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ANALYSIS OF THE PSYCHOMETRIC PROPERTIES OF THE ERQ QUESTIONNAIRE: A STUDY IN THE ECUADORIAN CONTEXT.

HERNÁN JULIÁN CORTEZ CHAGRAY
UNIVERSIDAD ESTATAL DE MILAGRO ECUADOR, MILAGRO, ORCID ID: HTTPS://ORCID.ORG/0009-0006-8979-7408, EMAIL: hcortezc@unemi.edu.ec

ÁMBAR ANNABELLE VERDUGO ARCOS
UNIVERSIDAD ESTATAL DE MILAGRO, ECUADOR, MILAGRO, ORCID ID: HTTPS://ORCID.ORG/0000-0001-6864-7773, EMAIL: averdugoa@unemi.edu.ec

MARÍA NOEMÍ ALCHUNDIA MENDOZA
UNIVERSIDAD ESTATAL DE MILAGRO, ECUADOR, MILAGRO, ORCID ID: HTTPS://ORCID.ORG/0000-0002-5619-3660, EMAIL: malchundiam@unemi.edu.ec

IVAN CHERREZ-OJEDA
UNIVERSIDAD ESTATAL DE MILAGRO, ECUADOR, MILAGRO, ORCID ID: HTTPS://ORCID.ORG/0000-0002-1610-239X, EMAIL: ivancherrez@gmail.com

Abstract
The aim of this study was to analyse the psychometric properties of the Emotional Regulation Questionnaire (ERQ) in a sample of Ecuadorian adults. The research was conducted using a non-experimental, cross-sectional, descriptive design, with a sample of 3,671 participants from different cities across the country. Exploratory and confirmatory factor analyses were applied to examine the structure of the instrument and its internal validity.
The results of the exploratory factor analysis revealed two factors consistent with the original theory: cognitive reappraisal and expressive suppression, which explained 61.3% of the total variance. Likewise, the internal consistency analysis yielded high reliability coefficients ($\alpha \geq 0.818$) for both the individual factors and the overall scale. The confirmatory factor analysis supported the two-factor structure of the questionnaire, with adequate fit indices (CFI=0.963, TLI=0.952, GFI=0.981, among others), demonstrating the robustness of the model in the Ecuadorian cultural context.
The findings confirm the validity and reliability of the ERQ as an instrument for assessing emotional regulation in adults in Ecuador. This provides a useful tool for both psychological research and clinical application, and allows for a stronger approach to mental health from a contextualised perspective.
Keywords: Emotional regulation, psychometrics, ERQ questionnaire, ecuadorian adults, factor analysis.

INTRODUCTION

Emotional regulation (ER) is an important factor within the mental health of people, which allows them to cope with difficult, uncertain, adverse or stressful situations. ER involves the ability to identify, manage and harmonize one's emotions in order to express them in different social or personal contexts (Gross, 2015). Therefore, emotional regulation is not only limited to regulate only emotions, but also allows to integrate other aspects such as problem solving, healthy interpersonal relationships, and decision making.
Emotional regulation has been a central theme for many researchers, and has been analyzed in different types of cultural contexts. In order to evaluate this construct in a comprehensive manner while validating it in the cultural context, it is necessary the use of instruments.
Within the Ecuadorian context, it is essential to have adequate and validated tools in the cultural context, which allow to evaluate in this case the construct of emotional regulation. The main objective of this study is to evaluate the psychometric properties of the ERQ (emotional regulation questionnaire) instrument in the Ecuadorian adult population. The ERQ is generally a tool used in research in the areas of psychology, education, among others, which allows the evaluation of emotional strategies in people. Nevertheless, the cultural context can be a barrier at the time of application in a population because it often varies by language in different locations. Additionally, it is necessary to validate the instruments in the context of study to ensure their applicability and accuracy in the variables to be evaluated (Gross & John, 2003).

Additionally, other research in other sociocultural contexts has highlighted the role of emotional regulation in different populations, which is essential in mental health. As is the case of the study by Smith et al. (2024), which focuses on low-income adolescents in South Africa, the association between depressive and anxiety symptoms has been significantly modified due to the lack of appropriate tools for work regulation, as assessed by the DERS-16 scale. Therefore, such research suggests that socioeconomic conditions should also be considered when assessing health and emotion regulation strategies in economically disadvantaged youth.

