EXPLORATORY ANALYSIS AND R SYNTAX

DESCRIPTIVES

Descriptive analysis of the initial 28 items comprising the questionnaire. It includes mean, standard deviation, skewness and kurtosis values, together with results from the normality test (Shapiro-Wilk test)

```
jmv::descriptives(
    data = data,
    vars = vars(ITEM 2A, ITEM 2B (F1), ITEM 2C (F1), ITEM 2D, ITEM 2E (F1), ITEM 2F (F1), ITEM 2G (F1), ITEM 2H (F1), ITEM 3A (F2), ITEM 3B (F2), I
    desc = "rows",
    missing = FALSE,
    min = FALSE,
    max = FALSE,
    skew = TRUE,
    kurt = TRUE,
    sw = TRUE)
```

Descriptives

					Skewness		Kurtosis		Shapiro-Wilk	
	N	Mean	Median	SD	Skewness	SE	Kurtosis	SE	W	p
ITEM 2A	306	3.89	4.00	0.381	-4.35416	0.139	23.7409	0.278	0.316	<.001
ITEM 2B (F1)	306	3.39	3.00	0.574	-0.38053	0.139	-0.0974	0.278	0.723	<.001
ITEM 2C (F1)	306	3.85	4.00	0.396	-2.86746	0.139	10.4544	0.278	0.417	<.001
ITEM 2D	306	3.30	3.00	0.658	-0.68156	0.139	0.6243	0.278	0.765	<.001
ITEM 2E (F1)	306	3.58	4.00	0.546	-0.91163	0.139	0.5010	0.278	0.666	<.001
ITEM 2F (F1)	306	3.71	4.00	0.517	-1.82146	0.139	4.1609	0.278	0.573	<.001
ITEM 2G (F1)	306	3.71	4.00	0.508	-1.68294	0.139	2.8966	0.278	0.577	<.001
ITEM 2H (F1)	306	3.71	4.00	0.517	-1.67818	0.139	2.8065	0.278	0.582	<.001
ITEM 3A (F2)	306	3.41	3.00	0.567	-0.40819	0.139	-0.1037	0.278	0.715	<.001
ITEM 3B (F2)	306	3.39	3.00	0.580	-0.41942	0.139	-0.0986	0.278	0.727	<.001
ITEM 3C (F2)	306	3.66	4.00	0.521	-1.30334	0.139	1.5641	0.278	0.618	<.001
ITEM 3D (F2)	306	3.57	4.00	0.570	-1.02066	0.139	0.6485	0.278	0.677	<.001
ITEM 3E (F2)	306	3.63	4.00	0.535	-1.18392	0.139	1.1687	0.278	0.639	<.001
ITEM 3F (F2)	306	3.47	4.00	0.612	-0.86884	0.139	0.6334	0.278	0.720	<.001
ITEM 4B (F3)	306	1.99	2.00	0.733	0.51244	0.139	0.2734	0.278	0.818	<.001
ITEM 4E (F3)	306	2.06	2.00	0.726	0.37484	0.139	0.0495	0.278	0.826	<.001
ITEM 4H (F3)	306	2.59	3.00	0.817	-0.21723	0.139	-0.4317	0.278	0.862	<.001
ITEM 4I	306	2.30	2.00	0.819	0.17846	0.139	-0.4712	0.278	0.864	<.001
ITEM 4J	306	2.08	2.00	0.742	0.30883	0.139	-0.1708	0.278	0.836	<.001
ITEM 4K (F3)	306	1.78	2.00	0.677	0.61181	0.139	0.5362	0.278	0.783	<.001
ITEM 4A	306	2.65	3.00	0.681	-0.30669	0.139	0.0340	0.278	0.811	<.001
ITEM 4C (F4)	306	2.55	3.00	0.755	-0.08736	0.139	-0.3127	0.278	0.849	<.001
ITEM 4D (F4)	306	2.52	3.00	0.865	-0.07094	0.139	-0.6453	0.278	0.875	<.001
ITEM 4F (F4)	306	2.36	2.00	0.819	0.00777	0.139	-0.5704	0.278	0.865	<.001
ITEM 4G (F4)	306	2.65	3.00	0.784	-0.19936	0.139	-0.3242	0.278	0.855	<.001
ITEM 4L (F4)	306	2.34	2.00	0.765	-0.00125	0.139	-0.4341	0.278	0.851	<.001
ITEM 4M (F4)	306	2.92	3.00	0.797	-0.58916	0.139	0.1580	0.278	0.830	<.001
ITEM 4N (F4)	306	2.70	3.00	0.785	-0.15885	0.139	-0.3773	0.278	0.856	<.001
ITEM 4B (F3)-R	306	3.01	3.00	0.733	-0.51244	0.139	0.2734	0.278	0.818	<.001
ITEM 4E (F3)-R	306	2.94	3.00	0.726	-0.37484	0.139	0.0495	0.278	0.826	<.001
ITEM 4H (F3)-R	306	2.41	2.00	0.817	0.21723	0.139	-0.4317	0.278	0.862	<.001
ITEM 4I- R	306	2.70	3.00	0.819	-0.17846	0.139	-0.4712	0.278	0.864	<.001
ITEM 4J - R	306	2.92	3.00	0.742	-0.30883	0.139	-0.1708	0.278	0.836	<.001
ITEM 4K (F3)-R	306	3.22	3.00	0.677	-0.61181	0.139	0.5362	0.278	0.783	<.001
ITEM 4A - R	306	2.35	2.00	0.681	0.30669	0.139	0.0340	0.278	0.811	<.001
ITEM 4C (F4)-R	306	2.45	2.00	0.755	0.08736	0.139	-0.3127	0.278	0.849	<.001
ITEM 4D (F4)-R	306	2.48	2.00	0.865	0.07094	0.139	-0.6453	0.278	0.875	<.001
ITEM 4F (F4)-R	306	2.64	3.00	0.819	-0.00777	0.139	-0.5704	0.278	0.865	<.001
ITEM 4G (F4)-R	306	2.35	2.00	0.784	0.19936	0.139	-0.3242	0.278	0.855	<.001
ITEM 4L (F4)-R	306	2.66	3.00	0.765	0.00125	0.139	-0.4341	0.278	0.851	<.001
ITEM 4M (F4)-R	306	2.08	2.00	0.797	0.58916	0.139	0.1580	0.278	0.830	<.001
ITEM 4N (F4)-R	306	2.30	2.00	0.785	0.15885	0.139	-0.3773	0.278	0.856	<.001

