test is another commonly used assessment method. With this model, the subject is asked to perform a task and is measured based on their performance. The specific purpose for some of these tests is concealed from the subject. An early application of this model was developed by Hartshorne and May, et al., (1928, 1929, 1930) and standardized on schoolchildren. Situational tests for adults were developed during World War II by the Assessment Program of the Office of Strategic Services. These tests were high in complexity for the time, and needed some detailed staging and skilled administration. Even so, issues of inter-rater reliability and interpretation of responses were rather subjective.

Another methodology is that of the projective test design. In this method, the subject is presented with an ambiguous or open-ended task or description to provide of a stimulus card or process. Again, the purposes of these tests are somewhat disguised from the subject to reduce the potential of the subject creating a preferred response, or malingering. As with free association and some situational tests, there is room for inter-rater reliability errors and variability in scoring due to the subjective nature of the instrumentation.

The Style Insights instrument and reports use the self-report methodology that eliminates inter-rater reliability issues because of the objective scoring method of the instrument. Using the self-report method, the instrument captures one's own self-perception and records responses. While inter-rater reliability is eliminated, an inherent issue with all self-report instruments is the accuracy of one's responses and the focus of their self-perception. Therefore, the respondent is always encouraged to be honest in their response and clear in their situational focus when they respond.

This methodology has been widely used and adopted in many academic and commercial applications.

CONNECTION OF DISC TO TARGET TRAINING INTERNATIONAL'S PUBLISHED INSTRUMENTS

In 1983-84 TTI acquired a DISC-based instrument under a license agreement. Since that time TTI has invested substantial amounts of attention, energy, and resources into the continued statistical validation of the instrument and the reports. Changes have been made to the newer versions of the instrument to keep pace with current terms and descriptors in use, and to up-date those terms and descriptors that were useful decades ago, but are less valid in the 21st century. TTI is rare among DISC providers in that their statistical validation work features current scores from the 21st century that are based in the language/cultural groups using an instrument. This allows for increased reliability and validity of the report printouts by comparing one's scores against a large, well-defined, contemporary, culturally relevant database.

VALIDITY & RELIABILITY

Reliability based on response processes and internal structure

The issue of instrument reliability is the initial question asked when exploring how "good" an instrument is, or if it is actually useful. The word "reliability" always means "consistency" when applied to instruments and tests. There are several procedures that are commonly used for this routine statistical treatment. Test-retest reliability is the consistency of scores obtained by the same persons when re-tested with the identical instrument. Alternate-form reliability provides the subject with two similar forms of the instrument. Both test-retest and alternate-form reliability documentation should express both the reliability coefficient and the length of time passed between the first and second testing events. Both of these procedures focus on the consistency of measurement. Such consistency and the "learning the test" advantage is a major concern with ability and knowledge measurements. The Style Insights is not subject to an advantage from repeated administration because it asks for self-reports. The instrument's scales are as stable as the individual's perception of situational demands and self-concept is constant.

Split-half reliability involves a single administration of the instrument and uses the technique of "splitting" the instrument in half, e.g., odd and even question items, and determining a correlation between the two sets of scores. This technique reduces some of the concerns of test-retest and alternate-form reliability by eliminating the passage of time between testing events. Kuder-Richardson reliability is also based on a single form and single administration of the instrument and measures the consistency of responses to all items on the test. The Kuder-Richardson formula is actually the mean of all split-half coefficients based on different splittings of the test.

The Spearman-Brown reliability formula is another statistical treatment that provides a reliability coefficient and is frequently used with the split-half procedures.

Spearman-Brown differs by including a method for doubling the number of items on an instrument as a part of its formula. By doubling the number of items on the instrument, reliability usually increases. Some critics of the Spearman-Brown formula say that it may artificially raise the reliability coefficient of a test. Each of the reliability coefficients discussed so far are ones that can be calculated by hand or using a simple calculator.

The alpha coefficient is the expression of an instrument's reliability and ranges from 0 through +1.00. An instrument with a perfect reliability would have an alpha coefficient of +1.00, and no instrument has yielded that score to date. Additionally, there is no standard, agreed-upon "levels" of what makes a good or bad correlation for testing purposes. However, there is general agreement on a minimum standard for alpha equal to .6 or greater, with some experts advocating use of a .7 or higher standard. Obviously, the higher the alpha coefficient the stronger is the coherence of items. Cronbach's alpha (α) (Cronbach, 1951) is considered by many to be the most robust reliability alpha to date (Anastazi, 1976; Reynolds, 1994). "Coefficient α is the maximum likelihood estimate of the reliability coefficient if the parallel model is assumed to be true" (SPSS, p.873). For dichotomous data, "Cronbach's alpha is equivalent to the Kuder-Richardson formula 20 (KR20) coefficient" (SPSS, p.873). Cronbach's alpha is used to determine all of the reliability coefficients used to assess the Style Insights instrument. The reader is encouraged to compare the reliability coefficients presented in this manual to the reliabilities of other instruments, and also to ask how other vendors compute their alpha numbers.

Validity based on context and relationships to other variables

Validity helps answer the question, "Does the instrument measure what it is supposed to measure?" It also asks a deeper quality-related question: "How well does the instrument make these measures?" These questions are obviously more difficult to answer and may leave room for subjectivity. With regard to any questions of validity, the critical issue is the relationship between performance on the instrument and other observable facts about the behavior being studied. When someone says, "The test wasn't fair," the comment is usually directed to the test's validity, not reliability. A more accurate way to state the same expression is, "The test wasn't valid." There are three primary forms of validity: Content, criterion-related, and construct validity.

Content validity examines the instrument's content to determine if it covers the behavioral topic being measured. Simple examination of items in a biology or chemistry test should indicate questions related to the topic or subject being studied.

When used in the development of the DISC themes, it is important that all four descriptor categories are represented in rather equal proportion for selection of D, I, S, or C descriptors. Additionally, it is important to explore social desirability as an element of content validity. If there is an imbalance between words that are socially desirable versus descriptors that are less desirable, then content validity is affected. The Style Insights instrument is screened for content validity and since its initial printing some descriptors have been replaced to boost both the content validity and the reliability of the instrument.

Criterion-related validity refers to the ability of an instrument to predict a participant's behavior in certain future situations. One's scores on an instrument are compared with any variety of external "criterions." In the use of the Style Insights instrument and reports, there are a variety of studies available from TTI Performance Systems that have clearly linked specific scores and patterns of scores to job success in specific, well-defined areas. Criterion-related validity has two forms: concurrent validity and predictive validity. Concurrent validity examines one's scores and compares them to external criterion at the same time as taking the instrument. Predictive validity explores one's instrument scores against criterion after a specified time interval. Both methods provide robust support for the Style Insights instrument and reports.

Construct validity examines the ability of an instrument to measure a theoretical construct or trait. Construct validity is built from a pattern of evidence and multiple measures across a variety of sources. Some constructs explored in behavioral trait analysis include developmental changes of participants responding to the instrument at different ages and stages of their lives or under different response focus points. Correlation with other tests is a form of construct validation.

