

Dr. Tony Alessandra
Assessments 24x7
San Diego, CA

Dear Dr. Alessandra –

A few weeks ago we completed the initial battery of ASI analyses yielding a Certificate of Compliance for Assessments 24x7. The results showed Very Good to Excellent results for three of the four DISC themes. There was an Acceptable score for the “I” traits, showing a Cronbach’s Alpha of .74, at the mid-range of the Acceptable criteria. Your office asked our assistance and guidance conducting follow-up research activity, selection of the weakest words (namely, those words that did not sustain the mean), and statistical analysis of the instrument with the new selected words.

This letter is to confirm that the research and statistical activity is completed. We have good news: Because of our work in recommending stronger words, and your field-testing those words, we have observed a statistical boost in Cronbach’s Alpha from .74 (Acceptable) to .83 (Very Good). This is a remarkable .09 boost in Cronbach’s Alpha after one research session of revision and subsequent statistical verification.

The result of this effort now shows a combined Cronbach Alpha observation of .87 (an overall Very Good ranking of the assessment). This makes the A24x7 DISC assessment one of the highest Cronbach scores in the DISC marketplace. This is a significant achievement, and the attached up-dated version of the DISC Data Reliability report confirms the results in the table on page 7.

You should feel very good about the efforts to make the A24x7 DISC report one of the best in the marketplace. As questions emerge, please feel free to contact us.

We wish you the best,

Dennis W. Koerner, PhD
President & CEO

Russell J. Watson, EdD
Chief Psychologist



REPORT NUMBER: A247-DISC-REL-190828
ORIGINAL ISSUE DATE: August 28, 2019

EVALUATION CENTER
Assessment Standards Institute
5865 Ridgeway Center Parkway, Suite 300
Memphis, TN 38120

RENDERED TO

Assessments 24x7
San Diego, CA

PRODUCT EVALUATED: DISC Assessment
EVALUATION PROPERTY: DATA RELIABILITY

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2. Introduction

This document is provided as a tool for end-users of DISC Assessments to allow comparisons between the DISC Assessment and other four-dimensional models in the marketplace.

All DISC instruments, and most similar instruments, are *ipsative* in design. That is, they are self-report inventories that measure *qualities* (traits) as individuals perceive those traits within themselves, and they ask the respondent to choose one trait at the exclusion of the others. This is done via either/or, most/least, or rank-order responses to the instrument. The result is *not* an absolute set of scores that would easily fit in a normative field, but rather a *relative* set of scores that applies to an individual's self-perception. The success of all self-report instruments depends on the insight, candor, honesty, and insight of the respondent. We will provide the essential types of statistical analysis herein, and we caution the reader to be aware of over-analyzing ipsative data. Some companies produce many pages of tables applying normative statistical rules to ipsative data, and we caution the reader to be aware of this. DISC instruments do not measure *quantities* like levels of cholesterol or blood pressure, but rather *qualities* that an individual report about themselves.

APA Guidelines

Evaluation was conducted in accordance with the Standards for Educational and Psychological Testing; developed jointly by the American Educational Research Assn. (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME).

Evaluation Dates

- Data evaluation began August 26, 2019.
- Data evaluation was completed on August 28, 2019.

3. Test Data Preparation

3.1 SAMPLE SELECTION

Sample data was submitted to ASI directly from the client and were not independently selected for testing. Samples are requested to:

- Be a sufficient number to represent the general population.
- Be randomly selected.

The sample panels were received at the ASI Evaluation Center by email on August 26, 2019.

- **SAMPLE SIZE: N = 3,212 for Influencing Style**
- **SAMPLE SIZE: N = 10,000 for other DSC Styles**

3.2 DATA CLEANING

Upon receipt of the samples at ASI, the data was downloaded and cleaned as follows:

1. **Missing Values** – There were no missing values.
2. **Duplicates** – Duplicate entries were removed if present.
3. **Categorization** – Data was categorized and labeled by attribute type for the appropriate comparison.

