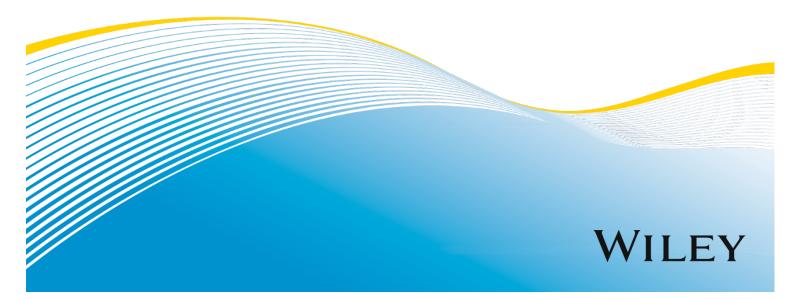# Estonian Validation Addendum

to Everything DiSC® Research Report for *Everything DiSC Workplace®* Assessment

WILEY

Estonia Validation: *Everything DiSC Workplace*®

The purpose of this **addendum** is to expand the *Everything DiSC® Research Report for Adaptive Testing Assessment* by Wiley (2012), with validation results from research conducted on the Estonian *Everything DiSC Workplace*® assessment. Included in this supplement are descriptions of the translation and validation of the Estonian *Everything DiSC Workplace* Adaptive Testing (AT) items and Continua Scale items. For information about the background and research on Everything DiSC and the circumplex representation of the DiSC® model, including information about the validation process, please consult the **Everything DiSC Research Report for Adaptive Testing Assessment** (hereafter referred to as the AT Research Report).

Description of the Estonian Validation

Sample

A total of 816 Estonian speaking men (50%) and women (50%) responded to a total of 243 items. All participants were working adults. The demographics of the sample are shown in Table 1.

Table 1. Everything DiSC® Assessment Development Estonian Sample Demographics

Gender	Male	50.0%
	Female	50.0%
Age	18–25	5%
	26–30	13%
	31–35	20%
	36–40	20%
	41–45	19%
	46–50	11%
	51–55	5%
	56–60	3%
	61+	4%

EVERYTHING DiSC
A Wiley Brand

Education	Põhiharidus	1%
	Kutseharidus/tehniline haridus	9%
	Keskharidus/Kõrgkoolis õppimine või tööturule sisenemine	15%
	Kõrgharidus - bakalaureuse-, magistri- või doktorikraad	75%
Region of Residence	Euroopa	97%
	Other	3%
Region Describing Ancestor's Origin	Euroopa	98%
	Other	2%
Employment	Töötaja (mitte juht)	49%
	Keskastme juht	40%
	Tippjuht	6%
	Ettevõtja	3%
	Other	2%
Industry	Avalik haldus	28%
	IT	13%
	Hulgimüük/Jaekaubandus	12%
	Haridus	11%
	Ehitus	8%
	Finants/Kindlustus/Kinnisvara	7%
	Tööstus	5%
	Äriteenused	3%
	Tervishoid	3%
	Transport/Kommunaalteenused	1%
	Other	9%

N=816

Reliability Measure: Internal Consistency for Workplace Items

The AT Research Report includes an overview of the validation of the Everything DiSC® assessment, stressing the importance of testing internal consistency. Analysis of internal consistency was performed on the Estonian items and is documented below. This analysis evaluates the degree of correlation among items that profess to measure the same thing. That is, each of the eight scales in the DiSC® model is measured using a series of different items (i.e., questions in the form of statements, such as *I am direct, I tend to be calm, I want things to be exact, I am lively).* Researchers recognize that if all of the items on a given scale (e.g., the D scale) are in fact measuring the same thing (e.g. Dominance), they should all correlate with each other to some degree. In other words, all of the items on a scale should be consistent with each other. A statistic called Cronbach´s alpha is usually regarded as the best method for evaluating internal consistency.

This analysis was performed on the Estonia data to ensure that the construct developed and tested on a US population could be adapted to an Estonian population using the translated items and the Estonian test group.

Cronbach´s alpha expresses the degree of consistency as a specific number, which typically varies between 0 and 1. If the value of alpha is 0 then there is no relationship among the items/statements that have been grouped as a scale. On the other hand, if all the statements in an assessment measure in an identical fashion, then the value of alpha will be 1.0, which indicates absolute internal consistency. Cronbach´s alpha is calculated separately for each of the assessment´s eight DiSC scales.

The following guidelines are frequently used to evaluate the quality of a scale´s internal reliability: alpha values above .70 are generally considered acceptable and satisfactory, alpha values above .80 are usually considered quite good, and values above .90 are considered to reflect exceptional internal consistency. In fact, alpha values that are too high may indicate that the items on a scale are redundant or too similar, suggesting that the respondent is asked to respond to the same thing many times repeatedly, thus not providing any new information about the respondent.

In the Everything DiSC assessment, all respondents are required to respond to the items on the eight *base scales*. A computer algorithm then looks at the variance of a person's responses to the items on each of those scales. If the variance is above a predetermined cutoff, the person is issued five additional items. This person is said to have received the *extended scale*. As shown in Table 2, the correlations between the base and extended scales range from .87 to .97, suggesting that there is a high degree of equivalence between them.

Alpha coefficients were calculated for the Estonian sample (N=816). The base scales on the Everything DiSC instruments demonstrate good-to-excellent internal consistency, as shown by the alpha values listed in Table 2. All reliabilities are well above .70, with a median of .83. The median reliability for the extended scales was .87.

