Cross-Cultural and Gender Invariance of Emotion Regulation in the United States and India

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INTRODUCTION

- Emotion regulation (ER) has been established as a transdiagnostic mechanism in psychopathology.
- Much of the ER has been conducted in White, Educated, Industrialized, Rich, and Democratic (WEIRD) samples.
- Specifically, there is a dearth of cross-cultural construct equivalence studies on measures of ER, which is an important first step to facilitate future research on ER in culturally diverse samples.
- The present study sought to validate the latent structures of three commonly used ER measures in the US and India: the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), Rumination Responses Scale (RRS-10; Treynor, Gonzalez, & Nolen-Hoeksema, 2003), and Acceptance subscale of the Five-Facet Mindfulness Questionnaire (FFMQ-AS; Baer et al., 2006).

METHOD

- **Recruitment method:** Amazon's Mechanical Turk (MTurk) using TurkPrime.
- **Eligibility criteria:** 1) completion of ≥ 1000 tasks; 2) task approval rating of at least 95% 3) Masters designation; 4) current location in the US or India, respectively.
- **U.S. sample characteristics:** ***N*** = 123
  - *Mage* = 43.98 years; *SD* = 12.46; range 23 to 74
  - 52.08% female
  - 88.54% White, 6.25% Asian American, 2.08% Hispanic, and 1.04% Black or African American.
- **Indian sample characteristics:** ***N*** = 121
  - *Mage* = 29.96 years; *SD* = 6.34; range 21 to 60
  - 35.19% female
  - 83.33% Indian, 6.48% Southeast Asian (e.g., Vietnamese, Cambodian, Thai, etc.), 3.70% East Asian (e.g., Chinese, Korean, Japanese, etc.), 3.70% White, and 5.55% other races/ethnicities.

RESULTS

- **Cross-cultural invariance (Tables 1 & 2)**
  - **ERQ:** configural invariance was met, but metric invariance failed. A partial solution freeing up item 4 was identified, and the measure subsequently met up to Level 2 strict invariance with this solution carried through.
  - **RRS-10:** configural and metric invariance were met. Strong invariance failed, and a partial invariance solution was identified by freeing up the item 5. The measure subsequently met up through Level 2 strict invariance
  - **FFMQ-AS:** configural invariance was met, and a partial metric invariance solution was identified, freeing up items 3 and 4. This solution held through Level 2 strict invariance.

Emotion regulation measures tested in ***US*** and ***Indian*** samples show evidence of ***partial cross-cultural invariance,*** and ***full gender invariance.***

Table 1

Configural, weak, strong, and strict partial invariance models for each of three emotion regulation measures in the United States and India

Model	WLSMV χ^2	*df*	*p*	RMSEA (90% CI)	CFI	SRMR
Emotion Regulation Questionnaire (10 item, 2-factor model)						
1a. ERQ – India	22.839	26	0.642	0.00 (.000, .061)	1	0.08
1b. ERQ – United States	21.293	26	0.727	0.00 (.000, .054)	1	0.074
1. Configural: ERQ across countries	44.131	52	0.773	0.00 (.000, .041)	1	0.071
2. Weak (metric: loadings equal)*	59.022	58	0.438	0.012 (.000, .057)	0.999	0.084
3. Strong (scalar: thresholds equal)*	62.206	64	0.54	0.00 (0.000, 0.051)	1	0.086
4. Error variances equal*	72.754	72	0.453	0.00 (0.000, 0.051)	0.999	0.086
5. Factor variances equal*	108.68	74	0.005	0.062 (.035, .086)	0.959	0.116
6. Factor means equal*	232.763	75	0	0.131 (.112, .151)	0.815	0.164
Five-Factor Mindfulness Questionnaire--Acceptance Subscale (8-item; 1-Factor Model)						
1a. FFMQ-AS – India	9.531	20	0.976	0 (.000, .000)	1	0.034
1b. FFMQ-AS – United States	3.605	20	0.727	0 (.000, .000)	1	0.042
1. Configural: FFMQ-AS across countries	13.136	40	1	0 (.000, .000)	1	0.034
2. Weak (metric: loadings equal)**	24.252	45	0.995	0 (.000, .000)	0.999	0.057
3. Strong (scalar: thresholds equal)**	27.934	50	0.995	0 (.000, .000)	1	0.06
4. Error variances equal**	33.662	56	0.992	0 (.000, .000)	1	0.06
5. Factor variances equal**	125.633	57	0	0.108 (.083, .134)	0.963	0.131
6. Factor means equal**	404.722	63	0	0.23 (.209, .252)	0.814	0.225
Ruminative Response Scale (10-item; 2-Factor Model)						
1a. RRS – India	31.476	34	0.592	.000 (0.000, 0.063)	1	0.08
1b. RRS – United States	20.969	34	0.961	0 (.000, .000)	1	0.067
1. Configural: ERQ across countries	52.446	68	0.918	0 (.000, .022)	1	0.069
2. Weak (metric: loadings equal)	76.703	97	0.456	0.01 (.000, .057)	0.999	0.82
3. Strong (scalar: thresholds equal)***	86.371	83	0.378	0.02 (0.000, 0.059)	0.997	0.087
4. Error variances equal***	95.95	92	0.368	0.02 (0.000, 0.058)	0.996	0.093
5. Factor variances equal***	181.493	94	<.001	0.096 (.075, .117)	0.92	0.127
6. Factor means equal***	240.195	97	0	0.121 (.102, .140)	0.869	0.145

