



"Enabling Businesses to Succeed through People"

STYLE ANALYSIS

A Validity Study

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INFORMATION FROM THE EXPERTS

Letter from James R. Hall, Ph.D., F.A.B.MR Associate Professor / Vice Chairman, Department of Psychiatry & Human Behavior:

January 5, 1999

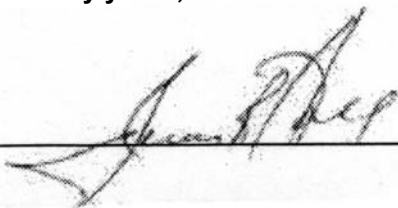
**Mr. Bill Bonnstetter, President
TTI, Ltd.
16020 North 77th Street
Scottsdale, AZ 85260**

Dear Bill:

I have had the opportunity to review the extensive research literature on the Style Analysis that has accumulated over the past 15 years. These studies have investigated populations as diverse as railroad track repair personnel, college students, truck drivers, salespeople and executives from Fortune 500 companies. Although the research has used varying populations, diverse methodologies and a variety of statistics, there are some general conclusions that can be drawn. These conclusions continue to support the reliability and validity of the Style Analysis.

I have included a summary that discusses the various forms of reliability and validity. As was shown in the earlier research, the Style Analysis continues to be an easily administered instrument that provides reliable and valid information in a wide variety of settings.

Sincerely yours,



**James R. Hall, Ph.D., F.A.B.M.P
Associate Professor / Vice Chairman
Department of Psychiatry & Human Behavior**

JRH/dy



University of North Texas
Health Science Center at Fort Worth

Department of Psychiatry and
Human Behavior

March 10, 1999

**Mr. Bill J. Bonnstetter
TTI Performance Systems, Ltd.
16020 N. 77th Street
Scottsdale, AZ 85260**

Dear Bill:

Your request to once again look at the internal consistency of the Style Analysis using the Spearman-Brown split-halves and the Kuder-Richardson Formula 21 Reliability Coefficients has been completed.

Our methodology was to test/retest 306 freshmen or sophomores taking English classes. Each student completed 3 Behavioral Instruments. They were the Cleaver Self DIScriptions, the Patient Communication and the Style Analysis. Significant correlations have been found across all four DISC dimensions.

The mean coefficients for each dimension between the Patient Communication Instrument are listed below:

Dominance	R=.92	Steadiness	R=.72
Influence	R=.71	Compliance	R=.74

The mean coefficients for each dimension between the Cleaver Self DISCRIPTION Instrument were:

Dominance	R=.93	Steadiness	R=.81
Influence	R=.92	Compliance	R=.86

These numbers indicate a high degree of internal consistency in the Style Analysis.

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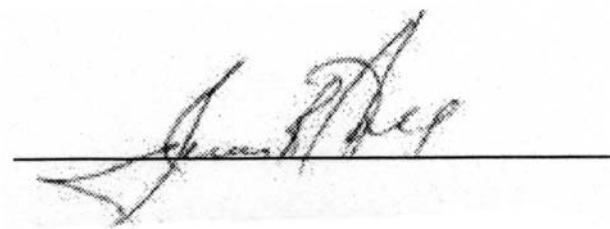
The pattern matrix on four sets of the Style Analysis adjectives are as follows:

	D	I	S	C
Orderly, neat, organized	-.14	-.17	-.03	.74
Even-tempered, calm	.04	-.06	.62	-.25
High-spirited, lively	.03	.75	.02	.09
Determined, decided	.64	-.06	-.16	.13

The statistical results compare very favorably with a similar study done in 1986.

I recommend that you maintain the completed pattern matrix study under lock and key as competitors could develop a new Four Factor Instrument based on your research.

Sincerely yours,

A handwritten signature in black ink, appearing to read "James R. Hall", is written over a horizontal line.

James R. Hall, Ph.D., F.A.B.M.P.
Associate Professor / Vice Chairman
Department of Psychiatry & Human Behavior

VALIDITY AND THE PRACTICAL APPLICATION OF ASSESSMENTS

Construct Validity

The first thing a user should investigate with regard to any assessment is Construct Validity. Construct Validity is theoretical with the simplest definition being; "does it measure what you say it measures?" In our Four Factor Style Analysis Instrument, we perform Construct Validity on a regular basis. Why? Because things change and words or phrases used change their meaning over time, such as, "gay" which was once used to identify one of the Marston Four Factors in years past.

How do you know if a word or phrase has gone bad? The answer is simple - You do an item analysis or single factor analysis. Words that have a low correlation must be replaced.

Words that have almost identical connections between two factors also should not be used in an assessment. Introvert and extrovert are words that are very close. Both "Dominant" and "Influencing" are extroverted and "Steadiness" and "Compliant" are introverted.

In 1936, G.M. Allport and H.S. Odbert, "Trait-Names: A Psycho-Lexical Study" Princeton: Psychological Review Company, identified over 17,000 English adjectives that described personal behaviour. R. B. Cattell (1943) "The Description of Personality: Basic Traits Resolved Into Clusters," The Journal of Abnormal and Social Psychology, 36; used the Factor Analysis method, which reduced Allport and Odbert's work to a manageable list.

Words used on assessments must be consistent with what the author says they are measuring. Using the word "trusting" has met our Construct Validity criteria. Also, in literature, we point out that this is the exception to the rule.

Words such as *articulate, studious, strategic, deep, fast, and devout* are words that raise a suspicion on Item Analysis.

Paper assessments or computerised reports measuring behaviour sometimes make the statement that the person is intelligent, honest, loves animals and is extremely fond of the outdoors. Behavioural assessments reporting that type of data are suspect from a Construct Validity standpoint. Behaviour is *how you do things, not, what, why or a measure of your intelligence*.

In any Four Factor Model, the words or phrases used in the assessment should identify one of the four dimensions. The more words you use in an assessment, the lower the Item Analysis correlation. Thus, the lower the validity. However, this is a catch 22 because the marketplace has trouble understanding how we can produce reports that are so accurate with 24 questions.

In reality, we have 48 questions: you respond to 24 most and 24 least. Both the most and least choices are analysed to develop each person's report.

Several years ago, we put twenty-four adjectives on a sheet of paper, six describing each of our four dimensions. People were asked to nominate under one of the four groups, the name of an individual that those six adjectives described. Those people were then assessed. The research proved people can be 82% accurate in putting people in the right category. Random would be 25% accurate only. However, identifying is not enough. You must be able to understand, appreciate and have to know how to communicate with them.

The following are excerpts from "Concise Encyclopaedia of Psychology," edited by Raymond J. Corsini and Alan J. Auerbach:

Testing and Legislation

During the spring and summer of 1964, while the Civil Rights Act of 1964 was being debated in the U. S. Senate, a case was brought before the Illinois Fair Employment Practices Commission in which it was alleged that a black job applicant was denied employment because he had failed a short psychological (IQ-type) test that was "culturally biased" against blacks. Although the commission dismissed this charge, the case drew widespread national press attention, particularly from business people who expressed the fear that governmental agencies would dictate selection procedures and hiring standards in private industry.

To allay such fears, Senator John Tower of Texas introduced an amendment accepted by Congress that became part of the law. This amendment states: "notwithstanding any other provision of this (Act), it shall not be unlawful employment practice for an employer to give and act upon the results of any professionally developed ability test provided that such test, its administration or action upon the results is not designed, intended or used to discriminate because of race, colour, religion, sex or national origin," (Civil Rights Act of 1964, Title VII, Section 703h). Many state legislatures in states where fair employment commissions or commissions against discrimination existed, followed the Senate's lead and incorporated a version of Paragraph 703h into their state laws.

Psychological tests used for employment selection, however, had an entirely predictable consequence, based on 50 years of data accumulated since World War I's Army Alpha: Blacks, and to some extent, other minorities (e.g., Latinos), earned lower scores than whites, and at any cut-off score, a smaller proportion of blacks than whites qualified or "passed the test." In this context, the Equal Employment Opportunity Commission (EEOC) issued "Uniform Guidelines on Employee Selection Procedures."

The turning point came in the U. S. Supreme Court in the case of *Griggs vs. Duke Power Company* [401 U. S. 424, 3 FEP 175 (1971)]. The court ruled in favour of the plaintiff, Griggs, in a landmark decision in which a number of standards for test use were set. First, the initial burden was on the plaintiff to offer evidence that the selection procedure had adverse impact; and, second; if the selection procedure did have an adverse impact, the defendant user had to assume the burden of demonstrating by appropriate means that performance on the test was related to performance on the job for which the test was used as a selection criterion. The court also indicated that "great deference" must be given to the EEOC Guidelines, which outlined standards of, and procedures for, test validation.

About 70,000 complaints of discrimination are filed with the EEOC annually. Of these, 10% to 15% allege discrimination by unfair testing.

Adverse Impact

In the historic March 8th U. S. Supreme Court decision regarding the Civil Rights Act of 1964, Justice Burger stated, "Nothing in the Act precludes the use of testing or measuring procedures; obviously they are useful." What Congress has forbidden is giving these devices and mechanisms controlling force unless they are demonstrably a reasonable measure of job performance. Congress has not commanded that the less qualified be preferred over the better qualified simply because of minority origins. Far from disparaging job qualifications as such, Congress has made such qualifications the controlling factor so that race, religion, nationality and sex become irrelevant. What Congress has commanded is that any tests used must measure the person for *the job* and not the person in the abstract. Testing obviously will continue, as indeed it should.

Validation for purposes of EEO law is the technical process whereby the employer defends the use of a selection device, or standard, that demonstrates a very close relationship between performance against the standard and performance on the job.

No company can use any selection device, or standard, that has an adverse impact on the protected group. The protected group is usually a minority person, female, or person over the age of forty, but it can be anyone.

The EEO legislation was aimed at employers who administered tests that are not job-related or are discriminated against the protected group. For example, giving a math test to keep someone from being hired as a police officer was deemed not job related and therefore, illegal.

The Equal Employment Opportunity Commission (EEOC) an agency of the Federal Government, issued the Uniform Guidelines on Employee Selection Procedures in 1966. These guidelines were issued to serve as a guide for applying the four-fifths rule. A selection for any race, sex or ethnic group which is less than four-fifths (4/5) or eighty percent of the rate for the group with the highest rate will generally be regarded by the Federal enforcement agencies as evidence of adverse impact, while a greater than four-fifths rate will generally not be regarded by Federal enforcement agencies as evidence of adverse impact.

Smaller differences in selection rate may nevertheless constitute *adverse impact* where they are significant in both statistical and practical terms, or where a user's actions have discouraged applicants disproportionately on grounds of race, sex or ethnic group.

