Evaluation of the Psychometric Properties of a Scale for Emotional Regulation in Academic Activities

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Abstract: This study arises from the need to scientifically investigate how university students deal with their emotions in school situations. Therefore, the objective was to develop an instrument that measured university students' level of emotional regulation during academic activities and evaluate its validity and reliability. After a thorough literature review of the definitions of the constructs, the Emotional Regulation Scale in Academic Activities (ERAAS) was developed. The first version of ERAAS consisted of 18 Likert-type items. A total of 1975 university students in various departments responded to the instrument. Two groups of experts evaluated its content validity. Validity and reliability analysis was performed. According to the EFA, three factors were found: emotional regulation, psychologic inadequate emotional regulation, and physiological insufficient emotional regulation. The final version of the scale consisted of 11 items, the validity and reliability of which could be demonstrated for further research purposes.

Keywords: *Emotional regulation, emotions, inventory, self-control.*

Introduction

Positive psychology is a scientific approach. It focuses on knowing how people live a dignified life and achieve their strengths and virtues to perform optimistically and develop psychologically in common and hostile situations. (Fernández-Ríos & Vilariño Vázquez, 2018). Since the development of positive psychology, interventions have been made to promote the improvement of various strengths of human well-being from different dimensions, such as wisdom, courage, humanity, justice, temperance, and transcendence.

This approach allows any person to acquire methods to behave, think, and feel they provide proper functioning. It is usually encountered in positive experiences in people's lives. This experience allows individuals to learn how to face adversity, appreciate and attend to the positive aspects of life, and get involved in enjoyable behaviors and activities to practice their strengths (Jiménez et al., 2016).

Any situation that is difficult to handle is adversity. The ability to deal with adversity fits any context in which people are immersed. In modern society, it is more common to find young people exposed to high academic pressure. It begins from a very early age with the burden of having large responsibilities, such as choosing a career. In addition, the college selection process has become more selective and, therefore, more demanding to those students because they must fulfill additional requirements. These types of changes in the life of teenagers can bring them issues such as anxiety, which makes the teaching of emotional regulation process (Del Valle et al., 2019).

Schunk et al. (2022) claimed in their study that emotional regulation strategies are key to young people going through difficult educational and social situations, such as cyberbullying. In this particular situation, the researchers noted that

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victims often have low emotional self-control or may have maladaptive emotional regulation strategies. Aside from the potential academic problems arising from this situation, there could be serious psychological consequences.

Consequently, emotions impact students' outcomes and academic achievements. As students' progress in their classes and gain more experience in school, they are more likely to experience unfavorable situations and develop negative emotions toward the teaching and learning process. Researchers have pointed out the importance of promoting emotional regulation, especially in university students (Engelmann & Bannert, 2019).

Another important aspect related to emotional regulation in the classroom is that it was found that the importance of teachers' academic training increases when their emotional regulation is high. It also shows more resources and motivation than the students' regulation, which is already considered a challenge (Del Valle et al., 2019). Hence, this skill of teachers' benefits and students' emotional regulation.

Emotion regulation has become widely accepted as a tool for improving the performance and well-being of people in the most vulnerable situations. Higher education students pursuing highly demanding careers and workers under constant anxiety and stress from their jobs are among the groups of people for whom it is very helpful. An example is health field students and workers (Greenberg et al., 2022), who are more likely to have high anxiety levels due to their heavy responsibilities.

For this reason, integral education has sought to develop various skills and abilities in students in recent years, including the ability to regulate emotions. This ability has become a key factor in education. Individuals with emotional regulation skills can benefit from developing their personal well-being, socialization, and pursuit of professional and academic achievements (Santander Trigo et al., 2020).

