

# Validity of Emotion Regulation Questionnaire in Diverse Mexican Samples Using Two Different Spanish Translations

Nadia Saraí Corral-Frías <sup>1a</sup>, Sheila Nataly Velardez Soto <sup>a</sup>, Mitzi Yael Camacho Amay <sup>a</sup>, & Kateri McRae <sup>b</sup> <sup>2</sup>

*Universidad de Sonora, Hermosillo, México <sup>a</sup>; University of Denver, Denver, United State of America <sup>b</sup>.*

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## ABSTRACT

Individual differences in emotion regulation, the use of specific strategies to influence various aspects of one's emotional thoughts or behaviors, are predictive of individual variation in psychopathology as well as wellbeing. The current manuscript sought to investigate reliability and validity of the emotion regulation questionnaire (ERQ) in three different Mexican samples. A Spanish translation previously validated in Spain was used for two samples (student;  $n = 238$  and young school children guardian;  $n=200$ ). To investigate if language differences led to variation in psychometric properties and factorial structure, an in-house Mexican Spanish translation was used for the third sample (community;  $n= 617$ ). We found that although reliability, factor structure and validity remained somewhat the same, there were differences in the number of items in each factor. Importantly, consistent with previous research, emotion regulation strategies assessed were associated with predicted outcomes such as mood and anxiety symptoms, resilience, and wellbeing. These results highlight the importance of adapting scales to specific contexts and attending to the characteristics of the sample.

## Keywords

emotion regulation questionnaire, validation, mexican samples, confirmatory factor analysis

## RESUMEN

Diferencias individuales en la regulación de las emociones, es decir el uso de estrategias específicas para cambiar los pensamientos o los comportamientos emocionales de uno mismo/a, son predictivos de las variaciones de la aparición de la psicopatología o el bienestar. El presente manuscrito busca investigar la confiabilidad y validez del cuestionario de regulación emocional (ERQ) en tres diferentes muestras mexicanas. Se utilizó una traducción previamente validada en España en dos muestras (estudiantes;  $n = 238$  y guardianes de niños/as en edad escolar;  $n = 200$ ). Para investigar si las diferencias lingüísticas llevaron a variaciones en las propiedades psicométricas y la estructura factorial, se utilizó una traducción interna al español mexicano en la tercera muestra (muestra comunitaria;  $n = 617$ ). Los resultados mostraron que, aunque la confiabilidad, la estructura factorial y la validez permanecieron similares, hubo diferencias en el número de ítems en cada factor. Es importante destacar que, en congruencia con investigaciones anteriores, las estrategias de regulación emocional evaluadas se asociaron con variables teóricamente congruentes, como los síntomas de depresión y ansiedad, la resiliencia y el bienestar. Estos resultados destacan la importancia de adaptar las escalas a contextos específicos y atender a las características de la muestra.

## Palabras Clave

cuestionario de regulación emocional, validación, muestras mexicanas, análisis factorial confirmatorio

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<sup>1</sup> Correspondence about this article should be addressed Nadia Corral-Frías: [nadia.corral@unison.mx](mailto:nadia.corral@unison.mx)

<sup>2</sup> **Conflicts of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Validación del Cuestionario de Regulación Emocional en Diversas Muestras Mexicanas  
Utilizando Dos Traducciones Diferentes al Español

**Introduction**

Extant evidence has shown that the use of emotion regulation strategies relates reliably to individual differences in psychopathological symptoms as well as resilience and wellbeing (Gross, 2015; Gross & Jazaieri, 2014). Considering the already high and rising prevalence of mental health problems worldwide (Vos et al., 2016), it is important to investigate possible risk and protective factors that lead to such individual differences. Given its clear link with psychopathology, one of the most frequently studied psychological factor is emotion regulation (Aldao et al., 2010; Sloan et al., 2017).

