



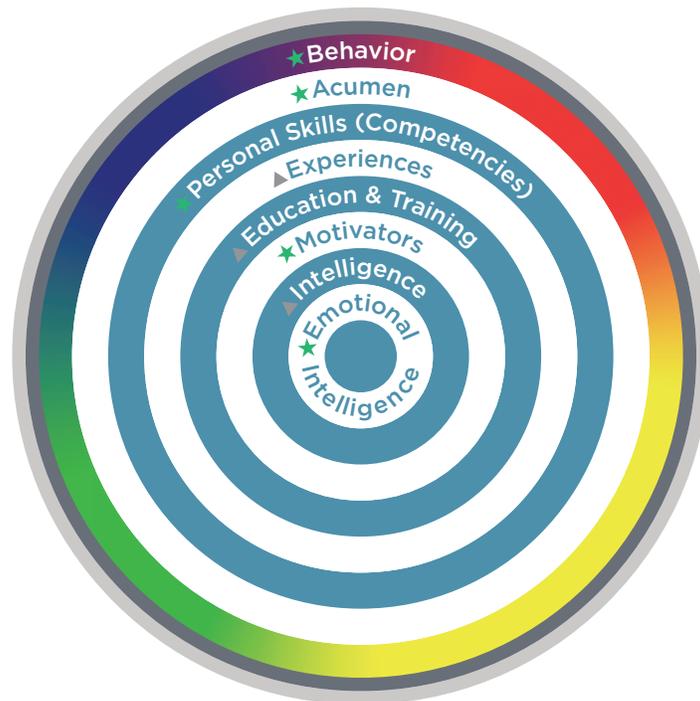
# Motivators TECHNICAL REPORT

## 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  $\alpha$  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 21<sup>st</sup> century.

| Cronbach's alpha ( $\alpha$ ) 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 lead 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 ( $\alpha$ ) 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 ( $\alpha$ ) (Cronbach, 1951) is considered by many to be the most robust reliability alpha to date (Anastazi, 1976; Reynolds, 1994). Coefficient  $\alpha$  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 criteria. 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 & 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 ( $\alpha$ ).



## 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  $\alpha$  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 ( $\alpha$ ). Cronbach's  $\alpha$  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  $\alpha$  is bounded from 0 to 1. In general an  $\alpha$  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 ( $\alpha$ ) 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.

| <b>Cronbach's alpha (<math>\alpha</math>) for the six Motivation Insights® Scales</b> |       |
|---|-------|
| 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  $\pm.3$  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 21<sup>st</sup> century.

**Submitted by:**

Peter T. Klassen, Ph.D. Principal, DocumentingExcellence.com  
Professor Emeritus, College of DuPage  
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. 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 entrepreneurship, education and human interaction. For more information go to [www.ttiassessments.com](http://www.ttiassessments.com).