One very important technique within construct validity activity is a factor analysis. This is a technique that "refines" an instrument by comparing and analyzing the inter-relationships of data. In this process the interrelationships are examined and "distilled" from all initial combinations, to a smaller number of factors or common traits. Through factor analytic work using other instruments, it has been discovered that instruments from some other vendors have specific descriptors that actually factor-load into different categories than the ones in which they are scored on the instrument (Golden, Sawicki, & Franzen, 1990). The Style Insights instrument has been refined through the factor analysis process and has made subtle scoring changes that increase both the overall validity and reliability of the instrument and reports.

REVISED SCALE RELIABILITY

Scale reliabilities were calculated using Cronbach's alpha (α). Cronbach's α is considered the most appropriate statistical test for calculating reliability. The statistic models internal consistency, based on the average inter-item correlation. These evaluations are a more rigorous approach than a traditional split-half statistic. Cronbach's α is a statistic bounded by 0 to 1. In general an α equal to or greater than .6 is considered a minimum acceptable level, although some authorities argue for a stronger standard of at least .7.

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Cronbach's Alpha (α) − Scale Reliabilities: N=16,950								
	Adaptive D	Natural D	Adaptive I	Natural I	Adaptive S	Natural S	Adaptive C	Natural C
SI.2011.i	.885	.884	.850	.845	.856	.834	.826	.826

Adverse Impact:

BEHAVIORS/DISC FINDINGS AS OF FEBRUARY 2012

Random Sample N=17,801

Measurement	Mean	Standard Deviation
Dominance	45.56	16.39
Influence	60.92	15.37
Steadiness	54.74	17.03
Compliance	46.81	15.08

Males N= 10,667

Measurement	Mean	Standard Deviation	Difference from Random Sample
Dominance	48.05	16.60	2.49
Influence	60.08	15.40	-0.84
Steadiness	51.98	17.31	-2.75
Compliance	46.79	15.02	0.61

Females N=7,134

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	41.84	15.34	-3.72	-6.20
Influence	62.16	15.25	1.24	2.08
Steadiness	58.86	15.70	4.12	6.87
Compliance	45.28	15.14	-0.90	-1.51

*The difference from the non-protected group compares the protected subgroup to the non-protected subgroup within the same EEOC category. All data has been rounded to the nearest hundredth.

Behavioral/DISC Findings as of February 2012

Caucasians N=11,988

Measurement	Mean	Standard Deviation	Difference from Random Sample
Dominance	46.51	17.01	0.94
Influence	62.13	15.90	1.21
Steadiness	54.06	17.49	-0.68
Compliance	44.77	15.55	-1.41

African Americans N=1,849

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	43.38	13.46	-2.18	-3.13
Influence	57.74	11.92	-3.18	-4.39
Steadiness	56.57	15.28	1.84	2.52
Compliance	49.29	11.95	3.10	4.51

American Indian or Alaskan Native N=175

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Protected Group
Dominance	42.86	15.19	-2.70	-3.65
Influence	58.35	13.87	-2.57	-3.78
Steadiness	57.98	16.96	3.25	3.93
Compliance	48.30	13.96	2.12	3.53

*The difference from the non-protected group compares the protected subgroup to the non-protected subgroup within the same EEOC category. All data has been rounded to the nearest hundredth.

Behavioral/DISC Findings as of February 2012

Asian N=1,079

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	41.76	14.07	-3.80	-4.75
Influence	55.94	14.15	-4.98	-6.19
Steadiness	57.72	15.13	2.99	3.67
Compliance	52.19	13.28	6.01	7.41

Hispanic or Latino N=1,078

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	44.08	15.05	-1.48	-2.42
Influence	60.15	14.36	-0.76	-1.97
Steadiness	55.23	16.34	0.49	1.18
Compliance	47.74	13.96	1.56	2.96

Two or More Races N=608

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Protected Group
Dominance	45.53	15.87	-0.03	-0.98
Influence	61.66	14.38	0.74	-0.47
Steadiness	53.23	16.70	-1.51	-0.83
Compliance	46.47	14.27	0.28	1.69

*The difference from the non-protected group compares the protected subgroup to the non-protected subgroup within the same EEOC category. All data has been rounded to the nearest hundredth.

Behavioral/DISC Findings as of February 2012

Non-Disabled N=16,575

Measurement	Mean	Standard Deviation	Difference from Random Sample
Dominance	45.62	16.36	0.06
Influence	61.06	15.36	0.14
Steadiness	54.68	17.05	-0.06
Compliance	46.03	15.06	-0.15

Disabled N=228

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	44.25	16.98	-1.31	-1.37
Influence	58.58	13.78	-2.33	-2.48
Steadiness	56.40	17.30	1.67	1.72
Compliance	48.52	14.10	2.34	2.49

*The difference from the non-protected group compares the protected subgroup to the non-protected subgroup within the same EEOC category. All data has been rounded to the nearest hundredth.

Behavioral/DISC Findings as of February 2012

Non-Veteran N=15,517

Measurement	Mean	Standard Deviation	Difference from Random Sample
Dominance	45.37	16.35	-0.19
Influence	61.20	15.38	0.28
Steadiness	54.92	17.04	0.18
Compliance	45.96	15.11	-0.22

Disabled Veteran N=122

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	49.70	16.87	4.14	4.33
Influence	59.82	14.20	-1.10	-1.38
Steadiness	50.67	17.64	-4.07	-4.24
Compliance	46.62	13.10	0.44	0.66

Other Veteran N=895

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	48.80	16.77	3.24	3.43
Influence	59.08	15.24	-1.84	-2.12
Steadiness	51.65	17.30	-3.09	-3.27
Compliance	47.22	14.73	1.04	1.26

Vietnam Veteran N=216

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Dominance	48.79	15.76	3.23	3.42
Influence	58.55	14.36	-2.37	-2.65
Steadiness	51.18	15.30	-3.56	-3.74
Compliance	48.17	14.24	1.99	2.21

*The difference from the non-protected group compares the protected subgroup to the non-protected subgroup within the same EEOC category. All data has been rounded to the nearest hundredth.

About Target Training International, Ltd.