Some emotional regulation scales have been developed, and their psychometric properties have been analyzed. The Difficulties in Emotion Regulation Scale-16 is a brief version of an original scale. It is a Likert-type scale with five subscales (nonacceptance of negative emotions, inability to engage in goal-directed behaviors when distressed, difficulties controlling impulsive behaviors when distressed, limited access to emotion regulation strategies perceived as effective and lack of emotional clarity) (Bjureberg et al., 2016). The CERQ-S (Cognitive Emotion Regulation Questionnaire) is a Spanish version of the original Likert-type instrument (CERQ) comprising 36 items. It has nine subscales related to emotion regulation strategies (rumination, catastrophizing, self-blame, blaming others, putting into perspective, acceptance, positive refocusing, positive reappraisal, and refocus on planning) (Betegón et al., 2022).

Because students' emotional regulation benefits their academic performance, the scales that evaluate emotional regulation are not specifically for students. Universities need to know quantitatively the level at which students have this ability. Accordingly, this study aims to develop an instrument that measures the level of regulation shown by university students in academic activities and evaluates its validity and reliability.

Literature Review

What is Emotional Regulation?

A variety of definitions of emotional regulation can be found in the literature. Thompson (1994) defines it as "the extrinsic and intrinsic process that's responsible for monitoring, evaluating and modifying emotional reactions, especially their characteristics of intensity and time in order to achieve their goals" (pp. 27-28). Gross (2002) this conceptualizes it as "the process in which there is an influence on the emotions we have, when we have them, how we experiment them and how we express them because emotions are multicomponent processes that develop through time" (p. 282).

Emotional regulation is a process that greatly influences how people live and express their emotions since they can increase, decrease, or keep the flow and intensity of their emotions (Castellano et al., 2019). The emotional reactions' intensity and length come with a personal background because they depend on previous learnings and experiences. They also depend on individual differences, which form the level of tolerance that everyone shows in their violated expectations (Begoña Ibañez et al., 2018).

Pascual Jimeno and Conejero López (2019) explain that emotional regulation, even if it can be considered exclusively positive, is based only on modifying emotions and thus does not distinguish whether they are healthy, counterproductive, or harmful to the individual. Regulation includes all the processes that allow us to monitor the nature and path of emotions to achieve goals and respond appropriately to the demands of our environment. These processes are all the strategies that can be used to regulate emotions and are the actions by which the goals are achieved.

Furthermore, it is also discussed about emotional regulation, the abilities that relate to the capacity to achieve these actions or activities successfully. In an academic context, these abilities are important because students should be able to overcome academic adversity and achieve their learning and professional development goals. It is helpful to control emotional reactions that may be interrupted or provoked during learning (Andres et al., 2017)

There are many different ways a person can regulate their emotions. Gross (2002) explains two of them: cognitive restructuring and suppression of emotional expression. The first focuses on the cognitive part of the emotion, while the second focuses on the expressive behavior; both are explained below.

Emotional Regulation Strategies

Within the academic environment, different strategies can be used to regulate emotions. Some strategies have been studied by Andres et al. (2017): cognitive restructuring, suppression of emotional expression, and rumination. The authors explain that these are strategies because when students have negative emotions, they tend to focus on emotional information instead of using their cognitive resources to process academic information, which hinders learning.

Cognitive Restructuring. It involves a cognitive change based on reinterpreting and re-evaluating the situation and the goals that they intend to achieve to modify their emotional impact (McRae & Gross, 2020). Studies have shown that the usual use of this strategy is positively related to well-being and negatively related to some psychopathology symptoms. Those who use it tend to have and express more positive and less negative emotions. Moreover, cognitive restructuring has been found to consume fewer cognitive resources than other strategies, such as emotional suppression (Gross, 2002). In addition, several studies have demonstrated that cognitive restructuring and its implementation in academic settings have positive effects, such as improved mathematics performance and the memory of informative education. However, no changes were found in homework related to reading (Andres et al., 2017).

Suppression of Emotional Expression. -This strategy is related to the modulation of emotional response. It consists of preventing an external expression of the internal emotional states. An example is avoiding making facial expressions when in disagreement, i.e., to maintain a neutral expression (McRae & Gross, 2020). It has the characteristic of arriving after the generation of emotions. It is, therefore, important to consider that it does not influence emotion (Kobylinska & Kusev, 2019). Suppression of emotional expression requires sufficient self-control and even greater cognitive resources than cognitive restructuring because suppression must be considered during the emotional response (Gross, 2002).

