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Cognitive Reappraisal Experimental Task: Replica in Mexican University Students

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A B S T R A C T

Background and Objective: Depression and anxiety, the most common mental disorders, have had a recent increase in prevalence in university students. The use of emotion regulation strategies and regulation success, which is predictive of mental health, have been primarily assessed through self-report, especially in Latin American samples. The present study sought to test a computerized emotion regulation experimental task in Mexican students samples.
Method: Two Mexican samples of undergraduate and graduate students (Sample I: n = 49 and Sample II: n = 40) completed an experimental task (in-house Mexican Spanish translation). Participants were asked to decrease negative affect (reappraise) or react naturally in response to negative or neutral images and to self-report affect immediately after.
Results: We found a significant decrease in negative affect when adopting a reappraisal strategy (decrease instruction) in the experimental task when participants were given verbal training instructions. However, these differences were not as strong when they were given in written form.
Conclusions: Given that most disorders begin in the early decades of life and the current high prevalence of depression and anxiety in university students, as well the importance of emotion regulation in the onset or prevention of psychopathology, it is important to study these strategies worldwide. The current study presents evidence of reduced negative affect after using reappraisal during an experimental task in Mexican university students. Further, our results highlight the importance of matching processes and replicating results in different cultural contexts.

Tarea Experimental de Reappreciación cognitiva: Réplica en universitarios mexicanos

Palabras clave:
Regulación emocional
Reapreciación cognitiva
Tarea experimental
Muestras mexicanas
Estudiantes universitarios
Éxito de Regulación

R E S U M E N

Antecedentes y objetivo: La depresión y la ansiedad son los trastornos mentales más comunes y recientemente han aumentado en estudiantes universitarios. El uso y éxito de estrategias de regulación emocional como predictoras de la salud mental ha sido previamente evaluada principalmente a través de autoinformes, especialmente en muestras latinoamericanas. El presente estudio buscó examinar una tarea experimental computarizada de regulación emocional en muestras de estudiantes mexicanos.
Método: Dos muestras mexicanas de estudiantes de pregrado y posgrado (Muestra I: n = 49 y Muestra II: n = 40) completaron una tarea experimental (traducción al español mexicano). Se pidió a los participantes disminuir (reapreciar) el afecto negativo o reaccionar de forma natural en respuesta a imágenes negativas y neutrales e inmediatamente después informar su afecto negativo.
Resultados: Encontramos una disminución significativa en el afecto negativo al utilizar la reapreciación (instrucción disminuya) en la tarea experimental cuando los participantes recibieron instrucciones de entrenamiento verbal. Sin embargo, estas diferencias no fueron tan fuertes cuando las instrucciones se dieron por escrito.

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Conclusiones: Dado que la mayoría de los trastornos inician en las primeras décadas de vida aunado a la alta prevalencia de depresión y ansiedad en estudiantes universitarios, así como la importancia de la regulación emocional en la aparición o prevención de la psicopatología es primordial estudiar estas estrategias a nivel mundial. El estudio presenta evidencia de la reducción del afecto negativo después de utilizar la reapreciación mediante una tarea experimental en estudiantes universitarios mexicanos. Además, se destacan la importancia de igualar procesos y replicar los resultados en diferentes contextos culturales.

Introduction

Depression and anxiety are highly prevalent worldwide. The proportion of the global population diagnosed with depression in 2015 is estimated to be 4.4%, where the total number of people living with depression in the world is 322 million and is more common among females (5.1%) than males (3.6%). The proportion of the global population with anxiety disorders in 2015 is estimated to be 3.6%, where the total estimated number of people living with anxiety disorders in the world is 264 million and as with depression, anxiety disorders are more common among females (4.66%) than males (2.6%) at the global level. In Mexico the prevalence of depressive disorders (4.2%) and anxiety disorders (3.6%) are similar to the global population (Organización Panamericana de la Salud, 2017).