Greater differences in selection rate may not constitute *adverse impact* where the differences are based on small numbers and are not statistically significant, or where special recruiting or other programs cause the pool, minority or female candidates to be atypical of the normal pool of applicants from that group.

Where the user's evidence concerning the impact of a selection procedure indicates *adverse impact*, but is based upon numbers which are too small to be reliable, evidence concerning the impact of the procedure over a longer period of time and/or evidence concerning the impact which the selection procedure had when used in the same manner in similar circumstances elsewhere may be considered in determining adverse impact. Where the user has not maintained data on adverse impact as required by the documentation section of applicable guidelines, the Federal enforcement agencies may draw an inference of adverse impact of the selection process from the failure of the user to maintain such data, if the user has an under-utilisation of a group in the job category, as compared to the group's representation in the relevant labour market or, in the case of jobs filled from within, the applicable workforce.

Consideration of user's equal employment opportunity posture: in carrying out their obligations, the Federal enforcement agencies will consider the general posture of the user with respect to equal employment opportunity for the job or group of jobs in question. Where a user has adopted an affirmative action program, the Federal enforcement agencies will consider the provisions of that program which includes the goals and timetables that the user has adopted. Also considered is the progress the user has made in carrying out that program and in meeting the goals and timetables. While such affirmative action programs may in design and execution be race, colour, sex, or ethnic conscious, selection procedures under such programs should be based upon the ability or relative ability to do the work.

[Approved by the Officer of Management and Budget under control No. 3046-0017, (Pub.L96-511, 94 Stat. 2812 (44 U.S.C. 3501 et. Seq.))]

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Since 1984, TTI has collected information on our Behavioural Instrument and Values Questionnaire. We meet or exceed the four-fifths rule. However, we have never released the statistics because our attorneys have advised us that the four-fifths rule does not apply to behaviour or values. In fact, there are many scientists who claim that some or all of these types of issues are inherited.

Located in my records is the data that I have collected which statistically demonstrates the following:

- People with a high Social value worldwide will run a company or department based on people issues.
- People with a low Social value will make decisions based on the bottom line.
- There is only a slight difference in the mean on each of the six values in the United States, Australia, South Africa, Ireland and the United Kingdom, which are all English-speaking countries.
- Top performing sales people in the United States and Germany have the same top three values with the Utilitarian value being the strongest drive in both countries.
- There are more D's and I's percentage-wise in the United States African American population than in the Caucasian population. Statistics clearly demonstrated that more top managers and top sales people are behaviourally D's and I's.
- Behaviourally speaking, the same can be said for Finland.

Every company should do their own validation study to determine which questionnaires/instruments are worth their continued investment. The types of devices that companies need to be concerned about are those that assess ability, aptitudes, skills or knowledge. They are most likely to have *adverse impact*, whereas devices that assess personality traits, behaviour or values are *least likely* to have *adverse impact*.

If knowledge always leads to success, every Certified Public Accountant, lawyer, doctor and nurse would be successful. In each of those professions behaviour and values is the better indicator of success. Age, gender or nationality have nothing to do with successful people.

In today's corporate environment, the proper use of test questionnaires and instruments as part of the selection process can make the difference between hiring the best or becoming non-competitive.

Reading Levels

The Reading Level of any assessment can impact the result. The assessment could be valid, but if the reading level is too high you may not get valid results from some people. We lowered our reading levels to ninth grade back in 1984 based on research that some people could not handle the words on certain assessments.

Instructions

The instructions can impact the usefulness of assessments. An assessment can be valid, but not useful if the participant doesn't understand the instructions.

VALIDITY & RELIABILITY OF THE STYLE ANALYSIS

A large body of research has supported the reliability and validity of the Style Analysis and the DISC dimensions. This research has provided evidence of high test-retest reliability (the stability of test scores over time); strong **Construct Validity** (the relationship of the Style Analysis to other tests measuring similar constructs); robust **Content Validity** (how well the DISC dimensions measure what they are supposed to measure); significant **Criterion or Predictive Validity** (the ability of the DISC dimensions to predict performance on another activity); and powerful **Construct Validity** (the extent to which the DISC dimensions measure a specific trait).

The research findings on test-retest reliability show that the scores on the Style Analysis exhibit very little change over time. Six-month test-retest correlations average in the .90. range where a correlation of 1.0 is a perfect relationship (absolutely no change) and .0 is no relationship (random change). The Style Analysis is a reliable instrument that consistently measures the same thing.

Construct and concurrent validity studies have compared the Style Analysis with other Four Factor instruments such as the Activity Vector Analysis, Personal Profile Analysis and Cleaver Self . Significant correlations have been found across all four DISC dimensions. This indicates that the Style Analysis validly assesses constructs measured by other Four Factor assessment instruments.

Research on content validity has shown that the DISC dimensions can differentiate good performances from poor performances. This ability to differentiate has been shown in studies of sales performance and managerial ability in a number of industries. The Style Analysis can successfully distinguish varying levels of performance.

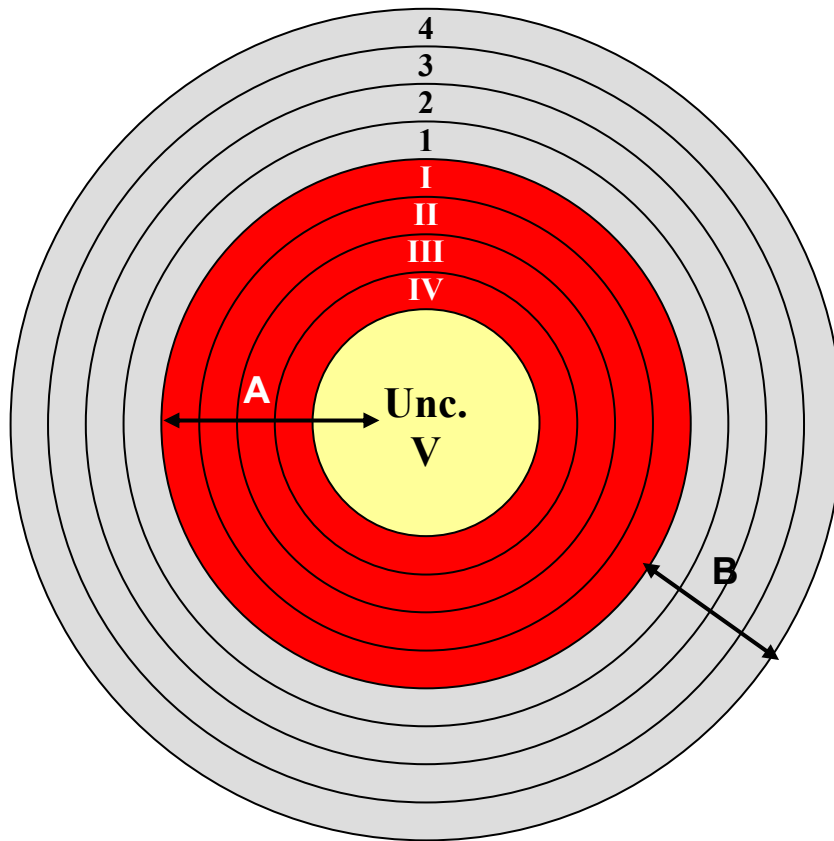
Criterion or predictive validity studies have looked at the ability of various DISC dimensions to predict outcomes. Outcome measures as diverse as sales performance, turnover rates and job injuries have been predicted with a high degree of accuracy on the basis of DISC scores. This ability to predict makes the Style Analysis a very valuable tool in selection and management.

Strong Construct Validity is shown when the instrument consistently exhibits content validity, concurrent validity and predictive validity. The research shows the Style Analysis to be a construct valid instrument.

A recent study provides an excellent example of validity of the DISC dimensions of the Style Analysis. Top sales people (N=166) were compared with a large sample of other professional workers (N=3448) on the DISC. The two groups were found to differ significantly on all DISC dimensions in both Natural and Adapted style. Each of the dimensions of the DISC contributed to the ability to distinguish top sales people from other workers. In addition, both Natural and Adapted style scores added to the ability to predict job performance. This study showed that the Style Analysis can identify specific characteristics that are predictive of success.

A review of the extensive research that has been conducted on the Style Analysis conclusively shows that the Style Analysis Instrument is a reliable and valid assessment device with a wide range of applications.

Emotions or Temperament



A. Unconscious
 B. Consciousness

- | | |
|--|--------------|
| I. Forgotten material | 1. Sensation |
| II. Repressed material | 2. Feeling |
| III. Emotions | 3. Intuition |
| IV. Irruptions | 4. Thinking |
| V. That part of the collective unconscious that can never be made conscious. | |

Dr. Jolande Jacobi, provides us with a diagram that may help explain the differences between types and emotions in her book, "*The Psychology of C. G. Jung*" (1942). Jacobi looks at the brain and breaks it into two parts - conscious and unconscious. Stored in the unconscious according to Jacobi are:

1. Forgotten material
2. Repressed material
3. Emotions
4. Irruptions
5. Part of the collective unconscious that can never be made conscious.

In the conscious mind she placed sensation, feeling, intuition and thinking. Thus, she is positioning emotions as stronger than type as they are stored in the unconscious mind, and provide a basis for the conscious mind to operate. Marston's anger and fear are very strong emotions and should carry more weight in evaluating how people act.

One should question assessments that have not compared their construct validity to other known assessments. TTI's Behavioural Assessment has been compared against other behavioural assessments in the marketplace. When vendors claim to be valid, but offer nothing more than their opinion that they are better, one really needs to question their ethics. Our Construct Validity meets and exceeds industry standards.

Benchmarking

You cannot benchmark a personality contest. You cannot benchmark the performance of a team if the team's performance based on industry standards is a C-. Benchmarking only works when you truly have people who are performing at a superior level. Then, and only then, do you see a significant difference. If you do not see a significant difference in their behaviour, then do not use behaviour in your solution process. (Note: for a more detailed explanation, see page 210-212 in the Universal Language Book DISC)

Rule Out

Quite often it is easier to rule out people who cannot be superior performers. In looking at top performing sales people both in the U. S. and Germany, we validated that salespeople who were classified as Analysers or Implementers had very little choice of becoming top performing salespeople. Look at Examples 1 and 2 on page 2 1.

Style Analysis

The Style Analysis form and its various uses are all derived from the work of Dr. William Moulton Marston who was born in Clifftondale, Massachusetts in 1893. Dr. Marston was educated at Harvard University and received an A.B. in 1915, LL.B. in 1918 and a PhD in 1921 from that institution.

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 Encyclopaedia Britannica, the Encyclopaedia of Psychology and all of these while authoring and/or co-authoring five books.