Rumination. -This strategy focuses on the deployment of attention. It consists of redirecting attention repeatedly onto one's feelings and the causes and consequences of the emotion (McRae & Gross, 2020). It is a controversial strategy; on the one hand, some authors consider it dysfunctional. According to some studies, it is more related to psychopathology, or in the academic setting, there have been no enhancements regarding the results (Andres et al., 2017; Kobylinska & Kusev, 2019). However, recent developments have found evidence for this strategy to be involved with automatic processes, less rational and oriented to the increased safety of the individual. Dominguez-Lara (2018) argues that rumination seems to develop psychopathology because of the irrational beliefs associated with the experienced event and how often it is used.

Emotional Regulation Skills.

As there are strategies to achieve emotional regulation, there are skills that help people implement all of these actions. In the academic setting, there are two that have been extensively studied. These skills are emotion recognition and stress tolerance (Andres et al., 2017).

Recognition of Emotions. - It is the capacity to read one's emotions or others accurately. When talking about others' emotions, it is necessary to pay attention to facial expressions, the voice, and the body, as they are a crucial component in successful social functioning and have been shown to help in better results in private and professional life (Schlegel & Scherer, 2016). The recognition of emotions has been linked to high scores on reading and math tasks (Andres et al., 2017).

Stress Tolerance (ST). **-** This skill is the capacity to handle psychological and physical anguish and endure negative emotional states to serve a goal (Andres et al., 2017; Simons & Gaher, 2005). ST is closely related to the school environment and academic success, as students are often exposed to difficult and demanding activities and situations over an extended period that elicit negative emotions (Andres et al., 2017; Simons & Gaher, 2005). The study by Andres et al. (2017) showed that the skill to tolerate stress is related to good academic skills, such as expository and mathematical reading.

Methodology

Research Design

The present research is a type of instrumental study, according to Montero and León (2002). It was used a quantitative, non-experimental design, the aim of the study was to develop the IMBS and generate evidence of its validity and reliability.

Sample and Data Collection

Participants

The sample was intentional or convenient. The instrument was applied to 1975 university students from a higher-level northern Mexico university. Of which 46.1% indicated to be male, 53.5% female, and 0.4% did prefer not to respond. The average age was =20.9 years old (SD=3), the median was 20, and the mode was 17, with a maximum value of 44 years and a minimum of 15 years. The descriptive statistics for age and gender are shown in Table 1.

Table 1. Descriptive Statistics for the Age Variable for Men and Women

Statistical	Men	Women
Mean	20.51	19.72
Median	20.00	19.00
Mode	17	18
Stand. Dev.	3.058	2.878
Minimum	16	15
Maximum	42	44

The period in which the sample was enrolled can be seen in Table 2, which indicates the frequency of university students per semester or four-month period.

Table 2. Distribution of the Simple by Semester or Four-Month Period

Grade	Semester	Four-Month Period
1°	468	2.0
2°	195	1.0
3°	245	6.0
4°	94	1.0
5°	158	8.0
6°	97	4.9
7°	167	12.0
8°	139	0.0
9°	114	7.0
10°	261	1.0

Instruments

Emotional Regulation in Academic Activities Scale (ERAAS). The Emotional Regulation in Academic Activities Scale (ERAAS) was designed with 18 Likert-type items, from which 5 were positives and 13 were negatives. The categories of answers were always, almost always, sometimes, rarely, and never, with a route of 5 to 1 for positive items.

Procedure

The phases followed for the instrument design and its corresponding evaluation of the psychometric properties were proposed by Carretero-Dios and Pérez (2005).

First phase: conceptual delimitation of the construct to be evaluated. A rigorous analysis of the construct was made, framed in positive psychology was conducted. The publications reviewed were the studies of Andres et al. (2017), Gross (2002), McRae and Gross (2020) and Thompson (1994).

