The Emotion Regulation Questionnaire: Psychometric Properties and Relations with Affective Symptoms in a United States General Community Sample

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Abstract

Background: Difficulties in emotion regulation are a key risk factor for affective disorders. The Emotion Regulation Questionnaire (ERQ) is a 10-item measure of two emotion regulation strategies, cognitive reappraisal and expressive suppression. It is widely used tool in the United States, however, most psychometric studies of the ERQ have so far been conducted with college students and some researchers have recently questioned its factorial validity in non-student samples. In this study, we conducted the first confirmatory factor analysis study of the ERQ in a United States general community sample. **Method:** We examined the ERQ's factor structure, measurement invariance across age, education and gender categories, internal consistency reliability, and concurrent validity with a sample of 508 adults. **Results:** The intended two-factor model (cognitive reappraisal, expressive suppression) was an excellent fit to the data, and this structure was invariant across different age, education, and gender categories. Both ERQ scale scores had good omega and alpha reliabilities, and correlated as expected with depression and anxiety symptoms. Cognitive reappraisal was negatively correlated with these symptoms, whereas expressive suppression was positively correlated with these symptoms. **Limitations:** We did not include a clinical sample and future psychometric studies of the ERQ in specialised clinical populations would be useful. **Conclusions:** The ERQ appears to have strong psychometric properties when used with general community members from the United States. ERQ scores can be confidently used and compared across adults of different ages, genders, and educational backgrounds.

Key words: Emotion Regulation Questionnaire; Factor structure; Psychometric; United States; General community

Introduction

Individual differences in emotion regulation have important implications for mental health, and there is strong evidence that the strategies used to modulate emotional experiences vary in their associations with psychopathology (Gross & Munoz, 1995; Preece et al., 2018). Models of affective disorders, for example, hold that emotion regulation difficulties are a key risk factor for psychopathology symptoms (Joormann & Gotlib, 2010), The development of reliable and valid measures of emotion regulation is therefore important.

One of the first tools developed for measuring emotion regulation was the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), which remains among the most widely used questionnaires in the field. The ERQ is based on Gross's (1998, 2015) *process model of emotion regulation*, a model that specifies that emotions unfold over time and different types of emotion regulation strategies can be applied at each stage of this emotion generation process. Emotion regulation strategies can aim to: change whether people are exposed to emotion inducing stimuli (situation selection) or alter the nature of that stimuli (situation modification); change how attention is focused on that stimuli (attentional deployment); change how that stimuli is appraised, in terms of what it is and what it means (cognitive appraisal); or, lastly, try to change the experiential, behavioral, and/or physiological manifestations of an emotional response once it is more fully developed (response modulation). The process model predicts that different regulation strategies will have different effects and that, generally speaking, strategies applied earlier in the emotion generation process (i.e., antecedent-focused strategies, like situation selection to cognitive appraisal) are likely to be more effective than those applied later (i.e., response-focused strategies like response modulation) (Gross, 1998, 2015). The ERQ is a 10-item self-report measure of two common regulation strategies defined within this model: *cognitive reappraisal* (six items, e.g., "When I want to feel less negative emotions, I change the way

I'm thinking about the situation"), which is a cognitive appraisal strategy, and *expressive suppression* (four items, e.g., "I control my emotions by not expressing them"), which is a response modulation strategy. Items are answered on a 7-point Likert scale with higher scores indicating greater habitual usage of that strategy.

Most psychometric studies of the ERQ have, to date, used college student samples. These factor analyses with students have consistently supported its intended two-factor structure (with cognitive reappraisal and expressive suppression factors), as well as finding good reliability coefficients and appropriate correlations with other constructs (e.g., Balzarotti et al., 2010; Gross & John, 2003; Matsumoto et al., 2008). Similar patterns of psychometric performance have so far emerged across different language translations and cultural groups (e.g., Cabello et al., 2013; Sala et al., 2012). Recently, however, Spaapen et al. (2014) questioned the validity of the ERQ with non-student samples. In confirmatory factor analyses (CFAs) in two Australian or UK community samples (*N*s=550, 483), they found some model fit values below desired cut-offs (with this model misfit attributed to the presence of correlated residuals for two similarly worded cognitive reappraisal items), and therefore argued that the ERQ's validity was suboptimal with community samples and item 3 should be removed. Consequently, some researchers have begun using a reduced form of the ERQ with no item 3 (e.g., Senkans et al., 2016). In response, though, Preece et al. (2020) have recommended against removing this item, arguing that its removal reduces the content breadth of the cognitive reappraisal score, that item 3 plays an important role in clarifying/defining the term *negative emotion* for respondents (which affects the interpretation of subsequent items), that a set of correlated item residuals may have little impact on the practical utility of the scale scores, and highlighting in their recent CFA findings an excellent fit for the original ERQ model across three Australian community samples (*N*s=300, 400, 348).

