

Supplemental Online Material 1

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

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Table S1

Descriptive statistics and omega reliabilities for the narcissism facets by sample

Questionnaire	Facet	Country					
		United States		United Kingdom		Germany	
		M (SD)	ω	M (SD)	ω	M (SD)	ω
B-PNI	Exploitativeness	3.06 (1.24)	0.84	2.94 (1.14)	0.82	2.93 (1.08)	0.81
B-PNI	Self-sacrificing enhancement	3.34 (1.16)	0.75	3.02 (1.1)	0.73	2.68 (1.06)	0.79
B-PNI	Grandiose fantasy	3.49 (1.35)	0.83	3.49 (1.36)	0.83	3.44 (1.24)	0.83
B-PNI	Contingent self-esteem	2.96 (1.28)	0.83	2.99 (1.26)	0.81	2.76 (1.18)	0.83
B-PNI	Hiding the self	3.77 (1.26)	0.78	3.67 (1.25)	0.81	3.19 (1.21)	0.81
B-PNI	Devaluing	2.57 (1.09)	0.72	2.45 (1.02)	0.70	2.44 (1.06)	0.81
B-PNI	Entitlement rage	2.73 (1.17)	0.79	2.67 (1.15)	0.77	2.53 (1.02)	0.77
NPI	Leadership	0.31 (0.22)	0.85	0.26 (0.2)	0.84	0.37 (0.2)	0.81
NPI	Vanity	0.29 (0.23)	0.79	0.25 (0.22)	0.79	0.34 (0.22)	0.75
NPI	Entitlement	0.22 (0.22)	0.75	0.21 (0.21)	0.75	0.29 (0.22)	0.70
NARQ	Admiration	3.08 (0.97)	0.86	2.82 (0.96)	0.86	2.79 (0.94)	0.87
NARQ	Rivalry	2.35 (0.93)	0.84	2.34 (0.93)	0.84	2.15 (0.78)	0.83

Note. B-PNI = Brief Pathological Narcissism Inventory, NPI = Narcissistic Personality

Inventory, NARQ = Narcissistic Admiration and Rivalry Questionnaire.

Table S2

Observed correlations between narcissism facets in the US sample

	B-PNI							NPI			NARQ
	EXPL	SSSE	GRFA	COSE	HIDE	DEVA	ENTI	LEAD	VAN	ENT	ADM
SSSE	0.32										
GRFA	0.35	0.50									
COSE	0.20	0.48	0.50								
HIDE	0.21	0.30	0.34	0.40							
DEVA	0.27	0.43	0.40	0.52	0.48						
ENTI	0.46	0.50	0.54	0.60	0.35	0.59					
LEAD	0.68	0.27	0.34	0.11	0.10	0.18	0.48				
VAN	0.41	0.26	0.36	0.31	0.03	0.21	0.47	0.58			
ENT	0.55	0.28	0.40	0.35	0.18	0.29	0.59	0.69	0.71		
ADM	0.59	0.40	0.46	0.24	0.08	0.27	0.55	0.70	0.65	0.57	
RIV	0.43	0.35	0.48	0.49	0.32	0.46	0.67	0.45	0.43	0.60	0.48

Note. EXPL = exploitativeness, SSSE = self-sacrificing self-enhancement, GRFA = grandiose fantasy, COSE = contingent self-esteem, HIDE = hiding the self, DEVA = devaluing, ENTI = entitlement rage, LEAD = leadership, VAN = vanity, ENT = entitlement, ADM = admiration, RIV = rivalry.

Table S3

Standardized factor loadings from the configural invariance model for the B-PNI analysis of US, UK, and Germany

Facet	Item	Standardized factor loading		
		US	UK	Germany
Exploitativeness	BPNI1	0.78	0.80	0.67
	BPNI4	0.90	0.89	0.81
	BPNI6	0.90	0.70	0.90
	BPNI11	0.50	0.63	0.59
Self-sacrificing self-enhancement	BPNI10	0.72	0.75	0.80
	BPNI12	0.52	0.50	0.53
	BPNI19	0.75	0.69	0.78
	BPNI24	0.64	0.58	0.68
	BPNI13	0.71	0.67	0.67
Grandiose fantasy	BPNI17	0.86	0.90	0.88
	BPNI25	0.68	0.59	0.78
	BPNI26	0.86	0.91	0.81
	BPNI2	0.78	0.78	0.72
Contingent self-esteem	BPNI16	0.85	0.85	0.83
	BPNI18	0.70	0.60	0.82
	BPNI21	0.71	0.69	0.72
	BPNI3	0.73	0.72	0.83
Hiding the self				

	BPNI15	0.70	0.68	0.61
	BPNI27	0.68	0.74	0.67
	BPNI28	0.75	0.82	0.87
Devaluing	BPNI7	0.62	0.62	0.68
	BPNI9	0.48	0.53	0.66
	BPNI14	0.75	0.75	0.84
	BPNI20	0.81	0.77	0.86
Entitlement rage	BPNI5	0.70	0.68	0.70
	BPNI8	0.70	0.65	0.71
	BPNI22	0.77	0.75	0.82
	BPNI23	0.73	0.76	0.67

Table S4

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

Model	Parameter	Country	Modification index	Expected parameter change	Effect size
Strict	[BPNI9\$4]	D	58.53	0.44	0.66
partial 1	[BPNI9\$5]	D	58.05	0.43	0.65
partial 2	[BPNI9\$3]	D	50.73	0.41	0.62
partial 3	[BPNI1\$1]	D	38.06	-0.45	-0.73
partial 4	[BPNI9\$2]	D	32.82	0.33	0.50
partial 5	Deva BY bpni20	D	33.53	-0.30	NA
partial 6	Hide BY bpni3	D	32.89	0.28	NA
partial 7	[BPNI4\$5]	UK	29.48	0.47	0.77
partial 8	Hide BY bpni28	D	26.99	0.43	NA
partial 9	[BPNI22\$5]	D	23.29	0.27	0.53
partial 10	[BPNI14\$5]	D	22.03	0.44	0.61
partial 11	[BPNI11\$2]	D	20.50	0.25	0.39
partial 12	[BPNI2\$3]	D	19.88	-0.29	-0.46
partial 13	[BPNI2\$2]	D	18.63	-0.29	-0.46
partial 14	[BPNI2\$4]	D	16.82	-0.27	-0.43

partial 15	[BPNI2\$1]	D	13.03	-0.26	-0.40
partial 16	[BPNI14\$1]	D	12.84	-0.33	-0.45
partial 17	[BPNI17\$1]	D	13.89	-0.27	-0.38
partial 18	[BPNI16\$5]	UK	12.16	-0.37	-0.50
partial 19	[BPNI26\$1]	D	11.44	0.27	0.46
partial 20	[BPNI26\$2]	D	13.59	0.30	0.49
partial 21	[BPNI3\$1]	US	11.21	0.26	0.42
partial 22	[BPNI4\$1]	D	11.09	-0.31	-0.49
partial 23	[BPNI1\$2]	D	13.15	-0.27	-0.41
partial 24	Expl BY bpni6	D	13.26	-0.32	NA
partial 25	[BPNI4\$2]	D	11.47	-0.36	-0.52
partial 26	[BPNI26\$3]	D	9.34	0.24	0.41
partial 27	Grfa BY bpni26	D	9.99	-0.28	NA
partial 28	[BPNI28\$4]	D	8.59	0.26	0.39
partial 29	[BPNI3\$5]	D	10.24	0.30	0.40
partial 30	[BPNI28\$3]	D	12.42	0.33	0.47
partial 31	[BPNI28\$5]	D	16.07	0.47	0.63
partial 32	[BPNI3\$4]	D	17.47	0.43	0.54
partial 33	[BPNI28\$2]	D	16.65	0.48	0.60
partial 34	[BPNI3\$3]	D	10.60	0.36	0.44
partial 35	[BPNI4\$3]	D	7.66	-0.29	-0.42

partial 36	Grfa BY npi17	D	6.14	-0.27	NA
partial 37	[BPNI13\$5]	D	16.45	0.26	0.39

Note. EXPL = exploitativeness, SSSE = self-sacrificing self-enhancement, GRFA = grandiose fantasy, COSE = contingent self-esteem, HIDE = hiding the self, DEVA = devaluing, ENTI = entitlement rage, D = Germany. Facet 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.