Second phase: Item writing. Positive and negative items were written regarding emotional regulation in school settings, respecting the criteria for item writing enunciated by Edwards (1983).

Third phase: content validity. A first version of the scale was created, to which the content validity of the items was evaluated through the judgment of three experts. For which the method presented by Yusoff (2019). As seen in Table 3, the items irrelevant to the experts were 1, 3, 5, and 12.

Table 3. Proporcial Relevance by Item

Item	Expert 1	Expert 2	Expert 3	AVE	I-CVI	UA
X1	0	0	0	0	0.00	1
X2	1	1	1	3	1.00	1
X3	0	0	0	0	0.00	1
X4	1	1	1	3	1.00	1
X5	0	0	0	0	0.00	1
X6	1	1	1	3	1.00	1
X7	1	1	1	3	1.00	1
X8	1	1	1	3	1.00	1
X9	1	1	1	3	1.00	1
X10	1	1	1	3	1.00	1
X11	1	1	1	3	1.00	1
X12	0	0	0	0	0.00	1
X13	1	1	1	3	1.00	1
X14	1	1	1	3	1.00	1
X15	1	1	1	3	1.00	1
X16	1	1	1	3	1.00	1
X17	1	1	1	3	1.00	1
X18	1	1	1	3	1.00	1
Proporcional relevance						.78
S-CVI/Ave						.78
S-CVI/UA						1

Note: I-CVI= item level content validy index; S-CVI/Ave=Sum of I-CVI scores/number of item; S-CVI/UA=Sum of UA score /number

Based on the experts' comments, modifications were made, items were eliminated, and the pilot scale was designed.

Fourth phase: application of the instrument. Informed consent was requested from the directors of the higher-level institutions where the instrument would be applied and from the students. In a self-administered, group, and online manner, the ERAAS was applied to a total of 1975 subjects. As part of the ethical questions, the university students were told that they could decide not to answer the instrument whenever they wanted. The instructions given to the participants were as follows: Below is a series of 18 statements. We asked students to answer only one of the response options, selecting with an (X) the closest to your situation, considering the following table.

5	4	3	2	1
Always	**Almost always**	**Sometimes**	**Almost never**	**Never**

Fifth phase: creation of the database. The database was created by coding the responses. The database was randomly divided into two samples, one for the EFA and the other for the

CFA.

Data Analysis

Sixth phase: analysis of psychometric properties. Regarding evaluating the construct validity of the ERAAS, with the statistical package SPSS v24, an AFE was performed with sample number one. At first, the feasibility of the EFA was evaluated with the Kaiser-Meyer-Olkin sample adequacy measures and Bartlett's sphericity tests. Next, the principal component extraction method was applied, and varimax was used as the rotation method.

For the confirmatory factor analysis of the ERAAS, the software IBM AMOS version 24 and JASP version 0.16.3 were used. The CFA was performed using the maximum likelihood estimation method (Hair et al., 2009). The goodness-of-fit values determined were relative chi-square ($\chi 2/df$; Bollen, 1998), which expresses an adequate model fit when presenting values between two and three, or more flexible, with values ≤ 5 (Carmines & McIver, 1981). Goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), non-normative fit index (NNFI), root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the average variance extracted (AVE). The indicative values of good fit were used, which are for the case of the GFI, AGFI, and NNFI > .90, RMSEA and SRMR < .08, and AVE < .5 (Hu & Bentler, 1998). Regarding the factor loads (λ's), values ≥ .40 were considered adequate (MacCallum et al., 1999). Once the scale's factorial structure was determined, the reliability index was obtained through a reliability analysis using Cronbach's alpha coefficient (Cronbach, 1951). De Vellis (2003) indicates that below .60, reliability is unacceptable, from .60 to .65 is undesirable, between .65 and .70 is minimally acceptable, from .70 to .80 is respectable, and from .80 to .90, very good. However, a consensus is that values closer to 1 indicate greater reliability.