The Present Study

The ERQ is widely used in the United States with non-student samples (John & Eng, 2014), but to date, no CFA studies have examined its psychometric properties in this type of population. Establishing the psychometrics for the ERQ in a community sample will help to inform its use in community-based research, such as cohort studies investigating predictors of mental health and well-being. Our aim here was therefore to help fill this gap by examining the ERQ's factor structure, measurement invariance across age, education and gender categories, internal consistency reliability, and concurrent validity (with a focus on affective symptoms) in a United States general community sample.

Method

Participants, Materials, and Procedure

Our sample included 508 adults recruited by Qualtrics Panels to be representative of the general community in terms of age ($M = 46.65$, $SD = 17.43$, range = 18-88), gender (49% male, 49.6% female, 1.4% non-binary), and geographic region (38.8% South, 21.9% Midwest, 20.1% Northeast, 19.3% West).[1] With respect to education, 43.7%% had completed a college degree (e.g., Associate's degree or higher) and 7.9% were currently college students. In terms of ethnicity, most identified as White (79.9%), Black (7.5%), or Asian (3.9%). All participants completed the ERQ and Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995) as part of an online survey. The DASS-21 is a well validated measure of depression and anxiety symptoms (e.g., Antony et al., 1998) that we used here as concurrent validity marker for the ERQ.

Analytic Strategy

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[1] Data collection was completed in August 2019. Qualtrics Panels is an online survey recruitment company that recruits participants primarily from actively managed research panels. Participants receive a reimbursement from Qualtrics for their participation in the survey, though the exact value of this reimbursement is unknown to the researchers (for a detailed description of Qualtrics Panels' sampling procedures, see Qualtrics, 2014).

Factor structure and measurement invariance

CFAs (maximum likelihood estimation with the Satorra-Bentler scaled χ^2 statistic and robust standard errors) were conducted in *R* with the lavaan package (version 0.6-5; Rosseel, 2012). We tested Gross and John's (2003) intended two-factor model, with six items loading on the cognitive reappraisal factor and four items on the expressive suppression factor. The two factors were allowed to correlate, and no correlated residuals were specified. Model goodness-of-fit was judged based on robust CFI, RMSEA, and SRMR fit index values. CFI values of ≥ .90 or .95 and RMSEA/SRMR values of ≤.08 or .06 were judged to indicate acceptable or excellent fit, respectively (Byrne, 2016).

The measurement invariance of this two-factor structure was assessed across *education* (college degree [*n*=222] vs no college degree [*n*=286]), *age* (≤44 years [*n*=238] vs ≥45 years [*n*=270]), and *gender* (female [*n*=252] vs male [*n*=249]) categories. As recommended by Byrne (2016), we tested invariance with respect to *configural invariance* (equal form), *metric invariance* (equal factor loadings), and *scalar invariance* (equal intercepts). Strong invariance was judged as supported if CFI values differed between the configural model and the scalar invariance model by less than .01 and RMSEA values differed by less than .015 (Cheung & Rensvold, 2002).

Internal consistency reliability

McDonald's omega (ω) and Cronbach's alpha (α) reliability coefficients were calculated, with values ≥ .70 judged as acceptable (Groth-Marnat, 2009).

Concurrent validity

Pearson correlations were calculated between ERQ and DASS-21 scores. The process model of emotion regulation (Gross, 1998, 2015) predicts that cognitive reappraisal should be significantly negatively correlated with depression and anxiety symptoms, whereas expressive suppression should be significantly positively correlated with these symptoms.

Results

Descriptive statistics and reliability coefficients for the ERQ and DASS-21 are presented in Table 1. Both ERQ scale scores had good omega and alpha reliabilities ($\geq$ .75). In terms of factorial validity, the two-factor model of the ERQ displayed excellent goodness-of-fit (SBχ^2 = 92.683 [df = 34], CFI = .961, RMSEA = .058 [90% CI = .048-.069], SRMR = .066, AIC = 17454.735), with all items loading well (i.e., >.40) on their intended factor (see Table 2). The cognitive reappraisal and expressive suppression factors were uncorrelated (estimated r = -.01, p = .855). With respect to the invariance of this structure, full configural, metric, and scalar invariance were supported across the different age and education categories (i.e., CFI and RMSEA values did not differ substantially [ΔCFI <.01 and ΔRMSEA <.015] between the configural, metric, and scalar models). For gender, full configural and metric invariance was supported, and at the scalar level partial invariance was supported; invariance was partial at the scalar level because the equality constraint on the intercept of item 4 ("When I am feeling positive emotions, I am careful not to express them") needed to be freed, otherwise the scalar model reduced CFI by more than .01 (Δ.018). As noted by Byrne et al. (1989), this type of minor (e.g., single item) deviation from full invariance at the scalar level is not uncommon in psychological tools, and is an invariance pattern that still supports meaningful group comparisons. A table displaying all fit index values for the invariance models is provided in the supplementary materials.

Cognitive reappraisal scores were significantly negatively correlated (small to moderate size) with depression (r = -.32, p<.001), anxiety (r = -.14, p<.001), and stress (r = -.21, p<.001) symptoms, whereas expressive suppression scores were significantly positively correlated (small size) with depression (r = .18, p<.001), anxiety (r = .10, p=.030), and stress (r = .12, p=.006) symptoms.