The Process Model of Emotion Regulation posits emotion regulation can generally be grouped into four different strategies: situational, attentional, cognitive, and response modulation (Gross, 2015; Gross et al., 2019). Two of the most commonly used emotion regulation strategies are expressive suppression and cognitive reappraisal, which are response modulation and cognitive strategies respectively. Expressive suppression relies on actively suppressing, or inhibiting emotional expressivity, such as not showing on one's face how one is truly feeling (Gross & John, 2003). On the other hand, cognitive reappraisal involves reframing or reinterpreting situations or stimuli to change their potential emotional impact (Barrett & Gross, 2001). Gross and John (2003) developed a 10-item instrument, the *Emotion Regulation Questionnaire* (ERQ), which measures the use of both strategies. Emotion regulation assessed through this scale has been associated with other mood management constructs (Gross & John, 2003) such as mood repair (Salovey et al., 1995). Additionally, reappraisal and suppression have been associated with the coping styles (Compas et al., 2014; Skinner & Zimmer-Gembeck, 2007) reinterpretation and venting (Carver et al., 1989).

The ERQ has been used extensively in research due to its consistent association with mental health symptoms. Expressive suppression has been associated with increased self-reported psychopathology symptoms (Aldao et al., 2010; Gross & Jazaieri, 2014; John & Gross, 2004; Joormann & Gotlib, 2010; Moore et al., 2008). Alternatively, cognitive reappraisal has been shown to be negatively associated with symptoms of anxiety and depression (John & Gross, 2004; Joormann & Gotlib, 2010) as well as positively with overall well-being (Sloan et al., 2017). Theoretical and empirical work has suggested that risk for mental health problems may not be due to the initial response

to a negative event, but the ability to recover from the effect of such event (Gross et al., 2019). Given the theoretical and the extensive empirical evidence linking certain emotion regulation strategies to improved mental health it is imperative to study these psychological processes and related constructs (Joormann & Gotlib, 2010; Sloan et al., 2017).

Both emotion regulation strategies assessed by the ERQ have also been reliably associated with personality facets in both the original English version and in various translations. Notably, expressive suppression has demonstrated a negative association with extraversion, agreeableness, and conscientiousness as well as a positive association with neuroticism (Ali & Alea, 2018; Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003). On the other hand, cognitive reappraisal has demonstrated a positive association with extraversion, agreeableness, and conscientiousness, and a negative association with neuroticism (Ali & Alea, 2018; Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003).

Studying emotion regulation strategy use in different cultural contexts, social scenarios, and age ranges has started to produce even broader understanding (Gullone & Taffe, 2012; Perez & Soto, 2011; Sala et al., 2012; Troy et al., 2017). The ERQ has been translated to at least 38 languages and implemented in various cultural contexts (Stanford Psychophysiology Laboratory, 2020). These translations have demonstrated to have acceptable reliability and validity in many countries and cultures worldwide. Cultural differences have also been explored (Matsumoto, Yoo, Nakagawa, et al., 2008), where internal consistency reliability for both ERQ subscales fluctuate between very poor to good ( $\alpha = 0.35-0.86$ ) depending on the country and context. Likewise, the 10-item 2-factor structure of ERQ has been replicated in some, but not all, studies. For instance, The 10-item 2-factor structure has been replicated in Chinese (Wang et al., 2009), Italian (Balzarotti et al., 2010; Sala et al., 2012), Spanish (Cabello et al., 2013), German (Abler & Kessler, 2009; Sala et al., 2012), Belgian (D'Argembeau & Van der Linden, 2006), Australian (Preece et al., 2020), and Peruvian samples (Gargurevich & Matos, 2010). However, others have found a better fit with a 9-item 2-factor structure in German, Australian, Finish, and U.K. samples (Rice et al., 2018; Spaapen et al., 2014; Westerlund & Santtila, 2018; Wiltink et al., 2011). Finally, some studies have found better fit with 8 items (Balzarotti, 2019) or have items that load onto both subscales (Wiltink et al., 2011). These studies demonstrate that translations of the ERQ have variable factor structure and demonstrate different internal consistency reliability.

Although in its nascent stages, research has demonstrated that culture and language shapes how people use emotion regulation strategies and, if used, the degree to which they are adaptive (Ford & Mauss, 2015). While Spain and Mexico share the same basic linguistic foundation with substantial cultural similarity, there are clear differences in the way language is applied and its impact on the application of assessment instruments. The lexicon of Mexican Spanish is the result of an adaption of indigenous and English influences (Valdivia Vázquez et al., 2015). Numerous words and phrases do not translate directly or adequately capture the breadth of meaning across populations (Cotton, 2001).