The onset of most psychiatric is during first decades of life. Approximately 50% of adults diagnosed with a mental disorder experience it before their twenty-first birthday (Berenzon et al., 2013). Currently, the world's universities face increasing rates of mental disorders, where 35% of the students have suffered from least one common mental disorder during adolescence and 31% in the last twelve months (Auerbach et al., 2018). Also, a recent study showed that graduate students are more than six times as likely to experience depression and anxiety as compared to the general population (Evans et al., 2018). Another study found that the prevalence of mental health problems is higher in PhD students than in the highly educated general population, highly educated employees, and higher education students. As well, one in two PhD students experience psychological distress and one in three is at risk of a common psychiatric disorder (Levecque et al., 2017).

Emotion regulation is as a set of diverse processes utilized when individuals attempt to modify the onset, displacement, magnitude, duration or quality of one or more aspects of an emotion, including the accompanying subjective experience, expression external, physiology, and/or behavior (McRae & Gross, 2020). Emotion regulation strategies are associated with differences in affective functioning (i.e. emotion experience and expression), interpersonal functioning, and wellbeing (Gross & John, 2003). These strategies may be adaptive or maladaptive, and more adaptive strategies have been linked with improved physical and mental health (McRae & Gross, 2020).

Two of the most commonly studied emotion regulation strategies are cognitive reappraisal and expressive suppression. Cognitive reappraisal (CR), reinterpreting the meaning of the emotional stimulus, is considered an adaptive strategy, and its frequent use has been negatively associated with psychopathology (e.g. decreased depression symptoms). On the other hand, expressive suppression (ES), inhibits the external expression of an internal emotional state, has been positively associated with psychopathology (e.g. increased depression symptoms), and it is considered to be maladaptive (Aldao et al., 2010; Hu et al., 2014; Schäfer et al., 2017). The association between CR and psychopathology is weaker than that one with ES (Aldao & Nolen-Hoeksema, 2010). However, this association varies, and the adaptiveness of CR might be more context dependent (e.g. type and intensity of the emotion, possibility to reframe the situation; Aldao & Nolen-Hoeksema, 2010, 2012). Additionally, it may be possible that people use reappraisal frequently, but not successfully. Moreover, even if the strategy is successful, it may not always be functional due to individual and/or situational factors. The strategy may not, for example, be adaptive (causing the individual to feel worse about their attempted reappraisal) or may be influenced by the degree of situational intensity or individual variation in cognitive reappraisal ability or psychological health (Ford & Troy, 2019).

It has been suggested that cognitive reappraisal ability (CRA), or the ability to use cognitive reappraisal successfully, is not adaptive on its own, but rather, its adaptiveness depends on context. CRA may be adaptive when stressors are perceived as uncontrollable, but maladaptive when stressors can be controlled (Troy et al., 2013). A meta-analysis of experimental studies identified factors that may moderate the effectiveness of emotional regulation strategies, including reappraisal. Among the most prominent were the frequency of use, the purpose for using a specific strategy, and the design and characteristics of the study (Webb et al., 2012).

Cultural norms and values affect the processes of evaluation and expression of emotion, which in turn influence emotion regulation process and strategies used (i.e. reappraisal and expressive suppression; Matsumoto et al., 2008). Additionally, these vary between individualistic and collectivistic cultures. Individualistic cultures value promotion goals (e.g., self-maximizing and personal ideals), the goal of emotion regulation are to increase positive emotion and reappraise both negative and positive emotions; they value open emotional expression (e.g., being authentic) and the process of emotion regulation is intrapersonal, autonomous and entity-based. While collectivists value prevention goals (e.g., group maximizing and social thoughts), the goal of emotion regulation are to modulate positive emotions and recognize negative emotions, they value emotional inhibition (e.g., don´t disrupt harmony) and the process of emotion regulation is interpersonal, accommodative and context-based. Therefore, the regulation of emotions depends on these (Trommsdorff & Rothbaum, 2008).

Therefore, emotion regulation strategies can be adaptive or maladaptive, depending on the cultural context (Arens et al., 2013). There is strong evidence that cultural values influence the use of CR (Hu et al., 2014). It should be noted that, all these studies utilized self-report questionnaires of the use of these strategies, while CRA using an experimental task have not been studied across a wide variety of cultures.

Jackson et al., (2000) demonstrated that an experimental task could be used to objectively measure emotion regulation, through the exposure of images (both negative and neutral) and instructions to enhance, maintain or suppress the emotional response, and measuring its effects. In experimental research, participants are trained to increase or decrease their positive and negative emotions elicited by affective stimuli, using different types of instructions (e.g., words or voices) presented before or during emotional stimuli.