4. Testing and Evaluation Methods

TEST STANDARDS

Analysis of the data was conducted using standard statistical methods. The statistical method employed was:

- Cronbach's Alpha

Cronbach's alpha

This technique is regarded as one of the most robust measures of reliability and presents the highest 'bar' from which to compare. The readers should note that Cronbach's alpha is the method selected by HRD Press authors and researchers for this instrument, because of its high standards. The reader is encouraged to compare reliability coefficients presented herein to other vendors, and also to ask those vendors which reliability formulas they used to compute their reliability coefficients.

Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency.

Cronbach's alpha is computed by correlating the score for each scale item with the total score for each observation (usually individual survey respondents or test takers), and then comparing that to the variance for all individual item scores:

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^k \sigma_{y_i}^2}{\sigma_x^2}\right)$$

...where: k refers to the number of scale items

$\sigma_{y_i}^2$ refers to the variance associated with item i

σ_x^2 refers to the variance associated with the observed total scores

Cronbach’s alpha is thus a function of the number of items in a test, the average covariance between pairs of items, and the variance of the total score.

The resulting alpha coefficient of reliability ranges from 0 to 1 in providing this overall assessment of a measure’s reliability. If all of the scale items are entirely independent from one another (i.e., are not correlated or share no covariance), then alpha = 0; and, if all of the items have high covariances, then alpha will approach 1 as the number of items in the scale approaches infinity. In other words, the higher the alpha coefficient, the more the items have shared covariance and probably measure the same underlying concept.

Although the standards for what makes a “good” alpha coefficient are entirely arbitrary and depend on your theoretical knowledge of the scale in question, many methodologists recommend a minimum alpha coefficient between 0.70. Alpha coefficients that are less than 0.7 are usually unacceptable.

Researchers generally use the following guidelines to assess the data and help them interpret test-retest reliability coefficients:

- Coefficient below 0.70 are considered suspect, **Questionable**
- Coefficients above 0.70 to 0.80 are considered **Acceptable**
- Coefficients above 0.80 to 0.90 are considered **Very Good**
- Coefficients above 0.90 to 1.00 are considered **Excellent**

5. Testing and Evaluation Results

Cronbach's Alpha Reliability: Table 1

Source	Style	Alpha	N
NP	Dominance	0.93	10,000
NP	Influencing	0.83	3,212
NP	Steadiness	0.88	10,000
NP	Conscientious	0.85	10,000

Descriptive Statistics: Table 2

Source	Style	Mean	SE	STD	Median	N
NP	Dominance	39.8	0.17	17.0	37.5	10,000
NP	Influencing	58.6	0.39	22.1	62.5	3,212
NP	Steadiness	58.9	0.17	17.1	60.2	10,000
NP	Conscientious	57.6	0.15	18.3	58.9	10,000

* NP denotes Not Provided

6. Conclusions

The data submitted for evaluation passed all acceptable standards and is therefore awarded ASI Certification.

Certified
August 28, 2019



7. Document Review

ASI TESTING SERVICES

Signed: *Russel J. Watson, Ed.D.*
Chief Psychologist

Signed: *Dennis W. Koerner, Ph.D.*
Chief Technical Officer



REPORT NUMBER: A247-DISC-VAL-190814
ORIGINAL ISSUE DATE: August 14, 2019

EVALUATION CENTER
Assessment Standards Institute
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RENDERED TO

Assessments 24x7
San Diego, CA

PRODUCT EVALUATED: DISC Assessment
EVALUATION PROPERTY: CONSTRUCT VALIDITY

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2. Introduction

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All DISC instruments, and most similar instruments, are *ipsative* in design. That is, they are self-report inventories that measure *qualities* (traits) as individuals perceive those traits within themselves, and they ask the respondent to choose one trait at the exclusion of the others. This is done via either/or, most/least, or rank-order responses to the instrument. The result is *not* an absolute set of scores that would easily fit in a normative field, but rather a *relative* set of scores that applies to an individual's self-perception. The success of all self-report instruments depends on the insight, candor, honesty, and insight of the respondent. We will provide the essential types of statistical analysis herein, and we caution the reader to be aware of over-analyzing ipsative data. Some companies produce many pages of tables applying normative statistical rules to ipsative data, and we caution the reader to be aware of this. DISC instruments do not measure *quantities* like levels of cholesterol or blood pressure, but rather *qualities* that an individual report about themselves.

