

# Technical Test Battery Differential Item Functioning: Construction Company Workers and Applicants.

## Grouping Variable: Race Group

### Sample composition

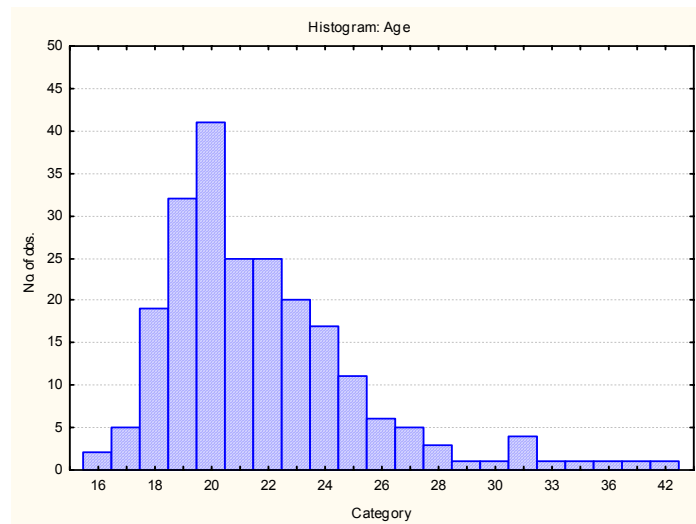
Workers and applicants to a construction company based in the Western Cape. Data were collected during 2002-2003.

Category	Frequency table: Race			
	Count	Cumulative Count	Percent	Cumulative Percent
BLACKS	124	124	55.60538	55.6054
ASIANS	2	126	0.89686	56.5022
WHITES/COLOUREDS	95	221	42.60090	99.1031
Missing	2	223	0.89686	100.0000

Category	Frequency table: Racegroup			
	Count	Cumulative Count	Percent	Cumulative Percent
non-Black	97	97	43.49776	43.4978
Black	124	221	55.60538	99.1031
Missing	2	223	0.89686	100.0000

Category	Frequency table: Sex			
	Count	Cumulative Count	Percent	Cumulative Percent
MALE	204	204	91.47982	91.4798
FEMALE	18	222	8.07175	99.5516
UNKNOWN	1	223	0.44843	100.0000
Missing	0	223	0.00000	100.0000

Variable	Descriptive Statistics					
	Mean	Std.Dev	Minimum	Maximum	N	No.cases Missing
Age	21.83784	3.751417	16.00000	42.00000	222	1



## **Method**

Applicants were classified into Black and non-Black for the purpose of the analysis, since the size of the sample did not allow for finer distinctions.

Applicants were classified into score levels for the test being evaluated. The cut-offs for the levels were determined by examining the frequency distributions for both race groups, trying to ensure a sufficient number of cases for both races in each category.

The statistical technique used in this study was factorial analysis of variance. For every item a factorial analysis of variance was done, using the scored item response as dependent variable, and the race group and score level (on the overall test score for the subtest being investigated) as predictor variables. If a significant effect was found for race, that was taken as an indication of uniform item bias, and the least-square difference in the means for that item was plotted graphically to illustrate which race group had a higher probability of getting the item right. If a significant interaction effect was found for race group and score level, that was taken as an indication of non-uniform item bias, and the means at all levels for both race groups were plotted to illustrate the severity of the non-uniform bias that was found.

### ***Detailed results by item for Mechanical Reasoning Test***

<b>Item number</b>	<b>Uniform Bias</b>	<b>In favour of group</b>	<b>Non-uniform bias</b>
1	Yes	Non-Black	No
2	Yes	Black	No
3	No		No
4	No		No
5	No		No
6	No		No
7	No		No
8	No		No
9	No		No
10	No		No
11	No		No
12	No		No
13	No		No
14	No		No
15	No		No
16	No		No
17	No		No
18	No		No
19	No		No
20	No		No
21	Yes	Non-Black	No
22	No		No
23	Yes	Non-Black	No
24	No		No
25	No		No
26	Yes	Black	No
27	No		No
28	No		No
29	No		No
30	No		No
31	No		No
32	No		No
33	No		No
34	Yes	Black	Yes
35	Yes	Black	Yes
36	Yes	Non-Black	Yes
37	No		No
38	No		No
39	No		No
40	No		No
41	No		No
42	No		No
43	Yes	Black	Yes
44	Yes	Non-Black	No
45	No		No

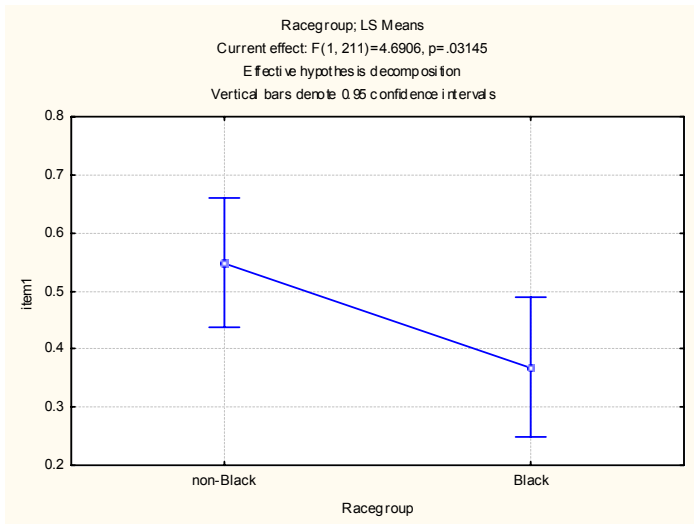
Uniform bias was found in 10 items.

5 items were biased in favour of the Non-Black group and 5 in favour of the Black group.