Marston's most well known contribution was his success in lie detection. He did this work at Harvard University and in 1938 published his book, "The Lie Detector." Lie detectors, including Dr. Marston's, have been used by law enforcement and crime detection officials in various countries of the world for many years.

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

"Emotions of Normal People" a book he published in 1928 described the theory that 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 favourable.

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

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- Dominance produces activity in an antagonistic environment.
- Inducement produces activity in a favourable environment (influence the system).
- Steadiness produces passivity in a favourable environment.
- Compliance produces passivity in an antagonistic environment.

Dr. Marston believed that people tend to learn a self-concept which is basically in accord with one of the four factors. Using Marston's theory, it is possible to apply the powers of scientific observation to behaviour. Thus, we can be Objective and Descriptive rather than Subjective and Judgmental.

As far as we know, Walter Clarke was the first person to build a psychological device around the Marston Theory. This form is called "Activity Vector Analysis (A VA)." When some of Clarke's original associates subsequently left his company, the format was further refined as they created their own "adjective check list forms."

There are at least fifty companies today using the Marston theory as the basis for examining behaviour via a descriptive behavioural device. The Style Analysis and its ancillary forms enable us to identify "patterns of behaviour" in such a way as to make practical application of the Marston Theory.

Reliability Estimates

Using the Spearman-Brown "split-halves reliability coefficient," reliability estimates were obtained. This coefficient indicates the degree of internal consistency of response to the instrument as a whole. The coefficients for each dimension are as follows:

■ Dominance	r = .92
■ Influence	r = .89
■ Steadiness	r = .91
■ Compliance	r = .90

It is evident from these reliability coefficients that there is an unusually high degree of internal consistency in response to the Style Analysis Instrument as a whole and to each of the related dimensions.

Strength of the correlation is indicated by the size of the coefficient. The coefficient can vary from +1.00 through 0 to -1.00. A coefficient near 0 tells us that there is no relationship between the variables. The closer a coefficient is to + or - 1.00, the stronger the relationship.

Correlation Examples:

+/- 1.0	= Perfect correlation (extremely rare)
+/- .80 - .99	= Unusually high correlation
+/- .70 - .79	= Very high correlation
+/- .60 - .69	= High correlation
+/- .30 - .59	= Moderately high correlation
+/- .20 - .29	= Very low correlation
+/- .00 - .19	= No correlation

The study duplicates, in part, a study by Dr. Russell J. Watson, Wheaton College, "Statistical Comparison Between the M Style Analysis and the Performax Personal Profile System," 1989.

Included in Watson's research is a reliability check for internal consistency of the Style Analysis using the Spearman-Brown split-halves and the Kuder-Richardson Formula 21 reliability coefficients. The mean coefficients for each dimension were as follows:

Dominance	r = .91	Steadiness	r = .92
Influence	r = .90	Compliance	r = .89

Graph I represents the "most like" behaviour, displaying the intensity of the four factors which allows interpretation of the behaviour an individual believes must be projected to achieve success in a given environment.

The "least" choices are plotted on Graph 11. This graph demonstrates the real self ... or, the intensity of each factor ... while the individual is under pressure and unable to mask behaviour. The "least" graph is very important as it represents the real person, allowing conclusions to be drawn on how to best understand, manage and communicate with this person.

Based on the individual's responses to the 24 "most" words, 19,630 different graphs can be plotted and 19,680 different graphs can be plotted for the "least" responses. The magnitude of those numbers makes it impractical to write an evaluation of each potential graph so, for evaluation purposes, these possible graphs are condensed into one (1) of 384 graphs. The computer-generated reports are based on evaluating the 384 graphs from both the "most" and the "least" responses.

Current research indicates that 54% of the population will fall into 16 basic graphs. The remaining 46% of the population is distributed across the remaining 368 graphs. This is why it is so difficult to compare the Style Analysis to other psychological instruments. As a result of this, the Style Analysis Instrument is far more sophisticated than instruments that only measure one factor against another in each question. This leads to a discussion of face validity.

Face Validity

Dr. Russell J. Watson of Wheaton College did a study of face validity. In this study the participants were asked to evaluate the "perceived accuracy" of their own computer-generated reports. The perceived accuracy of the reports was 88.49% with a standard deviation of 6.43%. The perceived accuracy of the reports according to the key dimensions were as follows:

Primary Dominance	91%	Primary Steadiness	85%
Primary Influence	94%	Primary Compliance	82%

This study confirms what behavioural researchers have discovered ... *that different styles see the world in different ways.*

Making the theories of Marston and Jung understandable and useful in people's lives was the key purpose of the Style Analysis Instrument. The theory of four to eight basic types can be looked at in many ways. To assist users of the Style Analysis Instrument and the accompanying software, we have completed the data in several different ways to meet the needs of a broad range of applications.

Style Analysis Instrument

The Style Analysis, while based primarily on William Marston's book, "Emotions of Normal People" also uses the works of Carl Gustav Jung. Jung's work starts from the assumption that there are three pairs of functions that are expressed differently in each person:

- extroversion-introversion
- perception-intuition
- thinking-feeling

In each case a person shows a preference for one of the two possibilities, which then results in eight possible combinations or types. Marston's system is in complete mathematical harmony with the works of Jung.

Isabel Briggs Myers added a further pair of functions "judging-perceiving" and developed the Myers-Briggs type indicator. This test places people into sixteen types.

Conclusion

The Style Analysis Instrument has compared favourably against other Marston-based instruments. The researchers concluded that the Style Analysis Instrument displayed a high degree of similarity to the compared instruments and is an assessment tool that shows much evidence of constructive validity. The instrument was developed in the late 1960s and has never been challenged in court. It is widely used by business and government including several agencies in the United States. Marston-based instruments similar to the Style Analysis have been administered to over 30 million people worldwide and have earned the respect of many professionals based on its accuracy and validity.

Practical Research

Every company wants to know: "Will this assessment work for me?" Most companies will not allow us to use their name in the study, but here is some of the research we have done over the last 20 years that solved problems for our clients.

GROUNDBREAKING RESEARCH ON WHAT IS INSIDE TOP SALES PERFORMERS IN THE UNITED STATES AND EUROPE

Bill Bonnstetter, CEO
Target Training International, Ltd.

Research studies of top salespeople in both the United States and Europe confirm that top sales performance can be predicted. These findings confirm that top performing salespeople are similar in very specific ways. This research carries significant implications for people who are considering sales as a career, are currently selling or are accountable for sales performance. The net conclusion of the research shows that top salespeople around the world place a high value on efficiency, utility and economics.

The most successful organisations in the world already know that hiring the right salespeople has the potential of becoming one of the most powerful "secret weapons" in their arsenal of competitive strategies. What they may not know is that hiring the right salespeople can be as simple as following a recipe based on recent findings from an international study conducted by Frank Scheelen of Institut for Managementberatung and Bildungsmarketing and myself, Bill Bonnstetter of Target Training International, Ltd. in Scottsdale, Arizona.

As global competition and increased customer demands require organisations to improve in key performance areas such as customer service, quality, reducing costs and customisation, aggressive organisations must be ever vigilant in the identification, acquisition, development and integration of innovative technology. This type of innovative technology is now available to select top performers.

As a result of our twenty years of research, development and distribution of assessment tools to measure performance, we have been telling organisations that it is what's on the inside, not the outside that counts, especially in sales performance. What we are fighting is the myth that hiring good looking and sounding people correlates to sales performance.

Much of the research conducted in the past on top salespeople has been focused on behaviour. Behavioural research has been popular because, like looking good and sounding good, behaviour can be observed. Little, if any significant study has been focused on what goes on inside a top salesperson. Our groundbreaking research in the United States and Europe now confirms that attitudes far outweigh looking good, sounding good or behaviour in distinguishing top salespeople.

Two of our most significant assumptions were confirmed by the two studies.

1. Top performing salespeople around the world are similar and,
2. Attitudes or values are more important than behaviour in sales performance.

(See Study 1 and Study 2 attachment)

In both studies, only top performing salespeople responded. In the United States study and a separate German study, top salespeople responded to two assessments. One was based on the internationally validated DISC behavioural model and the other was based on the Personal Interests, Attitudes and Values model, currently being validated internationally.

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The DISC assessment identifies eight basic patterns that define how people tend to behave. Listed below are brief descriptions of the eight behaviour patterns:

1. **Conductor** - direct and results-oriented
2. **Persuader** - optimistic and flexible
3. **Promoter** - verbal and trusting
4. **Relater** - cooperative team player
5. **Supporter** - accommodating and persistent
6. **Co-ordinator** - cautious and self-disciplined
7. **Analyser** - precise and detail-oriented
8. **Implementer** - creative and indecisive

The PIAV assessment measures six distinct attitudes that provide the context for motivation or why people act the way they do. Listed below are the six attitudes with a brief description of the focus of each:

1. **Utilitarian** - a focus on practicality, efficiency or economics
2. **Theoretical** - a focus on education, learning and truth
3. **Aesthetic** - a focus on beauty, harmony and balance
4. **Individualistic** - a focus on controlling one's own destiny or the destiny of others
5. **Social** - putting others before self
6. **Traditional** - a focus on a system for living

The results of the United States DISC behaviour study of top salespeople in 178 firms are illustrated with pie charts. As you can see, top sales performers tended to be spread across four behavioural patterns. In the German study, top sales performers tended to be spread across three of the same behavioural patterns. In view of these results, it is reasonable to conclude that salespeople with most, if not all, behavioural patterns can be top performers.

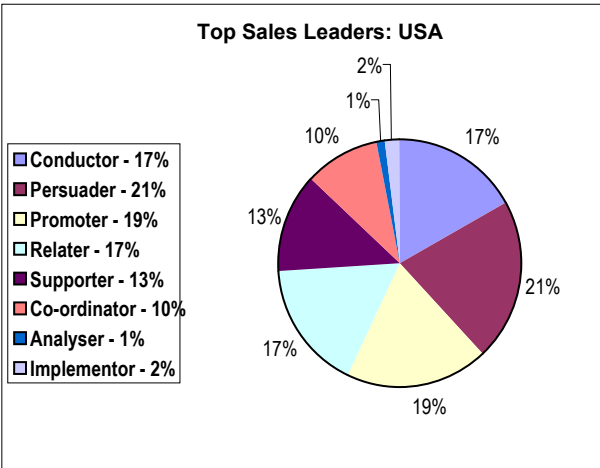
However, when it comes to what is on the inside of top performing salespeople, both United States studies as well as the German study confirm it is hands-down, a Utilitarian Attitude. The implications for the global sales community whether they are sales people, or those who must hire, manage, develop and motivate them are clear. The most important selection criteria when hiring salespeople is a high Utilitarian attitude. Once salespeople with a high Utilitarian attitude are hired, the job satisfaction and motivation buttons that need to be pushed are efficiency, practicality and economics.