The literature also suggests differences in emotion regulation depend on placement in the collectivisms-individualism scale (Matsumoto, Yoo, Nakagawa, et al., 2008). Mexican samples tend to be more collectivist while Spanish respondents may favor individualistic cultural values (Carballeira et al., 2015). These differences may be reflected in the use and the effects of emotion regulation strategies (Matsumoto, Yoo, Fontaine, et al., 2008). As such, it is critical to examine psychometric properties across Spanish speaking populations (Carretero-Dios & Pérez, 2007).

Apart from cultural differences, it is also important to note that the scale was originally validated in a student sample (Gross & John, 2003) and until recently most subsequent studies have used well-educated or university student samples (Balzarotti et al., 2010; Matsumoto, Yoo, Nakagawa, et al., 2008). Many (Balzarotti, 2019; Rice et al., 2018; Spaapen et al., 2014; Westerlund & Santtila, 2018) although not all of the community samples did not replicate the 10-item 2-factor structure (Ali & Alea, 2018; Brady et al., 2019; Cabello et al., 2013; Preece et al., 2020) (See Table 1). It is crucial to understand whether educational status, age, or stage in life impact factor structure and other psychometric properties in validation samples.

The main objective of the present research was to validate the emotion regulation questionnaire in Northwest Mexico using a previous Spanish translation validated in Spain. Moreover, since most previous validations are of a university or well-educated samples, we then sought to validate the scale in a non-student Northwest Mexico sample (i.e., young school children guardians). Finally, given possible variation in the Spanish language comprehension we translated the original English scale to Mexican Spanish and validated it in a larger community Mexican sample (sample from 16 different Mexican states).

Table 1

*Factor structure of ERQ studies in community samples*

Author	Language	Sample	Factorial Structure
(Balzarotti 2019)	Italian	Student and community sample	8-item 2-factor
(Brady et al. 2019)	English	Older adult community sample	10-item 2-factor
(Preece et al. 2020)	English (Australian)	Community sample	10-item 2-factor
(Rice et al. 2018)	English(Australian and Canadian)	Community sample	9-item 2-factor (item 6)
(Spaapen et al. 2014)	English (Australian and UK)	Community sample	9-item 2-factor (item 3)
(Ali and Alea 2018)	English (Trinidad and Tobago)	Community sample	10-item 2-factor
(Cabello et al. 2013)	Spanish (Spain)	Community sample	10-item 2-factor
(Wiltink et al. 2011)	German	Community sample	10-item 2-factor (ítem 8 loads on both factors)
(Westerlund and Santtila 2018)	Finish	Community sample	9-item 2-factor (item 5)
(Gračanin et al. 2019)	Croatian	Student and family members	10-item 2-factor

## Methods

### *Participants*

Participants were part of three separate samples. The first sample included social sciences graduate and undergraduate students (age:  $M = 23.08$ ,  $SD = 5.55$ ) from Northwestern Mexican universities. Participants were primarily women due to preference of social science majors in women (80.7 % women). Approximately 20% reported working in addition to studying. The second sample consisted of young parents (parents of 5-7 year old primary school students) from a North western Mexican city (age:  $M = 37.5$ ,  $SD = 7.68$ ). Given that in Mexico primary care givers are traditionally mothers the sample was more skewed toward female participants (86% women). The third sample was a community sample from various cities across Mexico. Participants in this sample were more evenly distributed in terms of gender (61.1% women and 38.7% men). The sample included participants from a wide range of ages (18 to 81;  $M = 31.98$ ,  $SD = 14.74$ ) where less than half of the sample were students (46.8%). It is also important to note that although it was a community sample, the education level was still higher than the average

in Mexico, where 46.7% of individuals reported having completed high school and 29.8% had a completed at least a bachelor's degree. Table 2 shows descriptive statistics.