Assessment of the the construct's internal validity, through the discrimination index or item-rest correlation index for each item

RELIABILITY ANALYSIS

Experimental Activities

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 2A, ITEM 2D),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

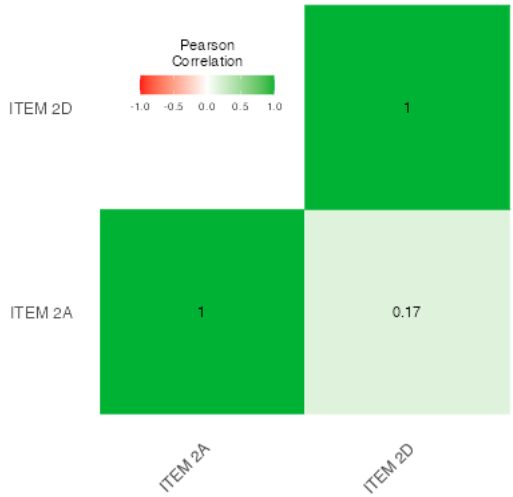
Scale Reliability Statistics

	Cronbach's α	McDonald's ω
escala	0.259	0.293

Item Reliability Statistics

	If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 2A	0.172	0.0994	0.00
ITEM 2D	0.172	0.2965	0.00

Correlation Heatmap



RELIABILITY ANALYSIS

Inquiry

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 2B (F1), ITEM 2E (F1), ITEM 2G (F1)),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

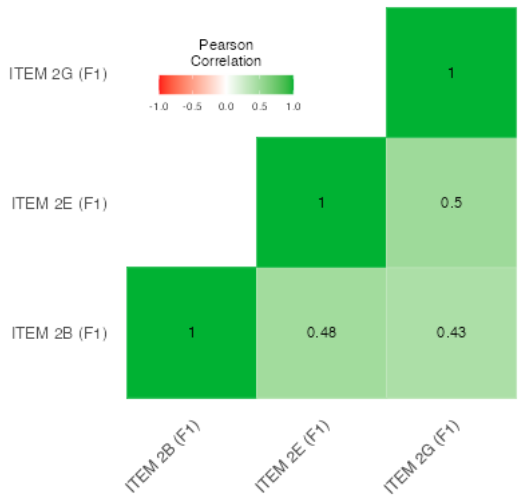
	Cronbach's α	McDonald's ω
escala	0.726	0.730

[3]

Item Reliability Statistics

	If item dropped		
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 2B (F1)	0.525	0.669	0.670
ITEM 2E (F1)	0.583	0.595	0.598
ITEM 2G (F1)	0.539	0.651	0.651

Correlation Heatmap



RELIABILITY ANALYSIS

Interaction

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 2C (F1), ITEM 2F (F1), ITEM 2H (F1)),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

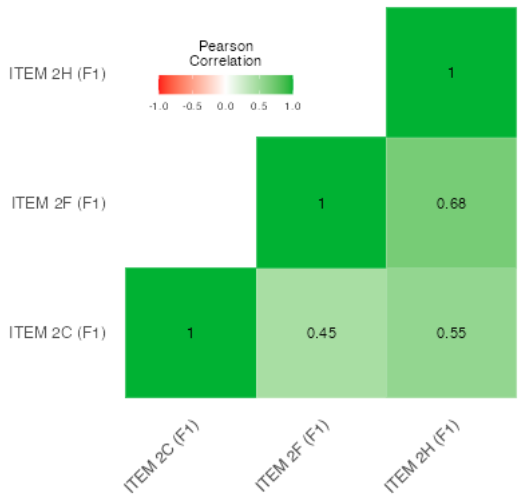
	Cronbach's α	McDonald's ω
escala	0.792	0.804

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 2C (F1)	0.545	0.810	0.810
ITEM 2F (F1)	0.659	0.692	0.708
ITEM 2H (F1)	0.729	0.607	0.622

Correlation Heatmap



RELIABILITY ANALYSIS

Motivation

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 3A (F2), ITEM 3B (F2)),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

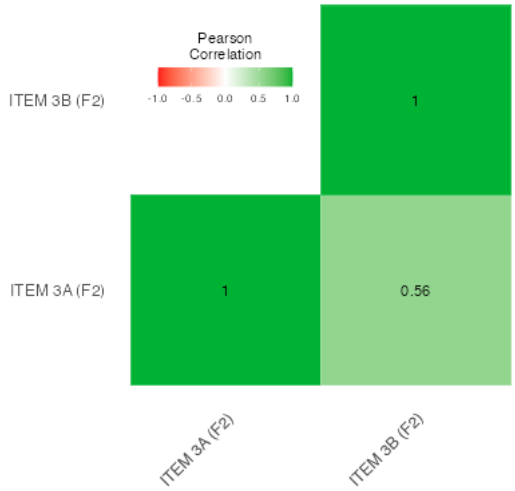
	Cronbach's α	McDonald's ω
escala	0.716	0.716

