The Factor Structure of Personality Derailers across Cultures

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Abstract

Despite the increasing popularity of dark-side (derailing) personality, there is little consensus over the structure of personality derailer constructs. The Five Factor Model (FFM) as the universal taxonomy of bright-side personality has shown equivalence across cultures. The present study examines the factor structure of personality derailers across cultures.

The Factor Structure of Personality Derailers across Cultures

Recent reviews (e.g., Furnham, Richards, & Paulhus, 2013; Harm, Spain, & Hannah, 2011; Judge, Piccolo, & Kosalka, 2009), special issues (e.g., Tierney & Tepper, 2007), and focal articles (e.g., Harms, Spain, & Wood, 2014) reflect a growing interest in personality derailers. Sometimes called dark-side (e.g., Hogan & Hogan, 2001; Hogan & Kaiser, 2005; Judge, Piccolo, & Kosalka, 2009; Paulhus & Williams, 2002; Resick et al., 2009; Wu & LeBreton, 2011) or maladaptive personality (e.g., Dilchert, Ones, & Krueger, 2014; Guenole, 2014), these scales measure characteristics that negatively affect job performance and may be disastrous for one's career (e.g., Benson & Campbell, 2007; Hogan, Raskin, & Fazzini, 1990; Judge & LePine, 2007; Ludge, LePine, & Rich, 2006; Moscoso & Salgado, 2004).

Despite this increasing interest, there remains little consensus over the structure and measurement of personality derailers. Similarly, little research has examined the cross-cultural relevance of personality derailers. We seek to fill this gap by examining factor structure equivalence of personality derailers across cultures.

Personality Derailers

Derailers represent flawed interpersonal strategies that, although often beneficial when used in moderation, may hinder performance and career advancement when relied on too heavily (Benson & Campbell, 2007). In other words, personality derailers represent an inability to regulate one's behaviors in order to avoid an overreliance on strategies that may prove detrimental when taken to extremes (O'Connor & Dyce, 2001). For example, colleges often respond favorably to individuals who exhibit excitement and enthusiasm for new projects or ideas. However, when taken to extremes, such enthusiasm may turn negative, especially when obstacles arise, leading to improperly placed criticism or emotional outbursts (Hogan & Hogan, 2009).

Kaiser, LeBreton and Hogan (2013) provide support for this conceptualization, showing that ideal leader performance ratings are most often associated with moderate scores on derailment measures. They also found that Emotional Stability often moderates these relationships where individual who are more likely to respond negatively to stress tend to exhibit derailing behaviors. For example, while managers prone to emotional outbursts are more likely to be viewed as "too forceful" by others, this was particularly true for those who are also low on Emotional Stability, indicating that one's ability to cope with stress influences their likelihood of exhibiting derailing behaviors.

Measurement Approaches

Attempts to measure personality derailers have taken a variety of forms and approaches. The two most common involve measuring three derailers known as the Dark Triad (O'Boyle et al., 2012; Paulhus & Williams, 2002; Wu & LeBreton, 2011) and measuring scales associated with personality disorders from various editions of the *Diagnostic and Statistical Manual of Mental Disorder* (DSM: Hogan & Hogan, 2009; Judge & LePine, 2007; Skodol et al., 2011). The former focuses primarily on scales related to narcissism, Machiavellianism, and psychoticism, whereas the latter captures a broader range of dysfunctional personality styles that parallel the Axis II personality disorders defined in various versions of the DMS such as the DSM-IV (American Psychiatric Association [DSM-IV-TR], 2000).