Studies of attitudes also reveal that when a person's highest attitude is fulfilled, they will begin to be motivated towards their second highest attitude. For instance, a top performing salesperson whose highest attitude is Utilitarian and second highest attitude is Aesthetic will begin to be motivated by beauty and harmony only after they have made as much money as they want through the most efficient and practical methods. This provides important insight into incentives. Income and other financially related incentives will yield the best effects with high Utilitarian salespeople, unless the sales person is completely satisfied in those areas. Although financial rewards are always a safe bet, incentives should ultimately be tailored to each salesperson's motivations.

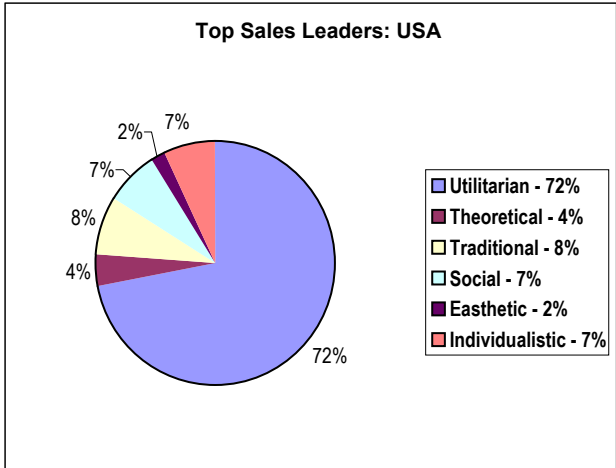
RESEARCH

**TOP SALES LEADERS
USA VS GERMANY**

BEHAVIOUR

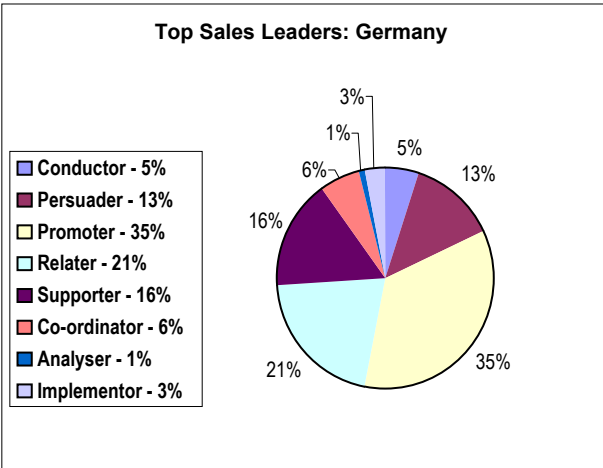


ATTITUDES

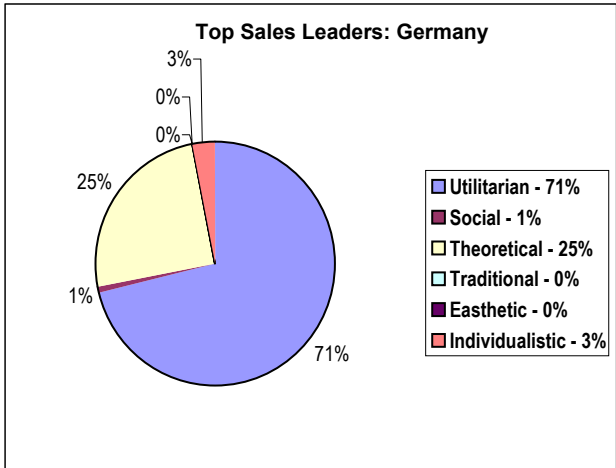


**Study 1: Top Sales Leaders,
N=178**

BEHAVIOUR

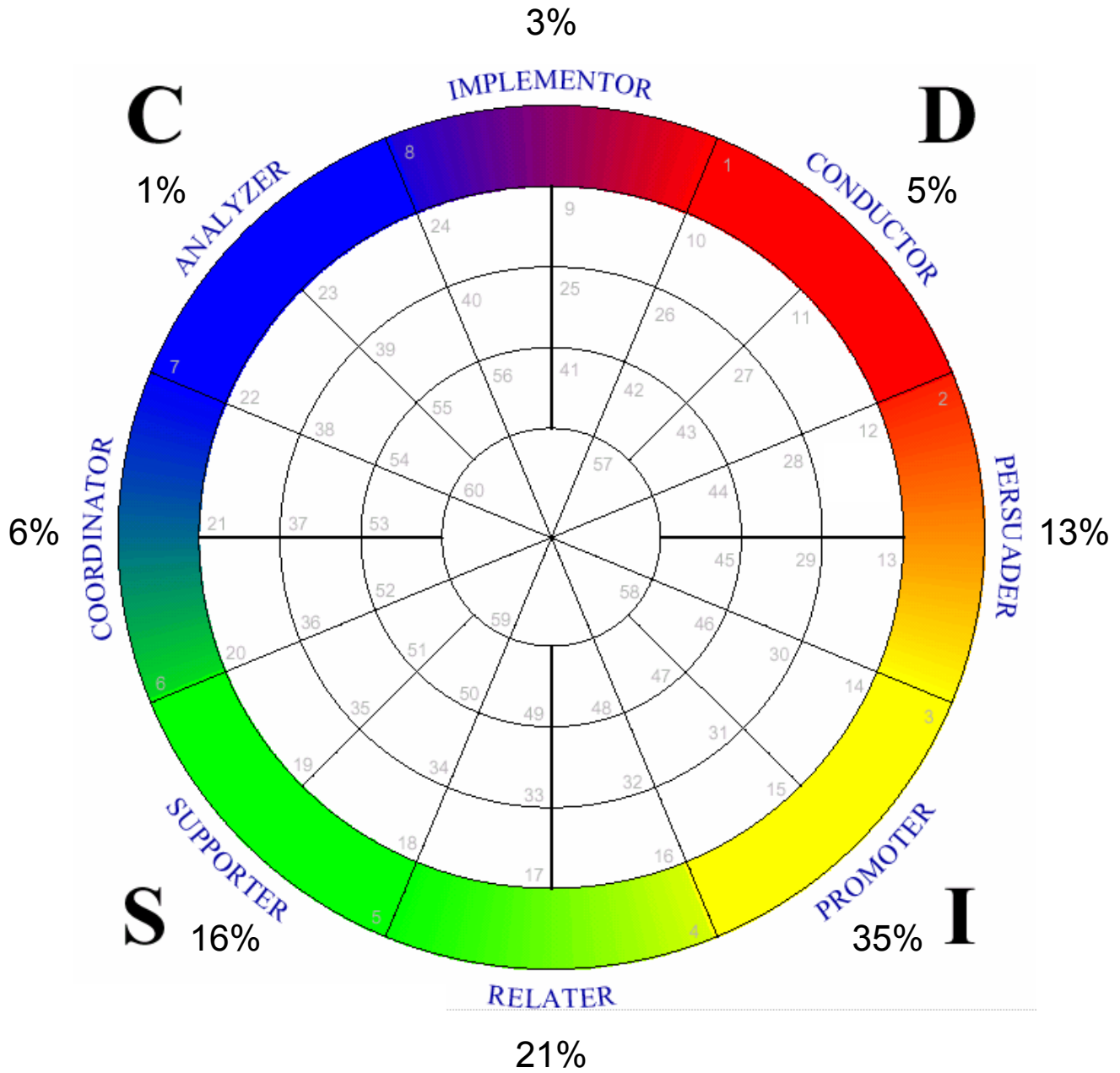


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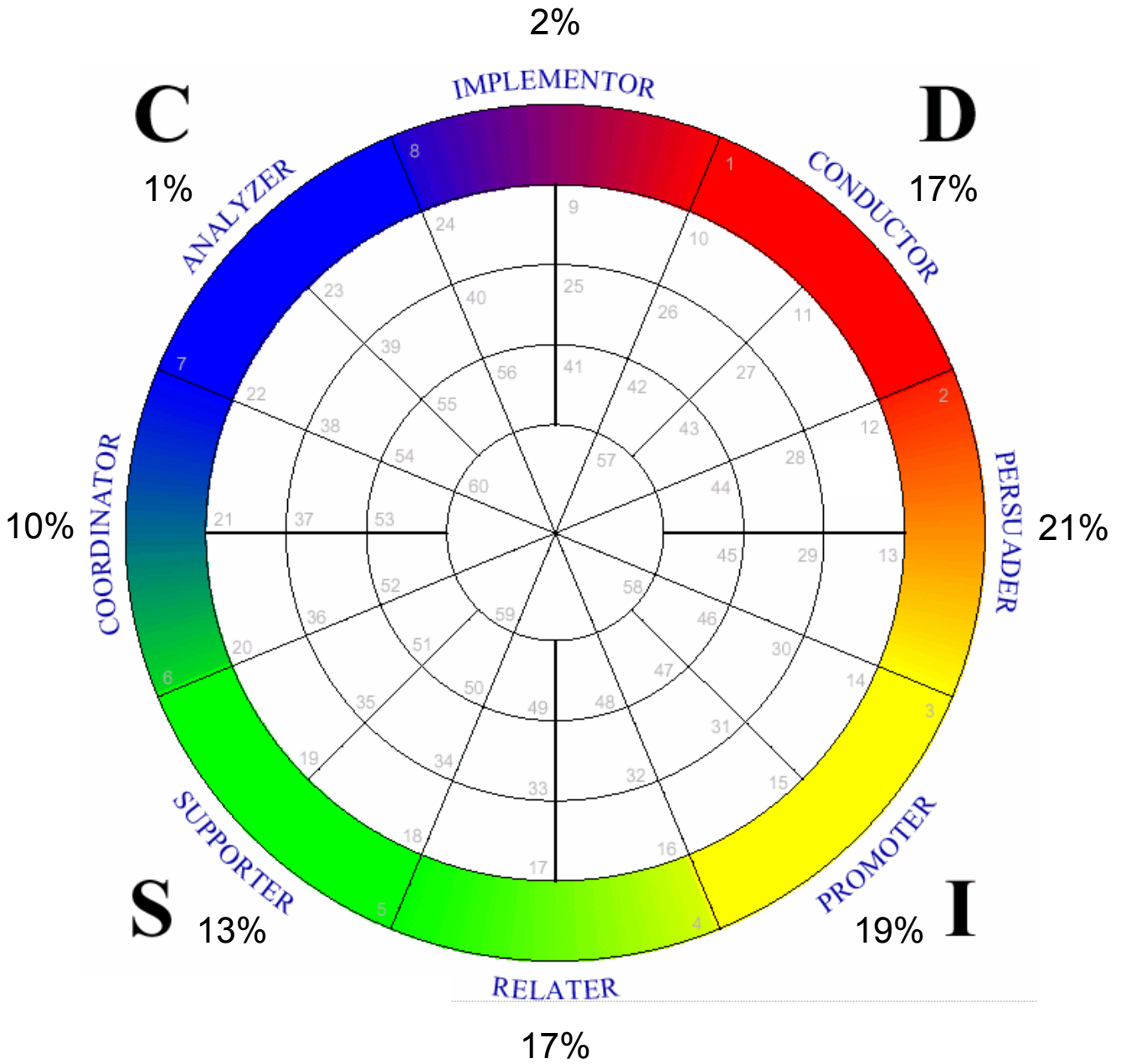
**Study 2: Top Sales Leaders,
N=492**

