Power of Visual Complexity to Predict Visualization Trust Antecedents

Component	Type	Dimension	F Value	Pr(>F)
Visualization	Cognitive	Accuracy	F(2,172) = 1.4516	0.23705
Visualization	Cognitive	Clarity	F(2,172)= 13.2680	**4.378e-06**
Visualization	Affective	Aesthetic Cues (Like)	F(2,172)= 5.2460	**0.006144**
Visualization	Affective	Aesthetic Cues (Science)	F(2,172)= 0.7739	0.46280
Visualization	Affective	Aesthetic Cues (Clarity)	F(2,172)=5.8652	**0.003435**
Visualization	Affective	Aesthetic Cues (Pretty)	F(2,172)=0.1745	0.84001

Table 1: Results of linear regressions modeling the predictive power of complexity over the antecedents to trust in the visualization. The column names refer to the following: F Value refers to the effect size, Pr(>F) refers to the p-value. Significant p-values are highlighted in red

Power of Visual Complexity to Predict Data Trust Antecedents

Component	Type	Dimension	F Value	Pr(>F)
Data	Cognitive	Accuracy	F(2,445)= 0.5710	0.565365
Data	Cognitive	Coverage	F(2,445)= 4.2602	**0.014699**
Data	Cognitive	Clarity	F(2,445)=2.0103	0.135159
Data	Affective	Benevolence	F(2,445)=5.5160	**0.0043010**
Data	Affective	Aesthetic Cues	F(2,445)= 3.5134	**0.0306236**

Table 2: Results of linear regressions modeling the predictive power of complexity over the antecedents to trust in the data. The columns refer to the following: F Value refers to the effect size, Pr(>F) refers to the p-value. Significant p-values are highlighted in red

Trust Antecedents			**| Predictive Power on Behavior - Action**		
Component	**Type**	**Dimension**	**Est**	**SE**	**P**
Visualization	Cognitive	Accuracy	0.209960	0.088394	**0.0180**
Visualization	Cognitive	Clarity	-0.204032	0.099706	**0.0413**
Visualization	Affective	Aesthetic Cues (Like)	0.193871	0.090844	**0.0334**
Visualization	Affective	Aesthetic Cues (Science)	0.002497	0.006084	0.6817
Visualization	Affective	Aesthetic Cues (Clarity)	0.010479	0.004521	**0.0209**
Visualization	Affective	Aesthetic Cues (Aesthetic)	-0.007712	0.004803	0.1090
Visualization	Overall	Trust (Visualization)	0.100306	0.112715	0.3740

Trust Antecedents			**| Predictive Power on Behavior - Sharing**		
Component	**Type**	**Dimension**	**Est**	**SE**	**P**
Visualization	Cognitive	Accuracy	0.247475	0.085334	**0.00392**
Visualization	Cognitive	Clarity	-0.023522	0.096255	0.80706
Visualization	Affective	Aesthetic Cues (Like)	0.273754	0.087699	**0.00192**
Visualization	Affective	Aesthetic Cues (Science)	0.002743	0.005873	0.64077
Visualization	Affective	Aesthetic Cues (Clarity)	0.002493	0.004364	0.56814
Visualization	Affective	Aesthetic Cues (Aesthetic)	-0.002755	0.004637	0.55275
Visualization	Overall	Trust (Visualization)	0.054641	0.108813	0.61581

Table 3: Results of linear regressions modeling the predictive power of trust antecedents in predicting the behavioral outcomes of using the visualization in daily life and sharing with family and friends. The columns refer to the following: Est is the estimated slope of the linear regression, SE is standard error, and P is p-value.

Component	Type	Dimension	Abbreviation
Visualization	Cognitive	Accuracy	VCA
Visualization	Cognitive	Clarity	VCC
Visualization	Affective	Aesthetic Cues (Like)	VAL
Visualization	Affective	Aesthetic Cues (Science)	VAS
Visualization	Affective	Aesthetic Cues (Clarity)	VAC
Visualization	Affective	Aesthetic Cues (Pretty)	VAP
Visualization	Overall	Trust (Visualization)	VOT
Data	Cognitive	Accuracy	DCA
Data	Cognitive	Coverage	DCCo
Data	Cognitive	Clarity	DCCl
Data	Affective	Benevolence	DAB
Data	Affective	Aesthetic Cues	DAA
Data	Overall	Trust (Data)	DOT
Personality		Interpersonal Trust	INT
Personality		Trust in Science	TIS
Personality		Need for Cognition	NFC

Table 4: Labels for the variables used in the study.