In addition, there are international studies highlighting the role of emotional regulation in different populations, essential in mental health, such as the study by Smith et al. (2024), which focuses on adolescents from low-income environments in South Africa, the relationship between symptoms of depression and anxiety has been influenced by the lack of adequate tools for emotional regulation, being evaluated with the DERS-16 scale. For this reason, it is necessary to consider socioeconomic conditions when assessing mental health and emotional regulation strategies in young people from vulnerable economic conditions.

In adults, it has been observed that the complex relationships of several constructs, including emotional intelligence, anxiety, depression, are increasingly complex, being emotional intelligence one of the key factors to improve the quality of mental health. The study by Tolsa & Malas, 2022, frames a mixed model, this type of study highlights the complexity and associations between the different factors that affect mental health and for this reason it is necessary to have tools that allow the evaluation of these study variables.

In addition, adults generally face major mental health challenges, particularly in relation to disorders such as depression and anxiety. Academic research has underscored the need for psychometric assessments tailored to this demographic group, employing specialized instruments to accurately assess these dimensions (Wuthrich, et al., 2024).

In Ecuador there is little empirical evidence that has analyzed the construct validity of emotional regulation in the Ecuadorian population; therefore, it is necessary to have robust and reliable tools to evaluate the construct of the study, such as the Emotional Regulation Questionnaire (ERQ). By exploring the psychometric properties, it is expected to provide solid data on the robustness of the instrument with the aim of applying it in different Ecuadorian cultural contexts. Therefore, the purpose of this study is to evaluate the psychometric properties of the ERQ instrument through exploratory and confirmatory factor analysis applications in the Ecuadorian adult population.

METHOD

In this research, a non-experimental, cross-sectional, descriptive design supported by an instrumental framework was chosen, as indicated by American Educational Research Association (2014); Ato et al. (2013); Setia (2016); Wang and Cheng (2020).

Participants

The sample of this study was composed of 3671 from different cities of the Ecuadorian territory. The average age of the sample was m=31.7 years old, ranging from 18 to 77 years old, of which 67.9% were women and 32.1% men.

The sample was established through a non-probabilistic convenience sampling process, characterized by the accessibility, availability and collection of data as mentioned by Arrogante (2022), although it may incur some limitations among them, it may present a bias (Castro, 2019). Table 1 below provides a summary of the sociodemographic characteristics of the sample to be studied.

Table 1. Sociodemographic data

Variable	Category	N	%
Genre	Male	1177	32.1 %
	Female	2494	67.9 %
Age range	18-38 years old	2791	77,0
	39-58 years old	788	21,7
	59 years to 77 years	45	1,2
Marital status	Single	1950	53.1 %
	Married	1257	34.2 %
	Divorced	215	5.9 %
	Others	249	6.8 %
Level of training	Basic	241	6.6 %
	Baccalaureate	1800	49.0 %
	Undergraduate	1314	35.8 %
	Postgraduate	316	8.6 %

Instrument

The Emotional Regulation Questionnaire (ERQ) was used for the study; it comes from the Gross and John model (2003), which has been adapted to the Spanish language by the authors Cabello et al. (2013). This is a self-administered instrument, so that it is made up of two factors, distributed by 10 items, six of the items evaluate the Cognitive reappraisal dimension and 4 the expressive suppression dimension, these respond to a Likert scale (7 points) that initiates its first score has a value: 1= totally; 2=Disagree; 3=Slightly disagree; 4= Neither agree nor disagree; 5=Slightly agree; 6=Agree; 7=Strongly agree. According to the study conducted by Cabello et al. (2013), the ERQ questionnaire showed good internal consistency, with Cronbach's alpha for the cognitive reappraisal dimension (α= 0.79) and expressive suppression (α= 0.75).

Procedure

Before collecting the data, the sociodemographic and questionnaire questions were structured in a way that was carried out on the Google Forms platform, and the informed consent form was added in order to keep the basic ethical principles of Helsinki to protect the integrity of individuals. Subsequently, the link was sent to the participants, once the collection was concluded, the data was coded and reviewed for their respective statistical analysis (Casas M, 2016; Martín, Apericio, & Jarne, 2023).