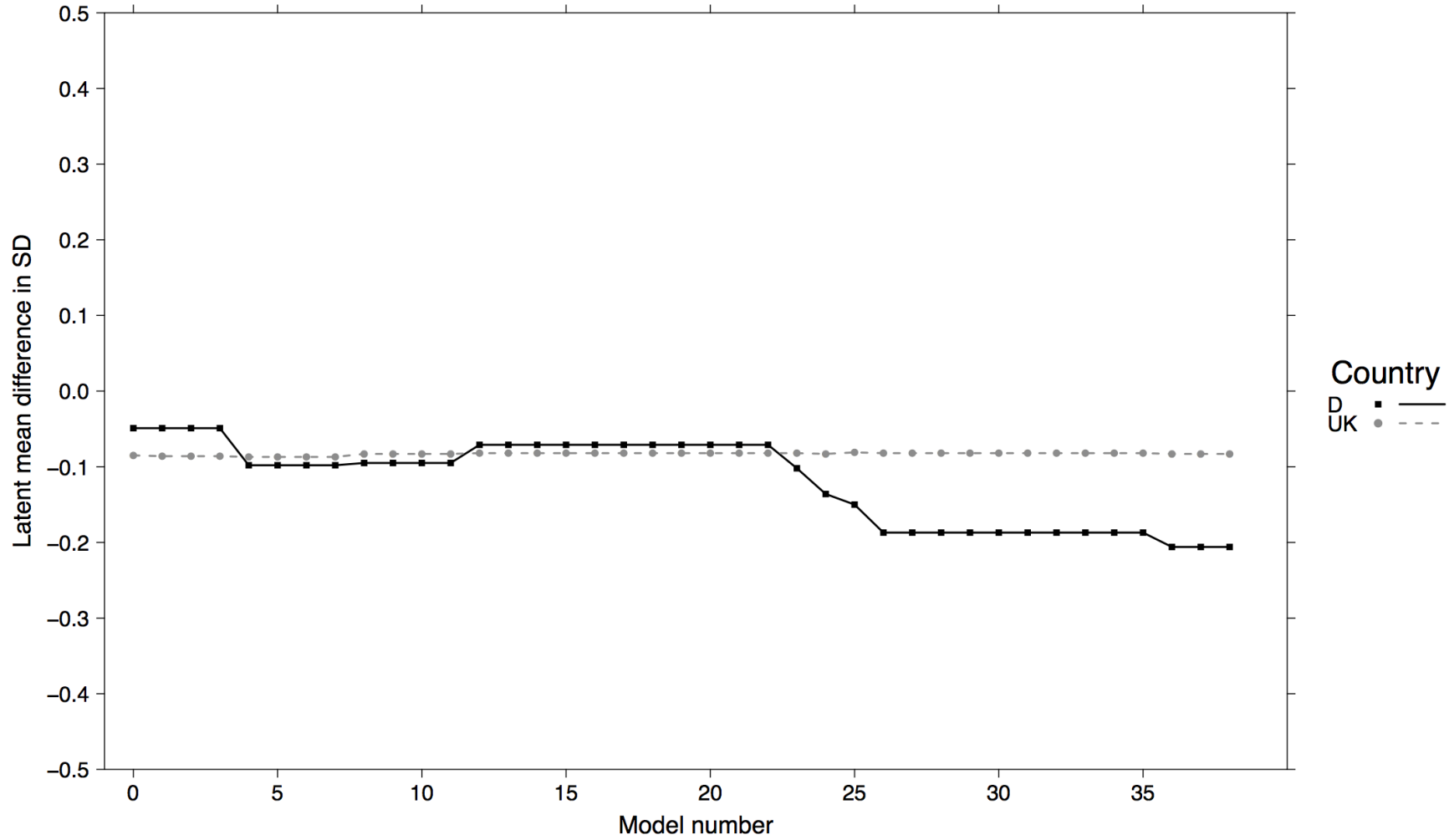


Figure S1. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet exploitativeness by country.

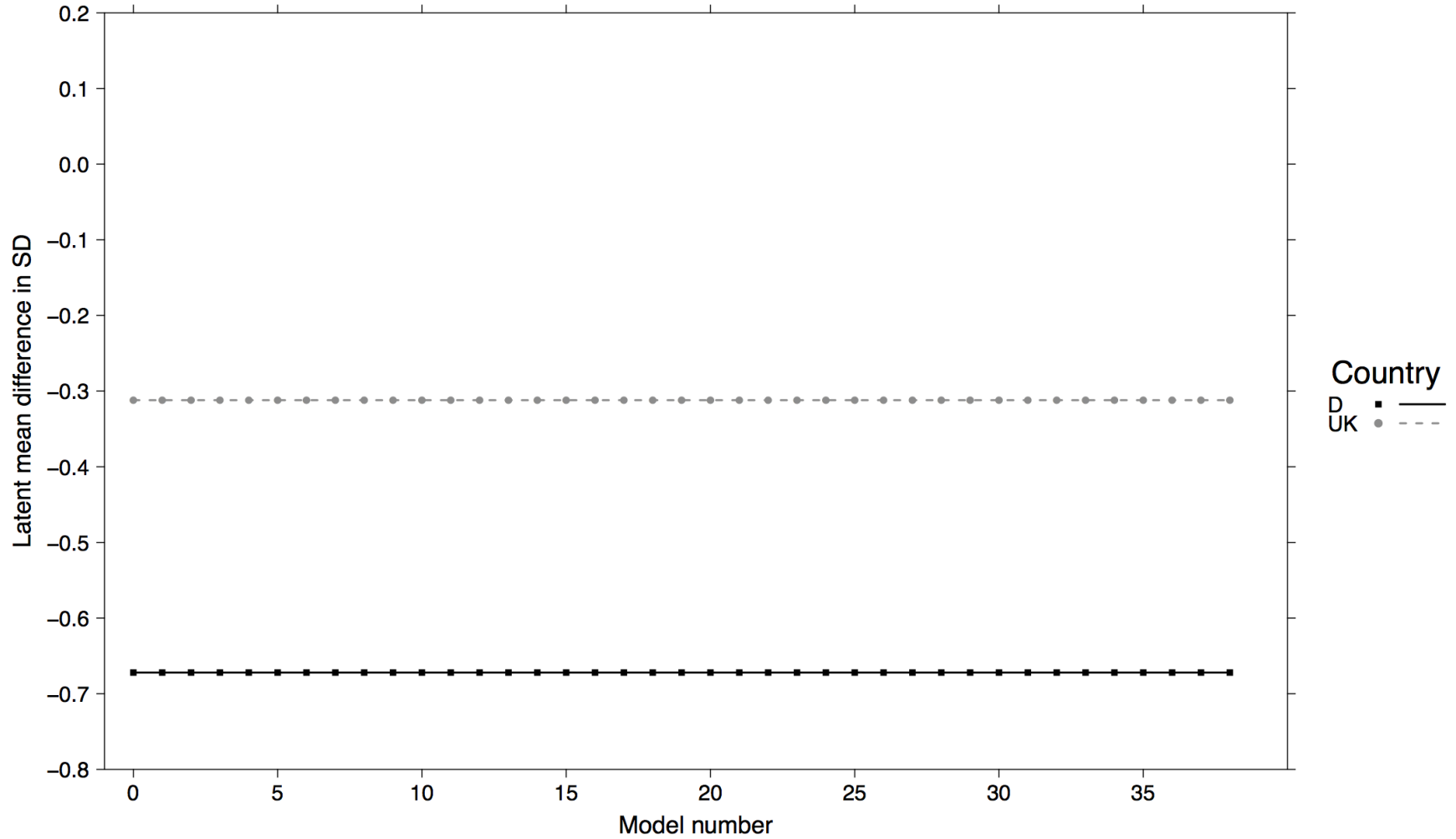


Figure S2. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet self-sacrificing self-enhancement by country.