Table 2. Internal consistency of the Everything DiSC® Scales in Estonian

Scale	Base Scale		Extended Scale		Correlation between base and extended scales
	#items	Alpha	#items	Alpha	
DI	9	.84	14	.90	.97
I	7	.86	12	.91	.96
IS	9	.80	14	.87	.95
S	10	.81	15	.84	.95
SC	11	.86	16	.90	.96
C	11	.84	19	.84	.87
CD	11	.80	19	.86	.93
D	8	.79	13	.87	.96

N=816

Construct Validity: Scale Intercorrelations for DiSC® Scales

As part of examining the construct validity of the DiSC® scales, the Estonian item scores from each respondent on the eight DiSC scales were examined. The DiSC model proposes that adjacent scales (e.g., Di and i) will have moderate correlations. That is, these correlations should be considerably smaller than the alpha reliabilities of the individual scales. For example, the correlation between the SC and S scale (.38) should be substantially lower than the alpha reliability of the SC (.86) or S (.81). Moreover, scales that are theoretically opposite (e.g., i and C) should have strong negative correlations. Table 3 shows data obtained from a sample of 816 respondents who completed the Everything DiSC assessment in Estonian. The correlations among all eight scales show strong support for the model. That is, we find moderate positive correlations among adjacent scales and strong negative correlations between opposite scales.

Table 3. Scale Intercorrelations

	Di	i	iS	S	SC	C	CD	D
Di	**.84**							
i	.49	**.86**						
iS	.09	.49	**.80**					
S	-.46	-.12	.39	**.81**				
SC	-.77	-.58	-.25	.38	**.86**			
C	-.57	-.73	-.52	.03	.59	**.84**		
CD	.06	-.25	-.58	-.60	-.23	.08	**.80**	
D	.48	.11	-.29	-.65	-.55	-.31	39	**.79**

Cronbach´s alpha reliabilities are shown in bold along the diagonal, and the correlation coefficients among scales are shown within the body of the table. Correlation coefficients range from -1 to +1. A correlation of + 1 indicates that two variables are perfectly positively correlated such that as one variable increases, the other variable increases by a proportional amount. A correlation of -1 indicates that two variables are perfectly negatively correlated, such that as one variable increases, the other variable decreases by a proportional amount. A correlation of 0 indicates that the two variables are completely unrelated. N=816, as shown in Table 1.

Reliability Measure: Internal Consistency for Priority Scales in Estonian

Alpha internal reliability coefficients were calculated for each of the eight *Everything DiSC Workplace*® priorities, as shown in Table 4, using a sample of 816 Estonian speaking participants. These coefficients range from .76 to .83, with a median reliability of .80. Therefore, these scales demonstrate acceptable to good internal consistency. This finding suggests that each of these priority scales is measuring a single, unified construct.

Table 4. Alpha Coefficients of the Priority Scales in Estonian

Priority Scale	Number of items	Alpha
Results	8	.82
Action	10	.81
Enthusiasm	9	.78
Collaboration	13	.79
Support	12	.78
Stability	10	.83
Accuracy	8	.81
Challenge	11	.76

N=816

Reliability Measure: Internal Consistency for Continua Scales in Estonian

The *Everything DiSC*® *Comparison Report* allows any two Everything DiSC participants to see their similarities and differences in six out of nine areas. These scales were also constructed on the Estonian items and below are the research findings. As this is a supplement, please consult section 7 (Comparison Report Research) in the AT Research Report for information about the background of the scales and selection of the six out of eleven possible continua.

Alpha internal reliability coefficients were calculated for each of the nine continua, as shown in Table 5, using a sample of 816 Estonian speaking participants. These coefficients range from .75 to .88, with a median reliability of .82. Therefore, these scales demonstrate acceptable to good internal consistency. This finding suggests that each of these continua scales is measuring a single, unified construct.

Table 5. Alpha Coefficients of the Continua Scales in Estonian

Continua Scale	Number of items	Alpha
Patient - Driven	10	.82
Soft-spoken - Forceful	10	.82
Outgoing - Private	9	.88
Calm - Energetic	11	.83
Skeptical - Accepting	12	.77
Daring - Careful	7	.76
Tactful - Frank	8	.78
Accommodating - Strong-willed	11	.75
Lively – Reserved	12	.86
Non-imaginative - Imaginative	5	.82
Non-structured - Structured	5	.76

N=816

Summary

Analysis of data collected on the Estonia version of the Everything DiSC® Adaptive Testing Assessment using Estonian participants indicate that the development of the assessment was successful. The findings show support for the **eight DiSC® Scales**, which are used as the basis of the *Everything DiSC Workplace®* profile, and the **eleven Continua Scales** used in the *Everything DiSC Comparison Report*.

- With high Cronbach´s alphas (.79-.86) for the eight base DiSC scales, the **reliability** of the instrument is very satisfactory. The assessment is adaptive and these reliability measures are results from analysis on the scale that only includes the base items. Moreover, the results include all responses, even responses from individuals who will receive the extra items to increase the precision of their score on a specific DiSC scale. Hence, this is a conservative measure because, dependent upon the scale, some of the respondents will be taking the extended scales (i.e., asked to respond to extra items).

- The construct **validity** of the eight DiSC scales, indicated by scale intercorrelations, supports the circumplex structure of the DiSC model. Using Estonian data, previous findings of the English Everything DiSC assessment were confirmed, with adjacent scales showing moderate correlations and opposite scales showing strong negative correlations, as predicted by the model.

- The **reliability** of the instrument on the eight *Everything DiSC Workplace* priority scales, indicated by internal consistency, shows acceptable to good degrees of consistency with Cronbach´s alphas ranging from .76 to .83.

- The **reliability** of the instrument on the eleven continua scales in the *Comparison Report*, indicated by internal consistency, shows acceptable to good degrees of consistency with Cronbach´s alphas ranging from .76 to .88.

- Further analysis on the circumplex structure including correlations between the Everything DiSC® scales and the scales of the NEO PI-R and 16PF® are thoroughly documented in the AT Research Report.