Findings/Results

As a result of expert judgment, items 1 [When I get desperate with a classmate and/or teacher because of a situation, I try to relax], 3 [At university, I avoid people who make me feel uncomfortable], 5 [When I anger at university I raise the volume of my voice] and 12 [I respect the opinions of others, even if I disagree] were eliminated.

Analysis of Psychometric Properties

In Table 4, Kaiser-Meyer-Olkin sampling adequacy measures and Bartlett's sphericity tests were used to evaluate the feasibility of AFE. To be acceptable, the KMO index must be greater than 0.5, and concerning the data obtained in the KMO sampling adequacy measures, the feasibility of factor analysis is observed.

Table 4. KMO and Bartlett's Test.

Kaiser-Meyer-Olkin measure of sampling adequacy.	.856
Bartlett's test of sphericity	3437.612
	91
	.000

As can be seen, the value of Bartlett's test of sphericity indicates that it is statistically significant (p<.05), so the hypothesis of independence of the variables is rejected, and it is deduced that it is appropriate to continue with the factorial analysis.

When selecting the number of factors, the K1 Rule (eigenvalues greater than 1) was used as the basis for the EFA. As can be seen in Table 5, the initial eigenvalues that are greater than 1 are 3.

Table 5. Initial Eigenvalues

Component	Initial Eigenvalues		
	Total	% Variance	% Accumulated
1	4.317	30.836	30.836
2	1.609	11.492	42.328
3	1.125	8.037	50.365
4	0.96	6.858	57.223
5	0.913	6.52	63.744

The analysis of the principal components with Varimax rotation offered a factorial solution composed of three factors (see Table 6), which have been named 1) Emotional regulation, 2) Inadequate emotional regulation (psychological), and, 3) Inadequate emotional regulation (physiological). Likewise, the percentage of the variance explained by each factor was adequate in each case.

Table 6. Factorial Structure

Rotated Components Array [a]	Components		
	1 Inadequate emotional regulation of a physiological type	2 Inadequate emotional regulation of a psychological type	3 Proper emotional regulation
2.When I'm angry about something that happened in class, I talk about it with my friends.			.701
4.When an unexpected situation arises in the classroom, I block myself (stay silent).			
6.If I get mad at a classmate, I stop talking to him.		.592	
7.I get frustrated when things during the class presentation turn out differently than I planned.		.559	
8.I openly express my emotions with my classmates.			.826
9.I sweat excessively when I give a presentation in front of the class.	.802		
10.I feel a knot in my stomach when the teacher or professor talks to me.	.749		
11.I express during the classes what I think without difficulty.			.606
13. At night, I recriminate myself for what I did wrong in college.		.542	
14.My hands sweat when I make a presentation in front of my group at the university.	.837		
15.I get stressed when I have to do college homework.		.695	
16.I get very nervous when I have an exam.		.579	
17.It bothers me a lot when the teacher draws my attention (scolds me).		.659	
18.I feel anxious having to start a conversation with new classmates.		.415	

Extraction method: Principal component analysis.
Rotation method: Varimax normalization with Kaiser.
a. Rotation has converged in 5 iterations.

Data Analysis

Confirmatory factor analysis (CFA) was used to test the model of three correlated factors (Figure 1). Pearson's product-moment correlation matrix was used, and the discrepancy function was minimized by the maximum likelihood (ML) method.
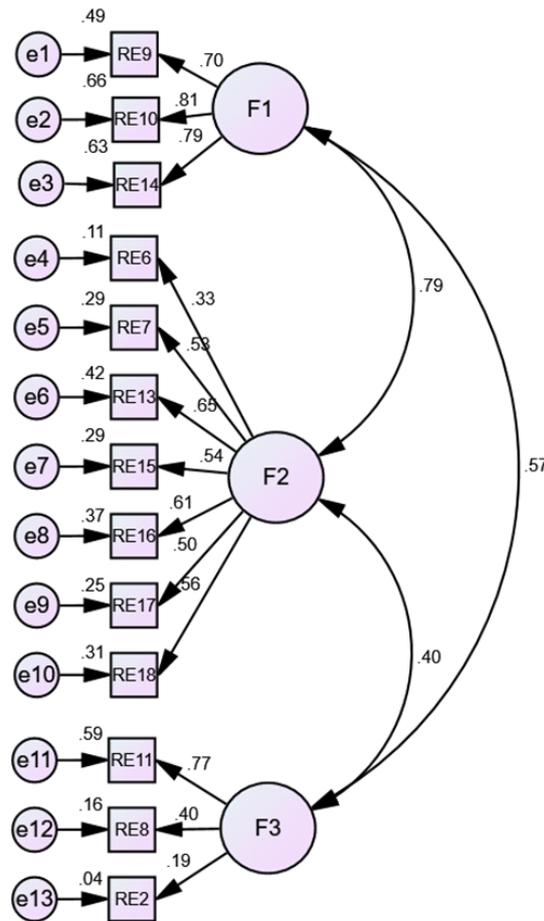