SUCCESS INSIGHTS™ WHEEL



GERMANY
N=492

SUCCESS INSIGHTS™ WHEEL



**U.S.
N=187**

STATISTICS RELATING TO DRIVER ANALYSIS SYSTEM EFFECTIVENESS

Company Name	1988	1989	1990	1991	1992	1993
WEST'S BEST FREIGHT % of turnover		180%	37%			
			65% reduction in accidents 80% reduction in workman's comp. claims			
BARR-NUNN TRANSPORT % of turnover		108%	70%	43%		
			50% reduction in accidents 50% reduction in workman's compensation claims 1993 1st Place - ITCC "Safest Fleet"			
D.M. BOWMAN, INC. % of turnover		130%	67%			
			50% reduction in accidents 65% reduction in workman's compensation claims			
EAGLE TRANSPORT % of turnover		180%	160%	87%	50%	
			60% reduction in accidents 50% reduction in workman's compensation claims			
MARTEN TRANSPORT % of turnover		120%	90%	70%	60%	47%
					45%	

MORE RESEARCH

I. Face Validity

II. Construct Validity

III. Predictive Validity

DISCOVERING THE PERSON AT WORK

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David Warburton's educational background includes: B.Sc. from Royal Veterinary College, University of London and Birkbeck College, University of London in Psychology. He received an A.M. in Psychology at Indiana University and his Ph.D. in Psychology and Physiology (with highest distinction) from Indiana University.

He has served as Lecturer and Reader at Reading University, Visiting Professor at Indiana University, Distinguished Lecturer at University of California, San Diego; Personal Professorship at Reading University and Fellow of the British Psychological Society and is a Chartered Psychologist (Founder Member).

Professor Warburton has also been Technical Advisor to the World Health Organisation, Surgeon General of the U.S. on smoking and health, Food and Drug Administration of the U.S. on nicotine, to the UK Independent Scientific Committee on Smoking and Health, and New Zealand's government on toxic substances. He is Membre du Jury, Fondation de France pour la Recherche sur la Maladie D'Alzheimer. His list of positions and appointments are extensive and available on request.

RESEARCH PROJECT PHASE 1

DISCOVERING THE PERSON AT WORK

General Introduction

As part of a program of profiling the behavioural style of managers, using Style Analysis (Target Training International, Ltd. 1991), we have collected information which has enabled us to carry out four studies that provide confirmatory validations of the DISC system and the software.

Validity has been investigated in terms of:

- Face validity (Study I). Face validity refers to whether the test "looks valid" to the people who take it and to untrained colleagues.
- Construct validity (Study II). Construct validity considers the relationship of the DISC model with related assessments of behavioural style.
- Predictive validity (Studies III and IV). Predictive validity refers to the extent in which it could be said a person is likely to become dissatisfied with their work, to become sick, etc.

In the past, validity testing has been regarded as not generalisable to different situations. However, this pessimism has arisen as the result of validation with samples which have been too small to yield stable estimates of the relation of the predictor and the criterion variables. It has been estimated that over half the validation samples have included no more than 50 people (Schmidt, Hunter and Urry, 1976). With such small samples, the validation is not technically feasible.

STUDY ONE – Nominated Groups

The aim of this study was to make an evaluation of the face validity of the DISC profiles. Face validity is a highly desirable feature of any assessment, because it establishes appropriateness for application in practical situations for the person and their colleagues.

One previous approach, which has been adopted, is to ask individuals to assess the accuracy of their own report. The rationale behind the present study is that the measures of behavioural style should ideally be closely related to actual behavioural styles in daily work life as seen by their co-workers. Evidence of this sort increases face validity with the client company and acceptance of their predictive applicability to work situations.

Methods

Subjects

The subjects were 91 middle managers from a variety of industries.

The majority of the volunteers were male (68%) with ages ranging between 28 and 62. Of these, 39% were between 28 and 36 and 6% were over 55. The majority were married (68%) with a further 2% cohabiting. Seventeen percent were single, 7.8% divorced, 4.3% separated and less than 1% widowed. Of the whole sample 53% had children, of which 26% had one child, 41% had two children and 33% had three or more.

The educational qualifications of the group were mixed, with 8% having no formal qualifications, 29% having high school graduation certificates at 16 years, 26% having high school graduation certificates at 18 years 'W' levels, 10% having a college degree and 27% having a higher degree or professional qualification.

Procedure

Our methodology has been the use of "The Method of Nominated Groups." In this procedure, independent judges were asked to select one or more colleagues who were best described by sets of six adjectives taken from the Managing for Success Users Manual Revised Edition (Target Training International, Ltd., 1989). Altogether, there were four sets, one for each of the four primary behavioural styles.

For Dominance, these adjectives were *ambitious, forceful, decisive, strong-willed, independent and goal-oriented*. For Influencing, these adjectives were *magnetic, enthusiastic, friendly, demonstrative, political and superficial*. For Steadiness, the adjectives were *patient, predictable, reliable, steady, relaxed and modest*. And for Conforming, they were *dependent, neat, conservative, perfectionist, careful and compliant*.

The subjects were asked to name people who were close to them in their work, and who were best described by these words. These nominees filled in the DISC profile. All these assessments were made prior to exposure to the Managing for Success software and the selected adjectives were not those used in the profiling in order to avoid response bias.

Analysis

1) Percentage Identification Success Rate (n=91)

Table 1: Identification Success Rate

D Style	I Style	S Style	C Style
86.3%	91.2%	71.0%	76.4%

Accuracy of Colleagues Identification - 81.2 percent (Chance - 25 percent)

$\chi^2 = 16.63$; $p < 0.0005$, i.e., a highly significant goodness of fit for a predicted frequency of 100 percent.

2) Calculation of Accuracy of Judgment

The raw scores for the primary styles were transformed into percentages and the percentage disparity between the ratings for the Response to the Environment Style of the nominee and the maximum (98 percent) was assessed.

Table 2: Mean Style Score of the Nominees

D Style	I Style	S Style	C Style
75.3%	88.5%	79.5%	86.1%

Accuracy of Colleagues Assessment - 82.4 percent

Conclusions

It is clear from the data (n=91) analysed that individuals who impress others as representing one behavioural style in their everyday behaviour answer the DISC in a similar manner (Predictive accuracy of over 81 percent).

From this data, there can be no doubt that the DISC responses give a very accurate picture of the person's habitual behaviour patterns at work as seen by colleagues.

This finding establishes a high face validity of the DISC profiling.

STUDY TWO – The DISC Constructs in Context

A second approach to the criterion of validity is to examine the extent to which it fits with predictions made from other theories of behaviour at work, construct validity. Construct validity is important, because it makes the results from measures easier to interpret and relate to real life situations, like work.

Methods

A series of questionnaires were selected as representing various aspects of behavioural style. These were Type A B, Extroversion-Introversion, Stability-Neuroticism, Optimism- Pessimism. In addition, we included some questionnaires on substance use, alcohol consumption and cigarette smoking.

Some significant positive and negative correlates of DISC (n=150)

	D	I	S	C
Type A	+	-	-	+
Extroversion	+	+	-	-
Optimism	+	+	-	-
Control Optimism	+			
Pessimism	-		+	+
Alcohol Use	+	+	-	-
Cigarette Use	+	+	-	-

D - DOMINANCE STYLE - driving, decisive

- | | | | |
|-----------------|---|-----------------|---|
| Positive | <ul style="list-style-type: none">- Type A- Extroversion- Optimism- Control Optimism- Alcohol Use- Cigarette Use | Negative | <ul style="list-style-type: none">- Pessimism |
|-----------------|---|-----------------|---|

I – INFLUENCING STYLE – outgoing, interacting

- | | | | |
|-----------------|---|-----------------|--|
| Positive | <ul style="list-style-type: none">- Optimism- Extroversion- Alcohol Use- Cigarette Use | Negative | <ul style="list-style-type: none">- Type A- Pessimism |
|-----------------|---|-----------------|--|

S – STABILITY / STEADY STYLE – steady, stable

- | | | | |
|-----------------|--|-----------------|---|
| Positive | <ul style="list-style-type: none">- Introversion- Pessimism- Alcohol Use- Cigarette Use | Negative | <ul style="list-style-type: none">- Type A- Optimism |
|-----------------|--|-----------------|---|

C – CONFORMING / COMPLIANT STYLE – cautious, careful

- | | | | |
|-----------------|---|-----------------|--|
| Positive | <ul style="list-style-type: none">- Type A- Introversion- Pessimism | Negative | <ul style="list-style-type: none">- Optimism- Alcohol Use- Cigarette Use |
|-----------------|---|-----------------|--|

Conclusions

First, it is clear that each behavioural style has a unique pattern of associations. Second, each pattern is a coherent one, demonstrating internal consistency of the single DISC constructs.

Thus, the DISC constructs can be related meaningfully to other theories of behavioural styles, which have been applied to work.

STUDY THREE – Style Disparity as a Predictor of a Stress Response

In this study, the predictive validity of the Style Analysis was tested by examining its validity as a predictor for stress responses. It was argued that an important aspect of job satisfaction was the match of the person to the demands of the job, with a good match giving high levels of job satisfaction. It is also believed that low levels of job satisfaction result in poorer physical and mental health, as well as higher levels of absenteeism.

In this study we investigated the importance of a disparity between Adapted Style (Graph 1) and Natural Style (Graph II) as a predictor of job dissatisfaction, weakened physical health, poorer mental health and absenteeism.

Method

DISC profiling was done for 150 managers using the Style Analysis. Occupational data was collected using the Occupational Stress Indicator.

