Supplemental Online Material 3

Measurement invariance of three narcissism questionnaires across the US, the UK, and Germany

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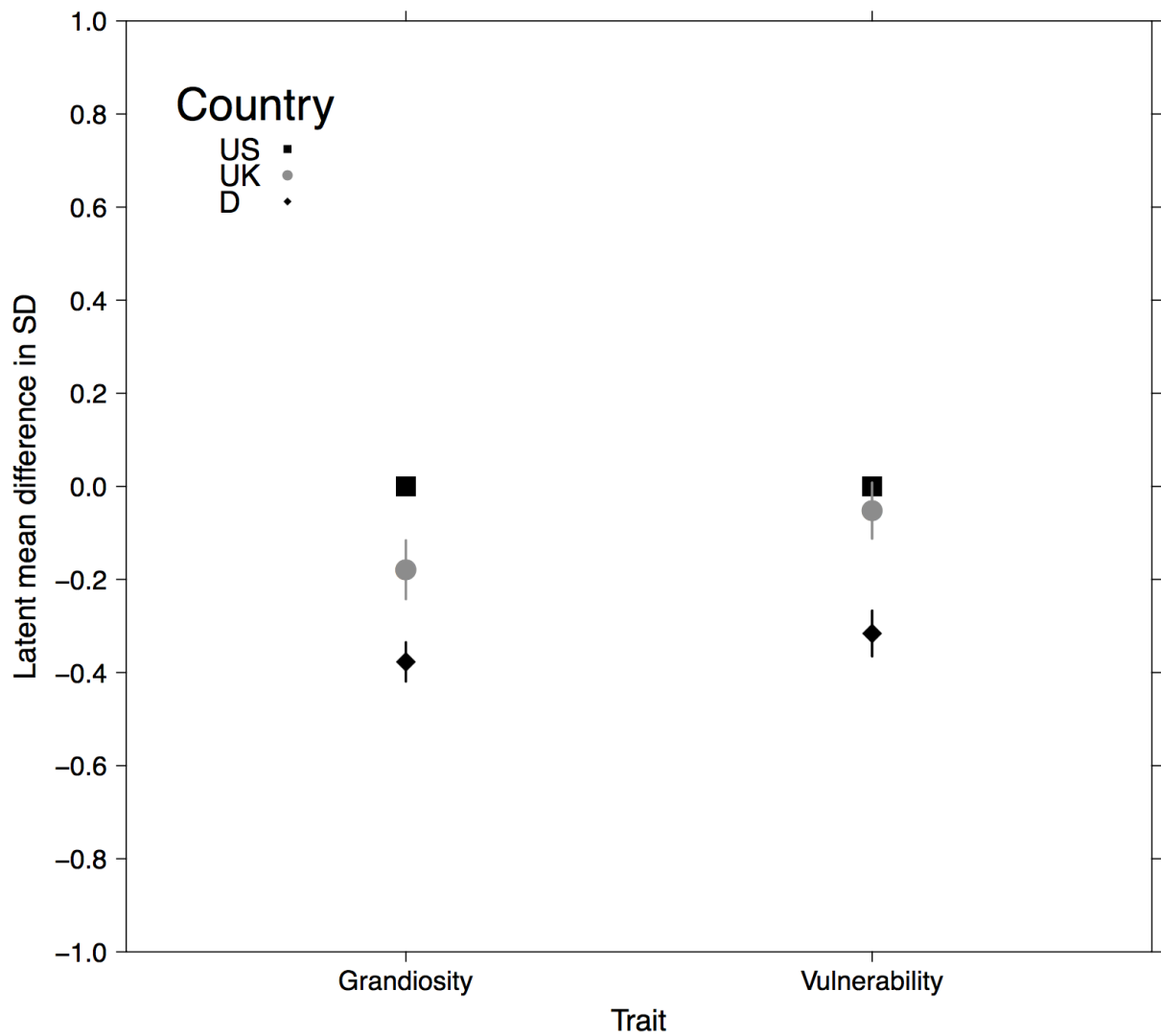
Table S1

Noninvariant parameters for the B-PNI analysis of US, UK, and Germany at the Domain