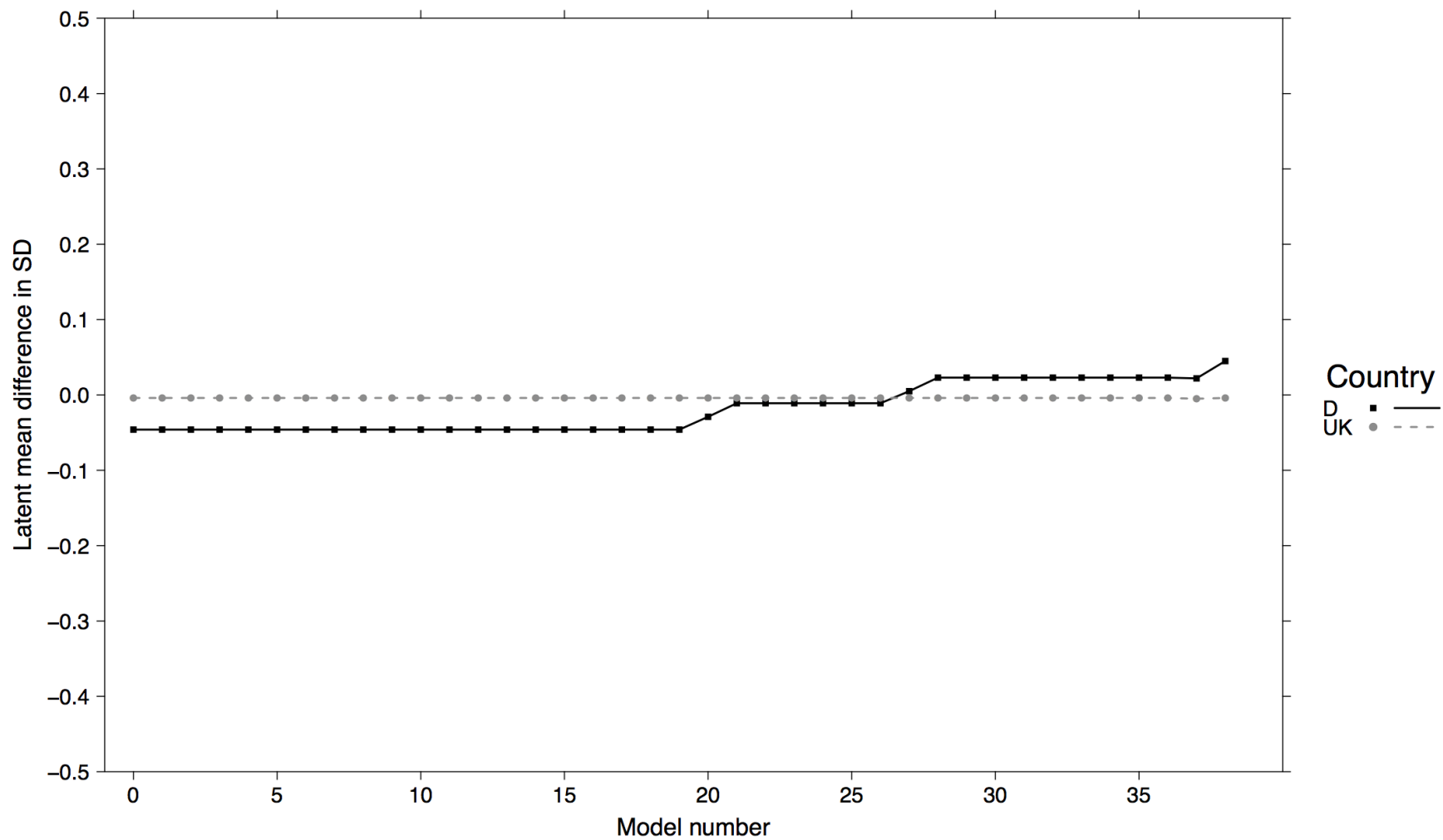


Figure S3. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet grandiose fantasy by country.

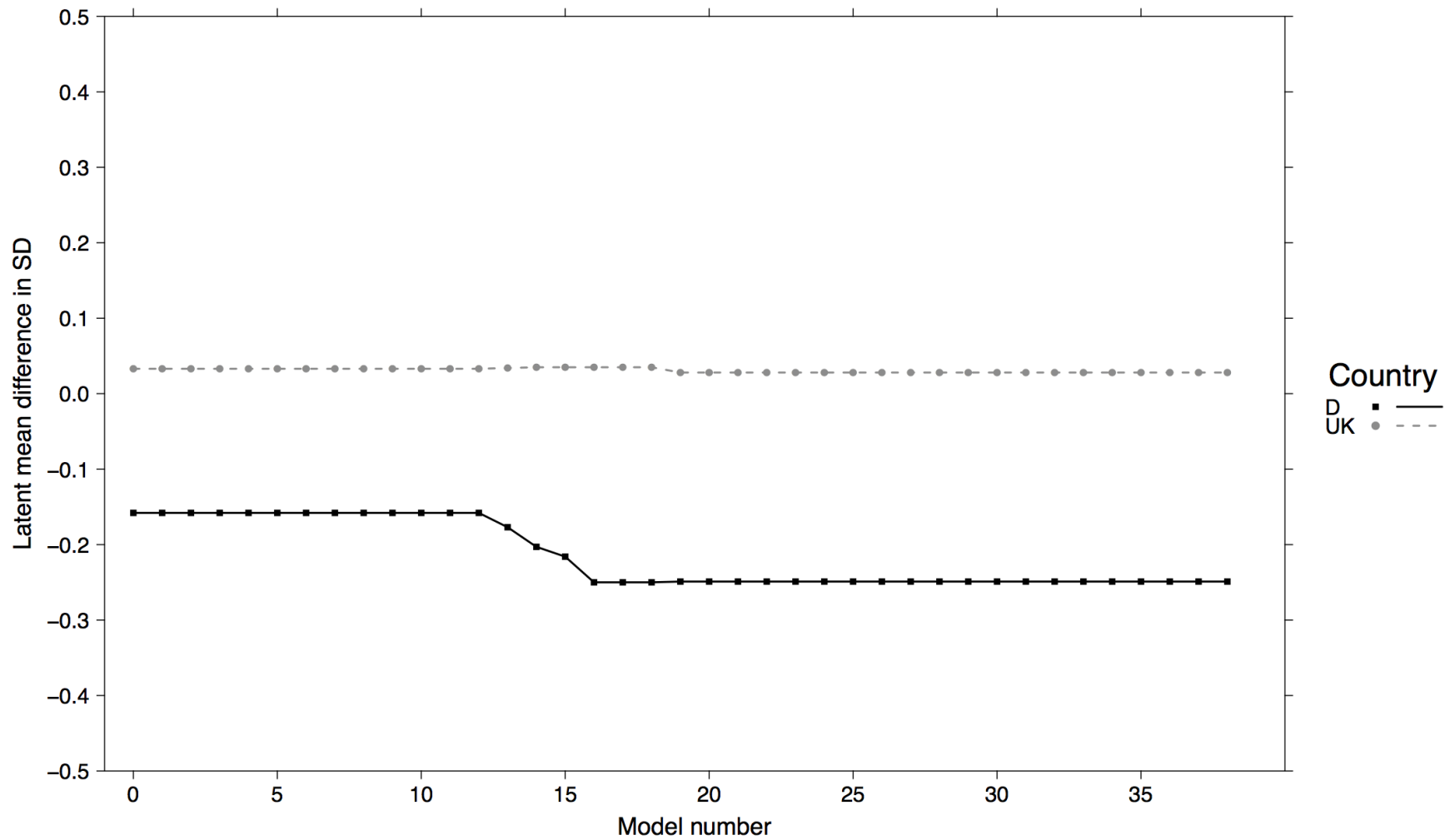


Figure S4. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet contingent self-esteem by country.