Target Training International, Ltd. is the world's leading developer of research-based, validated assessment and coaching tools that enable organizations to effectively meet their human resources needs. Many Fortune 500 companies are using TTI's products. Its related companies TTI Performance Systems, Ltd. and Success Insights International have put assessments and reports to work in more than 90 countries and in 40 languages. TTI is also a leader in cutting edge research on human behavior, communication and workplace attitudes and performance. TTI develops thought leadership in the realms of entrepreneurism, education and human interaction. For more information go to www.ttiassessments.com.
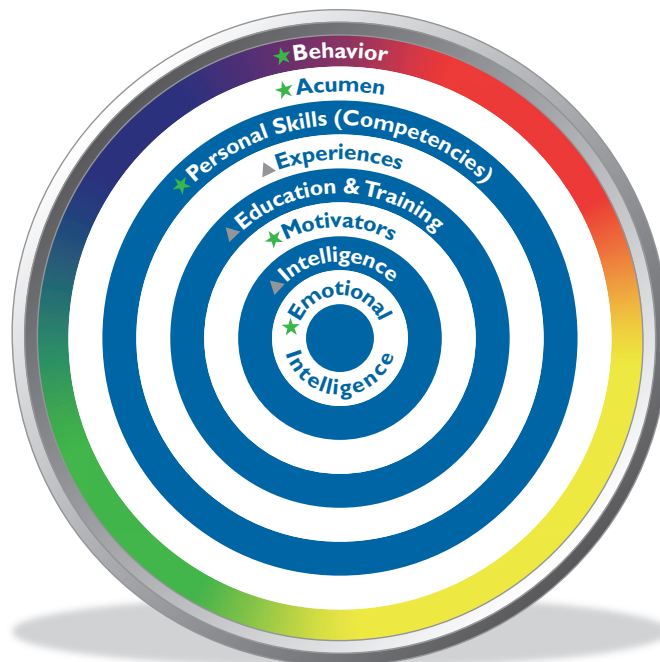
Values

Validation Study

Motivators TECHNICAL REPORT

Introduction

Target Training International, Ltd. was founded in 1984 by Bill J. Bonnstetter and his son, Dave Bonnstetter. TTI is the worldwide leader in the assessment industry. With extensive research, the Bonnstetters continue to enhance, develop and validate assessment-based solutions that drive results.

Bill has been doing research on what makes normal people unique since 1979. His brother, Dr. Ron Bonnstetter, professor emeritus University of Nebraska Lincoln, has recently joined TTI to expand its research endeavors. TTI's research has discovered the importance of identifying the HOW and WHY of people as they relate to performance.

To better understand what people bring to the workplace, take a look at TTI's Dimensions of Superior Performance™.

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★ **TTI MEASURES:**
- Behavior
- World View
- Personal Skills (Competencies)
- Motivators
- Emotional Intelligence

▲ **TTI ACKNOWLEDGES:**
- Experiences
- Education & Training
- Intelligence

Executive Summary

The following pages will provide detailed information on TTI's Motivation Insights® assessment, its validity and how TTI is free of adverse impact. Below is an executive summary of these findings.

Validity

These assessments of the Motivational Insights® instrument utilize 38,314 responses. These responses were collected during 2010, 2011. These data contained responses from 57.8% males and 42.2% female.

Results from these assessments indicate trustworthy reliability for all six scales with Cronbach's α ranging from .7 to .8.

Correlations among the six scales indicate that they are substantially independent as measurements. Scores on the scales are distributed across the scales leading to meaningful comparisons and interpretation.

The Motivation Insights® instrument is a strong, reliable instrument applicable across a variety of populations. The continual quality improvement efforts anchors this instrument in the motivations, attitudes and values of the 21st century.

Cronbach's alpha (α) for the six Motivation Insights® Scales	
N=38,314, F=42.2%, M=57.8%	
Theoretical	0.755
Utilitarian	0.820
Aesthetic	0.822
Social	0.829
Individualistic	0.679
Traditional	0.705

Adverse Impact

Overall TTI assessments are not pass/fail assessments. While on the surface some of the assessments appear to have ten as the best "score" this is not the case. Each factor of measurement can be a strength on either end of the scale (a zero all the way to a ten). This is because of our job-related process. TTI does not recommend using assessments in hiring unless you have completed our job benchmarking process.

The job benchmarking process is designed to provide clarity as to the position requirements, key accountabilities, skills, behaviors and motivators for each position within an organization. While TTI has over 10,000 job benchmarks available, it is recommended to complete the process within each organization for each position.

Because the TTI assessments are not pass/fail, the "80 percent" rule has to be applied differently. In order to illustrate TTI's compliance with this standard, we look at the mean of the measured factors for the general population as well as male/female, veteran status, disability status and ethnicity. The Adverse Impact section of this report will demonstrate that the TTI assessments do not have more than a 20 percent difference in how protected groups score versus the general population.

History

Since the beginning of time, every human has developed motivators. The earliest human motivators were probably focused on surviving or providing primary needs as described by Maslow.

Your brain tells you when you are hungry. However, it takes action or motivation to satisfy this hunger. The motivation may be based on survival rather than on eating to become an Olympic weight lifting champion.

There is not much literature supporting motivators during ancient times. The philosophers of that era laid the background for the whole field of psychology, which is less than 200 years old. So much of the study of motivation is fairly recent, and we really didn't start talking about motivators until Eduard Spranger wrote the book, "Types of Men" in 1928.

Prior to Spranger's work, motivators had not been clearly defined, researched or studied. TTI's motivators are based on Spranger's model. Spranger was an influential writer who defined motivators (values) as a compilation of likes, dislikes, viewpoints, shoulds, inner inclinations, rational and irrational judgments, prejudices and patterns that determine a person's view of the world. Once all these things are merged, they become consciously or subconsciously a standard or criterion for guiding one's actions.

ADDITIONAL RESEARCHERS

In addition to Spranger, there were a number of authors in the early 20th century (primarily from Europe) writing about people. Some of these authors are Robert Hartman, Carl Jung, Sigmund Freud and Gordon Allport.

Target Training International (TTI), under the direction of Bill J. Bonnstetter, has continued to research, validate and improve the use of motivational assessments, reports and training materials. Bill and his son, Dave, founded Target Training International in 1984. Their initial idea was to develop the world's leading computerized behavioral, motivators and personal skills assessments to enhance, develop and validate assessment-based hiring and personnel development.

Relentlessly driven to set the industry standard, Bonnstetter and his team have worked over the last 25 years to continue to research and develop assessments to provide unique solutions for his clients. TTI's groundbreaking work and thought leadership have given way to three U.S. patents.

THE WORK OF SPRANGER

Spranger identified six values or motivators that could be found in the workplace. Today we find these six motivators also influencing personal lives as well. "Types of Men" was originally published in German and remains in use at several universities in Germany as a textbook.

Spranger's original names for the six motivators are:

- THEORETICAL
- ECONOMIC
- AESTHETIC
- SOCIAL
- POLITICAL
- RELIGIOUS

Based on Spranger's model, Gordon Allport developed "Study of Values", the first paper instrument.

Each motivator was compared to another motivator twice. The instrument had 30 plus questions. Bill J. Bonnstetter used this instrument as a part of his consulting business in the early '80s. Soon after Allport's death, it was deemed sexist and obsolete. **Bonnstetter established Target Training International (TTI) and then developed an assessment based on Spranger's model, changing the descriptions to:**

- THEORETICAL
- UTILITARIAN
- AESTHETIC
- SOCIAL
- INDIVIDUALISTIC
- TRADITIONAL

The TTI assessment forces a comparison of each of these motivators to the others 12 times. This new approach made the assessment more solid, based on our research.