Table 2  
*Sample Characteristics*

	Sample 1			Sample 2			Sample 3		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Sample size	238			200			617		
Sex, <i>n</i> (%)	Female:	Male:		Female:	Male:		Female:	Male:	
	80.7%	19.3%		86.0%	14.0%		61.1%	38.7%	
Age(years)	23.08	5.55	18-32	37.5	7.68	21-72	31.98	14.74	18-98
Education(years)	14.21	2.55	12-27	13.33+	3.19	6-22	14.06	3.19	6-24

*Note.* + missing values from 53 participants

### ***Questionnaires***

Emotion regulation was assessed using a Spanish translation of the Emotion Regulation Questionnaire (ERQ (Cabello et al., 2013)) for the first two samples. The ERQ (Gross & John, 2003) consists of ten, seven-point Likert-style items ranging from “totally disagree” to “totally agree”. It evaluates two different emotion regulation strategies: *Expressive Suppression* (4 items) and *Cognitive Reappraisal* (6 items). For the third sample, an in-house translation was performed to have a version of the questionnaire that is adapted to the Mexican context. For the third sample, the ERQ was translated to Spanish by a bilingual researcher. A different bilingual researcher subsequently back translated it. The back-translated instrument was then compared to the original by a third bilingual researcher. Finally, two senior researchers checked the Spanish translation to ensure that Mexican participants would understand each of the items.

Anxiety and depression symptoms were assessed using a previously validated abbreviated version (Corral-Frías et al., 2019) of the Mini-MASQ (Casillas & Clark, 2000). It consists of 26-items using a five-point Likert-style scale grouped into three subscales: *General Distress* (GD, 8 items), *Anhedonic Depression* (AD, 8 items), and *Anxious Arousal* (AA, 10 items). Internal consistency reliability was acceptable ( $\alpha > 0.80$ ).

Personality was measured using a previously validated Spanish translation of the Big Five Inventory (BFI), which evaluates five personality dimensions. It consists of 44

Likert-style items using a five-point scale (Benet-Martínez & John, 1998) which showed acceptable reliability for all subscales ( $\alpha > 0.61$ ) and were consistent with reliability in Spanish samples.

Emotional repair was assessed using a previously validated Spanish version of the Trait Meta-Mood Scale (TMMS-24) (Fernandez-Berrocal et al., 2004). The TMMS-24 (Salovey et al., 1995) consist of 24 Likert-style items on a five-point scale ranging from “completely disagree” to “completely agree”. The full scale features four distinct dimensions, of which only the *Emotional Repair* subscale was utilized for Sample 3 of this study (8 items). Reliability ( $\alpha = .83$ ), was comparable to the original Spanish translation ( $\alpha = .85$ ).

A previously validated Spanish version of the COPE Inventory was used to assess coping strategies. Both the Spanish (Perczek et al., 2000) and the original English version (Carver, 1997) consists of 60 Likert-style items on a 4-point scale where items are grouped into 15 separate dimensions. Here the *Positive Reinterpretation (PR)* and *Focus on and Venting of Emotions (FVE)* (4 item) was used. Reliability in our study (*FVE*  $\alpha = .65$ ; *PR*  $\alpha = .76$ ) was acceptable.

Resilience was assessed using two separate scales, a translation of the Resilience Scale and the Connor-Davidson Resilience Scale (Connor & Davidson, 2003; Wagnild & Young, 1993). The first was used in sample 1 (Corral-Frías et al., 2019), and assesses resilience using 25 items. The latter, which consisted of 25 Likert-style items, was used in sample 2. Internal consistency reliabilities were acceptable for both scales ( $\alpha = 0.94$  and  $\alpha = 0.83$  respectively).

Wellbeing was assessed using a Spanish translation (Díaz et al., 2006) of the Ryff’s Psychological Wellbeing scale (Ryff, 1989). This translation consists of thirty-nine 6-point (1= Totally Disagree to 6= Totally Agree). For the use of this paper, a single score was calculated including all items ( $\alpha < 0.80$ ). For a summary of descriptive statistics and internal consistency reliabilities of all scales see Supplemental Table 1.