Level

Model	Parameter	Country	Modification index	Expected parameter change	Effect size
Strict	VULN BY BPNI3	D	73.58	0.25	NA
partial 1	[BPNI22$5]	D	52.51	0.57	0.85
partial 2	[BPNI1$1]	D	48.96	-0.42	-0.64
partial 3	[BPNI4$5]	UK	42.32	0.42	0.62
partial 4	[BPNI14$1]	D	38.52	-0.46	-0.67
partial 5	[BPNI3$5]	D	34.55	0.48	0.63
partial 6	[BPNI28$4]	D	32.55	0.39	0.58
partial 7	[BPNI28$3]	D	32.23	0.39	0.57
partial 8	[BPNI9$4]	D	32.29	0.35	0.52
partial 9	[BPNI28$2]	D	32.87	0.39	0.58
partial 10	[BPNI9$5]	D	32.98	0.35	0.53
partial 11	GRAND BY BPNI10	D	32.37	0.26	NA
partial 12	[BPNI10$5]	D	41.93	0.56	0.79
partial 13	[BPNI16$5]	D	29.97	0.44	0.65
partial 14	[BPNI8$5]	D	30.55	0.39	0.58
partial 15	VULN BY BPNI23	D	39.55	-0.25	NA

partial 16	[BPNI3$4]	D	28.69	0.44	0.57
partial 17	[BPNI28$5]	D	28.69	0.36	0.53
partial 18	[BPNI9$3]	D	25.86	0.32	0.46
partial 19	[BPNI7$1]	D	21.63	-0.31	-0.45
partial 20	[BPNI17$1]	D	20.27	-0.31	-0.51
partial 21	[BPNI4$1]	D	19.39	-0.26	-0.40
partial 22	[BPNI17$2]	D	19.89	-0.31	-0.50
partial 23	[BPNI25$1]	D	20.03	-0.28	-0.43
partial 24	[BPNI17$3]	US	19.03	0.35	0.50
partial 25	[BPNI17$4]	D	18.45	-0.30	-0.48
partial 26	[BPNI1$2]	D	18.61	-0.25	-0.38
partial 27	[BPNI18$5]	D	17.69	0.30	0.44
partial 28	[BPNI3$3]	D	17.91	0.35	0.46
partial 29	[BPNI22$1]	D	16.38	-0.34	-0.48
partial 30	[BPNI2$1]	D	16.43	-0.31	-0.45
partial 31	[BPNI2$2]	D	16.62	-0.31	-0.45
partial 32	[BPNI14$3]	UK	14.50	0.26	0.40
partial 33	[BPNI2$3]	D	13.59	-0.28	-0.41
partial 34	[BPNI14$2]	D	13.95	-0.28	-0.40
partial 35	[BPNI16$4]	D	12.35	0.30	0.42
partial 36	[BPNI10$4]	D	11.94	0.29	0.41
partial 37	[BPNI24$5]	US	13.71	-0.27	-0.38
Partial 38	[BPNI19$5]	D	12.96	0.24	0.39
Partial 39	[BPNI16$5]	US	8.56	0.20	0.39

Note. GRAND = grandiosity, VULN = vulnerability, D = Germany. Domain name BY …

indicates a noninvariant factor loading. Items in brackets are noninvariant thresholds with $1

= threshold 1, $ = threshold 2 etc. The expected parameter change (EPC) given by Mplus for

individual thresholds reflects the difference between the (constrained) estimate of the

parameter in the current model and the estimate of the parameter for this group if it were

freed. Thus, it does not directly reflect the difference in parameter estimates between one

group and the combined other groups. This group difference (column effect size) was

calculated from the EPC values for all groups by subtracting the mean of the EPCs for the

other groups from the EPC for the group of interest. This effect size was compared to the cut-

off criterion of 0.375 for thresholds.