Under the direction of Bill and Dave Bonnstetter, TTI was the first in the world to computerize the Spranger model and named it Personal Interests, Attitudes and Values (PIAV). In 2003, the questionnaire was updated to Motivations Insight®.

The title Motivation Insights® was chosen because values are sometimes called the hidden motivators, not to be confused with hidden agendas. Our motivators are visible only through their manifestation in our behavior. Without observable behavior or the ability to ask why someone chose to do something, our values may remain hidden. One's behavioral style, as expressed through the DISC model, describes how someone does what he or she does. One's values explore why someone does what they do. **By understanding both the how and the why of one's behavior and internal motivators, we are able to explore the constellation of an individual's activity, or that of a team of people, with far greater insight than looking at only one of these facets alone.**

Since 1984, TTI, using the Spranger model, has done research on people, which led to the recommendation that the motivators assessment be included during the selection process. Hiring managers should not make selection decisions based solely on the results from a behavioral assessment (DISC).

TTI has partnered with their Value Added Associates to develop case studies using the motivators assessment. Sometimes this research is written for public knowledge but often companies prefer to keep the information private, as it can represent their competitive edge in the marketplace.

WHY STUDY MOTIVATORS?

More and more research verifies that our motivators are part of our mindset, our way of valuing, our filters, our biases and a major influence of our decisions. Understanding "why" we do what we do is one of the major reasons we need to look closely at our motivators. **Only when you see yourself by clearly looking at both sides of the equation—things you like and things you dislike—will you understand your feelings toward other people and situations that expose you to your likes and dislikes.**

Our mindset is influenced by our filters, which affect what we hear and what we understand when we read things that differ with our mindset. For example, if you believe that you are one of the best managers in the world, how would you be impacted with feedback about your abilities as a manager? Would you welcome a need to change? Computerized assessments that provide feedback so people can see the real self is one of the best tools to help people change.

In society, we have value-based issues. Today with all the talk shows in the media, we are put into three possible positions: In favor of, against or indifferent. Once a person takes a position on these value-based issues, they are open to being challenged by others with the opposite

view. Now we are into a discussion of right or wrong. But it's not about right or wrong, it's about beliefs, perceptions, experiences or knowledge points that are stored in those parts of our brain that influences our opinion.

All people are biased because our opinions come from hearing, seeing, or experiencing life. Hearing, seeing or experiencing can lend to forming a belief or perception. These help us develop our motivators.

Validity

The Motivation Insights® model remains consistent with Spranger's original work that contains six values themes. Some models use seven values, others eight values, and still others up to eighteen values. If values are agreed to connect with drives and needs, then a clear range of needs / drives is recorded in the literature. At the low end, Freud (1922) has proposed two, Maslow (1954) suggests five, and Murray (1938) at the higher end, offers twenty-eight. The question emerges: Who is correct? The answer presents: There are no right and wrong theories, simply different theories. Science works by the process of 'negativity'. That doesn't mean that science is negative; it simply means that any theory is held up as a potentially true explanation, until it is disproven through the process of scientific investigation. Therefore, since Freud, Maslow, Murray, and Spranger's theories have not been disproven, each stands as a potential explanation of various facets of human behavior. All science works in this manner, whether social science or physical science.

In reviewing these theories and works, it becomes difficult to merge various theories because of specific constructs within each theory. **After careful review, the decision to remain consistent with Spranger's original model presented several advantages.**

- First, it remains historically accurate, except for some contemporary re-labeling of the names for certain values themes.

- Second, it supports one of the definitive and most widely-used theories presented in the values arena.

- Third, in exploring the broad scope of application of this model, the six values presented herein are ones that are supported in the work environment across a variety of businesses and industries. These environments include: Commercial/industrial, non-profit, religious, education, and governmental organizations.

Therefore, the decision to maintain the integrity of Spranger's theory provided the strongest and most flexible base on which to build this instrument.

The text files for the reports were additionally informed by the work of Allport, Vernon, and Lindzey in A Study of Values (1960), and Allport's work in Pattern and Growth in Personality (1961), as well as the work of Milton Rokeach in The Nature of Human Values (1973). Bill Bonnstetter wrote text files based on the Spranger model since 1984. Dr. Russ Watson worked for over ten years with large and small focus groups from a variety of industries and locations around the country to support individual and group face validity to the text files written for the Workplace Motivators® reports. These focus groups helped to refine and direct the statements in the reports to be as specific to each score-segment as possible. In addition, they helped to fortify the strength of the text files as the instrument was finalized.

INITIAL DEVELOPMENT – THEORETICAL VALIDITY

The process of developing an instrument begins with ideas, concept, existing theory and knowledge. Developers begin by targeting one or more areas of interest. These may come from identification of niches, unmet challenges, or new conceptual thinking. This targeting may result in one or related targets of interest. These initial ideas are then further developed. It is this developmental process that is the foundation of THEORETICAL VALIDITY. As design and implementation continues, developers consult existing research and experts to clarify and refine definition of these target concepts.

The next step is to operationalize these target concepts into measurable scales. Two agendas influence this process. One agenda takes the target concepts and brainstorms what indicators might cluster with the target concept. Parallel to this process is another agenda that examines various psychometric structures for measurement of the target concept.

Development at this stage involves drafting items that might be used in an instrument. Many possibilities are considered, and frequently many more items may be drafted than will be needed in the final instrument. At this stage items may be assessed for their conceptual fit with the target and theoretical concepts. However, final evaluation of "fit" and coherence are questions for statistical analysis of data, not developmental design.

CONSIDERATION OF MEASUREMENT STRUCTURE

The process of establishing a measurement structure starts with consideration of the characteristics of the target concept. Some targets may involve knowledge, where there are correct answers and realms of knowledge. Some targets may involve abilities such as capacity to learn, or problem solve. The Motivation Insights® instrument, as the title implies, focuses on differences in the driving forces held by various individuals. In this application no specific motivation is considered inherently better than another. However, within a specific setting (work/employment role) some motivations may be a more effective or consistent drive than another.

Items to be used in an instrument can be designed to have individual items valued or items ranked relative to each other. The first pattern might involve a Likert scale such as Strongly Agree, Agree, Disagree, Strongly Disagree. This pattern of valuing provides independence among the items, but may result in ties when items end-up equally valued.

An alternative might ask the respondent to value an item of a scale from 1 to 10. This pattern of scaling allows for some inference about relative values, and relative strengths of values since 1 and 10 can be assumed to be a greater value spread than 1 and 3.

Another alternative might ask the respondent to rank based on preferences or on attraction. This is a pattern of forced choice. The scaling focuses on order on a scale, not a quantity.

Once a draft of an instrument is designed it can move on to testing and revision.

CONSTRUCT VALIDATION

Validation begins with field testing. Validation of an instrument may involve the entire text or sections. Sometimes the first field-tests have a small number of respondents read over and answer the items, followed with a debriefing. Eventually the draft needs to be administered to a large enough sample of respondents to allow for statistical testing. These respondents should be as representative as possible of the total population for whom the instrument is intended.

