

# **Assessments 24x7 LLC DISC Assessment**

2013 – 2014

## **Construct Reliability and Validity Update Report**

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### **Executive Summary**

We provide this document as a tool for end-users of the Assessments 24x7 LLC (**A24x7**) Online DISC Assessment to allow comparisons between the A24X7 Online DISC Assessment and other four-dimensional models in the marketplace. There are many models using the four-dimensional design and most are based on the initial work of Carl Jung. It is helpful to have some basic information about the entire design, as well as some 'intelligence' into other style patterns, different from one's own. The A24X7 Online DISC Assessment helps to answer those needs.

This document serves as a base from which to compare other four-dimensional models, and for users of the A24X7 Online DISC Assessment to compare their own statistical work. This document is based on an analysis of over 28,200 respondents, and is based on a DISC instrument that was originally developed in 1980, with revisions in 1984, 1989, and 2001. The data provided in this report is data obtained since 2001, and is one of the few online DISC instruments using exclusively 21<sup>st</sup> Century data.

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. 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 reports about themselves. One person might perceive him or herself as possessing "high D" qualities, whereas peers might perceive otherwise.

## Scale characteristics

The A24X7 Online DISC Assessment is a forced-choice instrument like many others in the marketplace. Variations among the instruments largely come from specific word choices and selections. We have conducted robust factor analysis with the words selected, and have attempted to control for typical instrument variability, such as social desirability of certain word choices. This assists in building an instrument with higher degrees of construct reliability.

## Descriptive Statistics

Descriptive statistics are measures of central tendency that *describe* a set of data in comparable terms. Most essential are the measures of mean and standard deviation, to allow the audience to view the arithmetic average and the spread of scores. N for the sample below is 28,204 cases.

Scale	Mean	Std. Dev.
Adapted Style <b>D</b>	5.26	3.46
Adapted Style <b>I</b>	5.61	3.52
Adapted Style <b>S</b>	6.20	3.23
Adapted Style <b>C</b>	5.60	2.87
Natural Style <b>D</b>	7.82	3.97
Natural Style <b>I</b>	4.10	2.94
Natural Style <b>S</b>	3.46	2.09
Natural Style <b>C</b>	6.15	2.66

## Reliability

Reliability is a measure of the internal consistency of an instrument or assessment. Reliability on an identical set of data varies because of a wide array of choices for specific formulas to apply to that data. Reliability is a common statistic, and one that should always be considered when evaluating instruments of any type. Realize also that reliability is rather easy to obtain, if care is taken in the design of an instrument. Additionally, reliability of any instrument can be easily increased simply by increasing the number of items in the

instrument. There are several measures of reliability, and some will be explained briefly below.

### **Test-Retest reliability**

This is a measure of the consistency of scores within the same population when re-tested with the identical instrument. With academic tests, this may yield a higher score on a re-test because of learning additional content from the test. When this type of statistic is applied, it is important to know the time differential between the two administrations of the instruments. With a self-report instrument, such as A24X7 Online DISC™ the statistic is less corrupted by subsequent administrations of the instrument because it is a self-report inventory. That said, remember that all self-report instruments are subject to the respondent's level of honesty, integrity, and insight.

### **Alternate-form reliability**

When the subject takes two similar forms (but not identical forms), of the instrument, this is alternate-form reliability. Like test-retest methods, the time delay from first to second administration should be posted along with the statistics. Similar situations apply to this method as with the test-retest methods.

### **Split-half reliability**

This method involves only one administration of an instrument, and then 'splits' the instrument in half by using odd numbered items as one set of scores, and even numbered items as the second set of scores, then correlates the two sets of variables. The advantage of this method is that subjects take only one instrument, and it removes the passage of time as an extraneous variable.

### **Kuder-Richardson reliability**

Like the split-half technique, this method also uses only one administration of the instrument. It measures the consistency of all items on an instrument calculating the mean of all split-half coefficients based on a variety of splittings of an instrument.