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 3A (F2)	0.558	0.545	0.00
ITEM 3B (F2)	0.558	0.571	0.00

Correlation Heatmap



RELIABILITY ANALYSIS

Scientific Competence

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 3C (F2), ITEM 3D (F2), ITEM 3E (F2), ITEM 3F (F2)),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

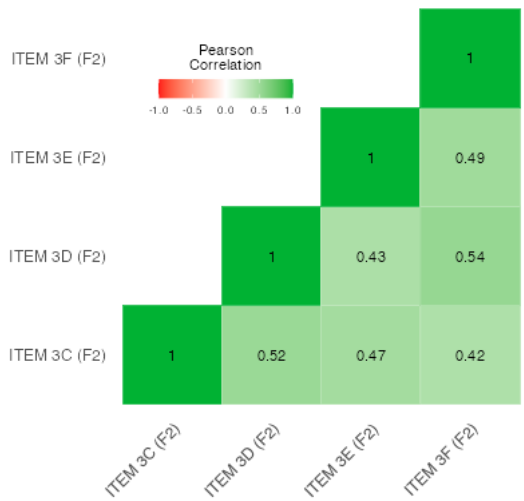
	Cronbach's α	McDonald's ω
escala	0.785	0.786

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 3C (F2)	0.575	0.741	0.744
ITEM 3D (F2)	0.626	0.714	0.718
ITEM 3E (F2)	0.569	0.744	0.751
ITEM 3F (F2)	0.602	0.728	0.732

Correlation Heatmap



RELIABILITY ANALYSIS

System Restrictions

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 4A - R, ITEM 4D (F4)-R, ITEM 4G (F4)-R, ITEM 4N (F4)-R),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
```

```
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

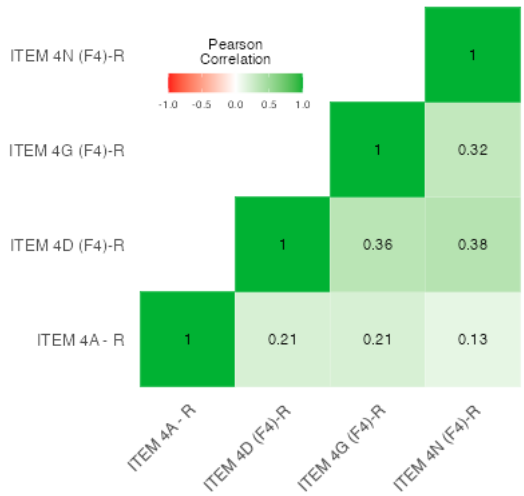
	Cronbach's α	McDonald's ω
escala	0.601	0.606

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 4A - R	0.243	0.620	0.622
ITEM 4D (F4)-R	0.461	0.462	0.489
ITEM 4G (F4)-R	0.427	0.493	0.528
ITEM 4N (F4)-R	0.398	0.517	0.527

Correlation Heatmap



RELIABILITY ANALYSIS

Classroom Management

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 4B (F3)-R, ITEM 4E (F3)-R, ITEM 4H (F3)-R, ITEM 4I- R),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

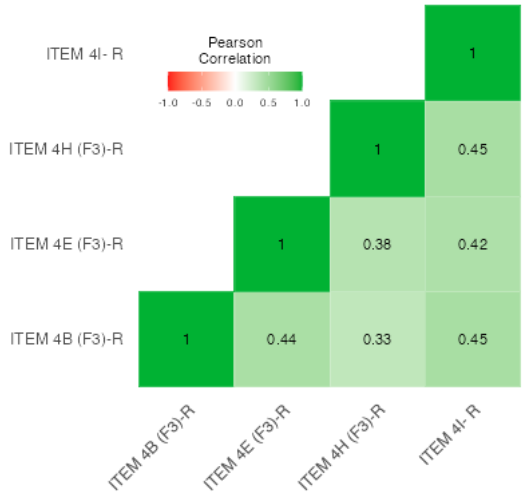
	Cronbach's α	McDonald's ω
escala	0.735	0.737

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 4B (F3)-R	0.514	0.682	0.684
ITEM 4E (F3)-R	0.527	0.675	0.683
ITEM 4H (F3)-R	0.496	0.694	0.697
ITEM 4I- R	0.573	0.647	0.655

Correlation Heatmap



RELIABILITY ANALYSIS

Resources

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 4C (F4)-R, ITEM 4F (F4)-R, ITEM 4L (F4)-R, ITEM 4M (F4)-R),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

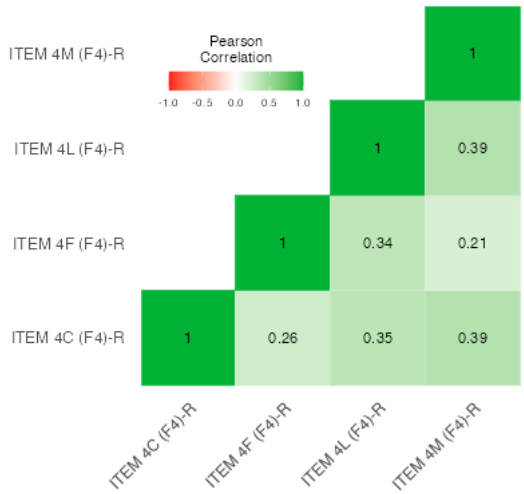
	Cronbach's α	McDonald's ω
escala	0.657	0.663

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 4C (F4)-R	0.454	0.578	0.604
ITEM 4F (F4)-R	0.354	0.647	0.648
ITEM 4L (F4)-R	0.501	0.546	0.565
ITEM 4M (F4)-R	0.446	0.583	0.590