Evaluation of an instrument proceeds at two levels. Basically, responses on single items from a respondent are aggregated into scales that are hypothesized to measure the target concepts. Thus, one level is the assessment of individual items and the second level is the assessment of how well the scales function at measurement. These two levels are simultaneously active.

ANALYSIS WITHOUT CONCEPTUAL CONSTRAINTS – FACTOR ANALYSIS

An initial statistical procedure examines responses on all of the items without structural assumptions. In other words, none of the designed scale assignments are imposed. Output from the procedure of Factor Analysis shows patterns of common cohesion and variation among the items. That is, it tends to show patterns in which respondents who answer strongly positive also answer strongly positive (or negative) on other items. This procedure is a first test of whether the developers' ideas about what indicators cluster together around their target concept are supported in the real world application.

Factor analysis is far from a magic bullet, although it is a very mystical statistical procedure. Factors may show that there are patterns of coherence unanticipated by the developers. A single factor may show complimentary patterns of items, which are opposite. As assessment proceeds through subsequent steps, evaluation references back to these non-constrained patterns as a way to identify possible issues with specific items.

ANALYSIS CONFIRMING PROPOSED STRUCTURE – SCALE RELIABILITY

The process of confirming coherence among a scale's items is that of assessing or confirming an aspect of reliability. Assessment of scale reliabilities has historically taken several forms. Since Cronbach's alpha (α) provides feedback as to how the overall reliability of a scale changes when the item is eliminated from the scale, it is possible to identify items that may require editing. Utilizing this process allows a developer to maximize the reliability of each scale.

ANALYSIS OF THE RELATIONSHIP AMONG SCALES – CORRELATIONS AMONG SCALES

Examination of correlations among scales allows a developer to judge if scales are relatively independent or strongly interconnected. Ideally, scales should be mutually exclusive and thus independent. However, that is not the case for many concepts in our real world. Examining correlations can also show if scales are opposing. This is a much more common situation. This broad relationship in a reference population provides insights into conceptual and theoretical interpretations, which may be helpful when debriefing respondents.

DEVELOPMENT OF SCALING VALUES & REFERENCE NORMS

The preceding three processes of evaluation provide the developers with indications as to the overall quality of the instrument as well as identification of items that do not work. Developing an instrument frequently involves recycling through the preceding steps until the developers' standards are met. These findings guide developers in revising and editing items, or deciding that the instrument is ready for the next step.

Once items in an instrument are functioning the way the developers want, the scale structures can be finalized. With the scales established, the final step is to provide information on how to interpret the scale values. Frequently this means translating raw scale values into a standardized or normalized refined scale. These normalized scales imply reference to a population, not a sample.

RELEASE AND FOLLOW-UP – CONFIRMATORY USE

With release of an instrument, the developers' work is not finished. The process of using an instrument provides both quantitative and qualitative feedback. This feedback provides anecdotal documentation as to an instrument's effectiveness. Regular review of data from respondents allows for continual assessment of item coherence, scale reliability, and reference norms based on a much larger population (versus the field-test sample).

RELIABILITY & VALIDITY

One frequently hears questions and comments about the validity and reliability of instruments. Fundamentally, validity refers to the question of whether an instrument or item measures what it purports to measure. There are many methods used to test and claim validity. Reliability refers to the question of whether an instrument or item measures in a consistent way. Some people get caught up in an argument as to whether an instrument can be valid if it is not reliable. We will not take on this discussion. We will present evidence indicating both validity and reliability as autonomous ideas.

RELIABILITY BASED ON RESPONSE PROCESSES & INTERNAL STRUCTURE

The issue of instrument reliability is the initial question asked when exploring how good an instrument is, or if it is actually useful. The word reliability always means consistency when applied to instruments and tests. Validity based on context and relationships to other variables.

There are several procedures that are commonly used for this routine statistical treatment.

Test-retest reliability is the consistency of scores obtained by the same persons when re-tested with the identical instrument. Alternate-form reliability provides the subject with two similar forms of the instrument. Both test-retest and alternate-form reliability documentation should express both the reliability coefficient and the length of time passed between the first and second testing events. Both of these procedures focus on the consistency of measurement. Such consistency and the learning the test advantage is a major concern with ability and knowledge measurements. Motivation Insights® is not subject to an advantage from repeated administration because it asks for self-reports. The instrument's scales are as stable as the individual's perception of situational demands and self-concept is relatively constant. We find that test-retest comparisons show some variation, but the observed variations are so slight as to not cause a major change in one's overall score pattern.

Split-half reliability involves a single administration of the instrument, and uses the technique of splitting the instrument in half, e.g., odd and even question items, and determining a correlation between the two sets of scores. This technique reduces some of the concerns of test-retest and alternate-form reliability by eliminating the passage of time between testing events. Kuder-Richardson reliability is also based on a single form and single administration of the instrument, and measures the consistency of responses to all items on the test. The Kuder-Richardson formula is actually the mean of all split-half coefficients based on different splitting of the test. The Spearman-Brown reliability formula is another statistical treatment that provides a reliability coefficient, and is frequently used with the split-half procedures. Spearman-Brown differs by including a method for doubling the number of items on an instrument as a part of its formula. By doubling the number of items on the instrument, reliability usually increases. Some critics of the Spearman-Brown formula say that it may artificially raise the reliability coefficient of a test. Each of the reliability coefficients discussed so far are ones that can be calculated by hand, or using a simple calculator.

Cronbach's alpha (α) (Cronbach, 1951) is considered by many to be the most robust reliability alpha to date (Anastazi, 1976; Reynolds, 1994). Coefficient α is the maximum likelihood estimate of the reliability coefficient if the parallel model is assumed to be true (SPSS, p.873). For dichotomous data, Cronbach's alpha is equivalent to the Kuder-Richardson formula 20 (KR20) (SPSS, p.873). The alpha coefficient is the expression of an instrument's reliability and ranges from zero to +1.00. An instrument with a perfect reliability would have an alpha coefficient of +1.00, and no instrument has yielded that score to date. Additionally, there is no standard, agreed-upon levels of what makes a good or bad correlation for testing purposes. However, there is general agreement on a minimum standard for alpha equal to .6 or greater, with some experts advocating use of a .7 or higher standard. Obviously, the higher the alpha coefficient the stronger is the coherence of items.

Cronbach's alpha is used to determine all of the reliability coefficients for the Motivation Insights® instruments. The reader is encouraged to compare the reliability coefficients presented in this manual to the reliabilities of other instruments, and to ask how other vendors compute their reliability numbers.