Figure 1. Model of Three Correlated Factors

The fit to the model data was assessed using six indices: Relative chi-square (χ^2/gl), Joreskog and Sorbom goodness-of-fit index (GFI) and their adjusted formula (AGFI), normed and non-normalized index of Bentler and Bonett fit (NFI and NNFI), standardized root mean square error (SRMR), root mean square error of approximation (RMSEA). Values of χ^2/gl ≤ 2, GFI, NFI, and NNFI ≥ .95, AGFI ≥ .90, SRMR, and RMSEA ≤ .05 are considered a good fit. Values of χ^2/gl ≤ 5, GFI, NFI and NNFI ≥ .90, AGFI ≥ .85, SRMR and RMSEA ≤ .08 indicate an acceptable fit (Byrne, 2016).

Statistical analyses were performed with IBM SPSS and AMOS software, both 24 versions.

Test of the Three Correlated Factors Model

The previously described model (Figure 1) was specified with its independent measurement residuals. The model showed an acceptable goodness of fit for the following indicators: GFI=.94, CFI = .90, and RMSEA = .07 90% CI (.06, .08), good for SRMR = .05 and not acceptable for χ^2/gl = 6.29, NFI = .88 and NNFI = .87.

After reviewing the modification indices, we eliminated item 6 (RE6) because it presented the lowest factor load (λ) in the entire factor. Remaining the final solution with good indicators in GFI = .95, AGFI = .93 and SRMR = .04, acceptable for NFI = .91, NNFI = .90, CFI = .93 and RMSEA = .06 IC (.05, .07). The only indicator that was higher than desired was the chi-square ratio (χ^2 = 273.20) over the degrees of freedom (df = 51), χ^2/gl = 5.35.

The goodness-of-fit indices revealed in Table 7 that the three-factor correlated model fitted the data well. During the CFA, items 1 and 5 of the inadequate emotional regulation factor (psychological) were eliminated. Concerning the values found, it can be argued that the scale has adequate validity in 7 of the 8 indicators presented (Jackson et al., 2009; Moss, 2016; Newsom, 2023), only in the Average Variance Extracted (AVE > .5) optimal indices were not reached for the factors of Adequate Emotional Regulation and Psychological Inadequate Emotional Regulation (Hair et al., 2009; Hu & Bentler, 1998).

Table 7. Goodness-of-fit Indicators of Emotional Regulation in Academic Activities Scale

X²/df	GFI	AGFI	NNFI	CFI	RMSEA	SRMR
5.080	.962	.939	.912	.934	.064	.042

Note. X2/df = Chi-square degrees of freedom, GFI = Goodness-of-Fit Index, AGFI = Adjusted Goodness-of-Fit Index, NNFI = Unnormalized Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error Approximation, SRMR = Standardized Root Mean Square, AVE = Average Variance Extracted.

Table 8. Average Variance Extracted and Factorial Loads by Item

Factor	Factorial loads		AVE
	Item	Load	
Adequate emotional regulation	I9	.70	.320
	I10	.81	
	I14	.79	
Psychological, inadequate emotional regulation	I6	.33	.304
	I7	.53	
	I13	.65	
	I15	.54	
	I16	.61	
	I17	.50	
	I18	.56	
Physiological inadequate emotional regulation	I2	.19	.593
	I11	.77	
	I18	.40	

Table 9 shows the internal consistency by factor. The indicators of alpha coefficient (α > .70) are adequate (Hair et al., 2009).