Correlation Heatmap



RELIABILITY ANALYSIS

Knowledge

```
jmv::reliability(
    data = data,
    vars = vars(ITEM 4J - R, ITEM 4K (F3)-R),
    omegaScale = TRUE,
    corPlot = TRUE,
    alphaItems = TRUE,
```

```
    omegaItems = TRUE,
    itemRestCor = TRUE)
```

Scale Reliability Statistics

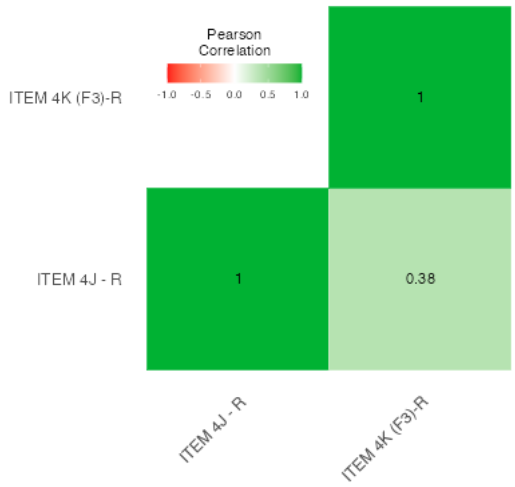
	Cronbach's α	McDonald's ω
escala	0.549	0.550

[3]

Item Reliability Statistics

		If item dropped	
	Item-rest correlation	Cronbach's α	McDonald's ω
ITEM 4J - R	0.380	0.416	0.00
ITEM 4K (F3)-R	0.380	0.346	0.00

Correlation Heatmap



References

[1] The jamovi project (2022). *jamovi*. (Version 2.3) [Computer Software]. Retrieved from https://www.jamovi.org.

[2] R Core Team (2021). *R: A Language and environment for statistical computing*. (Version 4.1) [Computer software]. Retrieved from https://cran.r-project.org. (R packages retrieved from MRAN snapshot 2022-01-01).

[3] Revelle, W. (2019). *psych: Procedures for Psychological, Psychometric, and Personality Research*. [R package]. Retrieved from https://cran.r-project.org/package=psych.

Results

The conduction of a Confirmatory Factor Analysis (CFA) is necessary to evaluate the factor structure, confirming the existence of of underlying latent variables. We look for as more parsimonious and balanced solution as possible.

Confirmatory Factor Analysis

```
jaspFactor::confirmatoryFactorAnalysis(
        version = "0.17.2",
        estimator = "diagonallyWeightedLeastSquares",
        factors = list(list(indicators = list("2C", "2F", "2H", "2B", "2E", "2G"), name = "Factor1",
title = "Factor 1"), list(indicators = list("3A", "3B", "3C", "3D", "3E", "3F"), name = "Factor2", title
= "Factor 2"), list(indicators = list("4B Recof", "4E Recof", "4K Recof", "4H Recof"), name = "Factor3",
title = "Factor 3"), list(indicators = list("4C recof", "4F Recof", "4L Recof", "4M Recof", "4D Recof",
"4G Recof", "4N Recof"), name = "Factor4", title = "Factor 4")),
        fitMeasures = TRUE,
        modificationIndices = TRUE,
        naAction = "listwise",
        pathPlot = TRUE,
        pathPlotParameter = TRUE,
        pathPlotStandardized = TRUE,
        pathPlotVariance = FALSE,
        seType = "robust",
        standardized = "all")
```

Model fit

Parameter estimates

Factor loadings

						95% Confidence Interval		
Factor	Indicator	Estimate	Std. Error	z-value	p	Lower	Upper	Std. Est. (all)
Factor 1	2C	0.814	0.037	21.711	< .001	0.740	0.887	0.814
	2F	0.837	0.029	28.591	< .001	0.779	0.894	0.837
	2H	0.860	0.026	33.029	< .001	0.809	0.912	0.860
	2B	0.748	0.040	18.722	< .001	0.669	0.826	0.748
	2E	0.795	0.032	24.644	< .001	0.732	0.858	0.795
	2G	0.786	0.036	22.049	< .001	0.716	0.856	0.786
Factor 2	3A	0.702	0.041	17.036	< .001	0.621	0.783	0.702
	3B	0.698	0.043	16.317	< .001	0.614	0.782	0.698
	3C	0.835	0.033	25.661	< .001	0.772	0.899	0.835
	3D	0.777	0.032	24.163	< .001	0.714	0.840	0.777
	3E	0.758	0.036	21.068	< .001	0.688	0.829	0.758
	3F	0.780	0.035	22.254	< .001	0.711	0.848	0.780
Factor 3	4B Recof	0.705	0.042	16.739	< .001	0.622	0.787	0.705
	4E Recof	0.722	0.037	19.316	< .001	0.649	0.795	0.722
	4K Recof	0.554	0.052	10.756	< .001	0.453	0.655	0.554
	4H Recof	0.580	0.044	13.209	< .001	0.494	0.666	0.580
Factor 4	4C recof	0.705	0.033	21.355	< .001	0.640	0.769	0.705
	4F Recof	0.550	0.044	12.413	< .001	0.463	0.636	0.550
	4L Recof	0.652	0.039	16.852	< .001	0.576	0.727	0.652
	4M Recof	0.601	0.045	13.414	< .001	0.513	0.689	0.601
	4D Recof	0.735	0.035	20.988	< .001	0.666	0.803	0.735
	4G Recof	0.575	0.044	13.124	< .001	0.489	0.661	0.575
	4N Recof	0.625	0.048	13.075	< .001	0.531	0.719	0.625