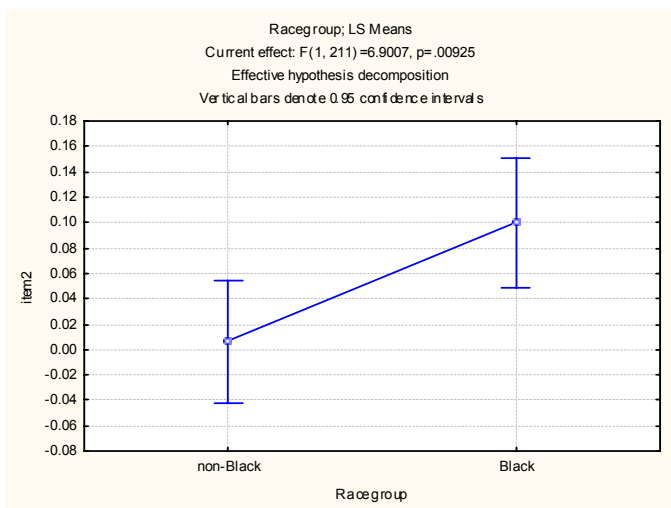
Non-Uniform bias was found in 4 items.

More information about this bias can be found in the graphs included in the detailed results that follow.

Univariate Tests of Significance for item1					
Sigma-restricted parameterization					
Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	28.34186	1	28.34186	121.6907	0.000000
Racegroup	1.09245	1	1.09245	4.6906	0.031449
Scorelevel	0.72583	4	0.18146	0.7791	0.539872
Racegroup*Scorelevel	0.71593	4	0.17898	0.7685	0.546811
Error	49.14206	211	0.23290		



Univariate Tests of Significance for item2					
Sigma-restricted parameterization					
Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel	0.219164	4	0.054791	1.276062	0.280463
Racegroup*Scorelevel	0.143084	4	0.035771	0.833096	0.505461
Error	9.059809	211	0.042937		



Univariate Tests of Significance for item3 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	18.19307	1	18.19307	80.12244	0.000000
Racegroup	0.00058	1	0.00058	0.00255	0.959736
Scorelevel	1.54553	4	0.38638	1.70163	0.150826
Racegroup*Scorelevel	1.00297	4	0.25074	1.10427	0.355531
Error	47.91089	211	0.22707		

Univariate Tests of Significance for item4 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.07847	1	0.07847	0.3139	0.575873
Scorelevel	1.00132	4	0.25033	1.0015	0.407749
Racegroup*Scorelevel	0.48305	4	0.12076	0.4831	0.748117
Error	52.74116	211	0.24996		

Univariate Tests of Significance for item5 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.00132	1	0.00132	0.0053	0.942265
Scorelevel	0.84130	4	0.21033	0.8383	0.502228
Racegroup*Scorelevel	0.33392	4	0.08348	0.3327	0.855752
Error	52.93976	211	0.25090		

Univariate Tests of Significance for item6 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.27678	1	0.27678	1.13522	0.287882
Scorelevel	0.07128	4	0.01782	0.07309	0.990227
Racegroup*Scorelevel	1.96902	4	0.49226	2.01901	0.092956
Error	51.44405	211	0.24381		

Univariate Tests of Significance for item7 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	35.21844	1	35.21844	146.6908	0.000000
Racegroup	0.15807	1	0.15807	0.6584	0.418047
Scorelevel	2.22069	4	0.55517	2.3124	0.058764
Racegroup*Scorelevel	0.49915	4	0.12479	0.5198	0.721296
Error	50.65820	211	0.24009		

Univariate Tests of Significance for item8 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.08313	1	0.08313	0.36241	0.547819
Scorelevel	1.47156	4	0.36789	1.60379	0.174531
Racegroup*Scorelevel	0.67795	4	0.16949	0.73887	0.566426
Error	48.40084	211	0.22939		

Univariate Tests of Significance for item9 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.04119	1	0.04119	0.1679	0.682361
Scorelevel	0.77663	4	0.19416	0.7916	0.531785
Racegroup*Scorelevel	0.74791	4	0.18698	0.7623	0.550858
Error	51.75230	211	0.24527		

Univariate Tests of Significance for item10 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.58700	1	0.58700	2.5749	0.110065
Scorelevel	2.07145	4	0.51786	2.2717	0.062660
Racegroup*Scorelevel	0.29827	4	0.07457	0.3271	0.859591
Error	48.10100	211	0.22797		

Univariate Tests of Significance for item11 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	8.59725	1	8.597245	45.02950	0.000000
Racegroup	0.06310	1	0.063101	0.33050	0.565976
Scorelevel	0.85223	4	0.213057	1.11592	0.349966
Racegroup*Scorelevel	0.47799	4	0.119498	0.62589	0.644533
Error	40.28512	211	0.190925		

Univariate Tests of Significance for item12 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.30939	1	0.30939	1.3591	0.245005
Scorelevel	1.71090	4	0.42772	1.8790	0.115292
Racegroup*Scorelevel	0.86367	4	0.21592	0.9485	0.436872
Error	48.03157	211	0.22764		

Univariate Tests of Significance for item13 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.13743	1	0.13743	0.58440	0.445447
Scorelevel	1.17512	4	0.29378	1.24930	0.291195
Racegroup*Scorelevel	0.47231	4	0.11808	0.50213	0.734205
Error	49.61783	211	0.23516		

Univariate Tests of Significance for item14 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.10420	1	0.104197	0.87503	0.350636
Scorelevel	0.49815	4	0.124537	1.04584	0.384525
Racegroup*Scorelevel	0.19164	4	0.047911	0.40235	0.806839
Error	25.12544	211	0.119078		

Univariate Tests of Significance for item15 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	15.97573	1	15.97573	70.42269	0.000000
Racegroup	0.36070	1	0.36070	1.59002	0.208716
Scorelevel	0.58580	4	0.14645	0.64556	0.630601
Racegroup*Scorelevel	0.45130	4	0.11282	0.49734	0.737709
Error	47.86639	211	0.22685		

Univariate Tests of Significance for item16 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.05240	1	0.05240	0.24724	0.619546
Scorelevel	1.91683	4	0.47921	2.26088	0.063731
Racegroup*Scorelevel	0.32882	4	0.08220	0.38784	0.817219
Error	44.72264	211	0.21196		