Figure S1. Latent mean differences on the B-PNI domains grandiosity and vulnerability between the US, the UK, and Germany (D). The means in the US were fixed to 0 for identification and are included here only as a reference point. The mean estimates of the other countries indicate the difference to the US. Error bars show +/− 1 SE of the estimated mean difference.
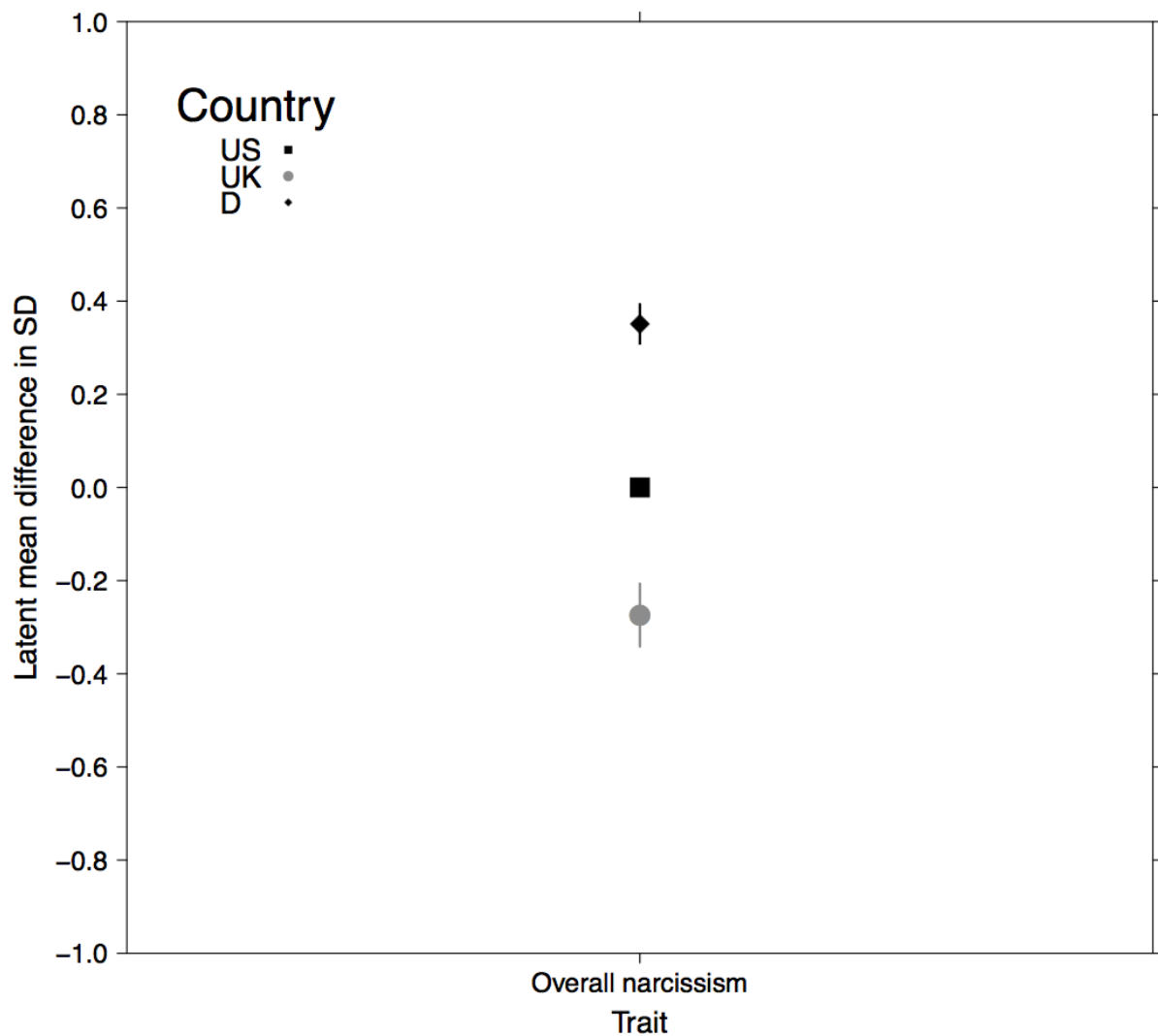
Table S2

Noninvariant parameters for the NPI analysis of US, UK, and Germany at the Level of