Factor variances

					95% Confidence Interval		
Factor	Estimate	Std. Error	z-value	p	Lower	Upper	Std. Est. (all)
Factor 1	1.000	0.000			1.000	1.000	1.000
Factor 2	1.000	0.000			1.000	1.000	1.000
Factor 3	1.000	0.000			1.000	1.000	1.000
Factor 4	1.000	0.000			1.000	1.000	1.000

Factor Covariances

							95% Confidence Interval		
			Estimate	Std. Error	z-value	p	Lower	Upper	Std. Est. (all)
Factor 1	↔	Factor 2	0.800	0.030	26.944	< .001	0.742	0.858	0.800
Factor 1	↔	Factor 3	0.517	0.050	10.433	< .001	0.420	0.614	0.517
Factor 1	↔	Factor 4	0.109	0.054	2.027	0.043	0.004	0.213	0.109
Factor 2	↔	Factor 3	0.435	0.052	8.411	< .001	0.333	0.536	0.435
Factor 2	↔	Factor 4	0.079	0.059	1.348	0.178	−0.036	0.195	0.079
Factor 3	↔	Factor 4	0.798	0.035	23.054	< .001	0.730	0.865	0.798

Residual variances

					95% Confidence Interval		
Indicator	Estimate	Std. Error	z-value	p	Lower	Upper	Std. Est. (all)
2C	0.338	0.000			0.338	0.338	0.338
2F	0.300	0.000			0.300	0.300	0.300
2H	0.260	0.000			0.260	0.260	0.260
2B	0.441	0.000			0.441	0.441	0.441
2E	0.368	0.000			0.368	0.368	0.368
2G	0.382	0.000			0.382	0.382	0.382
3A	0.507	0.000			0.507	0.507	0.507
3B	0.512	0.000			0.512	0.512	0.512
3C	0.302	0.000			0.302	0.302	0.302
3D	0.397	0.000			0.397	0.397	0.397
3E	0.425	0.000			0.425	0.425	0.425
3F	0.392	0.000			0.392	0.392	0.392
4B Recof	0.504	0.000			0.504	0.504	0.504
4E Recof	0.479	0.000			0.479	0.479	0.479
4K Recof	0.693	0.000			0.693	0.693	0.693
4H Recof	0.663	0.000			0.663	0.663	0.663
4C recof	0.503	0.000			0.503	0.503	0.503
4F Recof	0.698	0.000			0.698	0.698	0.698
4L Recof	0.575	0.000			0.575	0.575	0.575
4M Recof	0.639	0.000			0.639	0.639	0.639
4D Recof	0.460	0.000			0.460	0.460	0.460
4G Recof	0.669	0.000			0.669	0.669	0.669
4N Recof	0.610	0.000			0.610	0.610	0.610

Thresholds

Indicator	Threshold	Estimate	Std. Error	z-value	p	95% Confidence Interval		Std. Est. (all)
						Lower	Upper	
2C	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−2.482	0.252	−9.865	0.000	−2.975	−1.989	−2.482
	t3	−1.063	0.089	−11.996	0.000	−1.237	−0.890	−1.063
2F	t1	−2.482	0.252	−9.865	0.000	−2.975	−1.989	−2.482
	t2	−2.136	0.178	−11.992	0.000	−2.485	−1.787	−2.136
	t3	−0.609	0.077	−7.929	2.220×10^{-15}	−0.760	−0.459	−0.609
2H	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−1.998	0.158	−12.658	0.000	−2.307	−1.688	−1.998
	t3	−0.619	0.077	−8.039	8.882×10^{-16}	−0.770	−0.468	−0.619
2B	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−1.760	0.131	−13.427	0.000	−2.017	−1.503	−1.760
	t3	0.181	0.072	2.510	0.012	0.040	0.323	0.181
2E	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−2.062	0.167	−12.366	0.000	−2.389	−1.735	−2.062
	t3	−0.248	0.073	−3.421	6.239×10^{-4}	−0.391	−0.106	−0.248
2G	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−2.062	0.167	−12.366	0.000	−2.389	−1.735	−2.062
	t3	−0.629	0.077	−8.150	4.441×10^{-16}	−0.780	−0.478	−0.629
3A	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−1.843	0.139	−13.219	0.000	−2.116	−1.570	−1.843
	t3	0.131	0.072	1.826	0.068	−0.010	0.273	0.131
3B	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−1.723	0.128	−13.497	0.000	−1.973	−1.472	−1.723
	t3	0.165	0.072	2.282	0.022	0.023	0.306	0.165
3C	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−2.136	0.178	−11.992	0.000	−2.485	−1.787	−2.136
	t3	−0.467	0.075	−6.253	4.032×10^{-10}	−0.613	−0.321	−0.467
3D	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−1.843	0.139	−13.219	0.000	−2.116	−1.570	−1.843
	t3	−0.265	0.073	−3.649	2.638×10^{-4}	−0.408	−0.123	−0.265
3E	t1	−2.720	0.331	−8.224	2.220×10^{-16}	−3.368	−2.071	−2.720
	t2	−2.062	0.167	−12.366	0.000	−2.389	−1.735	−2.062
	t3	−0.395	0.074	−5.350	8.785×10^{-8}	−0.540	−0.250	−0.395
3F	t1	−2.482	0.252	−9.865	0.000	−2.975	−1.989	−2.482
	t2	−1.654	0.122	−13.585	0.000	−1.893	−1.416	−1.654
	t3	−0.057	0.072	−0.799	0.424	−0.198	0.083	−0.057
4B Recof	t1	−1.843	0.139	−13.219	0.000	−2.116	−1.570	−1.843
	t2	−0.844	0.082	−10.308	0.000	−1.004	−0.683	−0.844
	t3	0.711	0.079	9.027	0.000	0.557	0.865	0.711
4E Recof	t1	−1.890	0.145	−13.073	0.000	−2.173	−1.606	−1.890
	t2	−0.722	0.079	−9.135	0.000	−0.876	−0.567	−0.722
	t3	0.821	0.081	10.098	0.000	0.661	0.980	0.821
4K Recof	t1	−2.136	0.178	−11.992	0.000	−2.485	−1.787	−2.136
	t2	−1.221	0.095	−12.847	0.000	−1.407	−1.034	−1.221
	t3	0.404	0.074	5.463	4.674×10^{-8}	0.259	0.549	0.404
4H Recof	t1	−1.204	0.094	−12.770	0.000	−1.388	−1.019	−1.204
	t2	0.198	0.072	2.738	0.006	0.056	0.340	0.198
	t3	1.293	0.098	13.133	0.000	1.100	1.486	1.293
4C recof	t1	−1.372	0.103	−13.372	0.000	−1.574	−1.171	−1.372
	t2	0.090	0.072	1.255	0.209	−0.051	0.231	0.090
	t3	1.438	0.106	13.509	0.000	1.230	1.647	1.438
4F Recof	t1	−1.486	0.109	−13.575	0.000	−1.701	−1.272	−1.486
	t2	−0.148	0.072	−2.054	0.040	−0.289	−0.007	−0.148
	t3	1.035	0.088	11.810	0.000	0.863	1.207	1.035
4L Recof	t1	−1.654	0.122	−13.585	0.000	−1.893	−1.416	−1.654