Univariate Tests of Significance for item17 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01979	1	0.01979	0.10102	0.750921
Scorelevel	1.44543	4	0.36136	1.84442	0.121533
Racegroup*Scorelevel	0.26984	4	0.06746	0.34432	0.847783
Error	41.33891	211	0.19592		

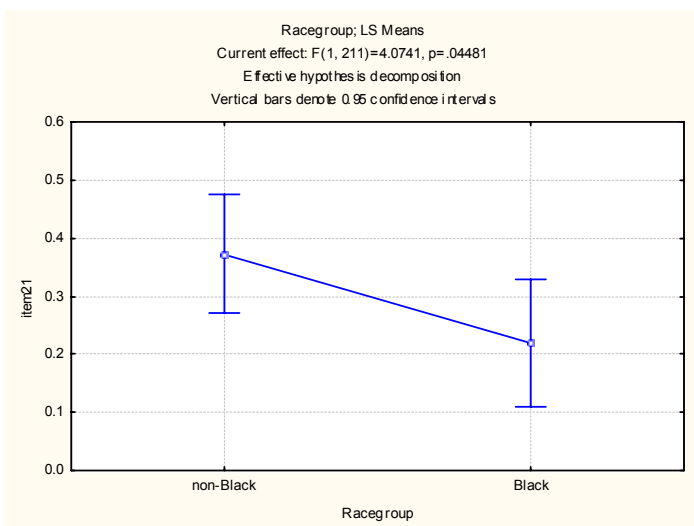
Univariate Tests of Significance for item18 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.32415	1	0.32415	1.6689	0.197813
Scorelevel					
Racegroup*Scorelevel	0.84337	4	0.21084	1.0855	0.364628
Error	40.98178	211	0.19423		



Univariate Tests of Significance for item19 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	29.46998	1	29.46998	125.2677	0.000000
Racegroup	0.34357	1	0.34357	1.4604	0.228217
Scorelevel	1.51786	4	0.37946	1.6130	0.172167
Racegroup*Scorelevel	0.43536	4	0.10884	0.4626	0.763101
Error	49.63901	211	0.23526		

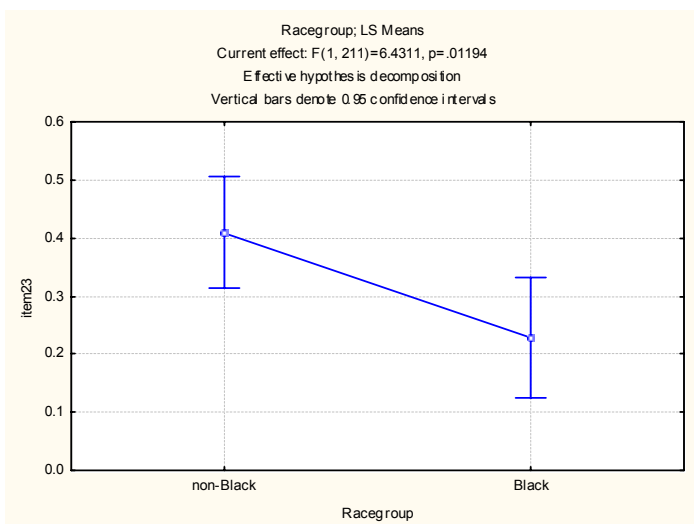
Univariate Tests of Significance for item20 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.48500	1	0.48500	1.9859	0.160238
Scorelevel	1.60376	4	0.40094	1.6417	0.164957
Racegroup*Scorelevel	0.54843	4	0.13711	0.5614	0.690911
Error	51.52939	211	0.24422		

Univariate Tests of Significance for item21 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel	0.81639	4	0.20410	1.04080	0.387111
Racegroup*Scorelevel	0.76028	4	0.19007	0.96927	0.425280
Error	41.37615	211	0.19610		



Univariate Tests of Significance for item22 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	8.16419	1	8.164186	44.42382	0.000000
Racegroup	0.00482	1	0.004820	0.02623	0.871505
Scorelevel	1.02651	4	0.256628	1.39639	0.236329
Racegroup*Scorelevel	0.04350	4	0.010875	0.05917	0.993474
Error	38.77747	211	0.183779		

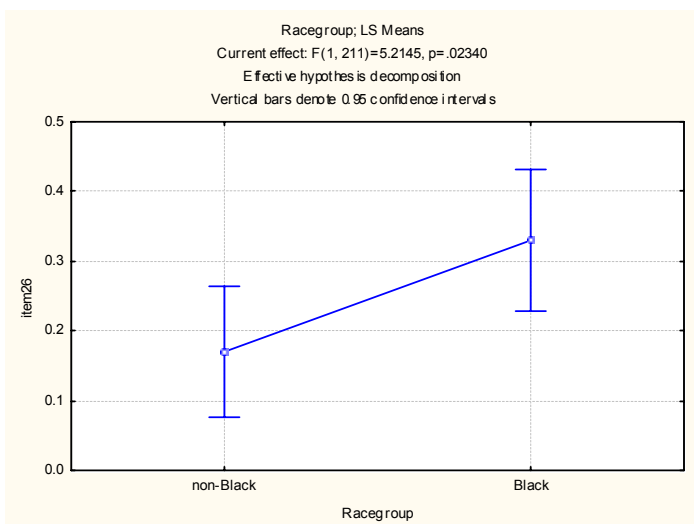
Univariate Tests of Significance for item23 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel					
Racegroup*Scorelevel	0.30831	4	0.07708	0.44496	0.776001
Error	36.54966	211	0.17322		



Univariate Tests of Significance for item24 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.14461	1	0.14461	0.67166	0.413399
Scorelevel					
Racegroup*Scorelevel	0.17823	4	0.04456	0.20695	0.934372
Error	45.42969	211	0.21531		

Univariate Tests of Significance for item25 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	20.27827	1	20.27827	104.5893	0.000000
Racegroup	0.00177	1	0.00177	0.0091	0.924062
Scorelevel	3.78874	4	0.94719	4.8853	0.000870
Racegroup*Scorelevel	0.59038	4	0.14759	0.7612	0.551570
Error	40.90969	211	0.19388		