## Procedures

Participants were recruited from various Northwest Mexico universities (sample 1), primary schools (sample 2) and community centres (sample 3) through flyers, classroom announcements and online forums. Participants who were students were given extra credit for their participation. Participants in samples 1 and 3 signed an online

informed consent form electronically. On the other hand, participants in sample 2 signed the consent form in paper form. All participants were informed of the research objective, risks and benefits of the study, and confidentiality of the data. Data were collected online using Qualtrics (Sample 1 and 3) or through paper questionnaires (sample 2).

### *Analysis*

Univariate analyses were performed, including computation of means and standard deviations of continuous variables and frequencies of categorical variables, using the statistical package SPSS v24. Additionally, to determine reliability (internal consistency) Cronbach's alphas were calculated. A Confirmatory Factor Analyses (CFAs) to assess the factor structure of the ERQ was run using the statistical software EQS v6. Two main types of fit index indicators were used to evaluate whether the data supported the proposed hypothetical model: practical and statistical. The chi square ( $\chi^2$ ) was used to measure the difference between the proposed model and the saturated  $\chi^2$ . Given large sample sizes (200 participants or more each), the relative  $\chi^2$  was used (calculated by dividing the  $\chi^2$  fit index by the degrees of freedom) to reduce the dependence of  $\chi^2$  on sample size. According to Schumacker and Lomax (2004) if this ratio is less than 5 the model is deemed to have good fit. The practical indicators used were the Comparative Fit Index (CFI), Bentler-Bonnet Normed Fit Index (NFI), and Tucker Lewis Index (TLI). To demonstrate good fit these indices should have a value higher than .90 (Bentler, 2007). Lastly, the Root Mean Square Error of Approximation (RMSEA) was used, which should have values lower than .09 (Browne & Cudeck, 1992). According to Satorra & Bentler (2001) and given that Mardia multivariate normalized coefficients values were greater than 7 (Sample 1 = 17.97; Sample 2 = 8.57; Sample 3 = 14.78), the robust maximum likelihood method was used.

Additionally, to measure concurrent construct validity, associations with previously related constructs were calculated using correlational analysis. Given that both ERQ measures showed a non-normal distribution (See Supplemental Table 2) non-parametric correlational analysis were run (i.e. Spearman correlations). Finally, to measure convergent and divergent validity in a more standardized manner we calculated the average variance extracted (AVE) as well as the difference between the square root of the AVE and covariances with other constructs. To calculate AVE, the factorial weights for each factor were extracted and squared (i.e., lambda squared). Afterwards



each lambda squared was added and subsequently divided by the total number of indicators (or parcels) in each of the constructs. Finally, the square root of the summation was used to calculate the square root of the AVE. According to (Hair, 1995) convergent validity is satisfactory if the AVE of the measured construct is higher than 0.50. On the other hand, Henseler et. al., (2009) suggests that satisfactory discriminant validity can be met if the square root of the AVE is larger than covariance with other constructs.

## Results

### Reliability

Descriptive statistics for the ERQ in each sample are shown in Table 3. In all three samples, the *cognitive reappraisal* (CR) subscale (Sample 1  $\alpha=.67$  and Sample 3  $\alpha=.69$ ) and *expressive suppression* (ES) subscale (Sample 1  $\alpha=.78$  and Sample 1  $\alpha=.77$ ) demonstrated acceptable levels of internal consistency reliability (See Table 2). However, reliability for sample 2 was slightly lower (CR  $\alpha= .63$  and ES  $\alpha= .62$ ).

Table 3

*Descriptive statics and internal consistency reliability coefficients for ERQ*

Measure/subscale	Sample 1			Sample 2			Sample 3		
	M	SD	$\alpha$	M	SD	$\alpha$	M	SD	A
<b>ERQ</b>									
CR	5.29	1.07	.67	4.86	1.28	.63	4.79	1.16	.68
ES	4.27	1.63	.78	3.07	1.44	.62	3.73	1.19	.77

Note. ERQ = Emotion Regulation Questionnaire, CR= Cognitive Reappraisal, ES = Expressive Suppression

### Factor structure

Confirmatory factor analyses of the ERQ partially replicated the 2-factor structure in all three samples (i.e. *cognitive reappraisal* and *expressive suppression*). The 2-factor model showed acceptable goodness of fit (for CFA fit index values see Table 4) in all three samples. However, the 10 item 2-factor structure was not replicated. Due to high residuals, two items were eliminated in Sample 1, three in sample 2, and one from sample 3 to improve fit indexes. After these exclusions, a 2-factor model showed acceptable fit indices.