The Occupational Stress indicator is divided into seven questionnaires. The first questionnaire collects biographical information, and the other six make up the Indicator itself. The questionnaire order is important, because completion of stress-related questionnaires can be seen by some individuals as threatening and they become reticent.

Biographical data is requested first, because it is simple to complete and settles individuals into the rhythm of answering questions. Next comes job satisfaction, and it is only the last sections which explicitly examine stressors and coping strategies. Most questions are brief and respondents simply mark their answers, but other questions are deliberately verbose, in order to slow down the rate of responding and help comprehension.

The four elements of the Occupational Stress Indicator occur in the different questionnaires in Table 1.

Table 1: The Content of the Occupational Stress Indicator

<u>Element</u>	<u>Questionnaire</u>
The individual	- Biographical Data - General Behaviour - How You Interpret Events Around You
Stressors	- Sources of Pressure in Your Job
Coping with stressors	- Interpretation of Events
Effects of stressors	- Coping Behaviours and Health

A brief rationale of each questionnaire is given below to explain why it is included and what it measures.

Biographical Data Questionnaire

The Biographical Questionnaire is divided into seven parts as follows:

1. **Family:** This subsection records very basic biographical details. It helps to focus the attention of the respondents and get them into the right frame of mind for questionnaire completion.
2. **Education:** Research indicates that there is a relationship between occupational stressors and duration of full-time education.
3. **Commitment:** This section establishes the extent in which individuals are committed to their current jobs.
4. **Interests:** This part assesses coping behaviours and the devotion of time to work-related activities.
5. **Habits:** There are a range of lifestyle behaviours that are related to stressors. Smoking and drinking were particularly interesting for our study.
6. **Life History:** There are fluctuations in stress responses which are due to the experience of "life events." These events can be positive (getting married), or negative (redundancy). Both types of events induce a stress response, indicating that the event was significant in the individual's life.
7. **Work History:** This part identifies some occupational characteristics, such as position in the organisational hierarchy and how they fit in, etc.

The Occupational Stress Indicator

The six remaining questionnaires form the Occupational Stress Indicator. Each of these questionnaires is divided into a series of sub-scales, which measure different dimensions of stressors and the stress response. The contents of each sub-scale are outlined, indicating the nature of the underlying theme.

Sources of Pressure in the Job

This section concerns a wide range of possible occupational stressors. The items contain both job- and home-related aspects, although on balance, it is the occupational theme that dominates. The sub-scales assess six types of stressors. These are:

- (i) **Intrinsic Factors:** These sources of stress originate in the fundamental nature of managerial work and encompass perceived ability to influence, and is a general measure of outlook on life and organisational events.
- (ii) **The Managerial Role:** This sub-scale measures how individuals perceive the expectations that others have of them, concerning those behaviours that managers are expected to exhibit in their job.
- (iii) **Relationships with other people :** The nature of management demands a high degree of contact with other people, both inside and outside the organisation. Most important, however, are relationships with superiors.
- (iv) **Career and Achievement:** By the process of selection and self-selection, those occupying management positions might be expected to be especially aware of their position in the management hierarchy. One of the principles, on which organisations operate, is that in trying to attain personal success by career advancement individuals contribute to company success. The need to achieve personal and corporate success can be a major source of satisfaction or a major stressor, if blocked.

- (v) **Organisational Structure and Climate:** Managers are in an interesting position: they work within the organisation structure and contribute to its design. In this sense, sources of organisational stress originate from structural design and process features of the organisation, although company climate will embrace an individual's perceptions of both.
- (vi) **Work-Home Interface:** One of the features that make managerial and professional work different from other jobs, is that there is a hazy overlap between work and home. There is a two-way relationship, with stressors at work affecting home life and vice versa.

Interpretation of Events

The importance of stressors is how the individual interprets events around them.

The more individuals feel that they have control over their life, the smaller their subsequent stress response. There are three sub-scales which measure different aspects of control. These are:

- (i) **Organisational Forces:** This sub-scale measures the degree to which employees perceive the influence of intra-organisational pressures. In other words, within any company there will be a range of "invisible" influence systems. These systems may be unspoken and difficult to define, but still exert an important effect on behaviour.
- (ii) **Management Processes:** While the first sub-scale examined the influence being exerted within the company, this sub-scale measures three key aspects on which individuals generally express a need to exert influence-how their performance is appraised, how they get promoted and who has the power.
- (iii) **Individual Influence:** This sub-scale completes the picture by measuring perceived control at the level of the individual manager. This perceived control is a function of perceived ability to influence, and is a general measure of outlook on life and organisational events.

Coping Strategies at Work

This straightforward questionnaire assesses sources of coping. There are six sub-scales as follows:

- (i) **Social Support:** This sub-scale measures the degree to which individuals rely on others as a means of coping. It may not necessarily be in the form of talking, the mere existence of supportive relationships will be significant.
- (ii) **Task Strategies:** This sub-scale measures the way the individual copes by work organisation. This ranges from organisation in the narrow sense of tasks, but may also entail reliance upon organisational processes in the wider sense.
- (iii) **Logic:** Individuals can cope with stress by adopting an unemotional and rational approach to the situation. This may involve the suppression of any feelings that might be expressed, but will also involve actively trying to be objective.
- (iv) **Work and Home Relationship:** It has already been stated that the overlap between work and home lives is an extensive one. This sub-scale recognises the dual role that this relationship can possess and examines its role in coping strategies. Again, this may take various forms, from the existence of certain qualities in home life to the activities of individuals when they are there.
- (v) **Time:** One of the major factors that managers have to negotiate with is time. "Time Management" is sold as a valuable managerial skill and coping strategy.
- (vi) **Involvement:** This set of questions is difficult to label, but the underlying theme refers to the individual submerging or committing themselves to their work.

General Behaviour

This questionnaire measures Type A behaviour. Type A behaviour is an overall style or manner of behaviour that is characterised by excessive time consciousness, abruptness of speech and gesture, competitiveness, etc. Ironically, these actions are the very behaviours that personify the stereotype of the dynamic executive, and so are rewarded in companies. This behaviour is said to be a significant and independent predictor of coronary heart disease and other stress-related ill health.

There are three sub-scales measuring different aspects of the Type A personality. These are:

- (i) **Attitude to Living:** This sub-scale measures the underlying perspective that individuals have regarding their lives and work. It measures the basic components concerning confidence, commitment, etc., as well as addressing work priorities and degree of dedication.
- (ii) **Style of Behaviour:** While the first sub-scale measured the mental component of Type A Behaviour, this sub-scale measures the behavioural component, i.e., what individuals actually do, such as speed and abruptness of behaviour.
- (iii) **Ambition:** This sub-scale could well be included as part of the previous two. However, while a high need for achievement is manifest in both attitude and style of behaviour, it is a separate quality in its own right.

Feelings about the Job

This questionnaire measures job satisfaction. While the precise relationship with the stress response is complex, it is usual for those who are experiencing stress responses to have negative attitudes towards their work. While being considered as an outcome in its own right, job satisfaction can be regarded as related to work attitude.

Five sub-scales measure different critical aspects of work as follows:

- (i) **Satisfaction with Achievement. Value and Growth:** This sub-scale represents a major component of job satisfaction that might be expected in a managerial group. It concerns the individual's perception of their current scope for advancement. Closely related to these aspects of work are perceptions of value in terms of income, praise and effort. Whether the job is seen as challenging, skills are also important.
- (ii) **Satisfaction with the Job:** Clearly, the nature of managerial work is wide and varied so the scope of this sub-scale is limitless. While the sub-scale explicitly mentions the type of scope of job tasks etc., these are intended to be metaphors. In other words, when individuals express satisfaction or dissatisfaction with their job, they mean simply the "type of work."
- (iii) **Satisfaction with Organisational Structure:** The nature of managerial work is such that the nature of the company and its characteristics have particular importance. It measures several important structural aspects of organisations.
- (iv) **Satisfaction with Organisational Processes:** The background rationale for this sub-scale is similar to the previous one. However, the focus is not on structural characteristics, but rather on internal processes.
- (v) **Satisfaction and Personal Relationships:** Although this sub-scale contains three quite diverse items, they all have a high interpersonal content. The nature of managerial work demands a high degree of contact with people, so that the quality of relationships is relevant.

Current State of Health

This part asks eighteen questions referring to mental ill health and twelve on physical ill health as follows:

Part A: Mental Health: The items measure overall mental ill health and tap a range of different aspects of it. The role of these questions is to give an insight into mental health, but not a clinical diagnosis.

Part B: Physical Health: All items relate to physical symptoms of the stress response.

Results

As a first analysis of the data, the only information which was examined was the Primary Behavioural Style disparity. The DISC data from the Style Analysis was transformed into percentages, and the percentage difference on the Primary Style was used as the independent variable. The dependent variables were job satisfaction and the amount of mental ill-health.

The association between the independent and dependent variables was examined with simple bivariate regression analyses. This showed that the assumption of linearity was invalid, and so a logarithmic transformation was used. As well as determination of the correlation coefficient, Pearson r , a coefficient of determination, r^2 , was calculated as a measure of the predictable variability, i.e., the percentage of overall variability in job satisfaction, mental health and absenteeism that is attributable to style disparity.

Job Satisfaction

The bivariate regression of job satisfaction on style disparity gave a significant correlation (Pearson $r = -0.39$; $p = 0.001$, $n = 50$) or a coefficient of determination of 0.152, i.e., 15.2 percent of the variability in job satisfaction is directly predictable from the variability in style disparity.

Mental Health

The bivariate regression of mental health on style disparity gave a significant correlation (Pearson $r = 0.38$; $p = 0.001$, $n = 150$) or a coefficient of determination of 0.144, i.e., 14.4 percent of the variability in mental health is directly predictable from the variability in style disparity.

Physical Health

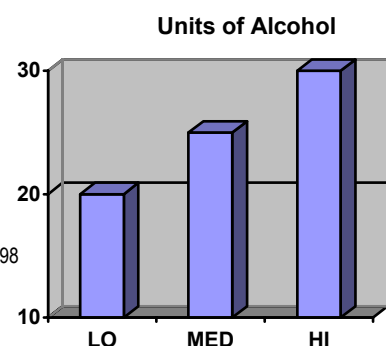
The bivariate regression of physical health on style disparity gave a significant correlation (Pearson $r = -0.23$; $p = 0.01$, $n = 150$) or a coefficient of determination of 0.053, i.e., 5.3 percent of the variability in physical health is directly predictable from the variability in style disparity. It should be noted that the physical health scale is a psychosomatic scale with "mental health" items, such as inability to get to sleep or stay asleep, decrease in sexual interest, tendency to sweat or feelings of your heart beating hard, etc.