## **Spearman-Brown reliability**

This method employs a formula that doubles the number of items in an instrument; as a result this method of determining reliability usually yields higher reliability coefficients. As a result, critics of this method say that it artificially raises the reliability of an instrument.

## **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.

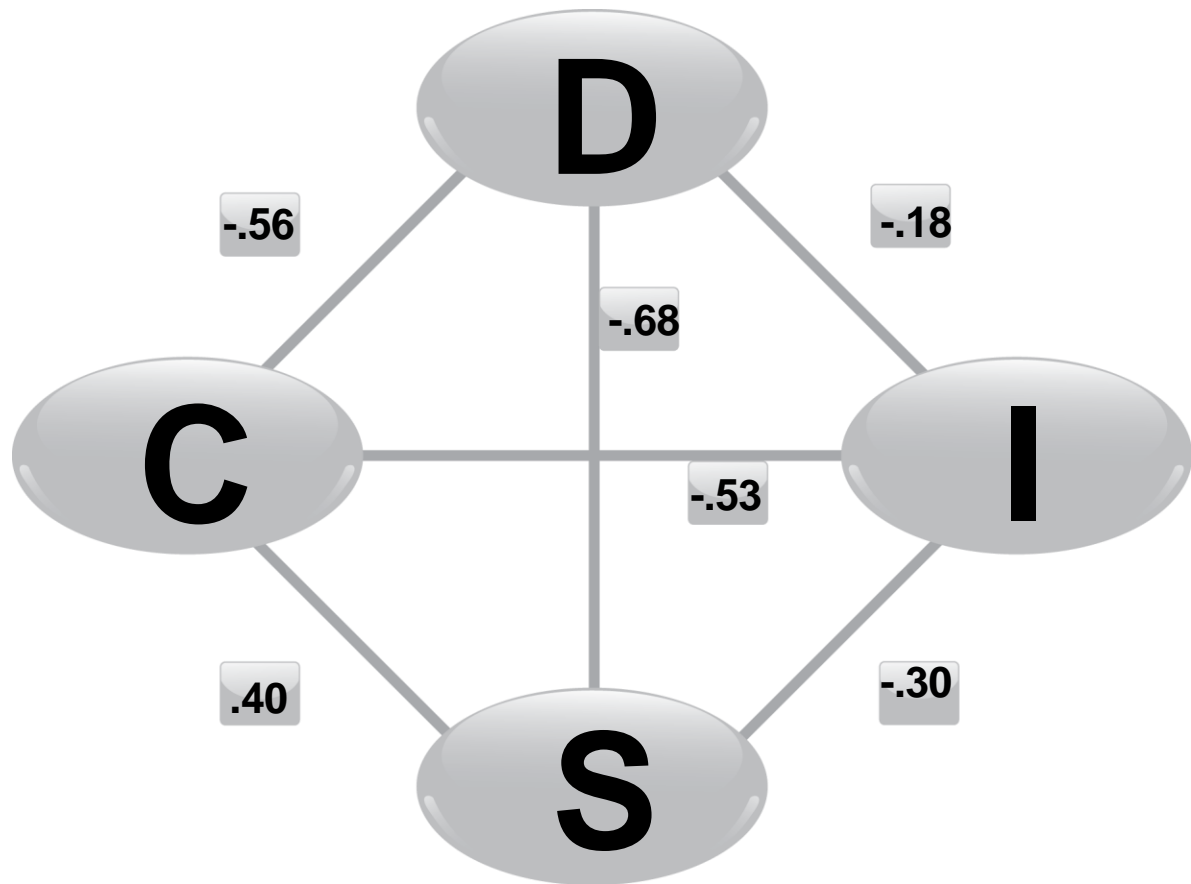
## **Cronbach's alpha**

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 A24X7 Online DISC™ 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. N = 28,204