Univariate Tests of Significance for item26 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel					
Racegroup*Scorelevel	0.44573	4	0.111433	0.67189	0.612156
Error	34.99440	211	0.165850		



Univariate Tests of Significance for item27 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01754	1	0.01754	0.08905	0.765684
Scorelevel					
Racegroup*Scorelevel	0.44072	4	0.11018	0.55927	0.692479
Error	41.56867	211	0.19701		

Univariate Tests of Significance for item28 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	3.14215	1	3.142154	29.99521	0.000000
Racegroup	0.11677	1	0.116769	1.11469	0.292272
Scorelevel	1.26811	4	0.317027	3.02636	0.018691
Racegroup*Scorelevel	0.62659	4	0.156647	1.49536	0.204739
Error	22.10334	211	0.104755		

Univariate Tests of Significance for item29 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.05181	1	0.05181	0.28782	0.592187
Scorelevel					
Racegroup*Scorelevel	1.03892	4	0.25973	1.44288	0.220987
Error	37.98160	211	0.18001		

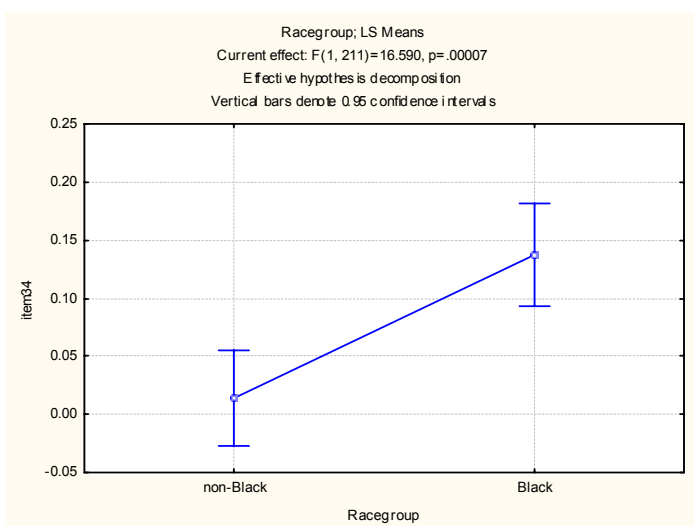
Univariate Tests of Significance for item30 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.09722	1	0.09722	0.57259	0.450075
Scorelevel					
Racegroup*Scorelevel	0.26343	4	0.06586	0.38788	0.817189
Error	35.82630	211	0.16979		

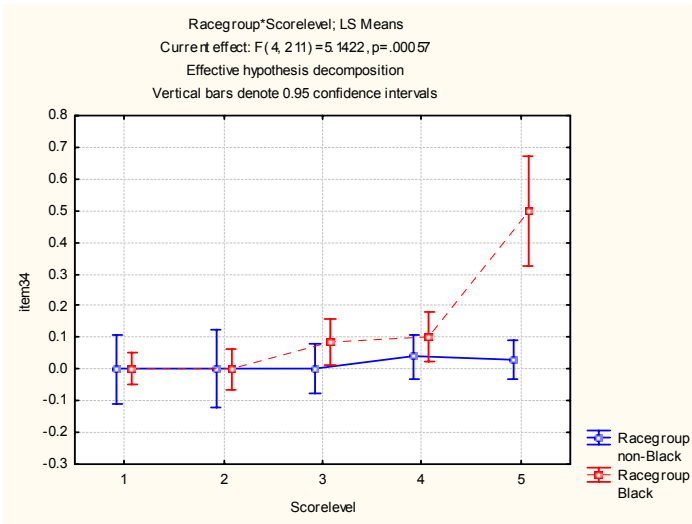
Univariate Tests of Significance for item31 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.042149	1	0.042149	1.09172	0.297287
Scorelevel	0.160874	4	0.040219	1.04171	0.386645
Racegroup*Scorelevel	0.347389	4	0.086847	2.24945	0.064887
Error	8.146321	211	0.038608		

Univariate Tests of Significance for item32 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	2.71836	1	2.718362	28.06657	0.000000
Racegroup	0.05442	1	0.054420	0.56188	0.454339
Scorelevel	2.16019	4	0.540048	5.57589	0.000276
Racegroup*Scorelevel	0.15140	4	0.037849	0.39079	0.815115
Error	20.43621	211	0.096854		

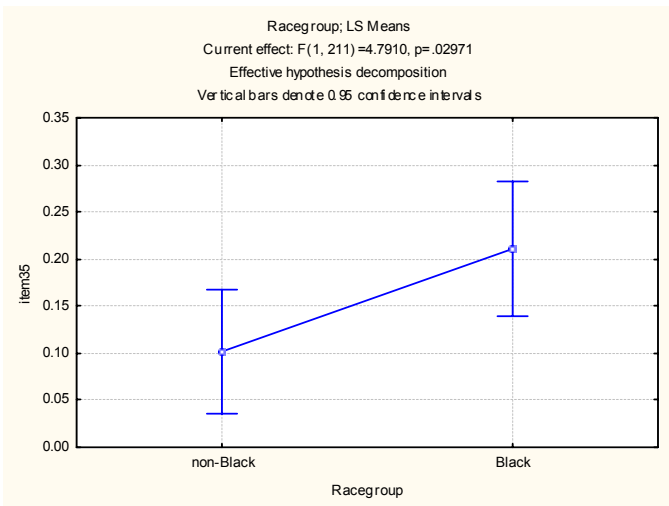
Univariate Tests of Significance for item33 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.16175	1	0.161745	1.05323	0.305939
Scorelevel					
Racegroup*Scorelevel	0.37069	4	0.092673	0.60345	0.660558
Error	32.40330	211	0.153570		