Absenteeism

The bivariate regression of absenteeism on style disparity gave a significant correlation (Pearson $r = -0.27$; $p = 0.01$, $n = 54$) or a coefficient of determination of 0.073, i.e., 7.3 percent of the variability in absenteeism is directly predictable from the variability in style disparity.

Alcohol Use

The bivariate regression of alcohol use on style disparity gave a significant correlation (Pearson $r = 0.31$; $p = 0.001$, $n = 150$) or

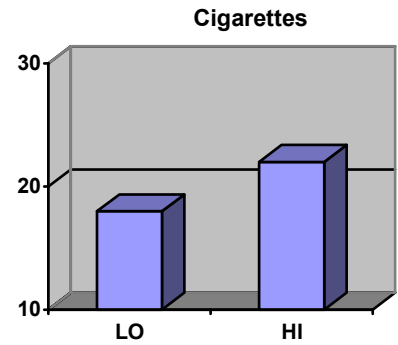


PEOPLE SUCCESS SOLUTIONS

a coefficient of determination of 0.096, i.e., 9.6 percent of the variability in alcohol use is directly predictable from the variability in style disparity.

Cigarette Use

The bivariate regression of cigarette use on style disparity gave a weak association (Pearson $r=0.29$; $p=0.1$, $n=36$) or a coefficient of determination of 0.084, i.e., 8.4 percent of the variability in cigarette use is directly predictable from the variability in style disparity.



Conclusions

This analysis gives evidence for DISC disparity as a predictor of job satisfaction, mental health, physical health, alcohol use and absenteeism.

Although we examined style disparity on only one dimension, 15.2 percent of the variance for job satisfaction, 14.4 percent of the variance for mental health, 5.3 percent of the variance for physical health, 9.6 percent of the variance for alcohol use and 7.3 percent of the variance for absenteeism is attributable to variability in style disparity.

At this point, a note of caution must be sounded. By saying that style disparity is a predictor of job satisfaction, mental health, physical health, alcohol use and absenteeism, should not be taken to indicate that style disparity caused these effects. Correlation is a necessary, but NOT a sufficient condition for establishing causality.

In order to establish a causal relationship, it would be necessary to conduct an experiment and manipulate disparity. Of course, that happens when people switch jobs and reduce style disparity.

However, research has established that there is a causal relationship between job fit and occupational dissatisfaction, mental health, physical health, alcohol use and absenteeism.

This body of evidence gives us confidence that DISC disparity is a predictor of problems at work and at home.

STUDY FOUR - DISC Profiles as Moderators of Stressors

An important aspect of any instrument is its predictive validity. This refers to the degree to which a measuring instrument can estimate some behaviour external to it, such as its ability to predict everyday aspects of work.

Occupational research has devoted a great deal of time to uncovering factors which moderate an employee's response to job characteristics. There have been three parallel lines of study. On the one hand, there are studies concerned with the moderating effects of extrinsic factors, such as a rural versus urban background. A second view has been a values approach e.g., an individual's espousal of, or alienation from, some value e.g., the Protestant Work Ethic (Blood, 1969; Stone, 1976). On the other hand, there are those concerned with the importance of intrinsic job characteristics to individuals. The latter concept is variously described as "higher-order needs strength" (Hackman and Lawler, 1971; Brief and Aldag, 1975), or "self-actualisation needs strength" (Sims and Szilagyi, 1976).

In a comparative study, Wanous (1974) contrasted needs strength, values and rural versus urban (extrinsic) factors as moderators. He found that needs strength was the strongest moderator, followed by values which showed intermediate effectiveness as a moderator, and least by the extrinsic difference.

In this study, we have examined higher order needs as represented by Natural Style as a predictor of stress responses and the interaction of Natural Style with job stressors as a moderator of responses.

Methods

In addition to the DISC profiling, occupational data was collected using the Occupational Stress Indicator (Cooper, Sloan and Williams, 1988). This instrument assesses six different aspects of work. Of relevance to this study were data on sources of pressure in their job, job satisfaction and their current state of mental health.

Results

An initial correlational analysis established that high pressure at work was associated with stress responses, both in terms of job satisfaction and mental health. However, Natural Style, per se, was not a predictor of either type of stress response.

The second analysis was designed to provide a test of the moderating effect of Natural Style on the relationship between perceived sources of pressure in the job and either job satisfaction or mental health. Thus, the independent variables were the sources of pressure, while the dependent variables were job satisfaction and state of mental health.

An analysis of covariance variant of moderated regression analysis was used. In this analysis, no prior decisions were made about the form of the need-stressor interaction (i.e., linear or non-linear). The analysis fell into two parts.

First, three equal groups were formed for each DISC dimension to give high, medium and low need groups (each of 50 people). The choice of three groups was determined by the need to obtain sensitivity of analysis while retaining subgroups of sufficient size to achieve stable regression coefficients.

The second step involved separate regression analyses within each group. The presence of a moderator effect was detected by testing for parallelism of the separate group regression lines.

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Identical slopes implies equal predictability within each group, and so no moderator effect. A Bonferroni correction was applied for multiple tests.

This analysis has been completed for the 48 combinations of style and sources of pressure to determine which style would be most susceptible to each source of pressure.

Natural Style as a Moderator of the Stress Response Job Satisfaction

	D	I	S	C
<u>Sources</u>				
1. <i>Intrinsic</i>			-	
2. <i>Managerial Role</i>	+			
3. <i>Personal Relations</i>		-		-
4. <i>Career / Achievement</i>	-	-		
5. <i>Corporate Structure</i>		-		
6. <i>Work / Home Interface</i>			-	

Key: - exacerbation + amelioration

Natural Style as a Moderator of the Stress Response Mental Health

	D	I	S	C
<u>Sources</u>				
1. <i>Intrinsic</i>			-	
2. <i>Managerial Role</i>	+		-	
3. <i>Personal Relations</i>		-		-
4. <i>Career / Achievement</i>	-	-		
5. <i>Corporate Structure</i>		-		
6. <i>Work / Home Interface</i>			-	

Key: - exacerbation + amelioration

Conclusions

First, the bivariate regression analysis showed a negative association between job pressure, satisfaction with the job and a positive correlation with the amount of mental ill-health.

The analysis of the data gives good evidence of interactions of Natural Style with specific sources of pressure in the job. For example, there was a negative effect of poor personal relationships on stress responses in the group, but the effect was magnified in High I individuals. In contrast, there was an overall negative effect of managerial role pressures on job satisfaction and mental health, but this effect was less in High D managers.

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Correlates of DISC with Behavioural Styles (n=150)

	D	I	S	C
Type A	+0.3897*	-0.2437	-0.2381	+0.2332
Extroversion	+0.2256	+0.4556*	-0.2296	-0.4442*
Optimism	+0.2955	+0.4249*	-0.2754	-0.2457
Control Optimism	+0.3484*	+0.1316	-0.0495	+0.0811
Pessimism	-0.2433	-0.3057*	+0.3547*	+0.4485*
Alcohol Use	+0.2718*	+0.4539*	-0.3216*	-0.3853*
Cigarette Use	+0.2923*	+0.4390*	-0.2426	-0.3514*

*P<0.01 ————— p>0.01

MAINTENANCE WORKERS SAFETY STUDY

Safety Analysis Project - Summary Report

XYZ Company* has established an effective safety program that has substantially reduced its rate of worker-related injuries. The program has focused on education and the formation of a structure that enhances the transmission of safety-related information and reinforces safety through a reward system. The effectiveness of this program could be enhanced by the development of a pre-employment assessment approach that utilises valid predictors of work-related injury. The current research project commissioned by XYZ Company and conducted by Resource Analysis, Ltd. is part of the process of improving the ability of the railroad to meet its goal of reaching an ever increasingly higher level of safety performance.

The Safety Analysis Project (SAP) was initiated in July of 1993 and involved the assessment of maintenance workers throughout the XYZ Company system. Subjects were selected using a stratified random sample to ensure proportioned representation of workers from the entire system. Inclusion in the sample was determined by willingness to participate, the availability of supervisor ratings, and the availability of injury data. Confidentiality of results was maintained. A sample of 230 maintenance workers resulted from the selection process.

Sample

The sample was composed of 230 males, ranging in age from 22 to 64 years, with a mean of 42.2 years ($SD = 9.38$). The educational level of the sample averaged 11.2 years ($SD=4.38$), with 56% completing high school, 8% having some post-high school education, and 36% having an eleventh grade education or less. The sample was very stable in terms of work history, with the mean number of years at Company being 17.2 years ($SD= 6.36$) and the median being 17.5 years. The vast majority of the sample (87%) had worked at Company for over 10 years. The data also shows that for the majority of the subjects (60%), XYZ Company was their first and only job. An additional 23% had only one job prior to working at XYZ Company. The overall picture of the sample is of middle aged, high school or less educated, individuals with highly stable work histories. The nature of the regions sampled suggest that the sample is very likely rural or small town in origin. * Actual name of the company was not included to protect them from phone calls. Research completed by Dr. Jim Hall

Safety Analysis Assessment Battery

The Safety Analysis Assessment Battery consists of a series of instruments that have been widely used in industry and transportation. The Battery included the DISC Style Analysis; the Personal Interests, Attitudes and Values Instrument; the Safety Analysis Questionnaire; and the SRA Pictorial and Mechanical Reasoning Tests.

The DISC Style Analysis is an instrument that assesses the individual's basic style of behaviour (Basic DISC), the preferred behavioural style usually seen at home or when under a great deal of stress; the individual's behavioural response (Response DISC) to the environment; and the individual's view of the behaviour required for response patterns is assessed along four dimensions; Drive (D) "how we deal with problems and challenges"; Influence (I) "How we influence and relate to others"; Steadiness (S) "how we respond to changes"; and Compliance (C) "how we react to rules and regulations."

The Personal Interests, Attitudes and Values Instrument is used to assess the interests, goals, and preferences that guide a person's functioning. This instrument assesses six basic values. These values include: **Theoretical** (Tv) "gaining of knowledge for its own sake"; **Utilitarian**

(Uv) "interest in gaining money"; **Aesthetic** (Av) "primary interest in form, harmony and enjoying life for its own sake"; **Social** (Sv) "interest and caring about others as a primary concern"; **Individualistic** (Iv) "primary interest in power"; and **Traditional** (Rv) "strong need for order."

The Safety Analysis Questionnaire is a 34 item instrument that measures knowledge and beliefs about basic safety issues. This questionnaire has been widely validated in samples of factory workers and transportation workers. A high score (total possible equals 34) indicated understanding of safety-related issues, including rule following, personal responsibility, and knowledge of basic concepts in safe operations.