Although the Dark Triad may be the simpler approach due a smaller number of scales, some have argued for a similarly limited number of factors with measures based on the DSM. For example, Hogan and Hogan (2001) outline parallels between the dimensions of managerial incompetence uncovered by Bentz (1985), McCall and Lombardo (1983), and the personality disorders listed in DSM-IV (American Psychiatric Association, 2000). In addition, the most prevalent measures of personality derailers consistently fall under the DSM structure. As shown in Table 1, the 11 scales in Hogan Development Survey (Hogan & Hogan, 2009), the 14 dysfunctional personality styles identified by Moscosco and Salgado (2004), and the dark-side personality traits in the Global Personality Inventory (GPI; Schmit, Kihm, & Robie, 2000) can all be mapped to the 11 DSM-IV Axis II personality disorders (Kaiser, LeBreton, & Hogan, 2013). Recent findings also indicate a match between the Dark Triad and the DSM-5 maladaptive trait model (Guenole, 2014), which further confirms the DSM as a universal taxonomy for organizing most existing personality derailment measures. Unlike research on personality models based on the Five Factor Model of personality (FFM: Digman, 1990; Goldberg, 1992; John, 1990; McCrae & Costa, 1987), research has not examined whether or not the factor structure of personality derailers is similar across cultures.

Personality Equivalence across Cultures

Numerous studies have replicated the FFM across culturally diverse samples to validate its use as a universal taxonomy of normal personality constructs and to ensure that FFM-based measurements are applicable to an increasingly global economy (e.g., Benet-Martínez & John, 2000; Church & Kaitigbak, 2002; McCrae & Costa, 1997; Saucier & Ostendorf, 1999). Personality derailers are commonly perceived as the maladaptive counterparts of normative personality constructs (e.g., Krueger, Derringer, Markon, Watson, & Skodol, 2012; Widiger & Simonsen, 2005). However, it is still unclear whether the factor structure of personality derailer constructs persists around the globe.

The lack of research in this area may result from the challenge of controlling measurement errors in multi-language personality measures. According to Meyer and Foster (2008), a variety of sources of error may influence personality assessment scores from multiple languages, which restricts the implications of cross-cultural comparisons. Specifically, sample differences (absolute sample size, relative sample size, and sample composition), translation differences (translation quality, lack of congruous words, culture relevance, and strength of item wording), and culture differences (responses styles, reference group effects, true cultural differences) all contribute to errors in multi-language personality measures. Given these potential sources of error, a secondary goal of the current study was to examine the factor structure of derailers across cultures using large diverse samples built specifically to minimize score differences caused by sample or translation issues.

Methods

Measures

Our measure was the Hogan Development Survey (HDS; Hogan & Hogan, 2009). The HDS was the first inventory developed specifically to measure personality derailers in working adults. Its scales originate from the DSM and align with a number of other commonly used personality derailment instruments (Hogan & Hogan, 2009). Moreover, it is available in over 40 languages and has been administered to over 1 million working adults across countries, industries, organizations, and jobs (Hogan Assessment Systems, 2013). Translations of the HDS went through a rigorous process combining forward- and back-translation to control for translation difference across languages and ensure interactional adaptations (Hogan Assessment Systems, 2008). The assessment publisher also developed global norms by stratifying samples on multiple variables (e.g., job categories, ethnicity, and gender) to create representative normative samples for each language that matched the workforce composition of each target region as closely as possible (Hogan Assessment Systems, 2011).

The HDS is one of the most widely used and researched derailer instruments. It has been used and/or referenced in over 70 academic research publications (Hogan Assessment Systems, 2013) and received favorable reviews by the Buros' Mental Measurement Yearbook (Axford & Hayes, 2014) and the British Psychological Society Psychological Testing Centre's Test Reviews (Hodgkinson & Robertson, 2007). Furthermore, at least based largely on U.S. data, research has shown that the HDS scales fit within a larger three-factor structure: moving away, moving towards, and moving against (Hogan & Hogan, 2009). These factors are consistent with themes described by Horney (1950) that represent higher order factors from a taxonomy of dysfunctional dispositions.