Thresholds

						95% Confidence Interval		
Indicator	Threshold	Estimate	Std. Error	z-value	p	Lower	Upper	Std. Est. (all)
	t2	−0.198	0.072	−2.738	0.006	−0.340	−0.056	−0.198
	t3	1.123	0.091	12.355	0.000	0.945	1.301	1.123
4M Recof	t1	−0.787	0.080	−9.780	0.000	−0.945	−0.629	−0.787
	t2	0.711	0.079	9.027	0.000	0.557	0.865	0.711
	t3	1.537	0.113	13.614	0.000	1.316	1.759	1.537
4D Recof	t1	−1.154	0.092	−12.526	0.000	−1.335	−0.974	−1.154
	t2	0.057	0.072	0.799	0.424	−0.083	0.198	0.057
	t3	1.154	0.092	12.526	0.000	0.974	1.335	1.154
4G Recof	t1	−1.170	0.093	−12.609	0.000	−1.352	−0.988	−1.170
	t2	0.257	0.073	3.535	4.081×10^{-4}	0.114	0.399	0.257
	t3	1.462	0.108	13.545	0.000	1.250	1.673	1.462
4N Recof	t1	−1.063	0.089	−11.996	0.000	−1.237	−0.890	−1.063
	t2	0.299	0.073	4.103	4.075×10^{-5}	0.156	0.442	0.299
	t3	1.565	0.115	13.622	0.000	1.340	1.790	1.565

Modification Indices

Cross-loadings

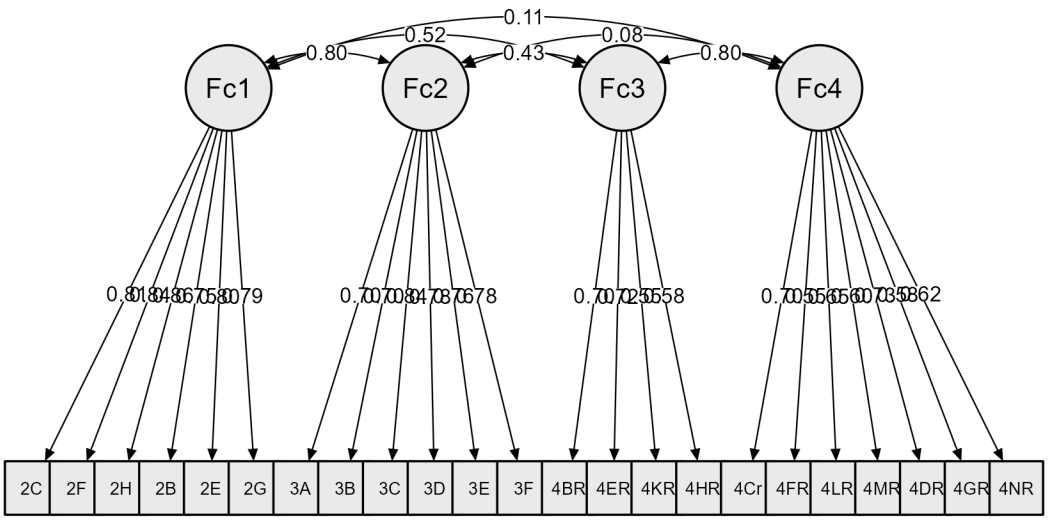
			Mod. Ind.	EPC
Factor 3	→	2B	29.092	0.216
Factor 4	→	2B	28.877	0.175
Factor 4	→	4H Recof	28.231	0.335
Factor 2	→	4H Recof	28.047	−0.192
Factor 1	→	4H Recof	26.033	−0.189
Factor 2	→	4E Recof	13.788	0.143
Factor 3	→	4L Recof	12.019	0.214
Factor 3	→	4M Recof	11.401	−0.209
Factor 2	→	4L Recof	11.380	0.098
Factor 1	→	4L Recof	11.081	0.097
Factor 4	→	4E Recof	10.460	−0.220
Factor 1	→	4M Recof	9.836	−0.091
Factor 1	→	4E Recof	9.681	0.124
Factor 2	→	4M Recof	9.385	−0.089
Factor 4	→	4B Recof	7.621	−0.187
Factor 2	→	4N Recof	7.563	0.076
Factor 1	→	4N Recof	7.259	0.074
Factor 3	→	4N Recof	6.727	0.152
Factor 1	→	4B Recof	6.368	0.100
Factor 3	→	3C	6.299	0.107
Factor 2	→	4B Recof	5.857	0.093
Factor 4	→	2C	4.732	−0.091
Factor 2	→	4C recof	4.597	−0.063
Factor 1	→	3C	4.528	0.269
Factor 4	→	3C	4.501	0.078
Factor 2	→	2H	4.466	−0.263
Factor 2	→	4K Recof	4.457	−0.084
Factor 3	→	2C	4.428	−0.107
Factor 1	→	4C recof	4.082	−0.060
Factor 3	→	4C recof	3.929	−0.124