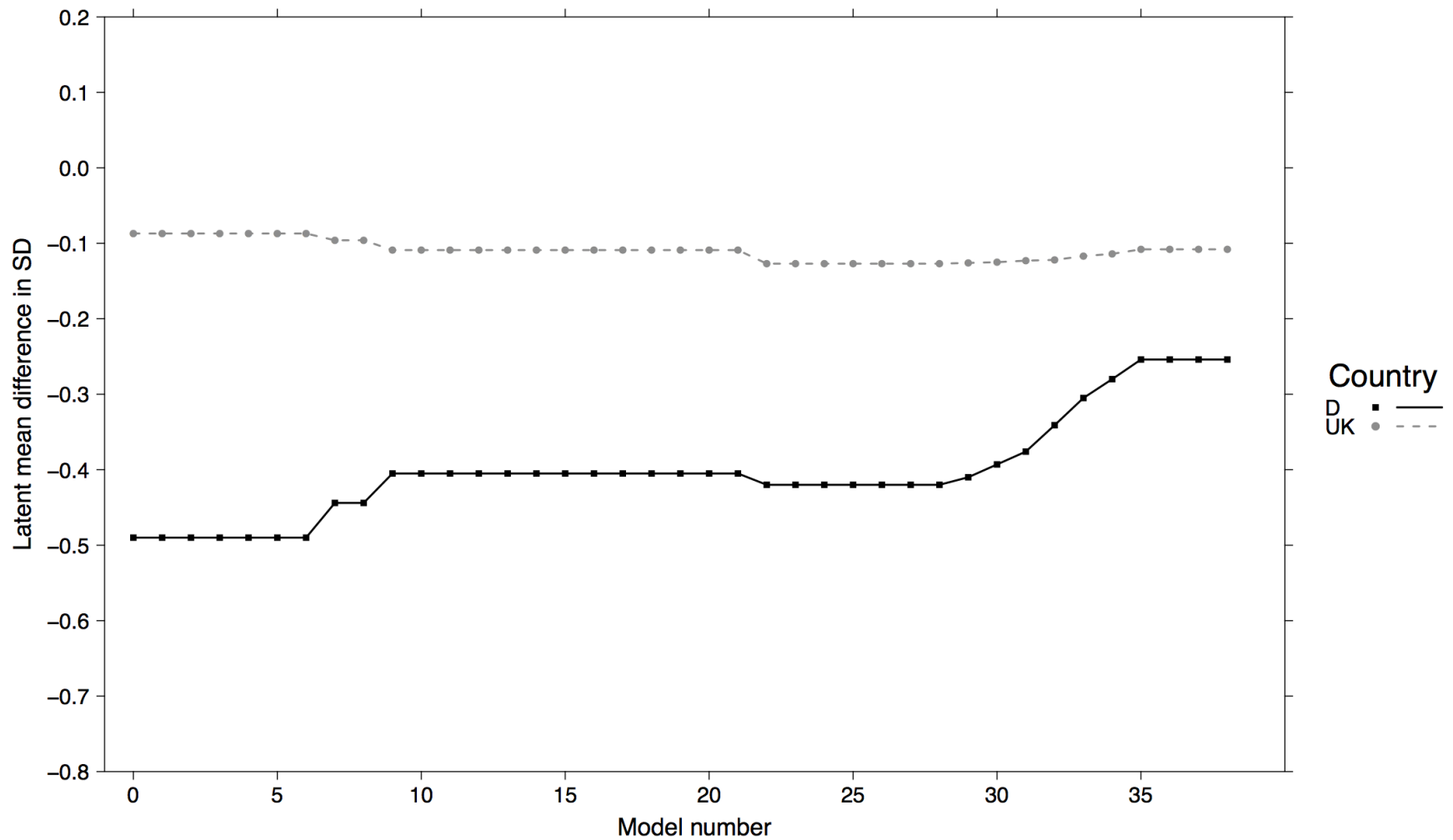


Figure S5. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet hiding the self by country.

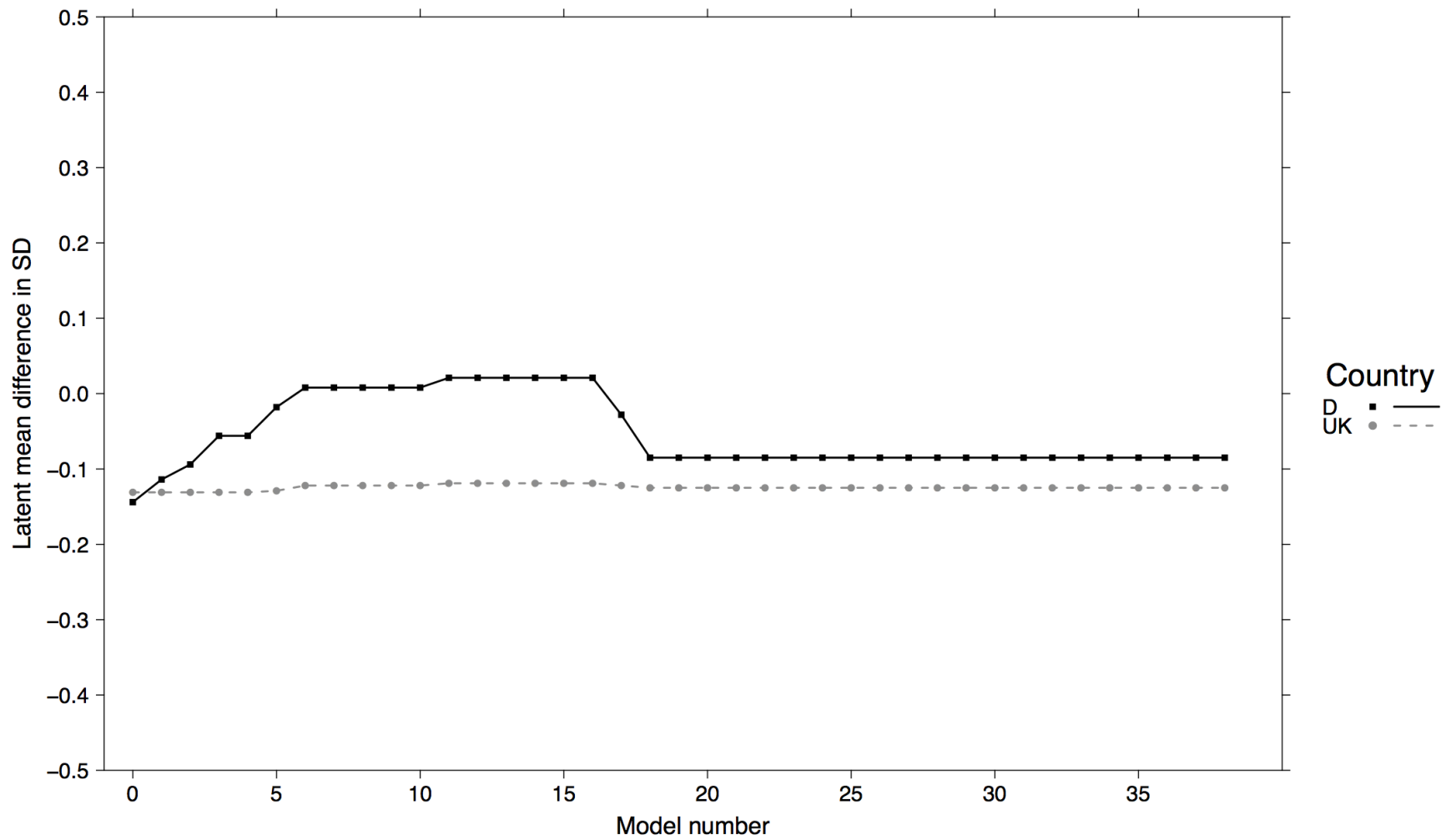


Figure S6. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet devaluing by country.