Samples

We obtained data from the Hogan Global Normative Dataset (Hogan Assessment Systems, 2011). We based analyses on HDS data from 12 countries. To balance simplicity and coverage, we identified the country with the largest sample size per GLOBE cluster, which are based on a large global research study of more than 60 societies that found empirical evidence for 10 major cultures in the world, each consisting of clusters of countries sharing values and practices (House et al., 2004). The current study includes at least one country from the 10 global cultures. We also added the United Kingdom and Norway because of their large sample sizes and frequent basis for studies into aberrant personality and dysfunctional leadership (e.g., De Fruyt, Willie, & Furnham, 2013). The sub-sample ($n = 40,358$) represents 60.1% of the archival dataset and included samples from Brazil, China, Germany, Norway, Romania, South Africa, Spain, Sweden, Thailand, Turkey, the United Kingdom, and the United States.

The data cover a time period from 2006 to 2010. We obtained the data through online administration from employees who completed the HDS either for job selection, succession planning, or for the purpose of personal development. Table 2 lists the countries, sample sizes, demographic breakdown, and descriptive statistics for the three themes across countries. There is some variation in sample sizes (from a minimum of N = 673 to a maximum N = 8,020). The average gender ratio was 60.77% men, which reflects gender composition of the broader workforce rather than the general population.

Analytical Approach

Although the primary purpose of the investigation is to test the cross cultural equivalence of derailers, a secondary purpose is to compare exploratory structural equation modeling (ESEM; Asparouhov & Muthén, 2009) to CFA for such analyses. Compared to traditional SEM techniques, ESEM is a more flexible and less restrictive. It allows for non-zero loadings of indicators and scales on non-targeted factors, which is common in personality data. As such, some have argued that it is more appropriate for factorially complex scales (Marsh, Nagengast, & Morin, 2013) like personality, which are often rife with cross loadings and interrelationships among factors. To our knowledge, this study is the first attempt to use ESEM with derailer scores.

Culture refers to the, "collective programming of the mind which distinguishes the members of one human group from another" (Hofstede, 1980, p. 25). For present purposes, we view culture as a shared set of behavioral patterns and artifacts (e.g., tradition, language), values, and assumptions, which are transmitted across generations and differentiate social collectives.
We conducted analyses using Mplus (Mplus 7.2, Muthén & Muthén, 1998-2012), specifying models with the robust maximum likelihood estimator (MLR) and with standard errors and tests of fit that are robust in relation to non-normality and non-independence of observations (Muthén & Muthén, 2008). We scaled latent variables by fixing latent variances to zero. Given prior knowledge of the factor structure, we applied target rotation in which scales are given a target value of zero on the factor they were not intended to represent, and the deviation from this loading pattern is minimized.

Following invariance testing procedures listed by Byrne (2012), we tested increasingly more restricted factor models by sequentially constraining different parameter estimates (e.g., configuration, factor loadings) across countries. This includes tests of configural invariance (same structure across groups), metric invariance (same factor loadings across groups), and factor variance-covariance invariance (same dispersion and interrelationships between the three HDS factors across groups). Because the present focus is construct validity, we did not conduct tests of intercept and mean invariance. Byrne (2012) suggests configural invariance assessments include fitting the hypothesized model for each group independently even if model specifications (such as correlated error terms) vary for each group. In addition, Marsh et al. (2013) recommend comparing fit between ESEM and CFA to justify use of one over the other. Therefore, we assessed CFAs and ESEMs independently in each country. Preliminary analyses revealed two residual covariates, one between Dutiful and Cautious and the other between Colorful and Reserved, which reliably occurred across languages. Upon closer inspection, the wording and formatting used in these sets of scales tends to overlap.