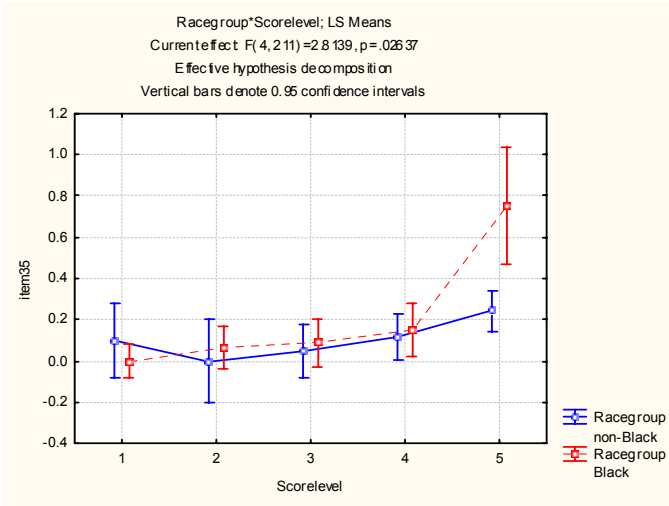
Univariate Tests of Significance for item34 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel					
Racegroup*Scorelevel					
Error	6.557322	211	0.031077		



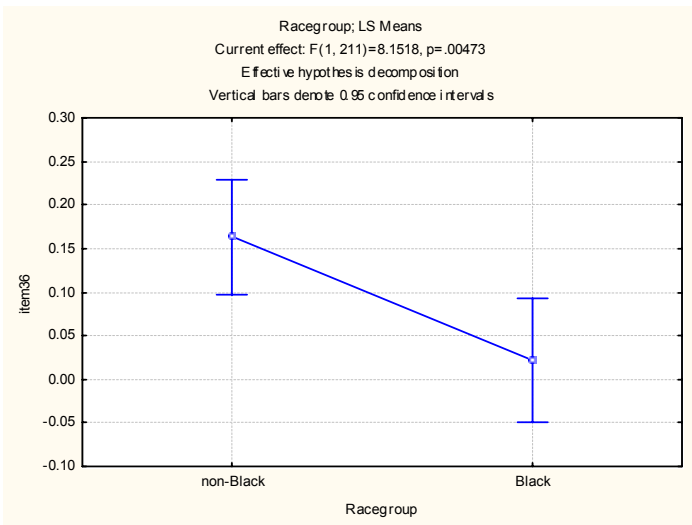


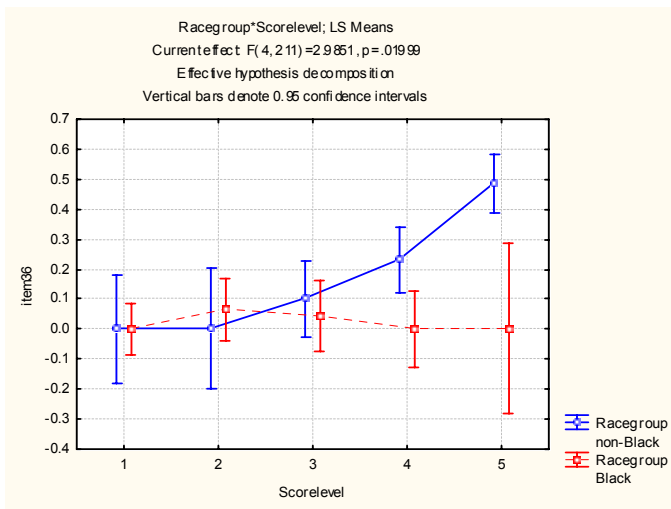
Univariate Tests of Significance for item35 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	3.28012	1	3.280123	39.41040	0.000000
Racegroup	0.39875	1	0.398751	4.79096	0.029707
Scorelevel	2.49352	4	0.623380	7.48986	0.000012
Racegroup*Scorelevel	0.93682	4	0.234205	2.81395	0.026368
Error	17.56151	211	0.083230		





Univariate Tests of Significance for item36					
Sigma-restricted parameterization					
Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	1.15085	1	1.150854	13.88768	0.000249
Racegroup	0.67553	1	0.675531	8.15182	0.004731
Scorelevel	0.70379	4	0.175947	2.12320	0.079069
Racegroup*Scorelevel	0.98947	4	0.247369	2.98507	0.019987
Error	17.48530	211	0.082869		





Univariate Tests of Significance for item37 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	3.63783	1	3.637826	32.65936	0.000000
Racegroup	0.00064	1	0.000639	0.00574	0.939689
Scorelevel	2.38889	4	0.597223	5.36170	0.000394
Racegroup*Scorelevel	0.82018	4	0.205046	1.84084	0.122197
Error	23.50264	211	0.111387		

Univariate Tests of Significance for item38 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.00492	1	0.004918	0.04732	0.828008
Scorelevel					
Racegroup*Scorelevel	0.14386	4	0.035964	0.34604	0.846594
Error	21.92927	211	0.103930		

Univariate Tests of Significance for item39 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.057688	1	0.057688	1.311787	0.253369
Scorelevel	0.206159	4	0.051540	1.171982	0.324166
Racegroup*Scorelevel	0.157083	4	0.039271	0.892993	0.468994
Error	9.279047	211	0.043977		