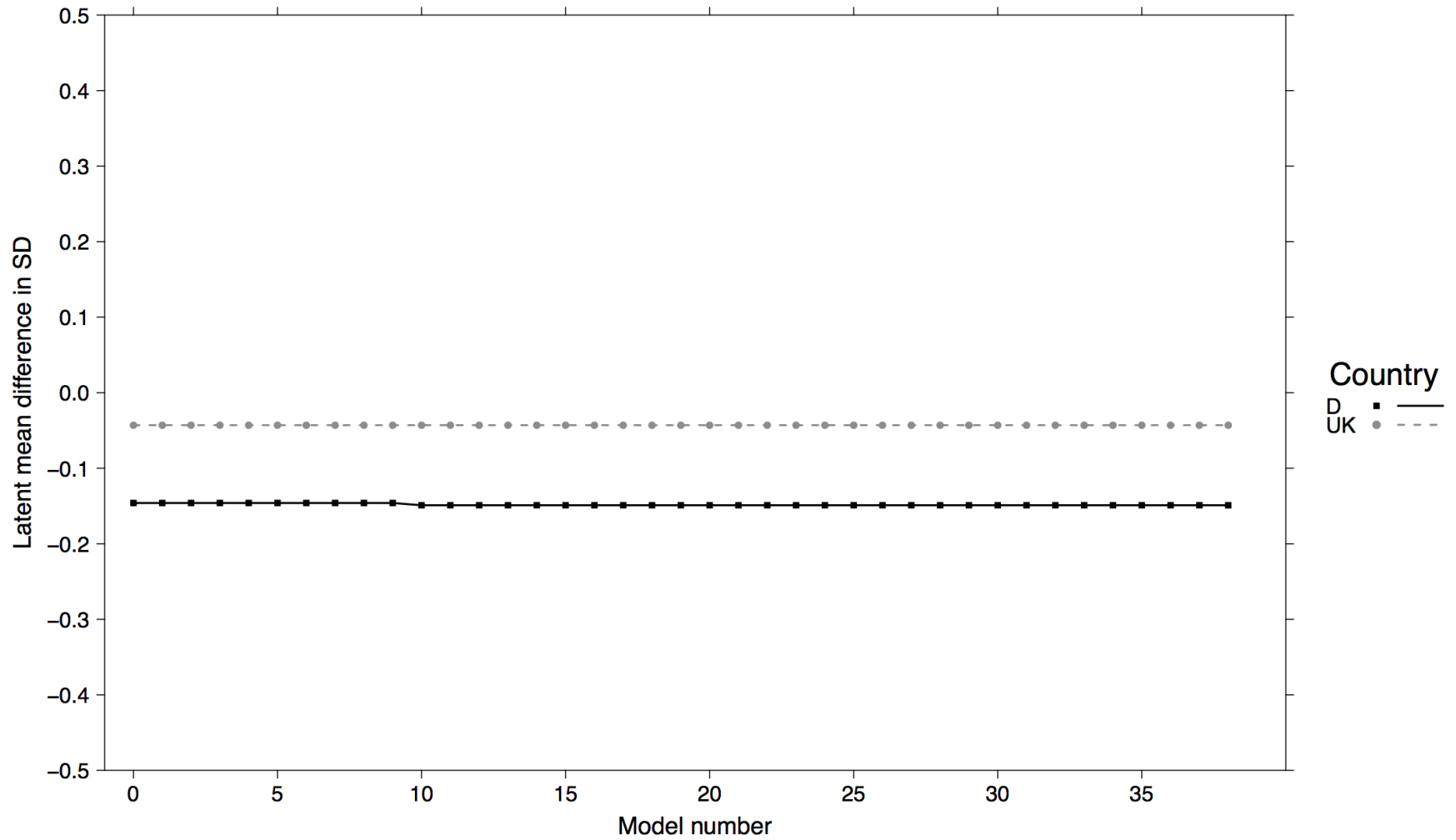


Figure S7. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the B-PNI facet entitlement rage by country.

Table S5

Observed mean differences and effect sizes for the B-PNI, NPI, and NARQ

Questionnaire	Facet	UK – UK		US – D	
		Mean difference	Cohen's <i>d</i>	Mean difference	Cohen's <i>d</i>
B-PNI	Exploitativeness	-0.12	-0.10 [-0.22, 0.02]	-0.13	-0.11 [-0.19, -0.02]
	Self-sacrificing self-enhancement	-0.32	-0.28 [-0.4, -0.16]	-0.67	-0.58 [-0.67, -0.5]
	Grandiose fantasy	-0.01	-0.01 [-0.13, 0.11]	-0.05	-0.04 [-0.12, 0.04]
	Contingent self-esteem	0.02	0.02 [-0.1, 0.14]	-0.2	-0.16 [-0.24, -0.08]
	Hiding the self	-0.09	-0.08 [-0.19, 0.04]	-0.57	-0.46 [-0.54, -0.37]
	Devaluing	-0.12	-0.11 [-0.23, 0]	-0.13	-0.12 [-0.2, -0.04]
	Entitlement rage	-0.05	-0.05 [-0.16, 0.07]	-0.2	-0.17 [-0.26, -0.09]

NPI	Leadership	-0.06	-0.26 [-0.38, -0.14]	0.05	0.25 [0.17, 0.33]
	Vanity	-0.04	-0.19 [-0.31, -0.07]	0.05	0.23 [0.15, 0.31]
	Entitlement	-0.01	-0.07 [-0.19, 0.05]	0.07	0.31 [0.23, 0.4]
NARQ	Admiration	-0.27	-0.28 [-0.4, -0.16]	-0.29	-0.30 [-0.38, -0.22]
	Rivalry	0	-0.01 [-0.12, 0.11]	-0.20	-0.22 [-0.30, -0.14]

Note. Cohen's d values for the NPI facets should be interpreted with caution. They differ rather strongly from the observed mean differences because the pooled standard deviations, which are in the denominator for calculating d , are very low.

Table S6

Correlations of trait estimates on the narcissism facets with age and sex for the strict and final partial invariance models

		US				UK				D			
		Strict		Partial		Strict		Partial		Strict		Partial	
Quest- ionnaire	Facet	Age	Sex	Age	Sex	Age	Sex	Age	Sex	Age	Sex	Age	Sex
B-PNI	EXPL	-0.14	0.14	-0.14	0.14	-0.20	0.13	-0.19	0.11	-	-	-0.07	-0.02
	SSSE	-0.22	0.07	-0.22	0.07	-0.28	0.04	-0.27	0.03	-	-	-0.23	0.04
	GRFA	-0.23	0.11	-0.23	0.11	-0.33	0.18	-0.33	0.18	-	-	-0.17	0.07
	COSE	-0.21	0.02	-0.21	0.01	-0.33	0.02	-0.34	0.02	-	-	-0.18	-0.03
	HIDE	-0.16	0	-0.16	0	-0.23	-0.01	-0.23	-0.01	-	-	-0.08	-0.06
	DEVA	-0.16	0.03	-0.15	0.03	-0.16	0.02	-0.16	0.03	-	-	-0.12	-0.02
	ENTI	-0.18	0.07	-0.17	0.07	-0.27	0.10	-0.26	0.09	-	-	-0.19	0
NPI	LEAD	-0.09	0.16	-0.10	0.16	-0.11	0.12	-0.12	0.12	0.01	0.11	0.02	0.11
	VAN	-0.16	0.04	-0.16	0.04	-0.16	0.06	-0.15	0.06	-0.04	0.01	-0.04	0.01
	ENT	-0.14	0.15	-0.15	0.15	-0.17	0.18	-0.17	0.18	0.01	0.07	0.02	0.07

NARQ	ADM	-0.14	0.13	-0.15	0.13	-0.2	0.11	-0.21	0.12	-0.06	0.14	-0.05	0.13
	RIV	-0.16	0.15	-0.16	0.15	-0.28	0.24	-0.28	0.24	-0.14	0.19	-0.14	0.19

Note. EXPL = exploitativeness, SSSE = self-sacrificing self-enhancement, GRFA = grandiose fantasy, COSE = contingent self-esteem, HIDE = hiding the self, DEVA = devaluing, ENTI = entitlement rage, LEAD = leadership, VAN = vanity, ENT = entitlement, ADM = admiration, RIV = rivalry. Sex is coded 0 = female, 1 = male. Correlations are based on maximum a posteriori (MAP) estimates. For Germany, MAPs could not be obtained in the strict model due to a non-positive definite matrix.

Table S7

Standardized factor loadings from the configural invariance model for the NPI analysis of US, UK, and Germany

Facet	Item	Item content	Standardized factor loading		
			US	UK	Germany
Leadership	NPI1	I have a natural talent for influencing people.	0.65	0.63	0.65
	NPI5	If I ruled the world it would be a much better place.	0.64	0.59	0.48
	NPI6	I can usually talk my way out of anything.	0.27	0.43	-0.06
	NPI8	I will be a success.	0.53	0.56	0.47
	NPI9	I think I am a special person.	0.45	0.53	0.32
	NPI10	I see myself as a good leader.	0.61	0.56	0.78
	NPI11	I am assertive.	0.52	0.50	0.56
	NPI12	I like having authority over people.	0.48	0.50	0.33
	NPI13	I find it easy to manipulate people.	0.42	0.62	0.38
	NPI16	I can read people like a book.	0.45	0.34	0.34
	NPI17	I like to take responsibility for making decisions.	0.31	0.33	0.45
	NPI21	I always know what I am doing.	0.57	0.53	0.37
	NPI23	Everybody likes to hear my stories.	0.57	0.63	0.56
	NPI27	I have a strong will to power.	0.70	0.72	0.75
	NPI31	I can live my life in any way I want to.	0.46	0.56	0.39
	NPI32	People always seem to recognize my authority.	0.70	0.58	0.79
	NPI33	I would prefer to be a leader.	0.65	0.56	0.70
	NPI34	I am going to be a great person.	0.46	0.42	0.42

	NPI35	I can make anybody believe anything I want them to.	0.68	0.61	0.49
	NPI36	I am a born leader.	0.75	0.71	0.63
	NPI39	I am more capable than other people.	0.57	0.59	0.35
	NPI40	I am an extraordinary person.	0.44	0.55	0.35
Vanity	NPI4	I know that I am good because everybody keeps telling me so.	0.79	0.87	0.66
	NPI7	I like to be the center of attention.	0.66	0.41	0.51
	NPI9	I think I am a special person.	0.25	0.22	0.20
	NPI15	I like to display my body.	0.65	0.63	0.72
	NPI19	I like to look at my body.	0.58	0.53	0.68
	NPI20	I am apt to show off if I get the chance.	0.43	0.14	0.22
	NPI26	I like to be complimented.	0.56	0.60	0.67
	NPI28	I like to start new fads and fashions.	0.50	0.59	0.46
	NPI29	I like to look at myself in the mirror.	0.55	0.69	0.63
	NPI30	I really like to be the center of attention.	0.65	0.38	0.52
	NPI37	I wish somebody would someday write my biography.	0.50	0.47	0.44
	NPI38	I get upset when people don't notice how I look when I go out in public.	0.53	0.44	0.43
	NPI40	I am an extraordinary person.	0.27	0.24	0.17
Entitlement	NPI2	Modesty doesn't become me.	0.71	0.53	0.69
	NPI6	I can usually talk my way out of anything.	0.40	0.17	0.47
	NPI7	I like to be the center of attention.	0.18	0.46	0.50
	NPI12	I like having authority over people.	0.25	0.18	0.45
	NPI13	I find it easy to manipulate people.	0.34	0.13	0.31