Three types of instructions are frequently used: enhance or increase, suppress or decrease, and maintain or look (i.e., unregulated

condition). These are used to compare between specific emotion regulation strategies or to compare a regulation strategy to a control condition where participants were instructed to respond to stimuli as they would naturally. Previous studies have shown that self-reported emotion ratings are higher to negative images than neutral images (Quinn & Joormann, 2020; Shermohammed et al., 2017). Likewise, instructions to either reappraise (i.e., decrease) or maintain (i.e., look) the initial negative emotional responses leads to differences in self-reported emotion ratings. The lowest negative emotional response was reported after using reappraisal in American undergraduate students (Hendricks & Buchanan, 2016; Moser et al., 2010), American young adults or university students (Shermohammed et al., 2017). These results where replicated in White/Caucasian, Asian, Hispanic or Latino, Black/African American, American Indian/Alaska Native and Middle Eastern undergraduate students (Quinn & Joormann, 2020), where a significant main effect of instruction on self-report emotion intensity was revealed.

Empirical studies have mainly focused on psychophysiological measures (Zaehringer et al., 2020), functional magnetic resonance imaging (Picó-Pérez et al., 2017), effectiveness and moderators of the effectiveness of strategies of emotion regulation (Webb et al., 2012) within samples from European descent. Recent studies have started to assess CRA in experimental tasks in Asian samples. However, there is little research on CRA experimental task performance in Spanish-speaking cultural contexts.

Previous research has evaluated possible cultural differences in the selection of emotion regulation strategies. For instance, (Mehta et al., 2017) evaluated differences between participants from India and the United States. Similarly, behavioral and psychological responses prior to training in emotion regulation strategies were compared among Asian American and Caucasian American young adult participants (Bebko et al., 2019). Likewise, differences in the behavior and physiological responses were compared between Chinese and American undergraduate students participants (Qu & Telzer, 2017). And found thar although no cultural variation was found in self-report affect during the emotion regulation task, evidence of cultural variation has been found in emotion regulation strategy choice, attention, as well as the underlying neural mechanisms.

Although the field of emotion regulation research has advanced incredibly (McRae & Gross, 2020), there is still a dearth of knowledge regarding Mexican samples (Gómez & Calleja, 2016), especially using experimental tasks. It is thus necessary to test replicability of commonly used emotion regulation experimental tasks in different cultural contexts and countries. The main aim of this study was to test an experimental CRA task in a Mexican sample. We hypothesized there would be a significant difference between negative affect during the look instruction with neutral pictures, look instruction with negative pictures and decrease instruction with negative pictures.

Methods

Participants

Two separate samples of undergraduate and graduate students from a northwest Mexican university completed an emotion regulation experimental task and self-report questionnaires. The first final sample consisted of 49 students (57.8% female and 42.2% male, mean age= 25.4, SD= 4.1). The second final sample consisted of 40 students (77.5% female and 22.5% male, mean age = 27.05, SD= 5.2). Most participants reported being single (82.2% and 67.5% sample I and II respectively; as shown in Table 1). Samples I and II (8.4% and 22.5% respectively) self-reported some type of current or past psychiatric disorder diagnosis, most of which reported anxiety or depression (see Methods instruments section).

To ensure the study had enough power to detect differences using a non-parametric test (Wilcoxon Sum Rank Test), we estimated sample size using G*Power 3.1. This analysis revealed that a sample size of 35 participants would be needed to have enough power to detect the needed effect (error =.50 statistical power= 0.80).

Table 1.
Samples description

	Sample I		Sample II	
	n	%	n	%
Female	26	57.8	31	79.5
Male	19	42.2	8	20.5
Undergraduate	24	53.3	15	37.5
Graduate	21	46.7	25	62.5
Single	37	82.2	27	67.5
In a relationship	8	17.8	13	32.5

Instruments

Task

Cognitive reappraisal ability (CRA) was assessed using an experimental task which measured self-reported negativity to neutral and negative images while being instructed on some trials to use cognitive reappraisal to regulate emotions. The task was created and administered using PsychoPy v1.90.1 for Windows.

