Power of Visual Complexity to Predict Visualization Trust Antecedents

Component	Type	Dimension	F Value	Pr(>F)
Visualization	Cognitive	Accuracy	F(2,172) = 1.1713	0.31242
Visualization	Cognitive	Clarity	F(2,172)= 13.1577	**4.817e-06**
Visualization	Affective	Aesthetic Cues (Like)	F(2,172)= 2.0510	0.13174
Visualization	Affective	Aesthetic Cues (Science)	F(2,172)= 0.7351	0.48098
Visualization	Affective	Aesthetic Cues (Clarity)	F(2,172)=5.8240	**0.00357**
Visualization	Affective	Aesthetic Cues (Pretty)	F(2,172)=0.1729	0.84135

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)= 0.1393	0.86999
Data	Cognitive	Coverage	F(2,445)= 0.8979	0.40818
Data	Cognitive	Clarity	F(2,445)=0.4238	0.65480
Data	Affective	Benevolence	F(2,445)= 3.6406	**0.02702**
Data	Affective	Aesthetic Cues	F(2,445)= 1.1404	0.32060

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																1.45
VCC	0.306	1.00															1.54
VAL	0.334	0.319	1.00														1.38
VAS	0.213	0.219	0.204	1.00													1.32
VAC	0.229	0.380	0.196	0.336	1.00												1.41
VAP	0.162	0.210	0.214	0.205	0.338	1.00											1.22
VOT	0.435	0.372	0.453	0.367	0.264	0.213	1.00										2.39
DCA	0.264	0.272	0.269	0.300	0.187	0.056	0.487	1.00									2.03
DCCo	0.380	0.136	0.220	0.163	0.130	0.070	0.355	0.354	1.00								1.34
DCCl	0.239	0.205	0.252	0.204	0.103	0.008	0.469	0.633	0.304	1.00							1.93
DAB	0.333	0.462	0.276	0.140	0.312	0.126	0.304	0.335	0.268	0.266	1.00						1.63
DAA	0.300	0.292	0.287	0.165	0.200	0.035	0.333	0.328	0.241	0.284	0.451	1.00					1.40
DOT	0.313	0.248	0.299	0.315	0.238	0.201	0.642	0.472	0.296	0.514	0.317	0.281	1.00				2.03
INT	0.058	0.095	0.125	0.117	0.070	0.122	0.200	0.177	0.006	0.116	0.062	0.085	0.216	1.00			1.15
TIS	0.163	0.107	0.173	0.278	0.100	0.120	0.360	0.296	0.149	0.186	0.086	0.187	0.322	0.265	1.00		1.29
NFC	0.160	0.198	0.176	0.087	0.155	0.112	0.124	0.036	-0.017	0.403	0.121	0.076	0.132	0.188	0.133	1.00	1.12

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

	a. trust in the visualization		b. trust in the data	
Predictor	**F Value**	**Pr(>F)**	**F Value**	**Pr(>F)**
chart complexity	F(2,436)=1.8706	0.155263	F(2,436)=3.3220	**0.036998**
data topic	F(1,436)=0.2166	0.641837	F(1,436)=2.7195	0.099846
chart type	F(1,436)=0.4650	0.495637	F(1,436)=0.7745	0.379316
complexity*data topic	F(2,436)=4.6796	**0.009754**	F(2,436)=2.2899	0.102496
complexity*chart type	F(2,436)=0.5495	0.577635	F(2,436)=1.2957	0.274767
data topic*chart type	F(1,436)=0.0547	0.815267	F(1,436)=5.2844	**0.021989**
complexity*data topic*chart type	F(2,436)=0.1589	0.853166	F(2,436)=0.7187	0.487972
Age	F(1,436)=2.3175	0.128648	F(1,436)=0.4562	0.499778
Gender	F(3,436)=1.8331	0.140369	F(3,436)=1.7197	0.162190
State	F(45,436)=1.5870	**0.011404**	F(45,436)=2.2029	**2.891e-05**
Education	F(9,436)=2.6549	**0.005264**	F(9,436)=1.8929	0.051202
Parents' education	F(2,436)=0.8964	0.408805	F(2,436)=2.3683	0.094847
Language	F(3,436)=0.4837	0.693744	F(3,436)=0.4913	0.688504
Ethnicity	F(8,436)=1.2195	0.285606	F(8,436)=0.8571	0.552911
Income	F(18,436)=1.3369	0.160010	F(18,436)=1.9989	**0.008919**
Religion	F(4,436)=1.1495	0.332649	F(4,436)=1.9189	0.106266
Trust in Science	F(1,436)=64.8188	**7.892e-15**	F(1,436)=36.4827	**3.303e-09**
Interpersonal Trust	F(1,436)=6.8000	**0.009429**	F(1,436)=9.5140	**0.002169**
Need for Cognition	F(1,436)=2.4506	0.118207	F(1,436)=4.0109	**0.045826**

Table 6: Results of linear regression models predicting trust in the visualization / trust in the data, with chart complexity, data topic, chart type, and demographic / individual characteristics. 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.