Table 4  
CFAs fit index values

a	Mardia	Relative $\chi^2$	CFI	NFI	TLI	RMSEA
<b>Sample 1</b>						
2-factor 10-item	37.89	2.06	.90	.84	.88	.07
2-factor 8-item	22.33	1.43	.96	.95	.90	.04
<b>Sample 2</b>						
2-factor 10-item	8.57	2.7	.68	.62	.58	.11
2-factor 7-item	1.30	2.09	.90	.85	.85	.07
<b>Sample 3</b>						
2-factor 10-item	14.78	3.44	.88	.85	.84	.07
2-factor 9-item	18.51	2.31	.93	.94	.95	.04

### Validity

Associations between the ERQ scales and other measures are presented in Table 5. ERQ scales were, as expected, also correlated with mood and anxiety symptoms. CR was negatively correlated with Mini MASQ scores (Sample 1: *anhedonic depression*  $\rho = -.27$  and *general distress*  $\rho = -.21$ ,  $p < .01$ ; Sample 3: *anxious arousal*  $\rho = -.08$ ,  $p < .05$  and *anhedonic depression*  $\rho = -.22$ ,  $p < .01$ ). ES, on the other hand, was positively correlated with symptoms (Sample 1: *anxious arousal*  $\rho = .14$  and *anhedonic depression*  $\rho = .15$ ,  $p < .05$ ; Sample 3: *anxious arousal*  $\rho = .18$ , *anhedonic depression*  $\rho = .22$  and *general distress*  $\rho = .23$ ,  $p < .01$ ). Consistent with previous studies, we found that the ERQ subscales were both significantly associated (albeit in opposite direction) with *wellbeing* (Sample 1: CR  $\rho = .21$ ,  $p < .01$  and ES  $\rho = -.33$ ,  $p < .01$ ; Sample 2: CR  $\rho = .04$ ,  $NS$  and ES  $\rho = -.17$ ,  $p < .05$ ) and *resilience* (CR  $\rho = .20$ ,  $p < .01$  and ES  $\rho = -.17$ ,  $p < .05$ ; Sample 2: CR  $\rho = .15$ ,  $p < .05$  and ES  $\rho = -.02$ ,  $NS$ ).

Likewise, ERQ measures were correlated with different personality facets (see Table 5). *Neuroticism* was negatively associated with CR (Sample 1:  $\rho = -.30$ ,  $p < .01$ ; Sample 3:  $\rho = -.09$ ,  $p < .05$ ) and positively with ES (Sample 3:  $\rho = .10$ ,  $p < .01$ ). *Agreeableness* was positively associated with CR (Sample 3:  $\rho = .18$ ,  $p < .01$ ) and negatively with ES (Sample 1:  $\rho = -.15$ ,  $p < .05$ ; Sample 3:  $\rho = -.20$ ,  $p < .01$ ). *Conscientiousness* was positively associated with CR (Sample 1:  $\rho = .18$ ,  $p < .01$ ; Sample 3:  $\rho = .20$ ,  $p < .01$ ) and negatively with ES (Sample 3:  $\rho = -.13$ ,  $p < .01$ ). *Extraversion* was positively associated with CR (Sample 1:  $\rho = .18$ ,  $p < .01$ ; Sample 3:  $\rho = .22$ ,  $p < .01$ ) and negatively with ES (Sample 1:  $\rho = -.27$ ,  $p < .01$ ; Sample 3:  $\rho =$

-.10,  $p < .01$ ). The results also demonstrated a positive correlation between CR and openness (Sample 1:  $\rho = .19$ ,  $p < .01$ ; Sample 3  $\rho = .12$ ,  $p < .01$ ).