Data Analysis

The database was reviewed to see if there was any missing or atypical data, finding 71 between missing and atypical data, so it was eliminated. Subsequently, the descriptive analysis was carried out to review the sociodemographic data (age range, level of education, marital status). First, Bartlett's Sphericity and Kayser-Meyer-Olkim KMO tests were applied to perform the PA. Exploratory factor analysis was performed by selecting the appropriate method and then the CFA.

RESULTS

Exploratory factor analysis

An exploratory factor analysis is a multivariate technique whose main purpose is to explore the latent variables by reducing variables (Diaz de la Rada, 2018). Before performing an EFA, it is necessary to comply with requirements that meet for its execution, same that allow you to know if the data are adequate or not, among them the application of Bartlett's sphericity tests and the Kayser-Meyer-Olkim test or by its acronym (KMO). Table 3 below shows the values of KMO and Bartlett Sphericity.

Table 2. Kaiser-Meyer-Olkin (KMO) and Bartlett's test table.

Kaiser-Meyer-Olkin (KMO) and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		,938
Bartlett's test for sphericity	Approx. chi-square	22639
	Gl	45
	Sig.	,001

The following table shows the results of the factor loadings of each question of the ERQ instrument and their respective consolidated dimensions, the loadings of the questionnaire are > 4, so that two factors (expressive suppression and cognitive reappraisal) have been identified. In this case, a Factorization method was applied principal axis, the objective of this method is to establish the underlying factors, it is regularly used when the data distribution assumption is not normal, i.e. where the data distribution does not meet the normality criterion (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Grieder & Steiner, 2022). Likewise, an oblique rotation was established: promax, according to Costello and Osborne (2005) and Hendrickson and White (1964) state that this type of rotation is established in the analysis, due to the fact that the factors are expected to be correlated (Costello & Osborne, 2005; Hendrickson & White, 1964). Table 4 shows the preliminary analysis of the factor loadings of the instrument, in order to know each of the characteristics of the items that consolidate the questionnaire.

Table 3. Factor Loadings

	Factor		
	1	**2**	**Uniqueness**
ERQ_7	0.860		0.273
ERQ_8	0.860		0.263
ERQ_3	0.807		0.358
ERQ_10	0.789		0.319
ERQ_5	0.735		0.376

	ERQ_1	0.708		0.486
	ERQ_4		0.854	0.395
	ERQ_6		0.712	0.415
	ERQ_2		0.644	0.543
	ERQ_9		0.431	0.450

Note: The extraction method 'factorization along the principal axis' was used in combination with a 'promax' rotation.

According to the following analysis, the summary of the total variance explained and by each factor is provided, with the objective of understanding the variability of the set of its factors that each one contributes to the total variance observed. In the study, the first factor was reported as contributing 41.2%, the second factor 20.1%, so that the total sum of variance is 61.3%. Table 5 presents a summary of the factors with their explained variance and is explained in the same way in Figure 1 by means of a scree plot.

Table 4. Variance explained

Factor	**SS Loadings**	**% of Variance**	**Accumulated**
1	4.12	41.2	41.2
2	2.01	20.1	61.3