APA Guidelines

Evaluation of the respondent data was conducted in accordance with the Standards for Educational and Psychological Testing; developed jointly by the American Educational Research Assn. (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME).

Evaluation Dates

- Data evaluation began August 8, 2019.
- Data evaluation was completed on August 14, 2019.

3. Test Data Preparation

3.1 SAMPLE SELECTION

Sample data was submitted to ASI directly from the client and were not independently selected for testing. Samples are requested to:

- Be a sufficient number to accurately represent the general population.
- Be randomly selected.

The sample panels were received at the ASI Evaluation Center by email on August 7, 2019.

SAMPLE SIZE: N = 10,000

3.2 DATA CLEANING

Upon receipt of the samples at ASI, the data was downloaded and cleaned as follows:

1. **Missing Values** – There were no missing values.
2. **Duplicates** – Duplicate entries were removed.
3. **Categorization** – Data was categorized and labeled by attribute type for the appropriate comparison.
4. **Data Transformation** – Data was transformed using appropriate methods as necessary for comparison and use in statistical equations.

4. Testing and Evaluation Methods

TEST STANDARDS

Analysis of the data was conducted using standard statistical methods. The statistical method employed was:

- Construct Validity

Construct Validity

Construct validity is one of the most central concepts in psychology. It is the degree to which a test measures what it claims, or purports to be measuring. Researchers generally establish the construct validity of a measure by correlating it with a number of other measures and arguing from the pattern of correlations that the measure is associated with these variables in theoretically predictable ways.

Overall, it is the appropriateness of inferences made on the basis of observations or measurements (often test scores), specifically whether a test measures the intended construct. Constructs are abstractions that are deliberately created by researchers in order to conceptualize the latent variable which is correlated with scores on a given measure although it is not directly observable). Construct validity examines the question: Does the measure behave like the theory says a measure of that construct should behave?

Correlations

The purpose of a correlation is to display the level or correspondence or *co-relationship* between two variables. An item or trait correlated against itself yields a perfect correlation of 1.0, that's as high as the scale goes. A completely opposite correlation yields a coefficient of -1.0, and that's a perfect inverse or negative correlation. Scores that have no co-relationship at all, show a correlation coefficient at or near zero.

That is, all correlations follow a spectrum of scores beginning at +1.0, passing through zero, and ending at -1.0. The closer a correlation is to zero, the lower the correlation. The more a correlation coefficient moves away from zero, in either direction, the stronger the correlation becomes. The more a correlation coefficient approaches +1.0 or -1.0, the stronger the correlation becomes.

The reader should note that there is no agreed-upon table in the world of statistics that 'grades' a correlation as weak or strong in absolute, definitive terms. As a result, specific commentary by a field of researchers may vary with regard to what they consider to be 'strong' or 'weak' correlations. The team of scientists at ASI have selected to establish the criteria as posted in this document. Other statisticians may present divergent opinions based on their own scientific observations and training.