Table 9. Alpha Coefficient

Factor	α
Adequate emotional regulation	.816
Psychological inadequate emotional regulation	.738
Physiological inadequate emotional regulation	.467

Discussion

This research arose from the interest in studying emotional regulation in the classroom, which is why the proposal of the ERAAS scale, an instrument that measures the construct in a valid and reliable manner, provides a quick diagnosis of the emotional regulation of university students regarding their academic activities.

Because it is important to examine the relationships among motivational, emotional, and cognitive aspects of learning, Burić et al. (2016) developed a scale to assess some of the strategies college students use in the classroom to regulate emotions. This scale contains eight subscales that measure strategies: avoiding situations, developing competencies, redirecting attention, reevaluation, suppression, breathing, ventilation, and seeking social support. Competence development is closely related to external variables, while situation avoidance is least related.

On the other hand, Nadeem et al. (2023) found that emotional regulation in the classroom and academic performance are strongly correlated, in addition to a positive association between cognitive reappraisal and academic performance, while there is a negative association between expressive suppression and academic performance.

This study aimed to develop an instrument that measured students' degree of regulation of academic activities and evaluated its validity and reliability.

Meanwhile, Chacón-Cuberos et al. (2019) conducted a study with different groups of university students and found that healthy students used more emotional regulation strategies that helped them control their academic stress. It was also found that autonomy and competence needs were positively related to cognitive reappraisal and negatively related to expressive suppression.

The results for the validity and reliability of the scale meet the requirements typically considered appropriate for CFA to use and interpret the results (Hooper et al., 2008; Kenny, 2020; Statistics How To, n.d.). The scale's validity indicates that it is adequate in measuring the intended variables. Reliability ensures accurate measurements in its applications, except for the emotional regulation factor, which does not achieve acceptable reliability values.

In conclusion, given the results obtained, the final version of the ERAAS (see Appendix) works well and can be used for research purposes.

The analyses carried out show a Likert scale that examines emotional regulation in university students when performing academic activities through the interpretation of three dimensions:

- Adequate emotional regulation. High scores in this dimension imply that the student adequately faces the emotions caused by the various academic activities, thus favoring a good relationship with classmates or teachers.

- Psychological Inadequate Emotional Regulation. High scores in this dimension indicate that the student has little ability to manage their emotions adequately when faced with simple academic activities, leading them to present a set of psychological symptoms (such as excessive negative thoughts, mental blocking, and anxiety) that prevent them from continuing and enjoying the learning process in the classroom.

- Physiological Inadequate Emotional Regulation. High scores in this dimension indicate that the student has little ability to manage their emotions adequately in the face of simple academic activities, leading them to present a set of physical symptoms (such as sweating and stomach pain) that prevent them from continuing and enjoying the learning process in the classroom.

The EFA of the ERAAS provides evidence that the described three-dimensional solution has construct validity, as the factor loadings are adequate ($λ´s > .40$).

As for the analysis of the internal structure with the CFA, the results also support the arrangement of the three dimensions of the ERAAS.

Concerning reliability, Cronbach's alpha proves the instrument's consistency, except for factor three.

Conclusion

Academic activities usually elicit emotional reactions. With a scale that measures how well students can regulate themselves during these activities, university authorities can make decisions to improve emotional regulation.

Using this scale, teachers could determine their students' level of emotional regulation as part of the teaching-learning process. In this way, they could address the needs of each student and take steps to improve academically in the classroom or refer them to a specialist.

The three-factor model of emotional regulation is the first approach to modeling emotional regulation for this population. Models can also lead to the development of appropriate interventions and measures of effectiveness. The model of emotional regulation in academic activities needs further analysis to obtain a structure whose dimensions reach the statistical indicators needed for its confirmation.