	VCA	VCC	VAL	VAS	VAC	VAP	VOT	DCA	DCCo	DCCl	DAB	DAA	DOT	INT	TIS	NFC	VIF
VCA	1.00																2.20
VCC	0.478	1.00															3.08
VAL	0.543	0.698	1.00														2.61
VAS	0.372	0.252	0.324	1.00													1.42
VAC	0.275	0.511	0.411	0.338	1.00												1.56
VAP	0.212	0.235	0.371	0.205	0.337	1.00											1.26
VOT	0.593	0.513	0.600	0.407	0.283	0.224	1.00										3.16
DCA	0.504	0.373	0.443	0.418	0.220	0.142	0.670	1.00									3.32
DCCo	0.635	0.351	0.408	0.368	0.133	0.512	0.355	0.597	1.00								2.30
DCCl	0.459	0.234	0.358	0.307	0.118	0.126	0.586	0.658	0.557	1.00							2.23
DAB	0.436	0.662	0.511	0.204	0.384	0.153	0.421	0.403	0.426	0.292	1.00						2.13
DAA	0.352	0.532	0.455	0.173	0.240	0.072	0.455	0.388	0.377	0.335	0.544	1.00					1.69
DOT	0.550	0.386	0.474	0.441	0.235	0.192	0.753	0.811	0.614	0.691	0.386	0.418	1.00				4.39
INT	0.151	0.154	0.190	0.122	0.072	0.121	0.213	0.225	0.098	0.196	0.134	0.164	0.236	1.00			1.15
TIS	0.282	0.216	0.270	0.276	0.097	0.114	0.458	0.435	0.316	0.392	0.162	0.207	0.484	0.276	1.00		1.42
NFC	0.153	0.227	0.226	0.093	0.156	0.109	0.156	0.127	0.034	0.072	0.185	0.116	0.140	0.197	0.145	1.00	1.12

Table 5: VIF scores for the variables used in the study.

“I trust this visualization"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=1.7237	0.179624
data topic	F(1,437)=2.1181	0.146282
chart type	F(1,437)=0.0153	0.901530

“The visualization transparently includes all important elements of the data"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=0.9045	0.405508
data topic	F(1,437)=3.6503	0.056715
chart type	F(1,437)=0.2346	0.628354

“I find it easy to understand this visualization"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=17.4340	**5.193e-08**
data topic	F(1,437)=1.3412	0.2474470
chart type	F(1,437)=5.4865	**0.0196120**

“I like this visualization"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=2.7523	0.06489
data topic	F(1,437)=0.1467	0.70189
chart type	F(1,437)=4.5060	**0.03434**

“I would likely use this visualization and its information in my daily life"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=3.1170	**0.0452781**
data topic	F(1,437)=22.6624	**2.63e-06**
chart type	F(1,437)=0.3553	0.5514583

“I would likely share this visualization with my family, friends or on social media"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=4.7810	**0.008831**
data topic	F(1,437)=39.2920	**8.764e-10**
chart type	F(1,437)=1.0398	0.308433

“Scientific – Unscientific"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=0.9126	0.402250
data topic	F(1,437)=1.3426	0.247210
chart type	F(1,437)=1.4790	0.224584

“Clear – Unclear"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=8.5265	**0.000233**
data topic	F(1,437)=1.6676	0.197264
chart type	F(1,437)=4.0977	**0.043549**

“Pretty – Ugly"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=0.2689	0.76437
data topic	F(1,437)=0.2727	0.60178
chart type	F(1,437)=0.4211	0.51672

Table 6: Linear regression models for each of the antecedents to trust in visualization and overall trust in visualization.

“I trust this data"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=2.0456	0.1305443
data topic	F(1,437)=1.1346	0.2873781
chart type	F(1,437)=0.0039	0.9504631
data topic*chart type	F(1,437)=6.7144	**0.0098839**

“The data is accurate"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=0.5744	0.563471
data topic	F(1,437)=0.3369	0.561918
chart type	F(1,437)=1.0789	0.299510

“The data is complete and does not leave out important information"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=4.2992	**0.014159**
data topic	F(1,437)=3.3984	**0.065935**
chart type	F(1,437)=0.7611	0.383473

“I understand the meaning of this data well"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=2.0203	0.133847
data topic	F(1,437)=1.8857	0.170394
chart type	F(1,437)=0.7916	0.374093
data topic*chart type	F(1,437)=4.0327	**0.045241**

“The data is unbiased and trustworthy"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=5.7999	**0.003266**
data topic	F(1,437)=27.7817	**2.138e-07**
chart type	F(1,437)=2.2844	0.131404

“The data source was clearly displayed"

Predictor	F Value	Pr(>F)
chart complexity	F(2,437)=3.4900	**0.031354**
data topic	F(1,437)=2.0563	0.152295
chart type	F(1,437)=0.1567	0.692390

Table 7: Linear regression models for each of the antecedents to trust in data and overall trust in data.