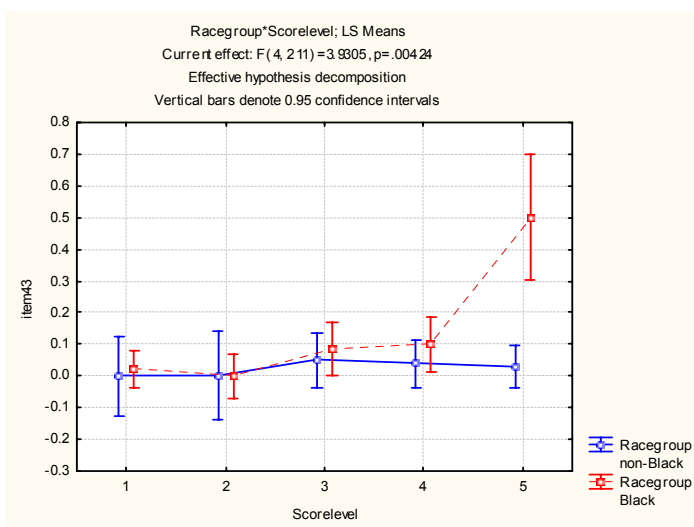
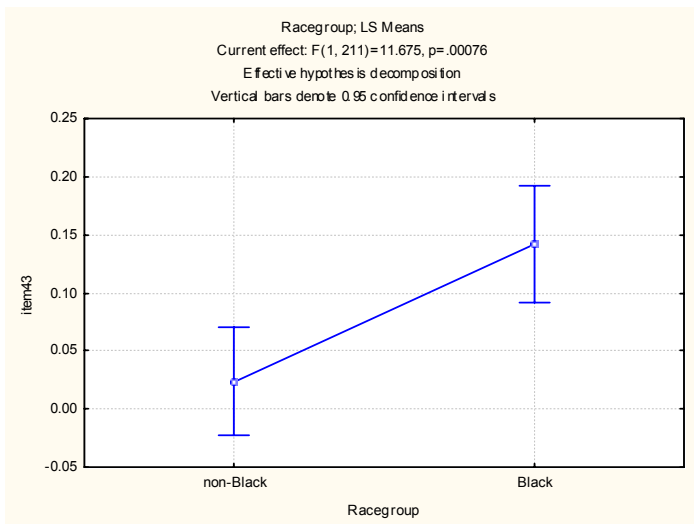


Univariate Tests of Significance for item40 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	0.50316	1	0.503160	7.878757	0.005470
Racegroup	0.04004	1	0.040040	0.626973	0.429357
Scorelevel	0.28744	4	0.071860	1.125228	0.345570
Racegroup*Scorelevel	0.39049	4	0.097621	1.528609	0.195009
Error	13.47506	211	0.063863		

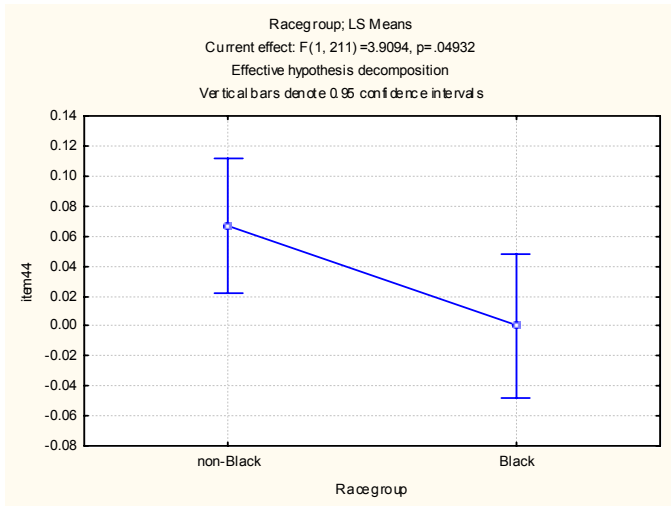
Univariate Tests of Significance for item41 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	0.141941	1	0.141941	3.753693	0.054026
Racegroup	0.076038	1	0.076038	2.010862	0.157652
Scorelevel	0.169026	4	0.042257	1.117498	0.349218
Racegroup*Scorelevel	0.229260	4	0.057315	1.515725	0.198729
Error	7.978666	211	0.037814		

Univariate Tests of Significance for item42 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.10416	1	0.104163	1.31932	0.252015
Scorelevel	0.51314	4	0.128284	1.62483	0.169164
Racegroup*Scorelevel	0.48792	4	0.121980	1.54498	0.190373
Error	16.65896	211	0.078952		

Univariate Tests of Significance for item43 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel					
Racegroup*Scorelevel					
Error	8.485583	211	0.040216		



Univariate Tests of Significance for item44					
Sigma-restricted parameterization					
Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	0.147706	1	0.147706	3.909351	0.049320
Racegroup	0.147706	1	0.147706	3.909351	0.049320
Scorelevel	0.169293	4	0.042323	1.120173	0.347952
Racegroup*Scorelevel	0.169293	4	0.042323	1.120173	0.347952
Error	7.972145	211	0.037783		



Effect	Univariate Tests of Significance for item45 Sigma-restricted parameterization Effective hypothesis decomposition				
	SS	Degr. of Freedom	MS	F	p
Intercept	0.001239	1	0.001239	0.269563	0.604169
Racegroup	0.001239	1	0.001239	0.269563	0.604169
Scorelevel	0.002985	4	0.000746	0.162372	0.957166
Racegroup*Scorelevel	0.002985	4	0.000746	0.162372	0.957166
Error	0.969697	211	0.004596		

**Detailed results by item: Spatial Reasoning Test**

Item number	Uniform bias	In favour of group	Non-uniform bias
1	No		No
2	No		No
3	No		No
4	No		No
5	No		No
6	No		No
7	No		No
8	No		No
9	No		No
10	No		No
11	No		No
12	No		No
13	No		No
14	No		No
15	No		No
16	No		No
17	Yes	Non-Black	No
18	No		No
19	No		Yes
20	No		No
21	Yes	Non-Black	No
22	No		No
23	No		No
24	No		No
25	No		No
26	No		No
27	No		No
28	No		No
29	No		No
30	No		No

Uniform bias was found in two items, both in favour of the Non-Black group.

Non-uniform bias was found in one item.

More information about the bias that was found is given in the graphs that are included in the detailed results that follow.