VALIDITY BASED ON CONTEXT & RELATIONSHIPS TO OTHER VARIABLES

Validity helps answer the question, "Does the instrument measure what it is supposed to measure?" It also asks a deeper quality-related question—How well does the instrument make these measures? These questions are obviously more difficult to answer and may leave room for subjectivity. With regard to any questions of validity, the critical issue is the relationship between performance on the instrument and other observable facts about the behavior being studied. When someone says, "The test wasn't fair," the comment is usually directed to the test's validity, not reliability. A more accurate way to state the same expression is, "The test wasn't valid." **There are three primary forms of validity: Content, criterion-related, and construct validity.**

Content validity examines the instrument's content to determine if it covers the behavioral topic being measured. Simple examination of items in a biology or chemistry test should indicate questions related to the topic or subject being studied. When used in the development of the Motivation Insights® themes, it is important that all six trait-categories are represented in equal proportion. Additionally, it is important to explore social desirability as an element of content validity. If there is an imbalance between words that are socially desirable versus descriptors that are less desirable, then content validity is affected. **The Motivation Insights® instrument is screened for content validity and since the initial PIAV release, some descriptors have been replaced to boost both the content validity and the reliability of the instrument.**

Criterion-related validity refers to the ability of an instrument to predict a participant's behavior in certain future situations. One's scores on an instrument are compared with any variety of external criterions. In the use of the Motivation Insights® instrument and reports, there are a variety of studies available from Success Insights and TTI Performance Systems that have clearly linked specific scores and patterns of scores to job success in specific, well-defined areas (Bonnstetter, et al., 1993). Criterion-related validity has two forms: concurrent validity and predictive validity. Concurrent validity examines one's scores and compares them to external criterion at the same time as taking the instrument. Predictive validity explores one's instrument scores against criterion after a specified time interval.

Construct validity examines the ability of an instrument to measure a theoretical construct or trait. Construct validity is built from a pattern of evidence and multiple measures across a variety of sources. Some constructs explored in behavioral trait analysis include: Developmental changes of participants responding to the instrument at different ages and stages of their lives, or under different response focus points. Correlation with other tests is a form of construct validation.

One very important technique within construct validity activity is the factor analysis. This is a technique that refines an instrument by comparing and analyzing the interrelationships of data. In this process the interrelationships are examined and distilled from all initial combinations, to a smaller number of factors or common traits. The Motivation Insights® instrument has been refined through the factor analysis process and has made subtle scoring changes that increase both the overall validity and reliability of the instrument and reports.

CONVERGENT & DISCRIMINATE EVIDENCE

Two additional issues are part of examining validity. These issues basically ask the question of whether classification using an instrument appropriately identifies common individuals (convergent) and differentiates among individuals belonging to a different classifications (discriminate). Once again most of the evidence to these powers lies with the successful application experiences of consultants using the instrument.

CULTURAL IMPACTS

Although there may be many cultures and sub-cultures present in a population, the effects of language groups are the level of differentiation implemented in the Motivation Insights® instrument's versions. Cultures differ in how specific behaviors are defined and judged. Anyone visiting another culture may notice such differences immediately. Loud simultaneous talking may be the norm of a good friendship in one culture, and signs of a fight about to erupt in another. A description of a preference utilizing similar words in two different languages may have very different connotations. For example solidarity and compassion may carry different connotations with reference to the role of equality and sympathy in different cultures. It is important to consider these differences when using an instrument in different cultures. In response to these differences, specific versions of Motivation Insights® are developed, evaluated and tested for different language groups. The descriptions used as items in the instrument are tested for reliability and coherence with the scale concepts for each language version. If usage of the instrument is sufficient and clients conclude that it is important, specific distributions and norms can be calculated for any specific sub-population that can be defined.

ITEM WEIGHTS AND SCALE CONSTRUCTION

First, the process of summing up the frequency of responses produces a score that is a comparative measure, not a quantity measure. A score is a count of descriptions selected by the respondent. The count is compared with other people's counts among a reference population. These raw counts across several scales cannot be compared directly. That is, selecting 10 x items and 5 y items does not mean one is more x. However, if in the reference population the average is selecting 5 x items and 7 y items, then an individual selecting 10 x items can be reasonably evaluated as seeing themselves as being more motivated by x than generally expected in the population. As long as interpretation is limited to this type of comparison on order, the observation that one x may have stronger connection with a trait than another x is not an issue.

In this instrument the comparison is made by reporting individual raw scores and a reference population mean (average). Remember, it is important to note that the scales are not quantities of the characteristics.

These comparisons are based on grounding the reference population as representative of people like those who look to an instrument for feedback. In this instrument the norms for comparison are representative of current instrument users. Wherever possible, specific norms are developed for unique language/cultural groups. Each norm-distribution used as reference for a version of the instrument is clearly identified.

REVIEW & REVISION

Target Training International (TTI), TTI Performance Systems (TTIPS), and Success Insights International (SI) initiated a review of their Personal Interests, Attitudes and Values™ (PIAV) instruments during the spring of 2002. The Motivation Insights® instrument is available in two report formats: Workplace Motivators® and PIAV™. The core issue addressed with this review was scale and item reliability for the twelve frames of six phrases each, resulting in 72 indicators used when constructing the six scales.

Scale reliabilities and item cohesion with its assigned scales were examined for samples. **The following description of the review and revision process outlines the steps taken to examine the reliability of items, and scale constructions.**

All of the cases reviewed and examined were from respondents completing the Motivation Insights® during the year prior to assessment. In most assessments the number of available cases far exceeded the appropriate number needed for statistical testing and evaluation. One or more test samples were drawn from this larger data set. Thus, test-retest processes confirmed and affirmed conclusions and parameters.

Most statistical procedures do not require use of the large numbers of cases available for examination. Therefore, for most statistical evaluations random samples were drawn from the sub-populations. The use of samples allowed for development of hypotheses that could then be tested against another sample that was independent of the first. This testing process was frequently applied to confirm recommendations for editing and revision. Such comparisons confirmed general patterns of psychological traits with significant differences in how specific indicators (words, ideas) are connected in different language and cultural groups.

Two approaches were taken in examining the coherence of the Motivation Insights® scales. One examination took a naive approach of looking for patterns of common variance (factor analysis). This addressed the question of whether responses presented a pattern of coherence that justified the theoretical construction of the scales.

A second examination applied the matrix of scale construction looking at the coherence of each item to its assigned scale, and the overall reliability of that scale construction. These examinations utilized Cronbach's alpha (α).

EXAMINATION OF THEORETICAL COHERENCE

Construction of a scale starts with implementation of theoretical constructs into operational measurement. In order to confirm the coherence of the descriptions assigned to each scale a sample of responses was examined using a Principle Component Factor Analysis. In this statistical procedure the seventy-two (72) items were examined to find patterns of similar variation. Each factor is a latent construct, an unmeasured characteristic. The procedure results in a listing of factors with a measure of covariance for each of the variables. These coefficients may be positive or negative or neutral. By selecting the items with substantial positive or negative coefficients to a factor, one identifies a constellation of items that describe a latent factor. Frequently a factor will reflect two contrasting sets of items. One characteristic can be found among the items sharing positive coefficients, and a second among the items sharing negative coefficients. If the listing of items agrees with the listing of items theoretically assigned to a scale, then one may conclude that the implementation of the theory as a scale is well founded. When an item has a strong positive coefficient with other items assigned to a scale to which it is not assigned, then the theory and/or item needs to be questioned. Most items aligned with their assigned scales. However, the most common anomaly is that an item does not have a strong positive coefficient with any scale. In this case the item is not a usable indicator of a characteristic for measurement, even if it may be a good description.