We reviewed multiple goodness-of-fit indices (TLI, CFI, RMSEA, SRMR, and AICwere) to examine various aspects of model fit (i.e., absolute fit, incremental fit, fit relative to the null model; Byrne, 2012). Evaluation of measurement equivalence traditionally relies on similar fitting nested models as indicated by a non-significant chi-square difference test. However, chi-square difference testing is dependent on sample size with trivial differences emerging in large samples. While we provide the chi-square values, we rely primarily on fit indices to compare models (e.g., CFI, TLI, RMSEA, SRMR; Marsh, Balla, & McDonald, 1988). Cheung and Resvold (2002) suggested that a more parsimonious (i.e., restricted) model is valid if the change in the CFI is less than .01 or if the change in the RMSEA is less than .015. An even more conservative criterion for the more parsimonious model is that the values of the TLI and RMSEA are equal to or even better than the values for the less restrictive model (Marsh et al., 2009).

Results

Table 3 presents results of baseline comparisons across SEM techniques. The CFA solution does not provide an acceptable fit to the HDS model in any country (Max CFI = .692, Max TLI = .575, Min RMSEA = .137), consistent with findings for the Big Five (Marsh et al., 2013). The next series of models (CFA: CU's) incorporates two correlated residuals. Results are still poor but better. The corresponding ESEM solutions fit the data much better. While the fit of the model with no CU's were marginally unacceptable in most cases inclusion of CU's resulted in marginally satisfactory fit for a majority of models (Max CFI = .971, Max TLI = .932, Min RMSEA = .057).

Countries with the poorest fit were Germany and Thailand, suggesting the three-factor model (with two covarying residuals) did not adequately represent the derailer space in these two nations. Among other things, primary reasons for poor fit may include translational issues, model misspecification, or conceptual differences in aberrant tendencies across these clusters. We reason the latter two issues are not likely candidates given the three-factor model holds up in geographically adjacent countries (e.g., China and Spain) and seems to fit most regions reasonably well (i.e., model is properly specified). Another pattern shows the TLI fit index is generally lower compared to the CFI. Booth and Hughes (2014) reported similar results, which led them to suggest a diminishing rate of return on fit per additional factor loading in the model. Notwithstanding the lower TLI, the remaining indices (CFI, RMSEA, AIC, SRMR) attest to the potential value of ESEM over CFA.

Table 4 provides fit for omnibus equivalence tests across all countries and country sub-samples using ESEM. Results of model fit for the multigroup configural baseline are in the first row and, with the exception of the TLI, were acceptable (CFI = .951, TLI = .891, RMSEA = .069). This confirms the basic three-factor HDS structure is present across groups with derailers loading on their targeted factors. Next, we examined metric invariance by fixing factor loadings to equivalence. This improved the RMSEA and TLI but reduced the CFI beyond the .01 cutoff, suggesting the pattern of loadings varies across countries. Because partial invariance is unavailable in ESEM, we sought to remove the countries driving this discrepancy. Based upon modification indices and factor loading pattern, we found Spain, Thailand, and China responses as appearing most divergent from the multi-group baseline model. To confirm this, we re-ran ESEM analyses excluding these three countries and found support for metric invariance (see

Table 4). These findings indicate respondents ascribe the same meaning to the latent constructs underlying the HDS (via similar relative relationships between each derailer and its targeted Horney theme) across nine different countries (seven GLOBE clusters). While conceptually equivalent, results indicate dispersion and covariance of the three themes differ across countries. This opens up the possibility of cross-cultural differences in the variability and convergence of aversive patterns of interacting with others.

Discussion

This study represents an important first step in examining the cross-cultural equivalence of personality derailers. As assessments continue to be more widely used around the world, it is critical that we examine cross-cultural equivalence prior to comparing individual or average scores obtained from different regions. Our results indicate that, although the factor structure of personality derailers is relatively stable across cultures, some regions may warrant further investigation. We found the weakest evidence of fit for China, Spain, and Thailand, although it is impossible with single translations to determine if this lack of congruence is due to true cultural differences or other issues such as translation or sample differences. Therefore, future research should continue to examine cross cultural differences for these and other countries using additional measures and samples. In general, however, we believe our results indicate that the factor structure of personality derailers generally fits within the three-factor structure described by Horney (moving away, moving towards, and moving against; 1950) for most regions across the globe.