Univariate Tests of Significance for item1 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	34.46339	1	34.46339	145.8782	0.000000
Racegroup	0.18867	1	0.18867	0.7986	0.372523
Scorelevel	2.81327	4	0.70332	2.9770	0.020250
Racegroup*Scorelevel	0.89982	4	0.22495	0.9522	0.434795
Error	49.84826	211	0.23625		

Univariate Tests of Significance for item2 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.30780	1	0.30780	1.2857	0.258136
Scorelevel					
Racegroup*Scorelevel	1.57312	4	0.39328	1.6427	0.164725
Error	50.51594	211	0.23941		

Univariate Tests of Significance for item3 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.00084	1	0.00084	0.0037	0.951328
Scorelevel					
Racegroup*Scorelevel	1.11486	4	0.27871	1.2394	0.295230
Error	47.44751	211	0.22487		

Univariate Tests of Significance for item4 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.57953	1	0.57953	2.4387	0.119871
Scorelevel	1.26226	4	0.31557	1.3279	0.260633
Racegroup*Scorelevel	1.00849	4	0.25212	1.0609	0.376857
Error	50.14167	211	0.23764		

Univariate Tests of Significance for item5 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	4.38297	1	4.382970	32.18042	0.000000
Racegroup	0.01749	1	0.017485	0.12838	0.720478
Scorelevel	0.90316	4	0.225790	1.65778	0.161057
Racegroup*Scorelevel	0.41882	4	0.104706	0.76876	0.546629
Error	28.73817	211	0.136200		

Univariate Tests of Significance for item6 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01355	1	0.01355	0.0569	0.811670
Scorelevel					
Racegroup*Scorelevel	0.92958	4	0.23239	0.9761	0.421507
Error	50.23479	211	0.23808		

Univariate Tests of Significance for item7 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.48043	1	0.48043	2.1156	0.147289
Scorelevel	1.00238	4	0.25059	1.1035	0.355890
Racegroup*Scorelevel	1.82714	4	0.45678	2.0115	0.094040
Error	47.91501	211	0.22709		

Univariate Tests of Significance for item8 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.03362	1	0.03362	0.1447	0.704022
Scorelevel					
Racegroup*Scorelevel	1.32277	4	0.33069	1.4233	0.227332
Error	49.02361	211	0.23234		

Univariate Tests of Significance for item9 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	8.01138	1	8.011379	45.71650	0.000000
Racegroup	0.03118	1	0.031179	0.17792	0.673594
Scorelevel	2.12095	4	0.530239	3.02578	0.018708
Racegroup*Scorelevel	0.77136	4	0.192841	1.10044	0.357379
Error	36.97573	211	0.175240		

Univariate Tests of Significance for item10 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.04350	1	0.04350	0.23590	0.627689
Scorelevel					
Racegroup*Scorelevel	0.98453	4	0.24613	1.33467	0.258147
Error	38.91157	211	0.18442		

Univariate Tests of Significance for item11 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.02931	1	0.02931	0.1477	0.701172
Scorelevel					
Racegroup*Scorelevel	0.57850	4	0.14462	0.7285	0.573408
Error	41.89045	211	0.19853		

Univariate Tests of Significance for item12 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01452	1	0.014518	0.11166	0.738597
Scorelevel	0.98896	4	0.247240	1.90148	0.111388
Racegroup*Scorelevel	0.30754	4	0.076886	0.59132	0.669282
Error	27.43517	211	0.130025		

Univariate Tests of Significance for item13 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	23.88500	1	23.88500	105.6173	0.000000
Racegroup	0.01651	1	0.01651	0.0730	0.787271
Scorelevel	3.03051	4	0.75763	3.3502	0.011018
Racegroup*Scorelevel	1.93734	4	0.48434	2.1417	0.076820
Error	47.71695	211	0.22615		

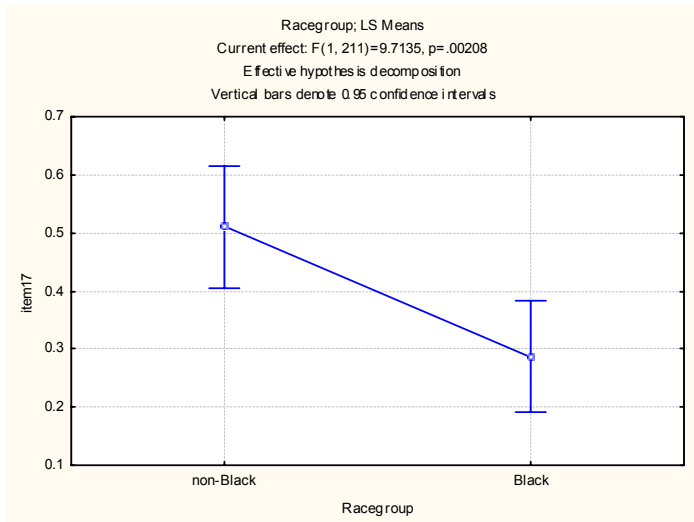
Univariate Tests of Significance for item14 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.21245	1	0.21245	1.4189	0.234917
Scorelevel					
Racegroup*Scorelevel	0.80277	4	0.20069	1.3404	0.256040
Error	31.59164	211	0.14972		

Univariate Tests of Significance for item15 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.52942	1	0.52942	2.4406	0.119730
Scorelevel					
Racegroup*Scorelevel	0.17928	4	0.04482	0.2066	0.934550
Error	45.77047	211	0.21692		

Univariate Tests of Significance for item16 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01812	1	0.018124	0.14973	0.699187
Scorelevel	0.57933	4	0.144832	1.19647	0.313401
Racegroup*Scorelevel	0.38937	4	0.097343	0.80416	0.523727
Error	25.54136	211	0.121049		