Cross-lagged Panel Analysis

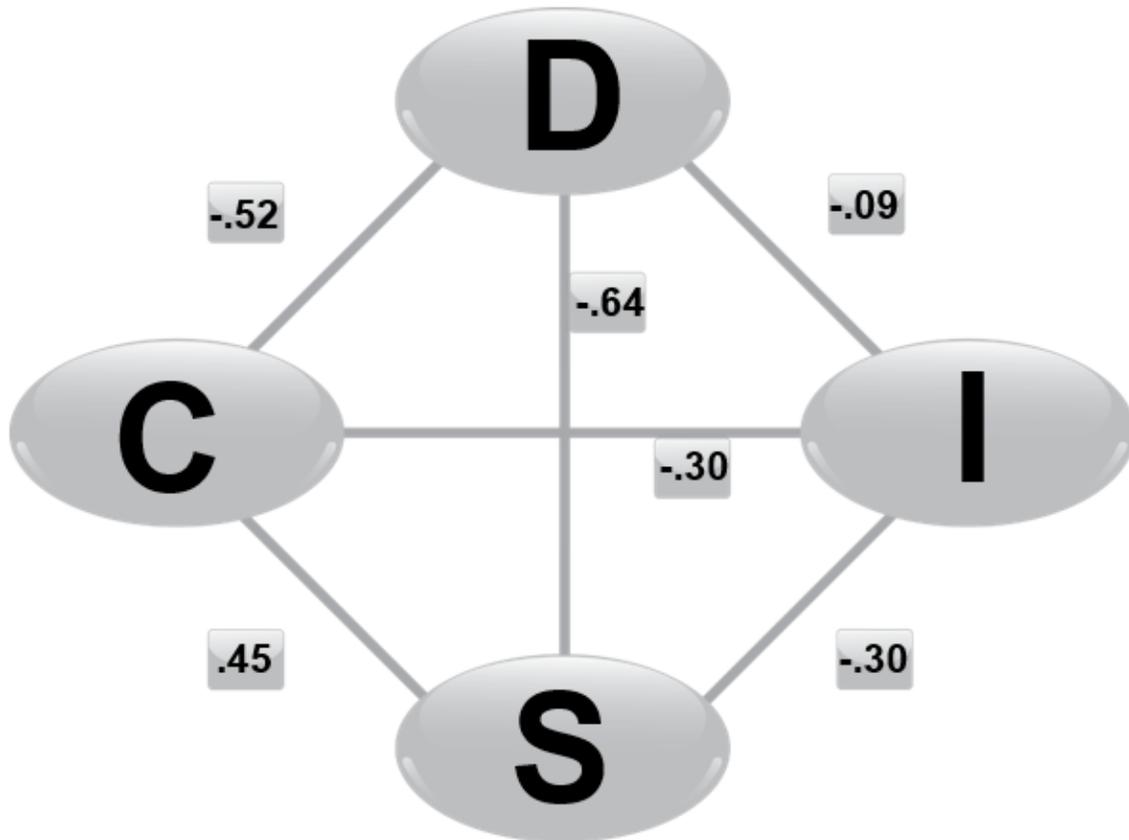
The cross-lagged panels on the following pages show the correlations of the variables measured in an at-a-glance method of comparison for the reader. This is the same data as in the correlation tables but shows a model by which the reader may observe the relationships in a graphical representation.

5. Testing and Evaluation Results

Pearson’s Correlation Coefficients, DISC Interactions: Table 1

	DI	DS	DC	ID	IS	IC	SD	SI	SC	CD	CI	CS
DI	1.00											
DS	0.41	1.00										
DC	0.23	0.85	1.00									
ID	-1.00	-0.41	-0.23	1.00								
IS	-0.45	0.62	0.63	0.45	1.00							
IC	-0.57	0.40	0.67	0.57	0.88	1.00						
SD	-0.41	-1.00	-0.85	0.41	-0.62	-0.40	1.00					
SI	0.45	-0.62	-0.63	-0.45	-1.00	-0.88	0.62	1.00				
SC	-0.35	-0.33	0.22	0.35	-0.02	0.46	0.33	0.02	1.00			
CD	-0.23	-0.85	-1.00	0.23	-0.63	-0.67	0.85	0.63	-0.22	1.00		
CI	0.57	-0.40	-0.67	-0.57	-0.88	-1.00	0.40	0.88	-0.46	0.67	1.00	
CS	0.35	0.33	-0.22	-0.35	0.02	-0.46	-0.33	-0.02	-1.00	0.22	0.46	1.00