We do not believe, however, that similar factor structures necessarily indicate that personality derailers will predict the same behaviors or outcomes across cultures. For example, it is possible that drawing attention to oneself is viewed very differently and produces different consequences in different cultures. Therefore, although establishing factor structure equivalence is necessary for cross-cultural research, it is only the start of any number of interesting cross-cultural questions we can ask. Future research should build on our results to better identify important antecedents to and consequences of personality derailers in different regions of the world.

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Table 1. DSM-based Personality Derailer Taxonomy and Related Measurements Scales

DSM-IV Axis II Dimension	Analogous dark side tendencies among normal adults	Measurement Scales: Hogan & Hogan (2009)	Moscosco & Salgado (2004)	Schmit, Kihm, & Robie (2000)
Borderline	Moody; intense but short-lived enthusiasm for people, projects, and things; hard to please	Excitable	Ambivalent	
Avoidant	Reluctant to take risks for fear of being rejected or negatively evaluated	Cautious	Shy	
Paranoid	Cynical, distrustful, and doubtful of others' true intentions	Skeptical	Suspicious	Intimidating1
Schizoid	Aloof, and uncommunicative; lacking awareness and care for others' feelings	Reserved	Lone	Intimidating1
Passive-Aggressive	Casual; ignoring people's requests and becoming irritated or excusive if they persist	Leisurely	Pessimistic	Passive Aggressive
Narcissism	Extraordinarily self-confident; grandiosity and entitlement; over-estimation of capabilities	Bold	Egocentric	Ego-centered
Antisocial	Enjoy taking risks and testing limits; manipulative, deceitful, cunning, and exploitive	Mischievous	Risky	Manipulation
Histrionic	Expressive, animated, and dramatic; wanting to be noticed and the center of attention	Colorful	Cheerful	
Schizotypal	Acting and thinking in creative but sometimes odd or unusual ways	Imaginative	Eccentric	
Obsessive-Compulsive	Meticulous, precise, and perfectionistic; inflexible about rules and procedures	Diligent	Reliable	Micro-managing
Dependent	Eager to please; dependent on the support and approval of others; reluctant to disagree with others, especially authority figures	Dutiful	Submitted	

Note. Analogous dark side tendencies based on Hogan and Hogan (2001; 2009) and Hogan and Kaiser (2005). Scales presented in the same row are measures of the same dark side trait. 1The Intimidating scale from Schmit, Kihm, & Robie (2000) blends elements of the Skeptical and Reserved dimensions from Hogan & Hogan (2009).

Table 2

Demographics, Descriptive Statistics, and Reliabilities of the Three Higher-Order Horney Factors across Representative Countries from the Ten GLOBE clusters (N = 40,358)

Country	**Globe Cluster**	***N***	***%Male***	***Age***	***Moving Away***		***Moving Against***		***Moving Towards***	
				M (SD)	***M (SD)***	***α***	***M (SD)***	***α***	***M (SD)***	***α***
South Africa	Sub-Saharan Africa	673	58%	39.27 (1.42)	4.21 (1.69)	.72	6.93 (1.94)	.73	8.70 (1.75)	.32
United Kingdom	Anglo	3912	67.7%	39.87 (8.38)	4.02 (1.63)	.69	6.93 (2.02)	.74	8.22 (1.80)	.32
United States	Anglo	4599	65.1%	39.44 (9.36)	3.96 (1.66)	.72	6.96 (2.02)	.74	8.36 (1.77)	.32
China (simplified)	Confucian	2124	65.2%	35.74 (6.31)	4.60 (1.63)	.75	8.21 (1.90)	.75	8.96 (1.66)	.29
Romania	Eastern European	1062	36.6%	33 (6.86)	4.42 (1.75)	.73	8.14 (1.95)	.74	9.02 (1.67)	.29
Germany	Germanic	4457	76%	40.77 (7.64)	3.89 (1.45)	.66	7.15 (1.80)	.72	7.62 (1.68)	.26
Brazil (portugese)	Latin America	1314	67.3%	37.81 (8.39)	4.02 (1.57)	.71	7.07 (1.73)	.69	8.59 (1.72)	.34
Spain	Latin European	5635	68.3%	36.23 (8.73)	3.55 (1.40)	.67	6.96 (1.79)	.72	7.97 (1.38)	.23
Turkey	Middle Eastern	1539	65.6%	36.89 (7.53)	4.50 (1.57)	.68	7.93 (1.91)	.77	8.47 (1.64)	.27
Norway	Nordic	5517	54.7%	39.46 (8.84)	3.04 (1.45)	.69	6.67 (1.92)	.72	7.39 (1.86)	.33
Sweden	Nordic	8020	56.9%	40.92 (8.83)	2.75 (1.28)	.63	6.48 (1.86)	.73	7.33 (1.81)	.31
Thailand	Southeast Asia	1506	47.8%	41.50 (10.12)	5.33 (1.78)	.71	7.22 (2.16)	.80	8.69 (1.84)	.19