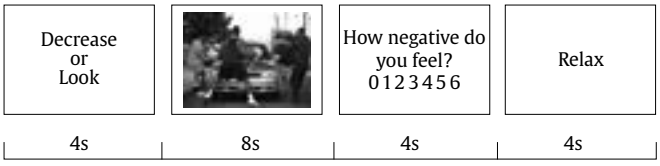

Figure 1.
Schematic of experimental trials for measuring cognitive reappraisal ability (CRA). Participants viewed pictures (8 s) following a "look" or "decrease" instruction (4 s) and were asked to decrease their negative emotion or react naturally. After each picture, participants rated their negative affect on a scale from 0 to 6 (4s) and had relaxation time between trials (4s).

The final version of the task consisted of 45 trials. At the beginning of each trial, a word was displayed for four seconds in the middle of a computer screen giving one of two instructions: "decrease" or "look" ("disminuya" or "mire"). When the instruction "decrease" appeared, participants were previously instructed to think of something that they could say to themselves that could help them feel less negative about the image (when it appeared). In the other instruction, "look", participants were asked to pay attention to the image and react as they naturally would. The images associated with the "decrease" instruction had a blue background whereas as the "look" instruction had a green background. After the instruction screen was presented, a negative or neutral image was shown for eight seconds in all three conditions (look instruction with neutral pictures, look instruction with negative pictures, decrease instruction with negative pictures). Afterwards, participants were asked to self-report their negative affect on a scale of 0 to 6, where 0 indicating "not at all" and 6 "extremely" (0= "nada negativo" and 6= "extremadamente negativo"). Finally, participants were given four seconds for relaxation (Figure 1).

Negative and neutral images were taken from the International Affective Picture System (Lang et al., 1993). These images were chosen to induce only moderate (instead of extreme) levels of negativity based on validation in a Mexican sample (Madera-Carrillo et al., 2015).

Translation of the task

We adapted a cognitive reappraisal experimental task by translating the instructions from English into Spanish, following the commonly used back-translation method (Reynolds & Ramsay, 2003). A bilingual researcher first translated the instructions from English to Spanish. Then another bilingual expert re-translated the Spanish version back to the original language. Both English versions were then compared to reveal and eliminate any inconsistencies. In a final step, expert researchers checked the instructions to ensure comprehension in a Mexican sample.

Self-Report Questionnaires

Cognitive reappraisal and expressive suppression frequency were assessed with a previously validated Spanish version of the Emotion Regulation Questionnaire (ERQ; (Cabello et al., 2013). The ERQ includes six items for the reappraisal and four items for suppression. Ratings were taken on a seven-point scale, where 1 indicates "totally agree" to 7, which indicates "totally disagree." Both subscales demonstrated acceptable internal consistency reliability (CR: sample I α = .61; AIC= .20; sample II α = .65; AIC= .23; ES: sample I α = .74; AIC= .41; sample II α = .78; AIC= .46).

Stress was measured using a previously validated Spanish version of the Perceived Stress Scale (PSS; Remor, 2006)for the reliability and validity of a European Spanish version of the Perceived Stress Scale (PSS, a 10-item questionnaire which evaluates the degree to which life events are perceived as stressful. The scale consisted of a five-point scale where 0 indicates "never" to 4 "very often". The Spanish version of the PSS demonstrated strong internal consistency reliability (sample I α = .90; AIC= .47; sample II α = .89; AIC= .44).

Anxious arousal (AA), anhedonic depression (AD) and general distress (GD) symptoms were assessed using a previously validated translation of the Mini version of the Mood and Anxiety Symptoms Questionnaire (Mini-MASQ; Corral-Frías et al., 2019). This is a 26-item, five-point Likert scale (1= "not at all" to 5= "extremely") instrument. All subscales showed acceptable reliability (AA: sample I α = .70; AIC= .18; sample II α = .88; AIC=.42; AD: sample I α = .84; AIC= .39; sample II α = .84; AIC= .39; GD: sample I α = .85; AIC= .41 sample II α = .92; AIC= .58).

Participants additionally answered demographic questions such as sex assigned at birth, years of education, marital status, and age. Finally, personal mental health history questions were also included where participants were asked to self-report any current or past psychiatric illness diagnosis.