---*Insert Table 1 about here*---

---*Insert Table 2 about here*---

Discussion

Our aim here was to conduct the first CFA study of the ERQ in a United States general community sample. Overall, our findings suggest that the ERQ performs well in this population. Our confirmatory factor analysis results indicate that the intended two-factor model is an excellent representation of the data, and importantly, that this structure is invariant across different age, education, and gender categories. All ten ERQ items performed well in terms of assessing their intended latent construct, with significant and salient loadings. Our findings are therefore consistent with the large body of existing student data that has supported the factorial validity of this two-factor model (e.g., Gross & John, 2003; Matsumoto et al., 2008; Sala et al., 2012), as well as the recent findings of Preece et al. (2020) in three Australian community samples. Similarly, we found that both ERQ factors had good reliability, and correlated with depression and anxiety symptoms in expected ways. The process model of emotion regulation (Gross, 1998, 2015) predicts that, when used habitually, cognitive reappraisal should usually be associated with better mental health outcomes than expressive suppression, and this pattern was indeed present in our data.

More broadly, our psychometric findings therefore provide further evidence for the conceptual specifications of the process model, in terms of the statistical separability of antecedent-focused (cognitive reappraisal) and response-focused (expressive suppression) regulation strategies, and the divergent outcomes associated with these different categories of emotion regulation. Our findings align, similarly, with contemporary models of affective disorders, that position emotion regulation as an important determinant of symptom development and maintenance (e.g., Joormann & Gotlib, 2010). Contemporary affective disorder treatment protocols often target emotion regulation skills in terms of trying to

increase usage of cognitive reappraisal and decrease usage of expressive suppression (e.g., Sauer-Zavala et al., 2020), so ERQ scores are highly relevant for these contexts.

Limitations and Conclusions

Taken together, our findings reinforce the robustness and mental health relevance of the ERQ scale scores as measures of cognitive reappraisal and expressive suppression with non-student populations. A limitation of this study, though, is that our markers of concurrent validity were limited to affective symptoms and were assessed only via self-report. Future psychometric work could examine a broader set of markers, including other measures of emotion regulation ability or difficulties (e.g., Preece et al., 2018). Another limitation is that we did not test the ERQ in a clinical sample; hence, from our data we can only comment on its utility in general community samples, rather than specialised clinical groups. Future psychometric research with the ERQ in clinical samples would therefore be useful to confirm its utility in such settings. Nonetheless, given the widespread usage of the ERQ with general community samples in the United States (John & Eng, 2014), our current results make an important contribution; supporting that ERQ scores can be confidently used and compared across adults of different ages, genders, and educational backgrounds.

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Table 1

Descriptive Statistics and Omega (ω) and Alpha (α) Reliability Coefficients for the Emotion Regulation Questionnaire (ERQ) and Depression Anxiety Stress Scales-21 (DASS-21)

	Total Sample (N=508)					Females (n=252)		Males (n=249)		Younger age ≤44 (n=238)		Older age ≥45 (n=270)		No college degree (n=286)		College degree (n=222)	
Scale	*M*	*SD*	Range	ω	α	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
ERQ																	
Cognitive reappraisal	28.78	7.36	6-42	.88	.88	29.04	7.33	28.55	7.37	28.62	7.82	28.93	6.94	28.58	7.64	29.05	7.00
Expressive suppression	15.04	5.33	4-28	.75	.75	13.86	5.18	16.30	5.21	15.58	5.40	14.57	5.22	15.65	5.33	14.26	5.22
DASS-21																	
Depression	5.46	5.82	0-21	.93	.93	5.38	5.54	5.49	6.12	6.66	6.08	4.41	5.36	6.12	5.98	4.62	5.49
Anxiety	4.25	4.84	0-21	.89	.88	4.27	4.86	4.03	4.64	5.48	5.36	3.16	4.03	5.23	5.35	2.98	3.72
Stress	5.92	5.32	0-21	.91	.90	5.89	5.21	5.87	5.42	7.46	5.71	4.56	4.54	6.84	5.67	4.74	4.59

Note. Sometimes DASS-21 values are doubled to make them comparable to DASS-42 scores. The DASS-21 values reported here are the raw (undoubled) values.

Table 2
Standardised Factor loadings from Confirmatory Factor Analysis of the Emotion Regulation Questionnaire Items

Item	Factor 1 Cognitive reappraisal	Factor 2 Expressive suppression
1 - When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	.64	-
2 - I keep my emotions to myself.	-	.67
3 - When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	.69	-
4 - When I am feeling positive emotions, I am careful not to express them.	-	.45
5 - When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	.64	-
6 - I control my emotions by not expressing them.	-	.83
7 - When I want to feel more positive emotion, I change the way I'm thinking about the situation.	.86	-
8 - I control my emotions by changing the way I think about the situation I'm in.	.85	-
9 - When I am feeling negative emotions, I make sure not to express them.	-	.66
10 - When I want to feel less negative emotion, I change the way I'm thinking about the situation.	.79	-

Note. All factor loadings were statistically significant, $p < .001$.