Table 3
Three-Factor HDS Model Fit Comparison between CFA and ESEM within Countries

Model	df	*NF Param*	χ^2	*TLI*	*CFI*	*RMSEA*	RMSEA CI	*SRMR*	*AIC*
South Africa									
CFA: no CU's	41	36	559.05	.575	.683	.137	.127, .147	.105	33225.116
CFA: CU's	39	38	451.80	.644	,747	.125	.115, .136	.098	33144.562
ESEM: no CU's	25	52	157.78	.821	.919	.089	.076, .102	.034	32874.410
ESEM: CU's	23	54	83.68	.911	.963	.063	.048, .077	.024	32812.680
United Kingdom									
CFA: no CU's	41	36	3591.21	.478	.611	.149	.145, .153	.111	194642.709
CFA: CU's	39	38	3133.89	.522	.661	.142	.138, .147	.103	194235.804
ESEM: no CU's	25	52	1053.52	.752	.887	.103	.097, .108	.037	192340.982
ESEM: CU's	23	54	532.84	.866	.944	.075	.070, .081	.028	191918.763
United States									
CFA: no CU's	41	36	4206.44	.512	.636	.149	.145, .152	.110	227519.224
CFA: CU's	39	38	3531.36	.570	.695	.140	.136, .143	.102	226862.884
ESEM: no CU's	25	52	1148.92	.784	.902	.099	.094, .104	.036	224542.895
ESEM: CU's	23	54	563.30	.887	.953	.071	.066, .077	.026	224036.160
China (simplified)									
CFA: no CU's[a]	-	-	-	-	-	-	-	-	-
CFA: CU's	39	38	1793.99	.522	.661	.146	.140, .151	.113	103290.939
ESEM: no CU's	25	52	498.48	.799	.909	.094	.087, .102	.032	102126.606
ESEM: CU's	23	54	279.61	.882	.950	.072	.065, .080	.026	101981.475
Romania									
CFA: no CU's	41	36	1125.52	.488	.618	.158	.150, .166	.115	52374.540
CFA: CU's	39	38	1011.77	.517	.657	.153	.145, .161	.110	52266.080
ESEM: no CU's	25	52	250.63	.825	.921	.092	.082, .103	.031	51544.183
ESEM: CU's	23	54	158.52	.886	.952	.074	.064, .086	.025	51467.674
Germany									
CFA: no CU's	41	36	3898.69	.449	.590	.145	.141, .149	.104	212491.982
CFA: CU's	39	38	3102.96	.540	.674	.133	.129, .137	.098	212113.898
ESEM: no CU's	25	52	1025.27	.766	.894	.095	.090, .100	.035	210125.115
ESEM: CU's[b]	24	53	1014.43	.758	.895	.096	.091, .101	.037	210277.975
Brazil									
CFA: no CU's[a]	-	-	-	-	-	-	-	-	-
CFA: CU's	39	38	902.03	.560	.688	.130	.122, .137	.097	63094.126
ESEM: no CU's	25	52	371.58	.725	.875	.103	.094, .112	.033	62522.466
ESEM: CU's	23	54	186.87	.858	.941	.074	.064, .084	.027	62526.816
Spain									
CFA: no CU's	41	36	4685.87	.449	.589	.142	.138, .145	.097	263894.038
CFA: CU's	39	38	3969.83	.652	.509	.134	.130, .137	.090	263438.755
ESEM: no CU's	25	52	1038.82	.803	.910	.085	.080, .089	.031	260940.741
ESEM: CU's	23	54	677.16	.862	.942	.071	.066, .076	.026	260481.870
Turkey									
CFA: no CU's[a]	-	-	-	-	-	-	-	-	-
CFA: CU's	39	38	1614.59	.448	.609	.162	.155, .169	.119	74134.145
ESEM: no CU's	25	52	262.13	.870	.941	.079	.070, .087	.028	73103.190
ESEM: CU's	23	54	138.11	.932	.971	.057	.048, .066	.020	72993.274
Norway									
CFA: no CU's	41	36	4199.60	.534	.652	.136	.132, .139	.104	267198.198
CFA: CU's	39	38	3725.85	.565	.692	.131	.127, .134	.100	266808.366
ESEM: no CU's	25	52	1149.77	.793	.906	.090	.086, .095	.029	264068.684