Overall Narcissism

Model	Parameter	Country	Modification index	Expected parameter change
strict	[NPI35]	D	37.99	1.10
partial 1	[NPI3]	D	32.56	0.92
partial 2	NARC BY NPI14	D	28.71	-0.29
partial 3	NARC BY NPI10	D	21.87	-0.27
partial 4	[NPI27]	D	22.16	-0.95
partial 5	NARC	D	15.50	0.27
partial 6	[NPI10]	D	14.22	-0.76
partial 7	[NPI18]	D	14.04	-0.62
partial 8	[NPI21]	D	12.42	0.58
partial 9	[NPI8]	D	12.62	0.61
partial 10	[NPI34]	D	9.74	-0.50
partial 11	[NPI23]	D	8.89	0.53
partial 12	[NPI25]	D	8.51	0.50
partial 13	[NPI39]	D	6.39	-0.43
partial 14	[NPI33]	D	6.19	-0.46
partial 15	[NPI40]	D	5.42	-0.43
partial 16	[NPI5]	US	4.39	-0.38
partial 17	[NPI8]	US	3.49	0.38

Note. NARC = Overall narcissism, D = Germany, NARC BY … indicates noninvariant factor

loadings. Items in brackets are noninvariant thresholds. For the NPI the expected parameter

change of the item intercept is reported. This directly reflects the difference in parameter

estimates between the group of interest and the other groups and can therefore be compared to

the cut-off criterion of 0.375.

Figure S2. Latent mean differences on overall narcissism in the NPI between the US, the UK, and Germany (D). The mean in the US was fixed to 0 for identification and is included here only as a reference point. The mean estimates of the other countries indicate the difference to the US. Error bars show +/– 1 SE of the estimated mean difference.
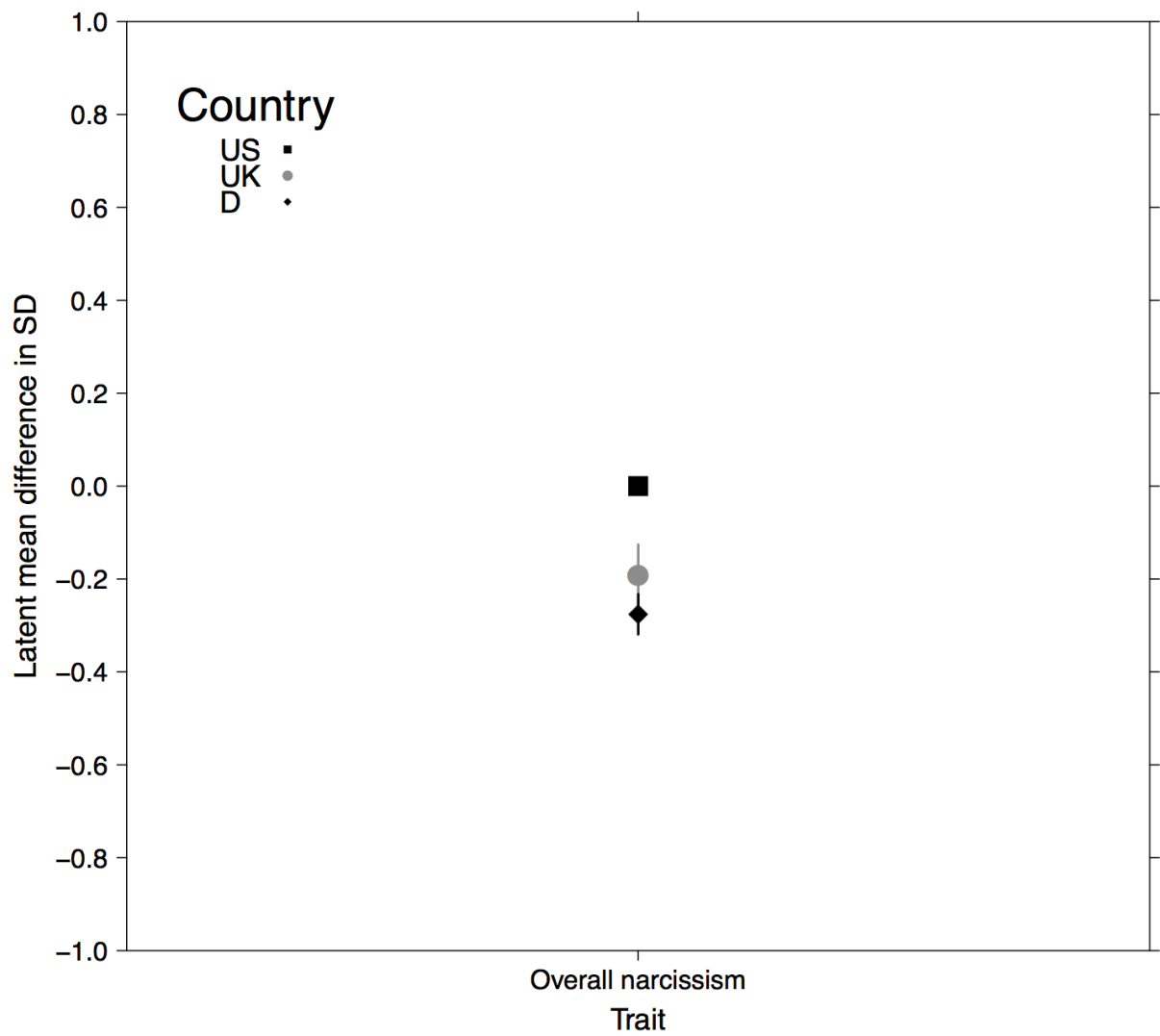
Table S3