Residual covariances

			Mod. Ind.	EPC
2F	↔	2H	37.125	0.290
3A	↔	3B	35.076	0.327
2H	↔	2B	14.084	−0.264
3C	↔	4B Recof	12.363	0.183
2B	↔	4H Recof	10.408	0.154
4C recof	↔	4D Recof	9.572	0.162
4F Recof	↔	4G Recof	8.967	0.157
4B Recof	↔	4M Recof	7.695	−0.176
4H Recof	↔	4L Recof	7.525	0.154
2G	↔	4H Recof	7.507	−0.182
2B	↔	4N Recof	7.183	0.144
2B	↔	4L Recof	6.945	0.148
3D	↔	4L Recof	5.700	0.144
3B	↔	3D	5.692	−0.159
2H	↔	2G	5.668	−0.158
2F	↔	2B	5.471	−0.160
4L Recof	↔	4D Recof	5.308	−0.145
3D	↔	3F	5.136	0.120
4M Recof	↔	4N Recof	5.087	0.121
2C	↔	4M Recof	5.042	−0.191
4H Recof	↔	4D Recof	4.861	0.114
2B	↔	4E Recof	4.822	0.114
3F	↔	4K Recof	4.541	−0.148
2B	↔	4D Recof	4.463	0.122
3B	↔	3E	4.205	−0.139
3B	↔	4F Recof	4.129	−0.131
2F	↔	2G	4.064	−0.125
2H	↔	4B Recof	4.053	0.108
3F	↔	4B Recof	3.990	−0.122

Plots

Model plot



CLUSTER ANALYSIS AND R SYNTAX

K-means Clustering

Cluster analysis using the Hartigan-Wong algorithm to assess whether participants could be categorised into different groups exhibiting significant differences in their perception of IBSE

```
snowCluster::kmeans(
    data = data,
    vars = vars(Media F1, Media F2, Media F3, Media F4),
    k = 3)
```

Clustering vector

Sum of squares Table

	Value
Cluster 1	67.5
Cluster 2	43.7
Cluster 3	31.6
Between clusters	117.8
Total	260.6

[3]

Clustering Table

Cluster No	Count
1	103
2	123
3	80

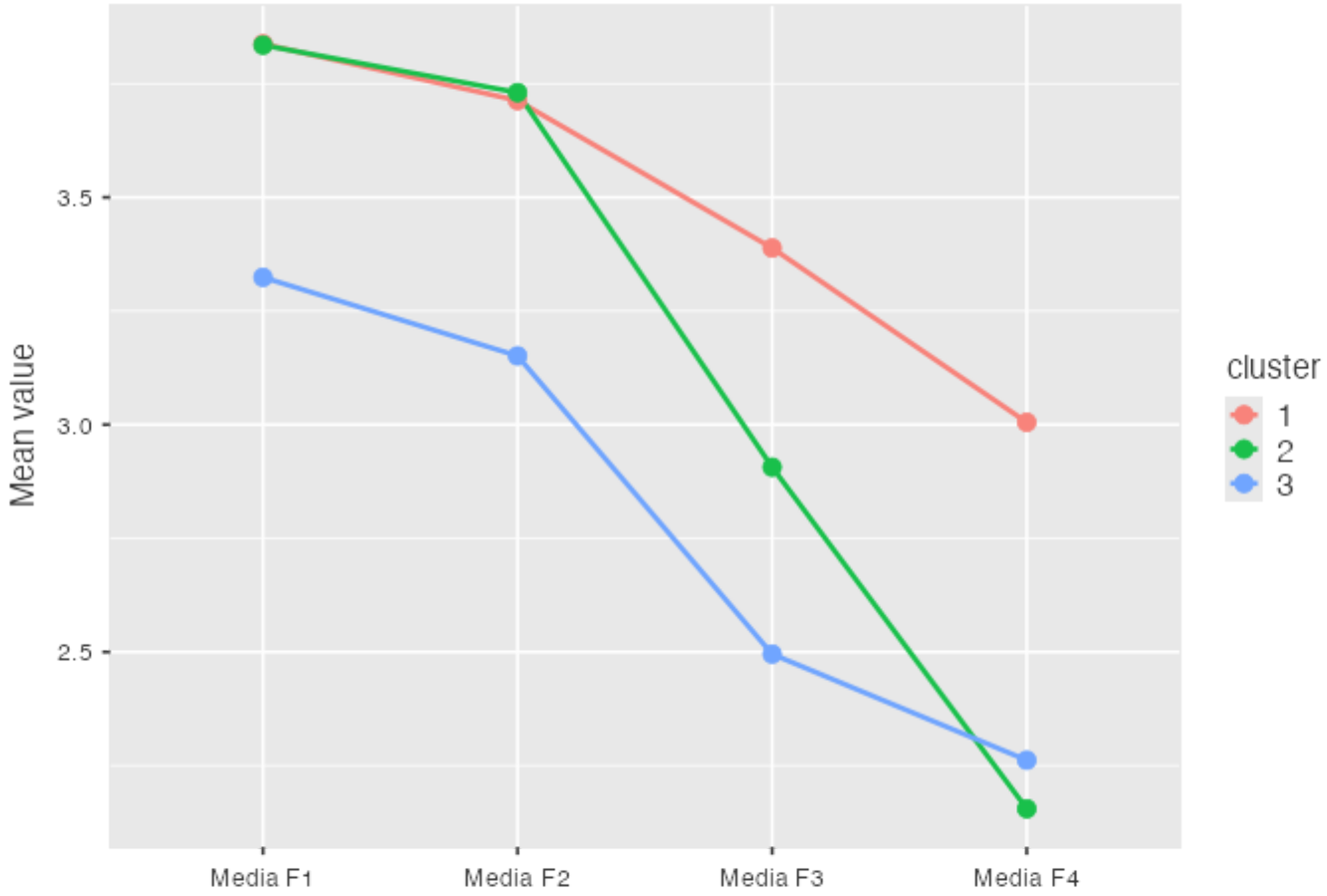
[3]