NORMS AND POPULATION PARAMETERS

The pedigree of the current versions of Motivation Insights® is based on the culmination of multiple evaluations involving a diversity of data sources and samples. Examination of prior versions which began in 2002 involved over one-hundred thousand respondents. Current item and scale reliability is the culmination of these repeated evaluations using different samples. The instrument's pedigree is strengthened by these repeated independent evaluations. Samples have come from current users of the instrument. These users represent a full range of individuals utilizing the instrument. This process changed the reference point for comparison of style from its historic point of development up to the 21st century with recognition of changing behaviors and social expectations.

GENDER

One concern for any instrument designed to serve business and individual users in the 21st century is the effect of gender on response patterns. One issue examined in instrument review has been differences in response patterns between males and females. As one might expect, there are some differences in the average scale scores for males and females. However, these differences indicate relatively minor shifts of dominance of specific expression of behaviors. Whether these differences arise from biology, socialization, or both is not important to the effectiveness of the instrument. What is important is that the instrument measurements reflect measurement and feedback that does not induce a gender bias. In response to this challenge the samples used to establish distribution norms are evaluated. When a sample contains a representative proportional sampling of females and males, no adjustment is required. However, when the proportion of males and females is disproportional, an adjustment is applied to these data to equalize the effects of patterns of males and females.

LANGUAGE VERSIONS

Motivation Insights is available in several language versions. With the release of the current revisions many of those versions were separately evaluated and developed as independent instruments. When such development takes place the item descriptions that are initial translations from the English version are analyzed for their coherence with their assigned scale, and those scales' reliabilities appraised. This process results in further editing of items, and when necessary, revision of scales in order to develop an instrument that is reliable and appropriate to the targeted language/cultural group.

Distribution norms specific to a language version are calculated based on responses to that language version in order to provide clients with clear feedback that is relevant to the language/cultural group that uses the instrument. Technical information sheets are then released for each specific version.

RESULTS

The following are excerpted summaries drawn from cycles of assessments of various TTI, TTTIPS and SI values instruments. These reports are organized by language and then from most recent to oldest. It is important to note that the more recent assessment utilize data collected after revisions of prior versions. It is also worth noting the small differences in reliability and other coefficients may best be considered as minor differences in sampling and not substantial changes in coefficient values.

MOTIVATION INSIGHTS® US 2011.i ASSESSMENTS

Summary
These assessments of the Motivational Insights® instrument utilize 38,314 responses. These responses were collected during 2010, 2011. These data contained responses from 57.8% males and 42.2% female.

Results from these assessments indicate trustworthy reliability for all six scales with Cronbach's α ranging from .7 to .8.

Correlations among the six scales indicate that they are substantially independent as measurements. Scores on the scales are distributed across the scales leading to meaningful comparisons and interpretation.

The Motivation Insights® is a strong, reliable instrument applicable across a variety of populations. The continual quality improvement efforts anchor this instrument in the motivations, attitudes and values of the 21st century.

Background
The Motivation Insights® instrument contains twelve frames of six phrases each. Each phrase is an indicator of one the six latent motivations. Respondents rank order the six items from 1 to 6, with number 1 being their highest ranking of the statement, down through number 6 being their lowest ranked statement. Scales are constructed by reversing the rankings, summing up related items' ranks, and adjusting the score upward to avoid possible 0's. The scales are labeled as THEORETICAL, UTILITARIAN, AESTHETIC, SOCIAL, INDIVIDUALISTIC, and TRADITIONAL.

Reliability & Item Coherence
Scale reliabilities were calculated using Cronbach's Alpha (α). Cronbach's α is considered the most appropriate statistical test for reliability given the ranking of responses used to construct the scales. This statistic models internal consistency, based on the average inter-item correlation. It is a more rigorous test than a traditional split-half statistic. Cronbach's α is bounded from 0 to 1. In general an α equal to or greater than .6 is considered a minimum acceptable level, although some authorities argue for a stronger standard of at least .7.

Cronbach's alphas (α) for the six scales based on the US 2011.i data range from .68 to .83. Based on these findings one may conclude that the Motivation Insights® instrument is confirmed as a consistent and reliable measure of the scale constructs.

Cronbach's alpha (α) for the six Motivation Insights® Scales N=38,314, F=42.2%, M=57.8%	
Theoretical	0.755
Utilitarian	0.820
Aesthetic	0.822
Social	0.829
Individualistic	0.679
Traditional	0.705

Reference Norms

Interpretation of Motivation Insights® is based on how an individual's responses compare with the reference sample used to set criterion. Setting these reference norms is impacted by two judgments.

First, statistical criterion (norms) are based on a stratified sampling, which uses gender weighted cases. This adjustment applies a weighting to each case such that the net results is a 50:50 ratio of men to women. This adjustment removes the bias introduced in the original sample of 58:42 ratio of men to women. Thus, the instrument is sex neutral, and the norms are equal in reflecting males and females. This is not to say that males and females rank the six traits in the same order.

Comparison of rank order indicate that men rank Theoretical, Utilitarian, and Individualistic scales higher than women. And women rank Aesthetic, Social, and Traditional scales higher than men. This is in line with predictions based on our sex-role understanding of American values. By equalizing the ratio of males to females in the norming sample the instrument does not reflect a male dominated rank order.

When assigning cut-points for the reports, the median and percentiles from the sex adjusted statistics are used. Once again this minimizes the bias arising from unequal participation rates for men and women in the original sample. Using the median and percentiles is also a more accurate reflection of the structural characteristics of the measurement scales. Scores on these scales are integers, not continuous.

Correlations

The following table lists the correlations among the scales. Given the large sample size, all of these correlations are statistically significant; however, many are not substantial enough to be considered consequential. For our purposes a coefficient of .3 or greater indicates a relationship worth noting. Correlations with negative coefficients indicate that as values on one scale increase the values of the second scale decrease. The largest positive coefficient is between Social and Traditional at .145 or about 2% shared variance. This coefficient does not exceed ±.3 and is therefore judged as not consequential.

	Theoretical	Utilitarian	Aesthetic	Social	Individualistic	Traditional
Theoretical	1					
Utilitarian	-0.027	1				
Aesthetic	-0.057	-0.337	1			
Social	-0.401	-0.547	-0.056	1		
Individualistic	-0.082	0.191	-0.553	-0.298	1	
Traditional	-0.386	-0.334	-0.222	0.145	-0.127	1

Negative coefficients indicate that the scales are opposed. In this case, a higher value on one tends to be associated with a lower value on the other. The largest negative correlation is between Aesthetic and Individualistic (.553). This level of opposition indicates that around 31% of the variance on one scale can be attributed to variance on the other scale. This level of inverse relationship agrees with a generally understood relationship between these two motivations. There is still more than enough unshared variance to allow us to judge that the scales are independent and not measuring the same latent concept. The correlation between Utilitarian and Social is a close tie at -.547. Once again this inverse relationship is supported by an accepted theoretical generalization.