For practical use of the scale, the items are listed in the appendix, including the response options, how to score the items, and how to interpret the results in three ranges.

Recommendations

The factor of *appropriate emotional regulation* was the only one that did not show consistency. Future studies should pay particular attention to this dimension and confirm whether the bias could be due to the nature of the participants or some foreign type variable.

Therefore, for future use of the scale, it is recommended that it be applied in different educational populations so that it can be adapted to different educational levels on the one hand and be able to diagnose students with emotional regulation problems and ensure their prompt attention.

Limitations

It is necessary to mention that this study has certain limitations, as participants from school contexts usually respond regarding social desirability.

The most important limitation of the study is that most of the validated items are negative; they measure "emotional non-regulation." Also, the construct of emotional regulation presented here applies only to the school context.

Ethics Statements

The application of the instrument considered what the American Psychological Association and the World Medical Association proposed in the Declaration of Helsinki.

There was no compulsion in administering the instrument; the decision to answer it must be voluntary. They were also informed that the results would be kept confidential and that the research would be conducted without the intention of profit.

Conflict of Interest

There is no conflict of interest in this study.

Authorship Contribution Statement

Cardenas: Conceptualization, data analysis/ interpretation, drafting manuscript, statistical analysis, admin. Mendez: Data acquisition, final approval. Castillo: Securing funding, technical or material support. Esquivel: Conceptualization, critical revision of manuscript. Ortiz: Conceptualization, supervision

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Appendix

- ### Emotional Regulation in Academic Activities Scale (ERAAS)

	Siempre [Always]	Casi Siempre [Almost always]	A veces [Sometimes]	Casi Nunca [Almost never]	Nunca [Never]
• Cuando estoy enojado por algo que pasó en clases, hablo de lo que me pasa con mis amigos. [When I'm angry about something that happened in class, I talk about it with my friends].					
• Si me enojo con un compañero de clase le dejo de hablar. [If I get angry with a classmate, I stop talking to him].					
• Me frustro cuando las cosas en la exposición de clase salen diferente a como las planifico. [I get frustrated when things in the class presentation turn out differently than I planned].					
• Expreso abiertamente mis emociones con mis compañeros de clase. [I openly express my emotions with my classmates].					
• Sudo en exceso cuando expongo en clase. [I sweat excessively when I present in class].					
• Siento un nudo en el estómago cuando el maestro o profesor se dirige a mí. [I feel a knot in my stomach when the teacher or professor talks to me].					
• Expreso durante las clases lo que pienso sin dificultad. [I express during the classes what I think without difficulty].					
• Respeto las opinions de los demás, aunque no esté de acuerdo. [I respect the opinions of others, even if I disagree]					
• Me sudan las manos cuando voy a dar clase frente a mi grupo en la universidad [My hands sweat when I go to teach in front of my group at the university].					
• Me estreso cuando tengo que hacer tarea de la universidad. [I get stressed when I have to do college homework].					
• Me pongo muy nervioso(a) cuando tengo examen. [I get very nervous when I have an exam.					
• Me molesta mucho que el profesor me llame la atención (regañe). [It bothers me a lot that the teacher calls my attention (scold)].					
• Me siento ansioso al tener que iniciar una conversación con nuevos compañeros. [I feel anxious having to start a conversation with new classmates].					

- ### Final distribution of the items in the dimensions

Factor	Items
Adequate emotional regulation	5, 6 9
Psychological inadequate emotional regulation	2, 3, 8, 10, 11, 12, 13
Physiological inadequate emotional regulation	1, 4, 7

- ### Item coding

		Siempre [Always]	Casi Siempre [Almost always]	A veces [Sometimes]	Casi Nunca [Almost never]	Nunca [Never]
Positive ítems	1, 4, 7	4	3	2	1	0
Negative ítems	2,3,5,6,8,9, 10, 11, 12, 13	0	1	2	3	4

- ### Interpretation Proposal

Scores	Level
0-17	Low level of regulation
17-33	Average level of regulation
34-52	High level of regulation