Centroids of clusters Table

	Cluster No	Media F1	Media F2	Media F3	Media F4
1	1.00	3.283	3.117	2.558	2.308
2	2.00	3.833	3.722	2.843	2.139
3	3.00	3.860	3.733	3.397	3.009

[3]

Plot of means across clusters



[3]

ANOVA test to verify the differences among clusters within each factor

ANOVA F1

```
jmv::ANOVA(
    formula = `Media F1` ~ Clustering,
    data = data,
    effectSize = "eta",
    modelTest = TRUE,
    homo = TRUE,
    norm = TRUE)
```

ANOVA - Media F1

	Sum of Squares	df	Mean Square	F	p	η²
Modelo global	21.5	2	10.7639	155	<.001	
Clustering	21.5	2	10.7639	155	<.001	0.506
Residuos	21.0	303	0.0694			

[4]

Assumption Checks

Homogeneity of Variances Tests

	Statistic	df	df2	p
Levene's	13.8	2	303	<.001
Bartlett's	89.6	2		<.001

Note. Additional results provided by *moretests*

Normality tests

	statistic	p
Shapiro-Wilk	0.821	<.001
Kolmogorov-Smirnov	0.158	<.001
Anderson-Darling	8.94	<.001

Note. Additional results provided by *moretests*

ANOVA F2

```
jmv::ANOVA(
    formula = `Media F2` ~ Clustering,
    data = data,
    effectSize = "eta",
    modelTest = TRUE,
    homo = TRUE,
    norm = TRUE)
```

ANOVA - Media F2

	Sum of Squares	df	Mean Square	F	p	η²
Modelo global	25.4	2	12.7198	154	<.001	
Clustering	25.4	2	12.7198	154	<.001	0.505
Residuos	25.0	303	0.0823			

[4]

Assumption Checks

Homogeneity of Variances Tests

	Statistic	df	df2	p
Levene's	2.21	2	303	0.111
Bartlett's	21.2	2		<.001

Note. Additional results provided by *moretests*

Normality tests

	statistic	p
Shapiro-Wilk	0.898	<.001
Kolmogorov-Smirnov	0.109	0.001
Anderson-Darling	4.72	<.001

Note. Additional results provided by *moretests*

ANOVA F3

```
jmv::ANOVA(
    formula = `Media F3` ~ Clustering,
    data = data,
    effectSize = "eta",
    modelTest = TRUE,
    homo = TRUE,
    norm = TRUE)
```

ANOVA - Media F3

	Sum of Squares	df	Mean Square	F	p	η^2
Modelo global	32.2	2	16.077	93.8	<.001	
Clustering	32.2	2	16.077	93.8	<.001	0.382
Residuos	51.9	303	0.171			

[4]

Assumption Checks

Homogeneity of Variances Tests

	Statistic	df	df2	p
Levene's	0.470	2	303	0.626
Bartlett's	3.90	2		0.143

Note. Additional results provided by *moretests*

Normality tests

	statistic	p
Shapiro-Wilk	0.960	<.001
Kolmogorov-Smirnov	0.119	<.001
Anderson-Darling	2.98	<.001

Note. Additional results provided by *moretests*

ANOVA F4

```
jmv::ANOVA(
    formula = `Media F4` ~ Clustering,
    data = data,
    effectSize = "eta",
    modelTest = TRUE,
    homo = TRUE,
    norm = TRUE)
```

ANOVA - Media F4

	Sum of Squares	df	Mean Square	F	p	η^2
Modelo global	38.7	2	19.362	131	<.001	
Clustering	38.7	2	19.362	131	<.001	0.463
Residuos	44.8	303	0.148			

[4]

Assumption Checks

Homogeneity of Variances Tests

	Statistic	df	df2	p
Levene's	1.97	2	303	0.142
Bartlett's	9.03	2		0.011

Note. Additional results provided by *moretests*

Normality tests

	statistic	p
Shapiro-Wilk	0.979	<.001
Kolmogorov-Smirnov	0.0818	0.033
Anderson-Darling	1.78	<.001

Note. Additional results provided by *moretests*

References

[1] The jamovi project (2022). *jamovi*. (Version 2.3) [Computer Software]. Retrieved from https://www.jamovi.org.

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[3] Seol, H. (2023). *snowCluster: Multivariate Analysis*. (Version 7.1.7)[jamovi module]. URL https://github.com/hyunsooseol/snowCluster.

[4] Fox, J., & Weisberg, S. (2020). *car: Companion to Applied Regression*. [R package]. Retrieved from https://cran.r-project.org/package=car.