	NPI14	I insist upon getting the respect that is due me.	0.60	0.65	0.23
	NPI20	I am apt to show off if I get the chance.	0.26	0.48	0.34
	NPI24	I expect a great deal from other people.	0.43	0.50	0.45
	NPI25	I will never be satisfied until I get all that I deserve.	0.72	0.59	0.56
	NPI30	I really like to be the center of attention.	0.16	0.56	0.47
	NPI38	I get upset when people don't notice how I look when I go out in public.	0.18	0.24	0.24

Table S8

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

Model	Parameter	Country	Modification index	Expected parameter change
strict	[NPI35]	D	44.02	1.20
partial 1	[NPI27]	D	22.16	-0.99
partial 2	ENT BY NPI14	D	21.17	-0.40
partial 3	ENT BY NPI6	D	20.75	-0.39
partial 4	[NPI8]	D	16.25	0.68
partial 5	[NPI21]	D	17.01	0.69
partial 6	LEAD BY NPI10	D	16.63	0.35
partial 7	[NPI23]	D	15.73	0.71
partial 8	LEAD BY NPI32	D	13.93	0.36
partial 9	[NPI5]	US	9.97	-0.57
partial 10	LEAD BY NPI33	D	9.63	0.27
partial 11	VAN BY NPI4	D	9.77	-0.47
partial 12	[NPI11]	D	9.06	0.50
partial 13	[NPI31]	D	9.06	0.49
partial 14	[NPI1]	D	8.82	0.56
partial 15	[NPI13]	D	7.55	0.63
partial 16	[NPI25]	D	7.34	0.58
partial 17	[NPI14]	D	6.60	0.43

partial 18	[NPI36]	D	6.21	0.51
partial 19	LEAD BY NPI27	D	5.89	0.29
partial 20	ENT BY NPI30	US	5.07	-0.26

Note. D = Germany, Lead = leadership, Van = vanity, Ent = entitlement. Facet name 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.

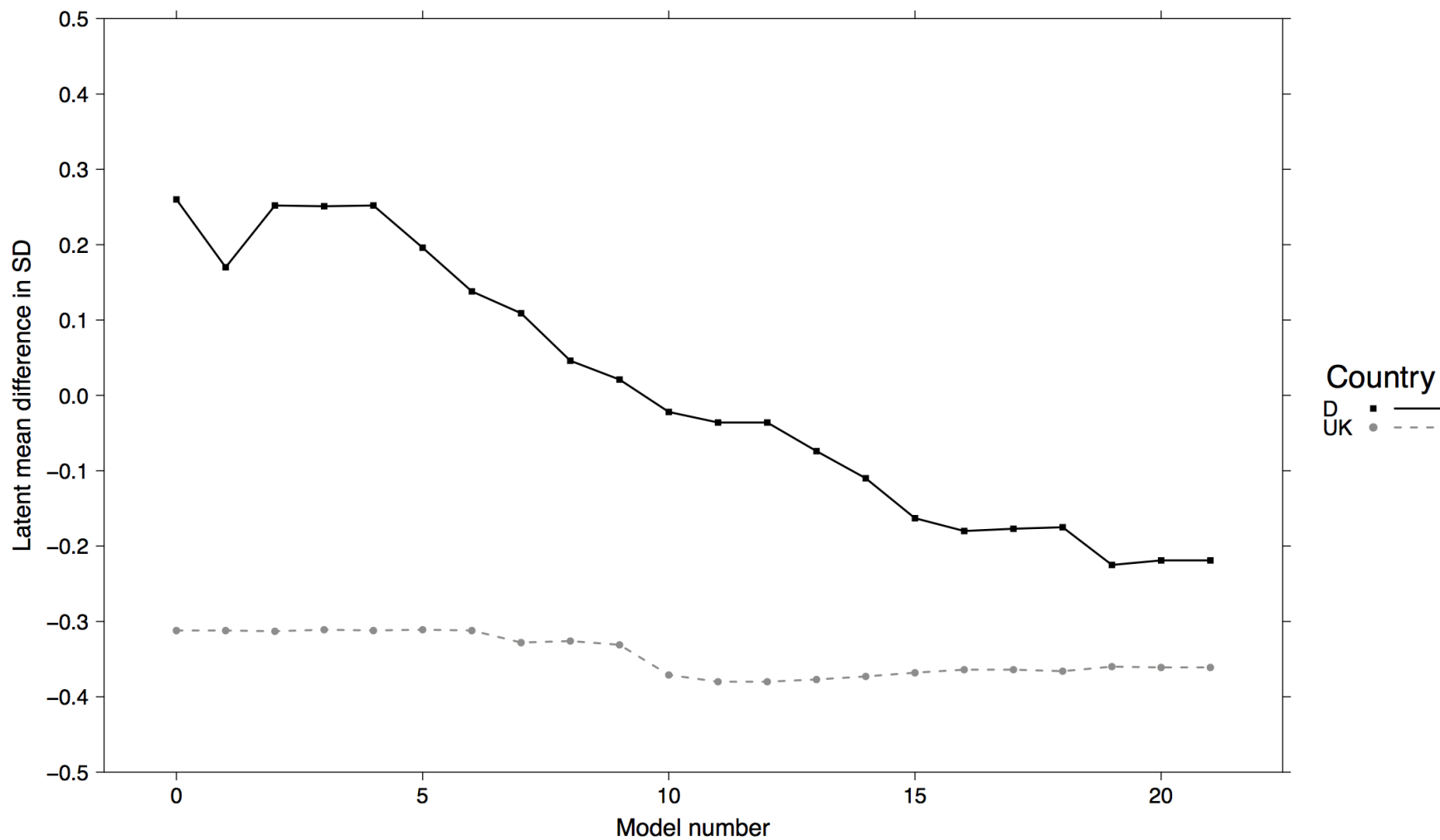


Figure S8. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the NPI facet leadership by country.