Noninvariant parameters for the NARQ analysis with US, UK, and Germany at the Level of

Overall Narcissism

Model	Parameter	Country	Modification index	Expected parameter change	Effect size
strict	[NARQ14$5]	D	98.67	0.70	1.08
partial01	[NARQ14$4]	D	73.08	0.59	0.91
partial02	[NARQ14$3]	D	75.00	0.60	0.91
partial03	[NARQ4$5]	D	76.24	0.67	1.06
partial04	[NARQ14$2]	D	78.85	0.57	0.87
partial05	[NARQ18$5]	D	54.43	0.45	0.68
partial06	[NARQ18$4]	D	52.40	0.45	0.67
partial07	[NARQ12$1]	D	47.09	-0.49	-0.74
partial08	[NARQ18$3]	D	42.34	0.40	0.60
partial09	[NARQ11$5]	D	37.07	0.39	0.59
partial10	[NARQ14$1]	D	35.28	0.38	0.58
partial11	[NARQ18$2]	D	32.04	0.35	0.52
partial12	NARC BY NARQ8	D	25.62	-0.28	NA
partial13	[NARQ10$1]	D	21.97	-0.36	-0.55
partial14	[NARQ2$1]	D	19.67	-0.31	-0.47
partial15	[NARQ16$2]	D	20.09	-0.37	-0.56
partial16	[NARQ16$1]	D	18.62	-0.36	-0.54

partial17	[NARQ15$1]	D	19.08	-0.35	-0.52
partial18	[NARQ16$3]	D	16.67	-0.34	-0.51
partial19	[NARQ17$4]	D	15.98	0.28	0.42
partial20	[NARQ11$4]	D	15.34	0.25	0.38
partial21	[NARQ17$2]	UK	12.90	-0.25	-0.38
partial22	[NARQ4$2]	D	12.29	0.27	0.40
partial23	[NARQ17$3]	D	13.36	0.25	0.38
partial24	[NARQ8$2]	D	10.80	0.24	0.42
partial25	[NARQ18$1]	D	16.39	0.25	0.38
partial26	[NARQ8$4]	D	9.37	0.22	0.38
partial27	[NARQ8$5]	D	10.09	0.28	0.42
partial28	[NARQ8$3]	D	10.72	0.27	0.41

Note. NARC = overall narcissism. NARC BY … indicates a noninvariant factor loading. Items

in brackets are noninvariant thresholds with $1 = threshold 1, $ = threshold 2 etc. The expected

parameter change (EPC) given by Mplus for individual thresholds reflects the difference between

the (constrained) estimate of the parameter in the current model and the estimate of the

parameter for this group if it were freed. Thus, it does not directly reflect the difference in

parameter estimates between one group and the combined other groups. This group difference

(column effect size) was calculated from the EPC values for all groups by subtracting the mean

of the EPCs for the other groups from the EPC for the group of interest. This effect size was

compared to the cut-off criterion of 0.375 for thresholds.

Figure S3. Latent mean differences on overall narcissism in the NARQ between the US, the UK, and Germany (D). The mean in the US was fixed to 0 for identification and is included here only as a reference point. The mean estimates of the other countries indicate the difference to the US. Error bars show +/– 1 SE of the estimated mean difference.