ESEM: CU's	23	54	584.71	.888	.953	.067	.062, .071	.024	263760.192
Sweden									
CFA: no CU's	41	36	6756.79	.443	.585	.143	.140, .146	.108	380930.256
CFA: CU's	39	38	5552.81	.520	.659	.133	.130, .136	.101	380354.200
ESEM: no CU's	25	52	1715.95	.770	.896	.092	.088, .096	.031	376445.232
ESEM: CU's	23	54	976.07	.859	.941	.072	.068, .076	.026	376020.340
Thailand									
CFA: no CU's[a]	-	-	-	-	-	-	-	-	-
CFA: CU's	39	38	1456.20	.588	.708	.155	.149, .162	.125	75200.383
ESEM: no CU's	25	52	471.54	.797	.908	.109	.100, .118	.039	74238.144
ESEM: CU's[b]	23	54	487.54	.781	.904	.113	.105, .122	.035	74193.558

Note. CU = post hoc correlated uniqueness terms based upon redundant item wording and formatting; NF Param = number of free parameters; TLI = Tucker-Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation; RMSEA CI = 95% Confidence Intervals for RMSEA; SRMR = standardized root mean square residual; AIC = Akaike Information Criterion.

[a] Model failed to converge.

[b]Dutiful with cautious CU's eliminated to allow an admissible solution

Table4

Multigroup Measurement Equivalence Models[a]

Model	χ^2	*df*	*TLI*	*RMSEA*	*CFI*	*ΔCFI*	Models Compared	Decision
All Countries								
1. Multigroup configural baseline	4551.334	298	.891	.069	.951			
2. Item factor loadings invariant	6556.421	562	.918	.059	.930	.021	2 vs. 1	Reject null of equal groups
3. Variances and covariances	7784.316	628	.913	.061	.913	.017	3 vs. 2	Reject null of equal groups
No China, Thai, or Spain								
1a. Multigroup configural baseline	3264.766	223	.894	.068	.952			
2a. Item factor loadings invariant	4264.700	415	.928	.056	.942	.01	2a vs. 1a	Accept null of equal groups
3a. Variances and covariances	4981.287	463	.926	.057	.929	.013	3a vs. 2a	Reject null of equal groups

Note. TLI = Tucker-Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation; RMSEA CI = 95% Confidence Intervals for RMSEA; SRMR = standardized root mean square residual; AIC = Akaike Information Criterion.

[a]All groups tested simultaneously