## **Cronbach's alpha reliability table**

<b>Scale item</b>	<b>Cronbach's alpha</b>
Adapted Style <b>D</b>	<b>.80</b>
Adapted Style <b>I</b>	<b>.78</b>
Adapted Style <b>S</b>	<b>.77</b>
Adapted Style <b>C</b>	<b>.74</b>
Natural Style <b>D</b>	<b>.81</b>
Natural Style <b>I</b>	<b>.79</b>

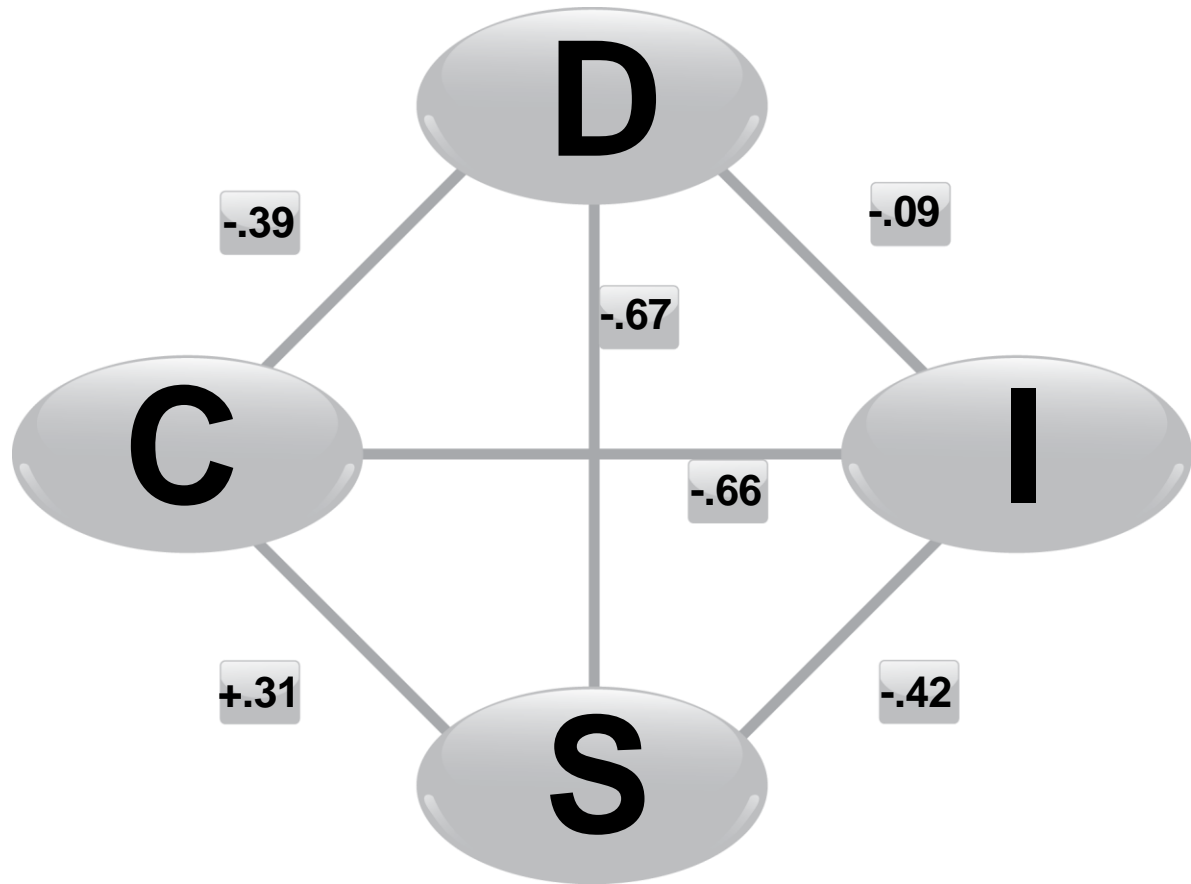
Natural Style <b>S</b>	<b>.65</b>
Natural Style <b>C</b>	<b>.75</b>



**Cross-lagged correlation of Natural Style D-I-S-C results.**

The Cross-Lagged correlation chart allows for at-a-glance review of the relationship between each of the Natural Style D-I-S-C components. To read the chart above, notice the correlation number between each of the D-I-S-C variables. For example, at the top is the “D” trait, and notice its relationship with the “I” trait is a  $-.18$ . This means that in the Natural Style the “D” and “I” traits have a slight negative correlation. That is, as the “D” traits go up, the “I” traits go down very slightly. Typically “D” and “I” traits have very soft correlations.