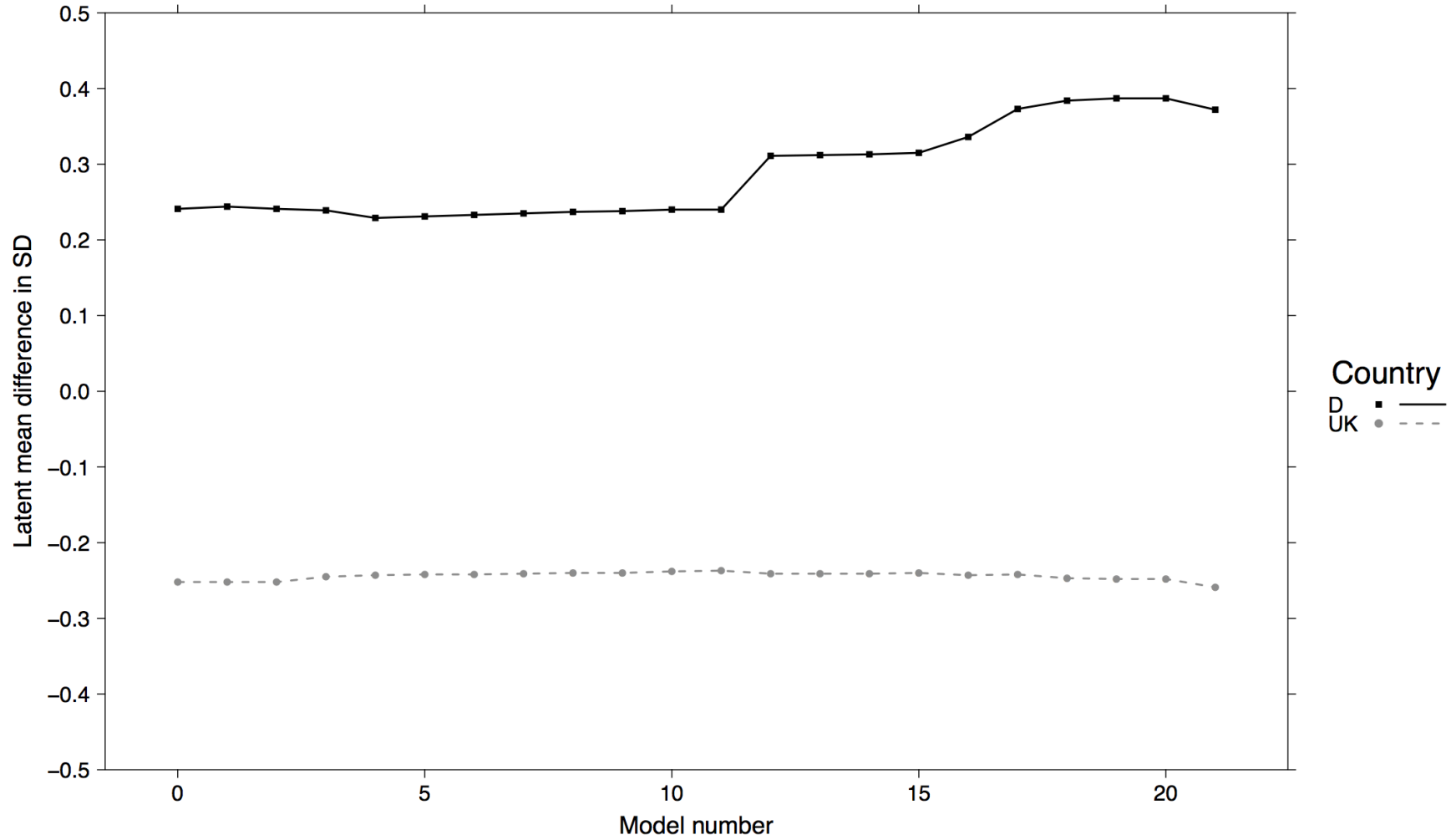


Figure S9. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the NPI facet vanity by country.

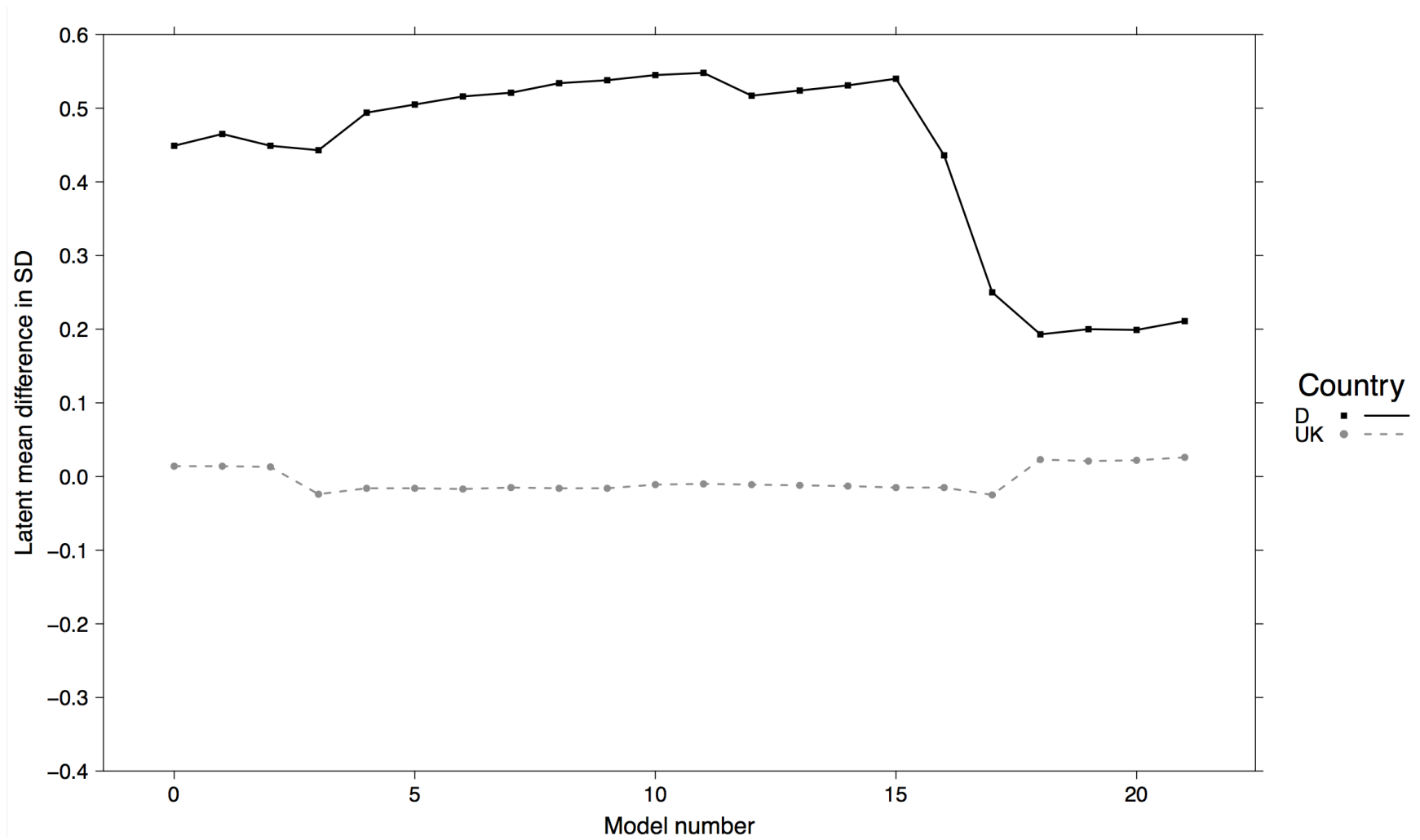


Figure S10. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the NPI facet entitlement by country.

Table S9

Standardized factor loadings from the configural invariance model for the NARQ analysis with

US, UK, and Germany

		Standardized factor loading		
Facet	Item	US	UK	Germany
Admiration	NARQ1	0.60	0.60	0.64
	NARQ2	0.64	0.63	0.62
	NARQ3	0.79	0.80	0.80
	NARQ5	0.54	0.58	0.60
	NARQ7	0.66	0.65	0.63
	NARQ8	0.78	0.81	0.78
	NARQ15	0.77	0.73	0.74
	NARQ16	0.81	0.79	0.80
	NARQ18	0.32	0.37	0.53
	Rivalry	NARQ4	0.72	0.71
NARQ6		0.67	0.68	0.72
NARQ9		0.67	0.71	0.69
NARQ10		0.81	0.83	0.70
NARQ11		0.54	0.62	0.33
NARQ12		0.72	0.67	0.64
NARQ13		0.54	0.50	0.59
NARQ14		0.49	0.47	0.68
	NARQ17	0.68	0.58	0.68

Table S10

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

Model	Parameter	Country	Modification index	Expected parameter change	Effect size
strict	RIV BY NARQ14	D	100.82	-0.60	NA
partial01	[NARQ4\$5]	D	66.05	0.56	1.00
partial02	[NARQ18\$5]	D	63.86	0.48	0.72
partial03	ADM BY NARQ18	D	90.39	0.28	NA
partial04	[NARQ18\$4]	D	61.26	0.57	0.77
partial05	[NARQ12\$1]	D	61.04	-0.55	-0.84
partial06	[NARQ10\$1]	D	37.69	-0.52	-0.78
partial07	ADM BY NARQ8	D	36.27	-0.40	NA
partial08	[NARQ18\$3]	D	34.61	0.44	0.59
partial09	[NARQ11\$5]	D	33.06	0.36	0.54
partial10	[NARQ8\$2]	D	20.17	0.34	0.62
partial11	[NARQ8\$1]	D	21.00	0.36	0.64
partial12	[NARQ12\$3]	D	18.73	-0.30	-0.46
partial13	[NARQ18\$2]	D	18.31	0.33	0.43
partial14	[NARQ12\$2]	D	17.95	-0.30	-0.46
partial15	[NARQ14\$5]	D	18.21	0.23	0.45
partial16	[NARQ14\$3]	D	35.10	0.33	0.60
partial17	[NARQ14\$4]	D	69.94	0.52	0.83

partial18	[NARQ14\$2]	D	96.66	0.68	0.99
partial19	[NARQ14\$1]	D	47.86	0.53	0.72
partial20	[NARQ2\$1]	D	14.77	-0.27	-0.40
partial21	[NARQ10\$2]	D	14.66	-0.31	-0.48
partial22	[NARQ12\$4]	D	14.67	-0.25	-0.40
partial23	[NARQ9\$1]	D	14.58	-0.28	-0.42
partial24	[NARQ16\$2]	D	14.06	-0.33	-0.49
partial25	[NARQ15\$1]	D	13.30	-0.30	-0.45
partial26	[NARQ16\$1]	D	15.12	-0.36	-0.51
partial27	[NARQ16\$3]	D	11.82	-0.31	-0.45
partial28	[NARQ10\$3]	D	10.26	-0.25	-0.40

Note. ADM = admiration, RIV = rivalry. Facet 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.