Table 5

*Relationship between cognitive reappraisal and expressive suppression*

	Cognitive Reappraisal				Expressive Suppression	
	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
<b>Mood and Anxiety</b>						
AA	-.04		-.08*	.14*		.18**
AD	-.27**		-.22**	.15*		.22**
GD	-.21**		-.05	.07		.23**
<b>Personality</b>						
Neuroticism	-.30**		-.09*	.04		.10**
Agreeableness	.13		.18**	-.15*		-.20**
Conscientiousness	.18**		.20**	-.11		-.13**
Extraversion	.18**		.22**	-.27**		-.10**
Openness	.19**		.12**	-.10		-.06
<b>Coping and Mood Repair</b>						
Mood Repair			.34**			-.15**
FVE			.04			-.32**
PRG			.33**			-.11**
<b>Resilience and Wellbeing</b>						
WB	.21**	.04		-.33**	-.17*	
Resilience	.20**	.15*		-.17*	-.02	

Note. AA = Anxious Arousal, AD = Anhedonic Depression, GD = General Distress, WB = Wellbeing, FVE = Focus on and venting of emotions, PRG = Positive reinterpretation and growth. \* =  $p < .05$ , \*\* =  $p < .001$

To test convergence with other emotion related constructs we computed correlations between ERQ constructs and *mood repair*, *positive reinterpretation and growth*, as well as *focus on and venting of emotions* (see Table 5). Our results demonstrated that there was a significant and positive correlation between CR, *mood repair* and *positive reinterpretation and growth* ( $\rho = .34$  and  $\rho = .33$ ,  $p < .01$ , respectively) and negatively between ES, *mood repair*, *focus on and venting of emotions* and *positive reinterpretation and growth* ( $\rho = -.15$ ,  $\rho = -.32$  and  $\rho = -.11$ ,  $p < .01$ , respectively).

Finally, to measure convergent and divergent validity in a more standardized manner we calculated the AVE and the difference between the square root of the AVE and correlations with other constructs. Only ES reached acceptable AVE scores in sample 1 (AVE SE: Sample 1 = .53, Sample 2 = .36, Sample 3 = .40; AVE CR: Sample 1 = .31, Sample 2 = .28, Sample 3 = .31). Based on the tenet that satisfactory discriminant validity can be met if the square root of the AVE is larger than correlations with other constructs, both CR and ES met this criterion (See Supplemental Table 3 for differences in sample 3).

## Discussion

The current manuscript shows evidence of reliability and validity of a previously validated Spanish ERQ translation in a college-age student Mexican sample. This same version of the ERQ showed lower fit indices in a sample of young school-age children guardians. Importantly, we found that a Mexican Spanish translation improved fit indices. Consistent with prior reports, albeit varying number of items, the instrument demonstrated a 2-factor solution in all three samples.

In congruence with previous evidence showing a reduced item 2-factor structure in some community samples (Balzarotti, 2019; Rice et al., 2018; Spaapen et al., 2014; Westerlund & Santtila, 2018), we found that a 7-item 2 factor solution had the best fit in a sample of young parents. Two items were eliminated from the CR subscale (5 and 10). Previous translations in community samples have eliminated items from this subscale, but most found problems with item 3 or high error correlations between item 1 and 3 (Balzarotti, 2019; Spaapen et al., 2014). A German version found that item 8 loaded onto both subscales (Wiltink et al., 2011). Only one previous translation found item 5 problematic (Westerlund & Santtila, 2018) and no previous studies report that item 10 is potentially problematic. We also eliminated item 9 from the ES subscale. Most previous translations have left this subscale intact except for one that eliminated a different item (item 6) (Rice et al., 2018). Data from the university sample, in comparison to the guardian sample, possibly exhibited better psychometric properties due to higher education and higher exposure to variants of the Spanish language. This hypothesis was supported by improved fit indices using a ERQ scale adapted to Mexican Spanish, where the factor structure was closer to the original using in a multiple state community sample. These results suggest that differences in fit and factor structure may be due to language comprehension. The instrument showed good divergent validity ( $\text{SAVE} > \text{covariance with}$

other constructs). However, convergent validity could be improved (AVE scores were only acceptable for the ES subscale in sample 1). This is further exemplified in the acceptable albeit low internal consistency reliability scores ( $\alpha > .62$ ) in all three samples.