Notice that most of the correlations are negative. This is typical based on the response pattern of this or any DISC instrument. One is always choosing an answer ‘at the expense’ of an alternative. Notice also that the strongest inverse (negative) correlation is between the “D” traits and the “S” traits at  $-.68$ , a moderately strong inverse correlation. Finally notice that the only direct (positive) correlation is between the Natural Style “S” and “C” traits at a  $+.40$ . This means that as the “S” traits go up, the “C” traits also go up in a weak relationship, and the converse.



Cross-lagged correlation of **Adapted Style** D-I-S-C results.

The Cross-Lagged correlation chart allows for at-a-glance review of the relationship between each of the Adapted Style D-I-S-C components. To read the chart above, notice the correlation number between each of the D-I-S-C variables. For example, at the top is the “D” trait, and notice its relationship with the “I” trait is a -.09. This means that in the Natural Style the “D” and “I” traits have almost no correlation. That is, as the “D” traits go up, the “I” may go either up or down, with very little dependence on the “D” scores. Typically “D” and “I” traits have very soft correlations.

Notice that most of the correlations are negative. This is typical based on the response pattern of this or any DISC instrument. One is always choosing an answer ‘at the expense’ of an alternative. Notice also that the strongest inverse (negative) correlation is between the “D” traits and the “S” traits at -.67, a moderately strong inverse correlation. Finally notice that the only direct (positive) correlation is between the Natural Style “S” and “C” traits at a +.31. This means that as the “S” traits go up, the “C” traits also go up in a weak relationship, and the converse.

## Pearson's Correlation

N = 28,204

Scale	WD	WI	WS	WC	BD	BI	BS	BC
Adapted Style <b>D</b> Correlation Sig. (2-tailed)	1.000							
Adapted Style <b>I</b> Correlation Sig. (2-tailed)	-.092* .039	1.000						
Adapted Style <b>S</b> Correlation Sig. (2-tailed)	-.679** .000	-.421** .000	1.000					
Adapted Style <b>C</b> Correlation Sig. (2-tailed)	-.390** .000	-.656** .000	-.313* .035	1.000				
Natural Style <b>D</b> Correlation Sig. (2-tailed)	-.728** .000	.052* .019	-.625** .000	-.316 ** .002	1.000			
Natural Style <b>I</b> Correlation Sig. (2-tailed)	-.045* .012	.600** .000	-.180* .028	-.496** .000	.179** .000	1.000		
Natural Style <b>S</b> Correlation Sig. (2-tailed)	-.573** .000	-.273** .000	.612** .000	.404** .001	-.681** .000	-.297** .000	1.000	
Natural Style <b>C</b> Correlation Sig. (2-tailed)	-.450** .000	-.461** .000	.519** .000	.590** .000	-.567** .000	-.532** .000	.457** .000	1.000

\* Statistically significant at .05 alpha level (two-tailed).

\*\* Statistically significant at .01 alpha level (two-tailed).

The above information was determined from a random sample of a group of 3,010 individuals throughout a wide spectrum of US businesses for the years 2001-2002. Other specific statistical investigations have been conducted. These include:

- ANOVA
- Two-way mixed effect model (for internal consistency measures)
- AMOS Structural equation factor modeling
- Factor Analysis
  - Varimax Rotation method with Kaiser Normalization
- Correlations:
  - Cronbach's Alpha (table above)
  - Spearman's rho
  - Item-to-item correlation matrix
  - Interclass correlation coefficients