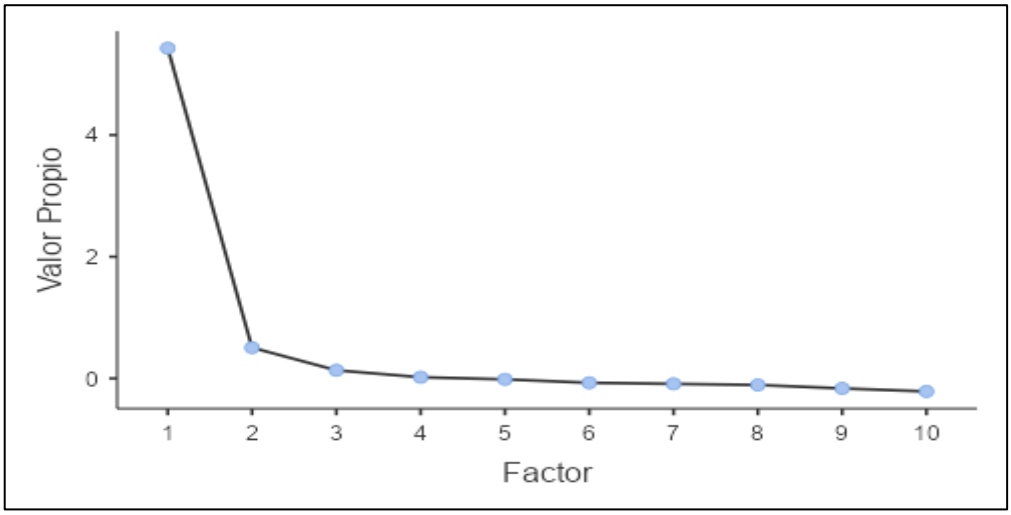

Figure 1. Sedimentation

In the following analysis, internal consistency was calculated using Cronbach's alpha, the purpose of which was to evaluate the reliability of the instrument in its dimensions and overall. The results explained in Table 6, showed values between a range of α=0.819-0.921. Some values that are within the established parameters were taken into consideration. According to the authors, those values that are < to 5 are not acceptable, therefore, those values > 7 are acceptable. Likewise, values between >8 to ≤9 are very good and > 9 are excellent values (Ahmed, Reangsephet, & Shah, 2019; Doval, Viladrich, & Angulo Brunet, 2023; Elosua Oliden & Zumbo, 2008; Sisniegas Vergara, Alva Santillan, & Monteza Nevado, 2023; Steiger, 1900; Vega Martíneza, Frías Osunab, & Del Pino Casado, 2019; Well, Mahendran, Dolgin, & Kayyali, 2023).

Table 5. Internal Consistency

Dimensions	**Cronbach α**	**McDonald's ω**	**Interpretation**
Factor 1	0.918	0.919	Excellent
Factor 2	0.818	0.819	Very good
Global	0.920	0.921	Excellent

Confirmatory factor analysis

Following the exploratory factor analysis, we proceeded to the confirmatory factor analysis. A CFA is a type of multivariate analysis, which aims to evaluate the internal structure or validity of the model to be evaluated (Ramirez Anormaliza, et al., 2017; Sánchez & Hernández, 2019). For this reason, in the following model analyzed, some parameters were considered in order to determine whether the data fit the model, and therefore the goodness of fit indexes are analyzed.

Table 7 exemplifies the indicators with their respective significant factor loadings in relation to their factors, indicating a robustness in the factor structure. In addition, the high standard estimators demonstrate precision in the factor loadings and allow us to determine the strength of the relationship between each indicator and its corresponding factor.

Table 6. Factor Loadings

Factor	Indicator	Estimator	SE	Z	P	Standard Estimator
Factor 1	ERQ_5	1.62	0.0284	57.0	< .001	0.794
	ERQ_3	1.62	0.0292	55.3	< .001	0.780
	ERQ_8	1.72	0.0266	64.9	< .001	0.865
	ERQ_10	1.65	0.0272	60.7	< .001	0.829
	ERQ_7	1.70	0.0266	63.7	< .001	0.855
	ERQ_1	1.49	0.0315	47.2	< .001	0.697
Factor 2	ERQ_9	1.53	0.0291	52.8	< .001	0.786
	ERQ_6	1.40	0.0293	47.7	< .001	0.736
	ERQ_4	1.28	0.0309	41.3	< .001	0.668
	ERQ_2	1.24	0.0306	40.4	< .001	0.644

According to the results of the factorial model; $\chi 2 = 854$: its degree of freedom gl = 34: obtaining a p value = 0.000. In addition, the following indexes, according to some studies, mention that for a model to be optimal or within the parameters of adjustments and parsimony are adequate as shown in Table 8, their values should be > 0.90. The Comparative Fit Index showed a CFI = 0.963, Tucker-Lewis index TLI= 0.952, goodness of fit index GFI = 0.981, Bentler-Bonett non-normalized fit index NNFI= 0.952; Bentler-Bonett normalized fit index NFI= 0.962.