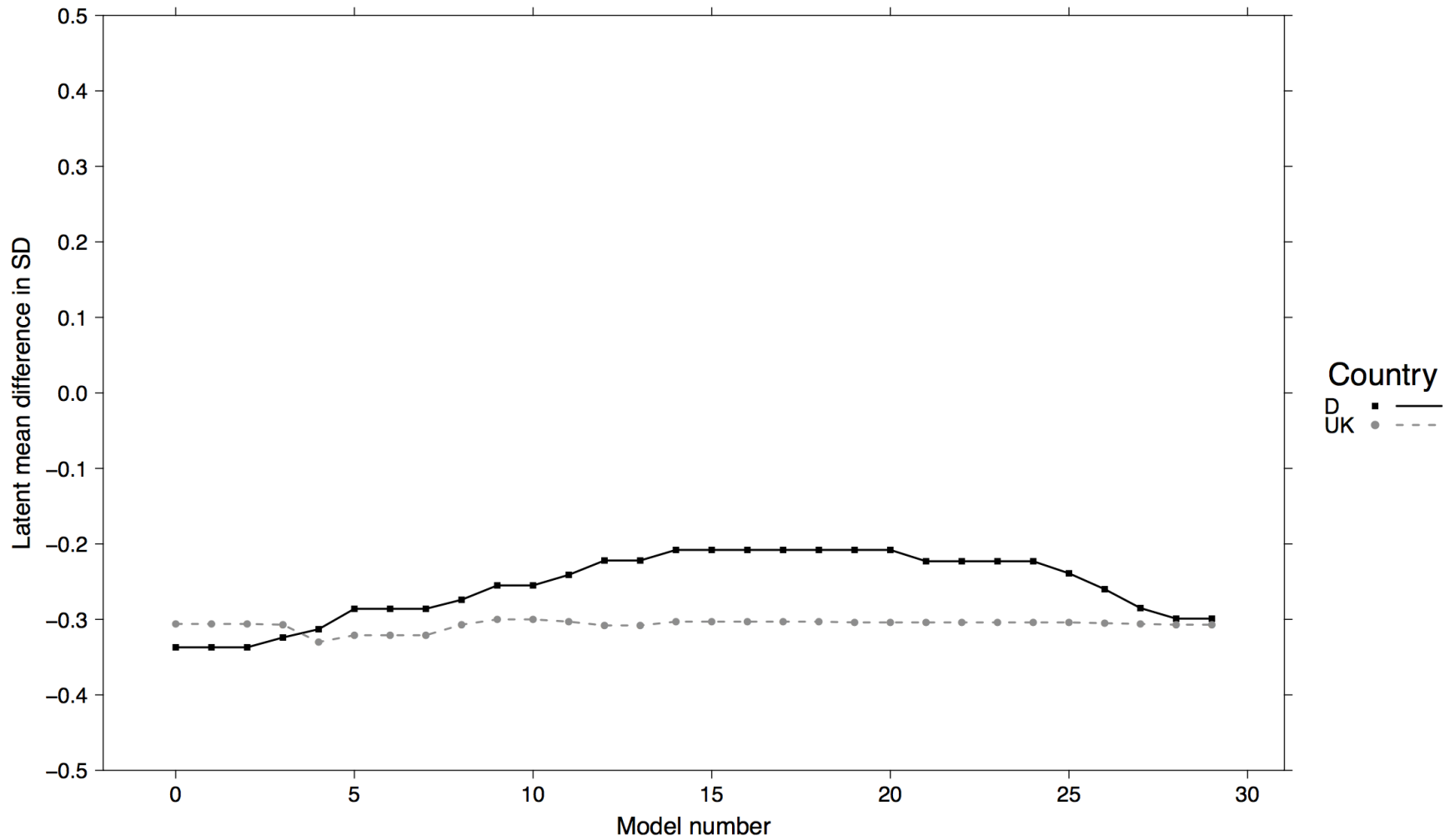


Figure S11. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the NARQ facet admiration by country.

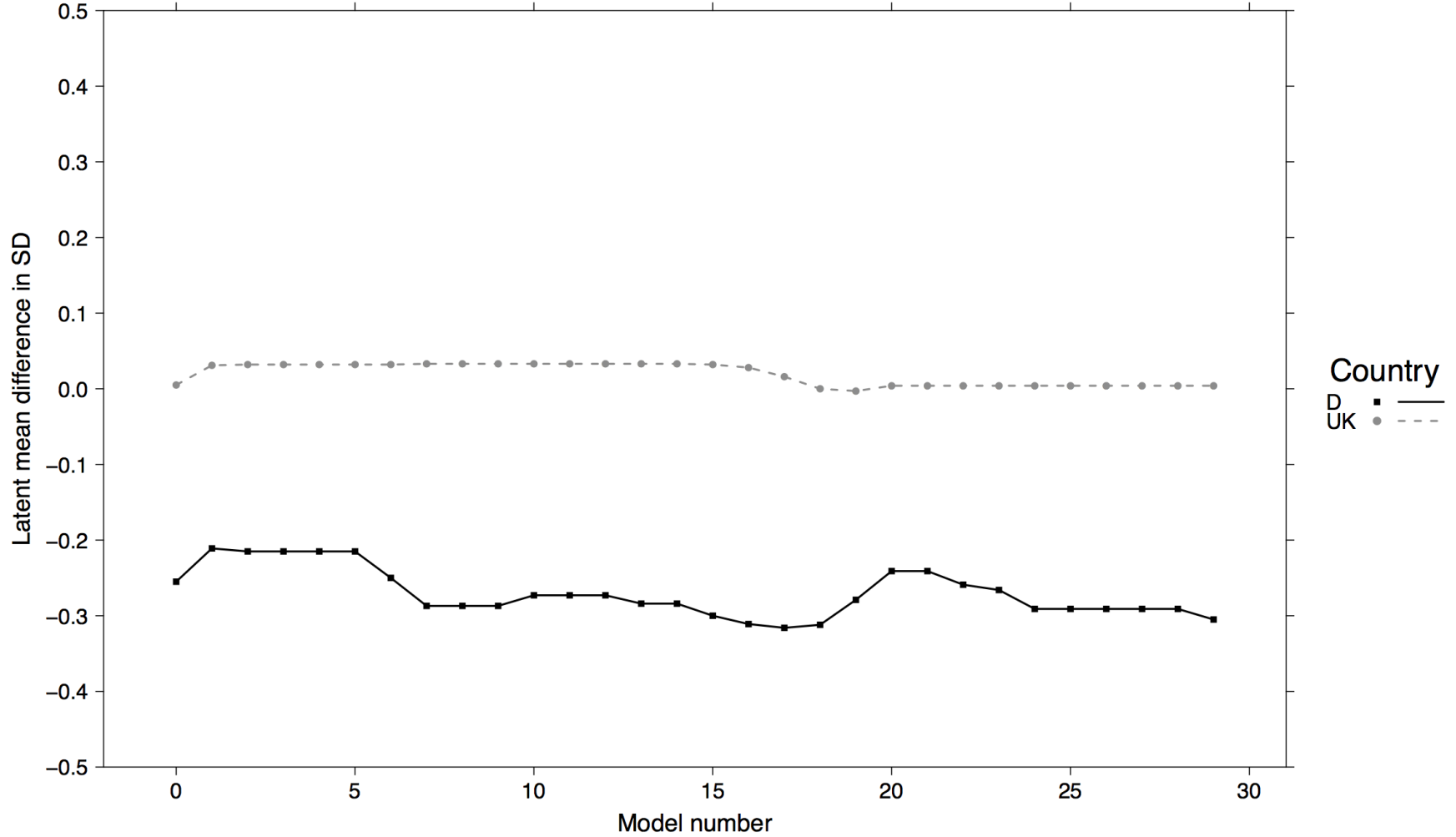


Figure S12. Development in latent mean differences from strict invariance model (model number 0) to final partial invariance model for the NARQ facet rivalry by country. Poland is not included because partial invariance was not achieved.