Our study further shows evidence of concurrent validity by showing associations between ERQ and related mood-regulation and coping strategies. Consistent with previous findings (John & Gross, 2004) *positive reinterpretation and growth* as well as *mood repair* were positively associated with CR and negatively with ES. Also consistent with previous findings, *focus on and venting of emotions* was only negatively associated with *expressive suppression* (Gross & John, 2003).

Significant associations between emotion regulation strategies assessed here with theoretically related constructs such as self-report psychopathology, resilience, and wellbeing provide additional evidence of validity. As expected, ERQ subscales were associated with mood and anxiety symptoms, where CR was negatively and ES was positively associated with self-reported psychopathology (John & Gross, 2004; Joormann & Gotlib, 2010; Moore et al., 2008). Moreover, ES showed incremental validity, where this type of emotion regulation predicted symptoms above and beyond other coping strategies and emotional repair (See Supplemental Tables 4-6). Finally, consistent with previous literature (Balzarotti, 2019; Haga et al., 2009) wellbeing and resilience were negatively associated with ES but positively associated with CR.

As in previous studies, ES was associated with different personality facets, notably a negative association with *extraversion* (Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003). Although some previous studies also report a positive association with *neuroticism*, this was only true in the larger community sample. There was also a negative association with *agreeableness* and *conscientiousness* (Ali & Alea, 2018; Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003). As in most previous studies, we found a negative association between CR and *neuroticism* and a positive association with *extraversion* (Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003) and *conscientiousness* (Balzarotti et al., 2010; Gross & John, 2003). Although previous studies have shown consistent associations (Ali & Alea, 2018; Balzarotti et al., 2010; Cabello et al., 2013; Gross & John, 2003), with *agreeableness* and *openness* we only found it to be true in the large community sample (sample 3).

As with all research, this study does not come without limitations. For instance, AVE scores only reached acceptable levels for ES in sample 1. This suggests that factor loadings are low, particularly as compared to those demonstrated in previous studies, and

especially in Sample 2 (lowest educational background). Furthermore, while we strove for variability in our samples, most participants were still highly educated (See Table 1 and Sample section) and two of the samples included or was entirely a student population. Moreover, samples included mostly people from Northern Mexico and may not be representative of the Mexican population as a whole. Thus, although both Spanish versions were grammatically correct and true to the original, some further adaptations may be needed for less educated samples.

Our findings thus highlight the importance of validating scales in the specific context in which they will be used, even when same-language versions have been previously validated. The ERQ is increasingly being utilized in research with non-undergraduate samples (Brady et al., 2019; Spaapen et al., 2014) and different cultural contexts (Butler et al., 2007; Cabello et al., 2013; Gómez-Ortiz et al., 2016; Sala et al., 2012; Wang et al., 2009). Validation studies in non-student samples, consistent with our results, show variations in the number of items in each factor. For instance, Spaapen and colleagues (2014) did not replicate the 10-item two-factor structure found in previous studies. A 9-item (removing item 3 from the reappraisal subscale) confirmatory factor analysis resulted in strong model fit in a diverse age sample. A recent study did replicate the 10-item two-factor structure in an older community dwelling sample, however, it is important to note that participants were all well educated (Brady et al., 2019). In our study, the sample that showed the worst fit indices included participants with the lowest range and mean years of education. This highlights the importance of adapting scales depending on the language, culture or educational background of the sample. Thus, making modifications to scales, assessing factor structure and reporting psychometric properties for scales in different contexts is necessary.

Extensive empirical work has demonstrated that risk for numerous mental health problems, such as depression, is more related to the ability to recover from the effect of such event rather than the event itself (Aldao et al., 2010; Gross & Jazaieri, 2014; Marroquín & Nolen-Hoeksema, 2015). Given the power that different strategies of emotion regulation have on mental health, it is imperative to continue the study of these strategies and related constructs, and thus to ensure that measures are appropriate, understandable, and psychometrically sound in a variety of cultural contexts. Our study highlights the importance of adapting scale language to fit different contexts. It is important that these scales are validated in the context in which they will be used, particularly scales which may be utilized for clinical application.

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