Table 7. Fit Indices

Model	**X²**	Df	**P**
User Model	854	34	< .001
Baseline Model	22482	45	< .001
Index	**Value**	**Recommended Cutoff**	**Compliance**
CFI - Comparative FIT Index	0.963	≥ 0.90	OK
TLI - Tucker-Lewis Index	0.952		OK
GFI - Goodness of Fit Index	0.981		OK
NNFI – Non-Normed Fit Index (Bentler–Bonett)	0.952		OK

Model	**X²**	Df	**P**
User Model	854	34	< .001
Baseline Model	22482	45	< .001
Index	**Value**	**Recommended Cutoff**	**Compliance**
NFI - Normalized Bentler-Bonett Fit Index	0.962		OK
SRMR	0.033	≥ 0,05	OK
RMSEA - root mean square approximation	0.08	≥ 0,05-0,08	OK
RMSEA p	< .001	< .001	OK

DISCUSSION

Emotional regulation is both a critical and fundamental process in the management of mental health, particularly in the face of adversity and stress. Likewise, emotion management has an impact on psychological well-being and performance in challenging situations. Navarro Siurana et al. (2018) have highlighted the importance of emotional regulation in mental health. Their Emotional Regulation Questionnaire, created together with Pineda et al. has become one of the most widespread instruments to assess emotional regulation strategies. Therefore, it is vital to investigate the psychometric properties of the ERQ in the population of Ecuador for its usefulness and reliability.

In Ecuador, a study conducted for the first time in the country and inclusive of all cities and characterized by considering the age range of 31.7 years, estimated the psychometric properties of the ERQ, using a sample of 3671 participants. There was a predominant gender which was female with a percentage of 67.9% of women. It was a cross-sectional, descriptive, non-experimental study of instrumental type framed within the logic of the AERA 2014 report. The use of the ERQ required its internal validation, which was performed through exploratory and confirmatory factorial analysis (EFA, CFA). The first EFA expressively indicated cognitive suppressive and reappraisal as two main factors, explaining 61.3% of the total variance. These results are consistent with previous research highlighting the cultural robustness of these dimensions (Pagano & Vizioli, 2021).

The internal consistency of the ERQ, measured by Cronbach's alpha, showed excellent results both for the factors considered and for the instrument as a whole, indicating high reliability. The constructional evaluation of the ERQ corroborated its factorization with fit indices that meet the minimum acceptable parameters. The CFI had a value of 0.963, the TLI was 0.952 and the GFI was 0.981, and others. These results suggest that the model is plausible and the ERQ is a valid and reliable instrument in the evaluation of emotional regulation in the Ecuadorian population.

Several studies have explored emotional regulation in different populations. For example, in adolescents from low-income backgrounds in South Africa, the relationship between symptoms of depression and anxiety has been influenced by the lack of adequate tools for emotional regulation, being assessed with the DERS-16 (DelValle et al., 2022). This type of research highlights the importance of considering socioeconomic conditions when assessing mental health and emotional regulation strategies in young people from vulnerable economic conditions.

In the same way, older people tend to manifest mental health problems, such as anxiety and depression. Regarding psychometric studies, the literature reflects that in the elderly population there is a research gap regarding the lack of adequate and reliable tools to assess the problems mentioned by this population. The study of the psychometric properties of the ERQ in the Ecuadorian context reinforces this work, providing valuable literature that incorporates the social reality of the elderly. Therefore, it is expected that, from an empirical analysis, reliable data will be obtained from this instrument to improve the credibility and usefulness of this cross-cultural application in the Ecuadorian population.

In the end, the analysis of this information shows once again the importance of psychometric tools that are structurally adequate and validated to the context of study. The fact that the ER questionnaire was rigorously analyzed and validated in Ecuador is not only beneficial for psychological knowledge but also for professionals working in mental health in this country and at the same time, these results are consistent with previous evidence in various regions and populations,

The validity of the ERQ instrument in the Ecuadorian context demonstrated that this tool allows measuring emotional regulation. Thus, the ERQ can be used in clinical practice and research to promote psychological well-being and people's ability to cope with difficulties. As a transdiagnostic process, emotional regulation

should be taken into account in psychological interventions, and recent studies have done just that by investigating its impact in different populations and contexts.