*Note. N = 246. WLSMV = weighted least squares estimator with means and variances adjusted; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = confirmatory factor analysis; SRMR = standardized root mean square residual. * Item 4 was left free to vary: "When I am feeling positive emotions, I am careful not to express them". ** Item 5 was left free to vary: "Write down what you are thinking and analyze it." *** Items 3 and 4 were left free to vary: "I believe some of my thoughts are abnormal or bad and I shouldn't think that way."; "I make judgments about whether my thoughts are good or bad."*

Take a picture to view the complete tables

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RESULTS, *cont'd.*

- **Gender invariance (see QR code for tables):**
  - Across gender, full invariance was found on the ERQ and the RRS-10
  - The FFMQ-AS met up through Level 2 strict invariance across gender.

Table 2

Tests of measurement invariance models for each of three emotion regulation measures across the United States and India

Model Comparisons	ΔWLSMV χ^2	Δdf	*p*	ΔRMSEA	ΔCFI	ΔSRMR
Emotion Regulation Questionnaire (10-item; 2-Factor Model)						
Configural vs. Metric invariance	14.89	6	0.08	0.01	-0.001	0.01
Metric invariance vs. Scalar invariance	3.18	6	0.48	-0.01	0.001	0.001
Scalar invariance vs. Error variances equal	3.18	6	0.07	0.00	0.001	0.01
Factor variances equal vs. Error variances equal	35.93	2	0.08	0.05	-0.04	0.02
Acceptance Scale (8-item, 1-factor model)						
Configural vs. Metric invariance	11.12	5	0.08	0.00	0	0.01
Metric invariance vs. Scalar invariance	3.68	5	0.24	0.00	0	0.003
Scalar invariance vs. Error variances equal	5.73	6	0.1	0.00	0	0.007
Factor variances equal vs. Error variances equal	91.97	1	0.01	0.11	-0.04	0.06
Ruminative Response Scale (10-item; 2-Factor Model)						
Configural vs. Metric invariance	24.26	8	0.04	0.009	-0.0006	0.01
Metric invariance vs. Scalar invariance	9.668	7	0.15	0.01	-0.002	0.005
Scalar invariance vs. Error variances equal	9.58	9	0.15	0.0006	-0.0005	0.006
Factor variances equal vs. Error variances equal	85.54	2	< .001	0.08	-0.08	0.03

Note. N = 246. WLSMV = weighted least squares estimator with means and variances adjusted; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = confirmatory fit index; SRMR = square root mean residual. Bold figures indicate significant changes in the practical fit indices (ΔCFI values of ≤ -.010, ΔRMSEA values of ≥ +.015, and ΔSRMR of ≥ +.030 from the unconstrained to constrained model).

DISCUSSION

- Overall, there was a high degree of construct compatibility across the two countries and across gender.
- The non-invariant item from the ERQ on suppressing positive emotions loaded lower in US compared to India on the suppression factor, in line with prior work on norms of positive emotion displays in Asian cultures (Oishi, 2002; Tsai, Knutson, & Fung, 2006).
- Lack of strong invariance for Item 5 of RRS-10 is interesting to consider in light of prior work on attenuated rumination—adjustment relationships in Asian samples, where invariance was not tested (e.g., Chang, Tsai, & Sanna, 2010). Results of present study may suggest including this item could artificially inflate rumination scores in Asian samples.
- FFMQ-AS showed lower loadings in India compared to US on items regarding acceptance of thoughts, perhaps suggesting that thought and emotion are more separable in Indian sample compared to US when it comes to acceptance.
- Results suggest ER measures may be suitable for cross-cultural research in the US and India with some amendments identified in partial invariance solutions.
- Future work should seek to replicate these findings in additional samples, including Indian college student samples (e.g. more WEIRD) and rural areas (less WEIRD) to assess the construct validity of ER measures in a broader array of participants across India.
- Nevertheless, results present first known analysis of measurement invariance of these ER measures in India.