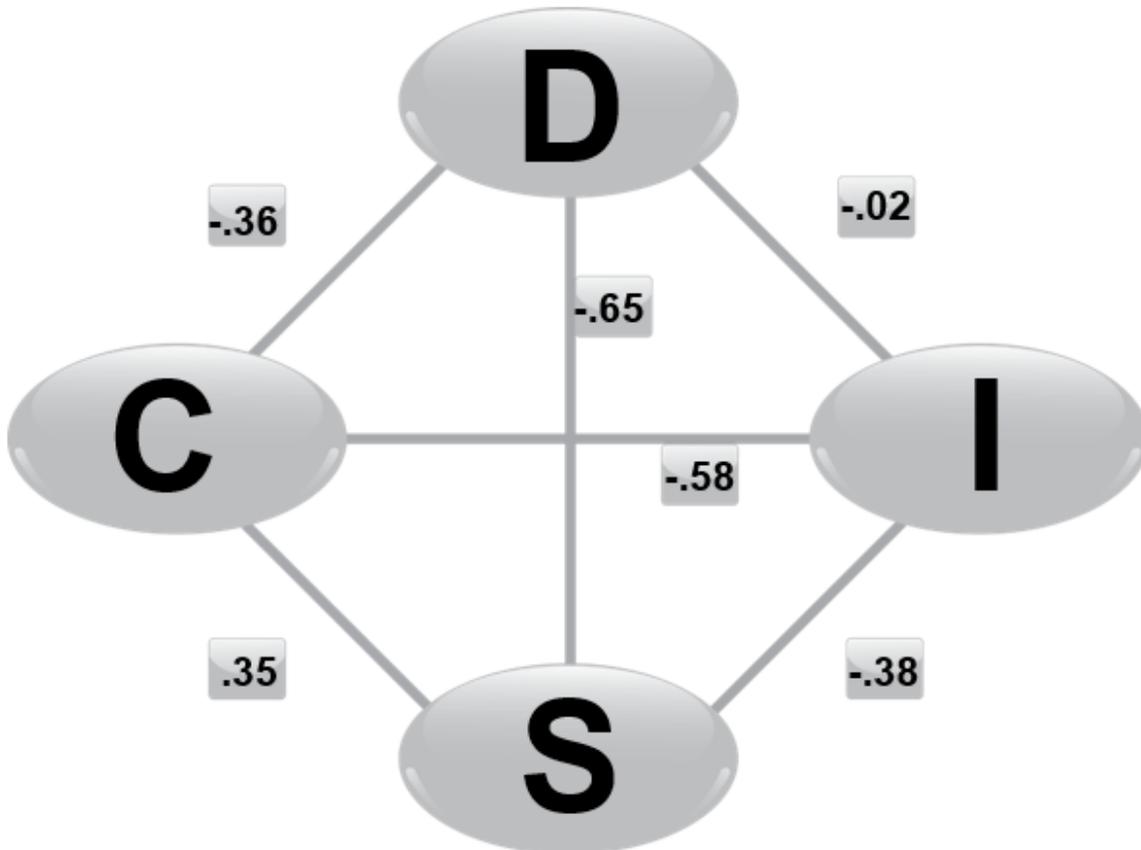
Cross Lagged Correlation: NATURAL STYLE: Graph 1



Correlation Data for DISC Natural Style: Table 2

	<i>D_N</i>	<i>I_N</i>	<i>S_N</i>	<i>C_N</i>
<i>D_N</i>	1			
<i>I_N</i>	-0.0904	1		
<i>S_N</i>	-0.6443	-0.3039	1	
<i>C_N</i>	-0.5223	-0.5544	0.452	1

Cross Lagged Correlation: ADAPTED STYLE: Graph 2



Correlation Data for DISC Adapted Style: Table 3

	<i>D_A</i>	<i>I_A</i>	<i>S_A</i>	<i>C_A</i>
<i>D_A</i>	1			
<i>I_A</i>	-0.0174	1		
<i>S_A</i>	-0.6525	-0.3858	1	
<i>C_A</i>	-0.3638	-0.5852	0.34654	1