CONCLUSION

The research collected data from 3671 people in different cities of Ecuador using a non-experimental, cross-sectional and descriptive approach. In the exploratory factor analysis (EFA) of the ERQ, two main factors were identified: expressive suppression and cognitive reappraisal, which accounted for 61.3% of the total variance. The internal consistency of the ERQ questionnaire was high, with Cronbach's alpha values indicating excellent reliability both at the individual factor level and for the instrument as a whole. Confirmatory factor analysis (CFA) confirmed the structure of the ERQ and presented adequate fit indices (CFI=0.963, TLI=0.952, GFI=0.981, among others), thus suggesting that the model is robust and accurate. The findings are in line with previous research conducted in other cultural contexts and, therefore, ratify the relevance and rigor of the ERQ in the Ecuadorian population. The validation of the ERQ in this context adds value to research in psychology, but at the same time, it also constitutes a valuable tool for mental health specialists in Ecuador. It also highlights the great impact of studying socioeconomic and cultural conditions on mental health and emotional regulation strategies.

The research confirms that the Emotional Regulation Questionnaire (ERQ) can be used accurately and reliably to measure emotional regulation in the Ecuadorian population. This enhances its use in clinical practice and research, addressing the psychological well-being and resilience of individuals facing challenging situations. Psychological interventions should consider emotional regulation due to its relevance in diverse populations and contexts.

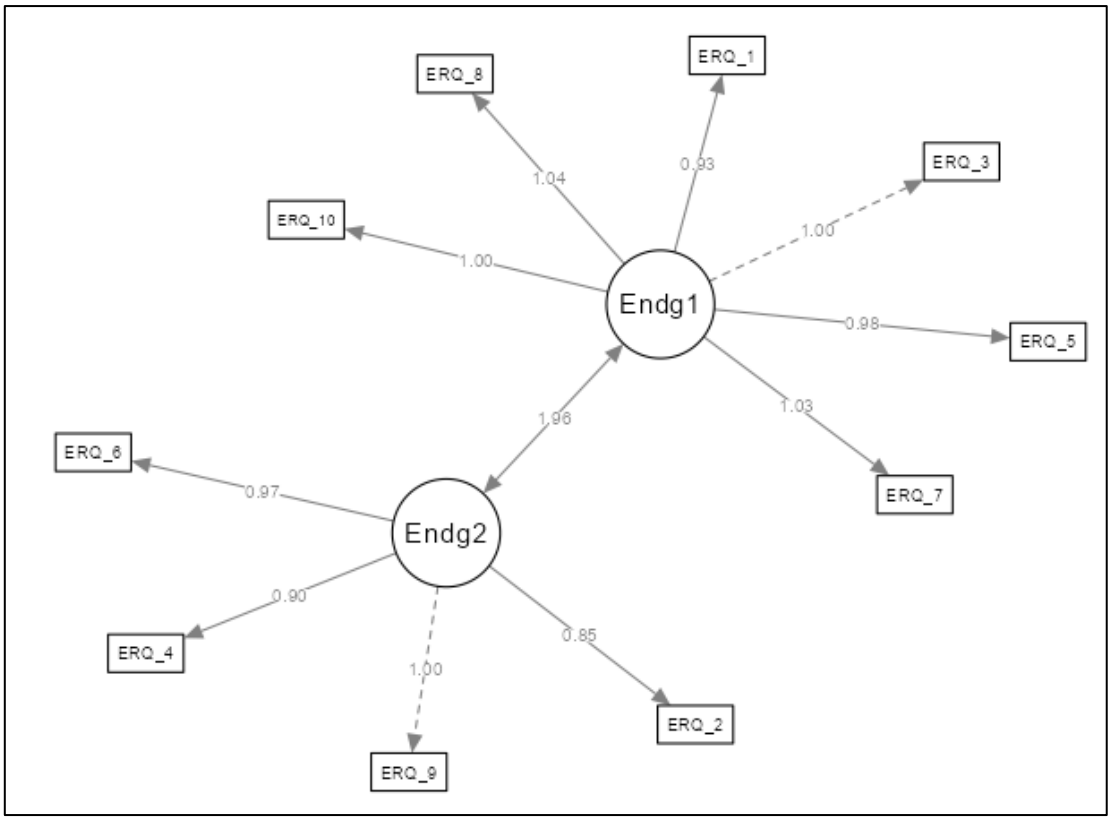

Figure 2. Modelo de análisis factorial confirmatorio del ERQ en población ecuatoriana

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