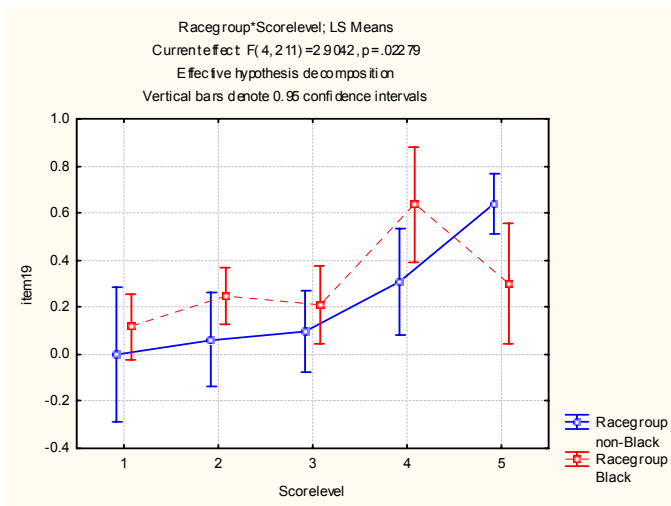
Univariate Tests of Significance for item17 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	25.49777	1	25.49777	122.2796	0.000000
Racegroup	2.02545	1	2.02545	9.7135	0.002084
Scorelevel	2.00881	4	0.50220	2.4084	0.050481
Racegroup*Scorelevel	1.25352	4	0.31338	1.5029	0.202502
Error	43.99776	211	0.20852		



Univariate Tests of Significance for item18 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01668	1	0.016677	0.12081	0.728509
Scorelevel					
Racegroup*Scorelevel	1.29912	4	0.324780	2.35269	0.055139
Error	29.12775	211	0.138046		

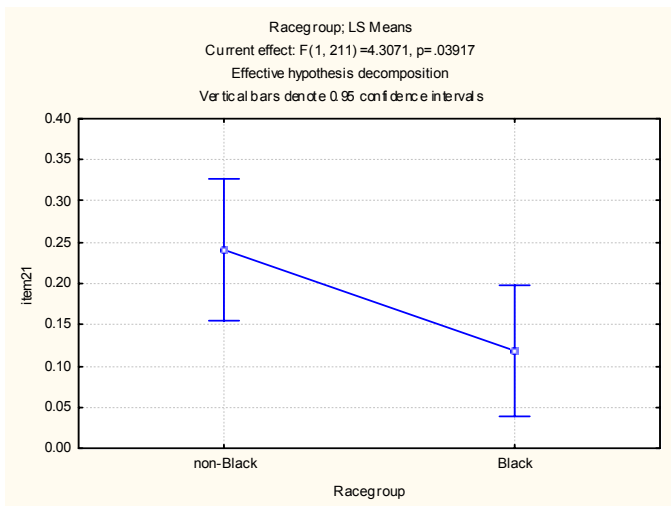
Univariate Tests of Significance for item18 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.01668	1	0.016677	0.12081	0.728509
Scorelevel					
Racegroup*Scorelevel	1.29912	4	0.324780	2.35269	0.055139
Error	29.12775	211	0.138046		

Univariate Tests of Significance for item19 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	10.98107	1	10.98107	66.32346	0.000000
Racegroup	0.25771	1	0.25771	1.55650	0.213562
Scorelevel	4.52712	4	1.13178	6.83572	0.000034
Racegroup*Scorelevel	1.92337	4	0.48084	2.90419	0.022788
Error	34.93492	211	0.16557		



Univariate Tests of Significance for item20 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.24552	1	0.24552	1.1430	0.286232
Scorelevel					
Racegroup*Scorelevel	0.39256	4	0.09814	0.4569	0.767298
Error	45.32245	211	0.21480		

Univariate Tests of Significance for item21 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup					
Scorelevel	0.19931	4	0.049828	0.35171	0.842664
Racegroup*Scorelevel	0.96414	4	0.241034	1.70132	0.150896
Error	29.89328	211	0.141674		



Univariate Tests of Significance for item22 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	1.16555	1	1.165549	14.70917	0.000166
Racegroup	0.08955	1	0.089555	1.13018	0.288953
Scorelevel	1.97348	4	0.493369	6.22629	0.000094
Racegroup*Scorelevel	0.09733	4	0.024332	0.30707	0.873048
Error	16.71956	211	0.079240		

Univariate Tests of Significance for item23 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.15847	1	0.158472	1.24716	0.265365
Scorelevel					
Racegroup*Scorelevel	0.50017	4	0.125043	0.98408	0.417152
Error	26.81084	211	0.127066		

Univariate Tests of Significance for item24 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.02517	1	0.025166	0.17014	0.680409
Scorelevel					
Racegroup*Scorelevel	0.59533	4	0.148832	1.00619	0.405236
Error	31.21022	211	0.147916		

Univariate Tests of Significance for item25 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	4.52336	1	4.523365	34.86124	0.000000
Racegroup	0.25931	1	0.259307	1.99846	0.158933
Scorelevel	3.04333	4	0.760834	5.86369	0.000171
Racegroup*Scorelevel	0.31208	4	0.078021	0.60130	0.662104
Error	27.37797	211	0.129753		

Univariate Tests of Significance for item26 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.00205	1	0.002050	0.02311	0.879322
Scorelevel					
Racegroup*Scorelevel	0.03782	4	0.009454	0.10659	0.980126
Error	18.71481	211	0.088696		

Univariate Tests of Significance for item27 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.07687	1	0.076869	0.85071	0.357404
Scorelevel					
Racegroup*Scorelevel	0.07690	4	0.019224	0.21276	0.931160
Error	19.06561	211	0.090358		

Univariate Tests of Significance for item28 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.13699	1	0.136992	2.520618	0.113864
Scorelevel	0.45324	4	0.113309	2.084858	0.083932
Racegroup*Scorelevel	0.08885	4	0.022213	0.408721	0.802258
Error	11.46752	211	0.054348		

Univariate Tests of Significance for item29 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	0.64677	1	0.646772	8.903550	0.003182
Racegroup	0.06523	1	0.065231	0.897981	0.344408
Scorelevel	0.19509	4	0.048772	0.671407	0.612493
Racegroup*Scorelevel	0.39361	4	0.098402	1.354619	0.250909
Error	15.32748	211	0.072642		

Univariate Tests of Significance for item30 Sigma-restricted parameterization Effective hypothesis decomposition					
Effect	SS	Degr. of Freedom	MS	F	p
Intercept					
Racegroup	0.004644	1	0.004644	0.111249	0.739058
Scorelevel					
Racegroup*Scorelevel	0.041915	4	0.010479	0.251036	0.908809
Error	8.807585	211	0.041742		