Conclusions

This assessment is an important follow up and confirmation of earlier implementations of Target Training International's Motivation Insights®. Utilizing over thirty-eight thousand respondents from 2010 and 2011 it provides a solid basis for confirming the reliability of the instrument and continuing minor adjustments to the reference norms. Updating the reference norms using data adjusted for the differences in participation of males and females in this large sample makes these criterion representative of a larger population and anchors them in the 21st century.

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12 May 2011

Adverse Impact:

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Random Sample N=17,801

Measurement	Mean	Standard Deviation
Theoretical	46.93	9.37
Utilitarian	47.44	10.49
Aesthetic	32.19	9.88
Social	46.81	9.91
Individualistic	39.96	8.63
Traditional	38.66	8.39

Males N= 10,667

Measurement	Mean	Standard Deviation	Difference from Random Sample
Theoretical	47.67	9.44	0.74
Utilitarian	48.93	10.35	1.49
Aesthetic	30.70	9.58	-1.49
Social	44.55	9.58	-2.27
Individualistic	41.81	8.37	1.85
Traditional	38.34	8.38	-0.32

Females N=7,134

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	45.82	9.13	-1.11	-1.85
Utilitarian	45.21	10.31	-2.23	-3.72
Aesthetic	34.42	9.90	2.23	3.72
Social	50.21	9.41	3.40	5.66
Individualistic	37.20	8.26	-2.76	-4.61
Traditional	39.14	8.37	0.48	0.80

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Caucasians N=11,988

Measurement	Mean	Standard Deviation	Difference from Random Sample
Theoretical	46.52	9.45	-0.41
Utilitarian	47.92	10.54	0.48
Aesthetic	32.18	10.14	-0.01
Social	46.27	10.00	-0.55
Individualistic	40.53	8.72	0.56
Traditional	38.58	8.47	-0.08

African Americans N=1,849

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	45.59	8.03	-1.34	-0.93
Utilitarian	46.91	9.97	-0.54	-1.02
Aesthetic	29.97	8.31	-2.22	-2.21
Social	50.12	8.94	3.31	3.86
Individualistic	39.78	7.53	-0.18	-0.75
Traditional	39.62	7.92	0.97	1.04

American Indian or Alaskan Native N=175

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Protected Group
Theoretical	46.30	8.53	-0.63	-0.22
Utilitarian	44.32	10.79	-3.12	-3.60
Aesthetic	33.11	9.40	0.92	0.93
Social	47.87	9.29	1.05	1.60
Individualistic	38.94	8.31	-1.02	-1.59
Traditional	41.46	8.27	2.80	2.88

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Asian N=1,079

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	52.19	8.94	5.26	5.67
Utilitarian	45.51	10.69	-1.94	-2.42
Aesthetic	33.86	8.93	1.67	1.68
Social	47.03	9.45	0.21	0.76
Individualistic	36.01	8.30	-3.96	-4.52
Traditional	37.41	7.94	-1.25	-1.17

Hispanic or Latino N=1,078

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	47.16	8.96	0.22	0.63
Utilitarian	46.36	10.20	-1.08	-1.56
Aesthetic	32.49	9.56	0.30	0.30
Social	47.65	9.99	0.83	1.38
Individualistic	39.15	8.55	-0.82	-1.38
Traditional	39.20	8.16	0.54	0.62

Two or More Races N=608

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Protected Group
Theoretical	47.67	9.32	0.74	1.15
Utilitarian	46.78	10.48	-0.66	-1.14
Aesthetic	33.24	9.85	1.05	1.06
Social	46.65	9.85	-0.17	0.38
Individualistic	39.52	8.25	-0.45	-1.01
Traditional	38.14	8.57	-0.52	-0.44

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Non-Disabled N=16,575

Measurement	Mean	Standard Deviation	Difference from Random Sample
Theoretical	46.86	9.35	-0.07
Utilitarian	47.46	10.49	0.02
Aesthetic	32.10	9.83	-0.09
Social	46.87	9.91	0.06
Individualistic	40.03	8.60	0.07
Traditional	38.67	8.38	0.02

Disabled N=228

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	47.92	8.90	0.99	1.05
Utilitarian	46.14	10.54	-1.30	-1.32
Aesthetic	32.74	9.67	0.55	0.64
Social	47.50	9.86	0.69	0.63
Individualistic	38.90	9.09	-1.06	-1.13
Traditional	38.80	8.68	0.14	0.12

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Non-Veteran N=15,517

Measurement	Mean	Standard Deviation	Difference from Random Sample
Theoretical	46.82	9.38	-0.11
Utilitarian	47.48	10.52	0.03
Aesthetic	32.25	9.86	0.06
Social	47.03	9.91	0.21
Individualistic	39.78	8.55	-0.18
Traditional	38.64	8.40	-0.02

Disabled Veteran N=122

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	46.98	8.92	0.05	0.16
Utilitarian	46.57	9.87	-0.88	-0.91
Aesthetic	30.17	9.73	-2.02	-2.08
Social	46.41	8.65	-0.40	-0.62
Individualistic	43.56	8.50	3.59	3.77
Traditional	38.31	8.66	-0.34	-0.33

MOTIVATORS FINDINGS AS OF FEBRUARY 2012

Other Veteran N=895

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	47.48	9.02	0.54	0.65
Utilitarian	47.13	10.27	-0.31	-0.35
Aesthetic	29.96	9.27	-2.23	-2.29
Social	45.22	10.04	-1.59	-1.80
Individualistic	43.16	8.99	3.19	3.37
Traditional	39.05	8.06	0.39	0.41

Vietnam Veteran N=216

Measurement	Mean	Standard Deviation	Difference from Random Sample	Difference from Non-Protected Group*
Theoretical	47.41	8.30	0.48	0.58
Utilitarian	48.28	9.92	0.83	0.80
Aesthetic	30.90	9.69	-1.29	-1.35
Social	43.47	9.36	-3.34	-3.55
Individualistic	42.43	8.29	2.46	2.64
Traditional	39.52	8.51	0.86	0.88

About Target Training International

Target Training International, Ltd. was founded in 1984 by Bill J. Bonnstetter and his son, Dave Bonnstetter. TTI Ltd. is the worldwide leader in the assessment industry. With extensive research the Bonnstetters continue to enhance, develop and validate assessment-based solutions that drive results.

Bill has been doing research on what makes normal people unique since 1979. His brother Ron Bonnstetter, professor emeritus University of Nebraska Lincoln, has recently joined TTI to expand its research endeavors. TTI's research is concentrated in the field rather than in the library and has discovered the importance of understanding the HOW and WHY of people as they relate to performance.