In addition to the style, values, and safety instruments, the SRA Pictorial and Mechanical Reasoning Tests were administered. These two tests have been used at other companies as part of their pre-employment assessment.

The supervisor of each subject was asked to complete a ten item rating form. The supervisor rated the subject's knowledge of safety procedures, along with his view of the extent to which the subject used appropriate safety measures in the workers daily functioning.

Results

The purpose of this study is to develop pre-employment screening instruments that have the ability to predict which individuals would have an increased likelihood of experiencing on-the-job injuries. Therefore, number and type of injuries was used as the primary grouping variable. Subjects were divided into groups based on injury history.

Individuals who had no record of any serious or chronic work-related injuries were categorised as "non-injured." Subjects who had experienced any serious or chronic injuries were classified as "injured." The injured subjects were categorised into single serious or chronic injury group, and multiple injury group. Analysis of this categorisation revealed no significant differences on any measures between these two groups of injured subjects. Therefore, in this analysis, these two subgroups were merged into a single injured group, leading to comparisons based on two groups; "Non-injured" group and "Injured" group.

The "Non-injured" group was composed of 97 individuals averaging 39.71 years of age (SD= 9.40), with an average of 11.3 years of education (SD=4.8 1), and an average of 14.81 (SD=8.15) years of service at Company. The "Injured" group was made up of 133 subjects averaging 43.57 years of age (SD=7.58). These individuals had an average of 11.1 years of education (SD=4.28), and an average of 18.88 years (SD=3.88) of service at XYZ Company. The "Non-injured" group was significantly younger than the "Injured" group ($t=-3.46$, $df=228$, $p=0.01$). A significant difference ($t=3.21$, $df=228$, $p=0.01$) was found on total number of years at XYZ Company. A review of the data suggest that these differences may have been accounted for by the existence of a small number of outliers in the "Non-injured" sample who were significantly younger and had been at XW Company less than 5 years. No significant differences were found on any of the other demographic variables assessed. It was assumed that the two groups would differ on measures of behavioural style, values, and knowledge of safety. The hypotheses were based on the assumption that these factors should all influence injury history. The following exploratory hypotheses were tested:

1. There would be a significant difference on basic style, response style, and work style between the Injured group and the Non-injured group. j The specific pattern was not hypothesised.
2. There would be a significant difference on each of the values scales between the Injured and Non-injured group.
3. The Non-injured group would score significantly higher on the Safety Analysis, suggesting a relationship between knowledge and behaviour.
4. Supervisors would rate the non-injured subjects as more knowledgeable about safety as measured by overall ratings.
5. Scores on Pictorial and Mechanical Reasoning Tests would not be significantly different for the two groups.

Data analysis consisted of subjecting the data to multi-variant analysis of covariance (MANCOVA). This analysis was chosen to allow for the effects of the significant differences found on age and total number of years at XYZ Company to be statistically controlled. Sheffe's test, a robust post hoc test of significance of differences, was applied to determine the source of significant MANCOVAs. The $p=0.05$ level of significance was accepted as an appropriate alpha level.

MANCOVA analysis of style variables revealed a significant main effect for group (Wilks Lambda=0.891, Rao's R=2.02, $p=0.02$, $df=13,215$). Post hoc Scheffe's tests showed significant differences for Basic D; Basic S; Response D, Response S, and Response C. Table A shows the means and standard deviation for these variables.

Table A - Means and Standard Deviations of Significant Style Differences

	Injured	Non-injured
Basic D	7.25 (SD=3.53)	8.28 (SD=3.95)
Basic S	3.91 (SD=2.40)	3.27 (SD=1.88)
Response D	3.80 (SD=2.69)	2.88 (SD=2.51)
Response S	6.74 (SD=2.85)	7.58 (SD=2.68)
Response C	4.85 (SD=2.07)	5.44 (SD=2.15)

The Scheffe's probability levels for differences between the two groups are shown in Table B.

Table B - Scheffe's Post hoc Analysis of Differences

Variable	p Level
Basic D	0.05
Basic S	0.005
Response D	0.004
Response S	0.03
Response C	0.02

MANCOVA analysis of the Personal Interests, Attitudes and Values data revealed no significant main effect for group. Exploratory analysis of the individual values suggested a difference between the groups on Social values (Injured $M=44.95$, $SD=9.35$; Non-injured $M=47.0$, $SD=10.82$ $t=2.05$, $df=228$ $p=0.05$), but not on any of the other value scales.

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No significant difference was found for the groups on the Safety Analysis. The means and standard deviations for the two groups were: injured, $M=24.22$, ($SD=3.71$), and non-injured, $M=24.15$ ($SD=3.10$).

Analysis of the supervisor's ratings showed no group differences, either on individual items or total score (Injured 32.60 $SD=11.84$ and Non-injured 33.74 $SD=12.09$). A review of the data suggest a strong tendency toward positive ratings, regardless of injury history. There was a trend toward rating those who had worked at Company for longer periods in a slightly more positive direction.

As was hypothesised, there were no group differences on the measures (Injured Pictorial $M=50.87$ $SD=14.03$, Mechanical $M=38.35$ $SD=10.92$; Non-injured Pictorial $M=51.49$ $SD=15.34$, Mechanical $M=38.82$ $SD=9.82$).

Interpretation

The differences found on the Style Analysis are suggestive of specific behavioural tendencies that may impact on safety. The score on the Basic D scale suggests that individuals who are more cautious and undemanding as part of their preferred style of behaving will be less likely to engage in behaviour that could increase the probability of injury. Additionally, a basic tendency toward high levels of consistency, patience, and predictability will lend itself to taking adequate time rather than pushing oneself or acting impulsively. This is shown in the Basic S scale score. These behavioural tendencies represent the way the individual sees himself and are likely to be expressed when placed under a great deal of pressure.

The style differences found in the response to environment reflect the individual's understanding of the demands of his environment. The individual who is less likely to be injured recognises that his environment requires an even greater tendency to be cooperative and cautious. This is especially important in a work environment where injuries are frequent and can be very severe. The low Response D reflects an awareness that the potentially threatening environment is best dealt with by exercising deliberation and caution.

The high Response S further emphasises the perception of the environment as one in which patience and steadiness are highly adaptive. Loyalty and a team orientation are also seen as mechanisms that reduce unpredictability and threats to security in the work environment. These tendencies are further reinforced by a tendency toward compliance and rule following, as shown by the high Response C of the non-injured sample.

Style picture that describes the individual less likely to be injured is that of a basic core of Low D and High S qualities, with a shift to enhancing these tendencies in the work environment. These individuals in the work environment exhibit High C characteristics, with rule-following behaviour and a team orientation.

The team orientation is further strengthened by the high social value score. This score suggest a concern for others and a tendency to define oneself in terms of the group, especially the small work unit which may serve as a primary source of identity.

This identification enhances behaviours which tend to support the group, such as rule following, compliance, and acquiescence. The high social value supports and strengthens the style tendencies of Low D, High S, and High C. This profile of Low D, High S, and High C is descriptive of the sample of maintenance workers who had not experienced serious on-the-job injuries.

The scores of the Safety Analysis exhibit no between-group differences and are within the low average score range that has been found in previous research on industrial and transportation workers. The level of the scores suggest that the educational component of the XYZ Company safety program is having an effect on workers' knowledge of safety-related factors. The response to the individual items on the Safety Analysis provides some insight into the workers' understanding of safety. As a group, the maintenance workers tend to view the presentation of accident statistics, the viewing of the results of "horrible" accidents, and the presence of safety posters as the most effective ways to build safety attitudes. This likely reflects the workers' experience with safety programs at XYZ Company.

It appears that although these techniques are having some impact, they have not affected areas that may be more directly related to injury prevention and an understanding of the determinants of safe behaviour. Respondents show a very strong tendency to emphasise experience over training as primary factors in safety. This is shown by the erroneous endorsement of answers stating that experience is more important than company policy or specific company directed training. The fact that this sample of workers have very long work histories with XYZ Company likely accounts for this tendency. However, this belief may make it very difficult to develop new, safer work habits and should be a concern for the safety program.

Further influencing the training of safer work habits is the tendency of the respondents to endorse items that reduce personal responsibility for accidents and do not recognise the relationship between personal attitudes and on-the-job safety behaviour. These views need to be considered when developing training programs so that these issues are directly addressed.

The lack of group differences on the supervisor's ratings reinforces previous research which has found that supervisors do not make distinctions based on performance such as knowledge of safety or safe behaviour. Rather, they tend to base ratings on factors not usually assessed by behaviourally based ratings such as liking and perceived similarity to the supervisor.

The lack of group differences on the measures was expected in that they are not conceptually tied closely to safety-related issues, especially at the maintenance worker's level. Although these measures have some utility in assessing basic intellectual functioning and flexibility, they are not helpful in differentiating injured from non-injured workers.

Recommendations

Analysis of the data suggest a number of recommendations that may enhance the safety program at XYZ Company.

1. The use of the DISC Style Analysis and Personal Interests, Attitudes and Values as components of XYZ Company's applicant screening process. The data presented strongly suggest a profile that is related to increased level of safety. It is recommended that a goodness of fit approach be used in screening applicants so that those who most fit the profile derived in this study would receive a positive weighted score that would be added to previous job history, performance on tests of mechanical flexibility and problem solving, and recommendations. Scores on the DISC Style Analysis and Personal Interests, Attitudes and Values scale would serve as positive inclusionary rather than exclusionary criteria.
2. The use of the Safety Analysis as a tool to assist in the development of training programs that help train workers in appropriate safety techniques. The Safety Analysis would serve as a useful pre/post-test measure of learning in the Safety Program.
3. The data gathered in this study suggest avenues to explore to further develop the existing safety program. Among the suggested changes are an increase in the use of direct training techniques such as job-related training where direct modelling of appropriate safe behaviour is conducted with immediate feedback and reinforcement. An example would be a lifting module where appropriate lifting techniques are modelled with opportunities for the trainee to engage in the behaviour, with corrective feedback and reinforcement. This active approach would be used along with the passive techniques of files, booklets, and posters.
4. The use of reinforcement of safe behaviour, based on the performance of both individuals and small work groups. The emphasis on group performance may be used to enhance group identification and concern for other workers of their small work group. The reinforcements need to be relevant, immediate, and tangible. (For example: quarterly, group based bonuses, if allowed by contract.)
5. The training of supervisors in recognition and evaluation of safety-related behaviours. There is a need to have objective standards of evaluation to provide valid feedback to the workers.
6. The continuation of data-based assessment of each functional level at XYZ Company to develop assessment and training strategies that are specific to the nature of the job rather than general and generic.