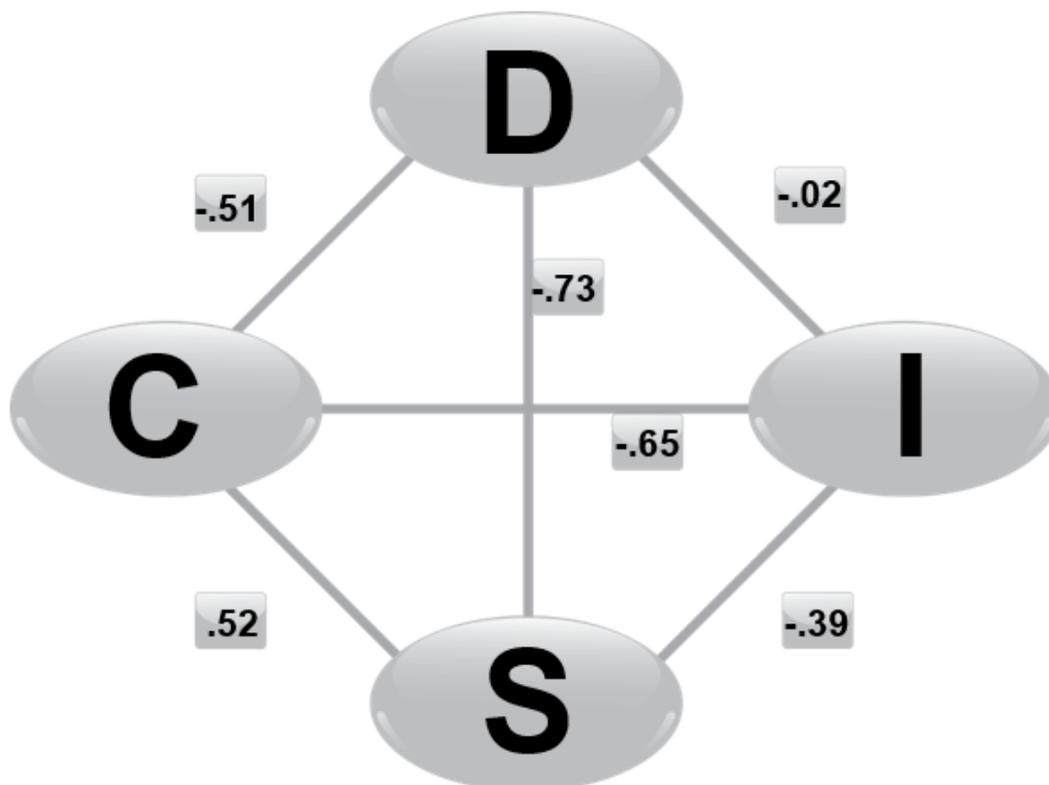
Description

The DISC model for construct validity proposes that opposite scales (e.g., D and S or I and C) should have strong negative correlations and moderate positive or negative correlations to adjacent scales (e.g., D and I). In this evaluation the primary measure is the negative correlation of opposite scales. The correlations among the six scales shown in the composite table and graph below support the general model for DISC construct validity. That is, strong negative correlations are observed between the opposite measures.

Cross Lagged Correlation: Composite STYLE: Table 3

	<i>D</i>	<i>I</i>	<i>S</i>	<i>C</i>
<i>D</i>	1			
<i>I</i>	-0.0244	1		
<i>S</i>	-0.7349	-0.3919	1	
<i>C</i>	-0.5126	-0.6556	0.52355	1

Cross Lagged Correlation: Composite STYLE: Table 3



6. Conclusions

The data submitted for evaluation passed all acceptable standards and is therefore awarded ASI Certification.

Certified
August 14, 2019



7. Document Review

ASI TESTING SERVICES

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