Procedure

Participants were recruited from a public University in Northwest Mexico through classroom announcements. Students were given extra credit for their participation. Upon arrival at the lab, participants were greeted by a trained research assistant, and the research objectives, risks and benefits of the study, confidentiality of the data and the study procedures were explained. Consequently, participants signed an informed consent form if they agreed to participate. To maximize privacy during data collection, participants were left alone in the experiment room while the research assistant stayed in an adjacent room.

Before starting the task, training instructions were provided. One important distinction between sample I and sample II was the format in which the training instructions were given. Participants form sample I received all instruction is a written form and were encouraged to ask questions. However, after reviewing qualitative responses of the strategies used, we realized that participants were not all fully grasping the reappraisal technique. Thus, instructions were given verbally for those in sample II. Consequently, participants were asked to answer three questions and to complete three trials to familiarize participants with the experimental task. Sample II participants were given examples of how to reappraise (e.g., imagining that it is only a scene from a movie) and were instructed to report the techniques they used to regulate their emotions aloud during the training to ensure comprehension of the instructions. Subsequently, participants completed 45 trials, and answered open-ended questions regarding which tactics they used to regulate, and their success in regulating their emotions. Finally, they were directed to a website link where they completed self-reported questionnaires assessing emotion regulation frequency, perceived stress, anxious arousal, anhedonic depression and general distress symptoms using Qualtrics. On average, the CRA task lasted about 30 minutes, and the entire experimental session lasted approximately 45 minutes to an hour. All procedures contributing to this work comply with the ethical standards of human experimentation and Institutional Ethics approval was obtained for all the procedures from the University of Sonora Ethics Board.

Data Processing and Analysis

Emotional reactivity (ER)

The CRA task was used to measure emotional reactivity. Negative affect ratings in response to neutral images were subtracted from ratings for the negative images viewed under the non-reappraisal condition. Greater scores suggested greater emotional reactivity. It is important to note that participants who did not show a significant difference between self-report negative affect after exposure to neutral and negative images were excluded from final analyses.

Cognitive reappraisal ability (CRA)

The CRA task was used to measure CRA. Negative affect ratings for the reappraised images were subtracted from ratings for the non-reappraised negative images. Thus, a greater score indicates greater CRA for that participant.

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 and AIC were calculated (see Supplemental Material section).

Given that the data was not normally distributed (see Supplemental Material section) and to test differences between all 3 conditions (look neutral, look negative images, and decrease negative images) a non-parametric Friedman ANOVA test was utilized. Also, we conducted a repeated measures Wilcoxon Sum Rank Test to test whether the conditions (look and decrease) as within-subjects variables impacted negativity affect self-report to negative images (as shown in Figure 2).

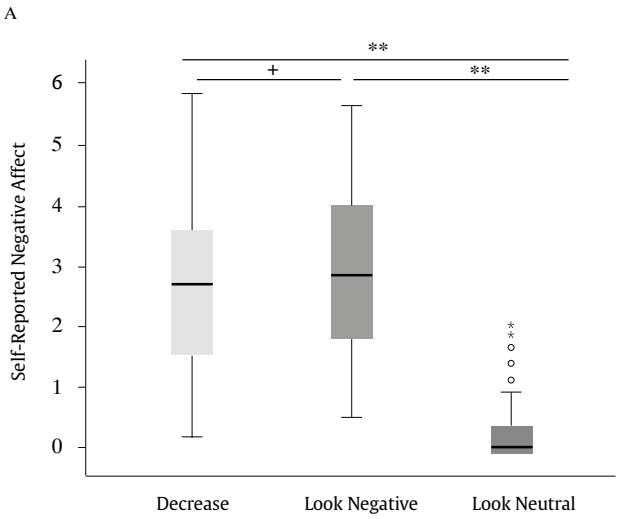

Figure 2A.
Sample I Self-reported negative affect after exposure to the three different types of stimuli (a) decrease instruction with negative image, (b) look instruction with negative image and, (c) look instruction with neutral image. Significant mean differences were found between the look neutral and decrease conditions, and the look negative and look neutral conditions. The difference between look negative and the decrease conditions only reached trend levels.

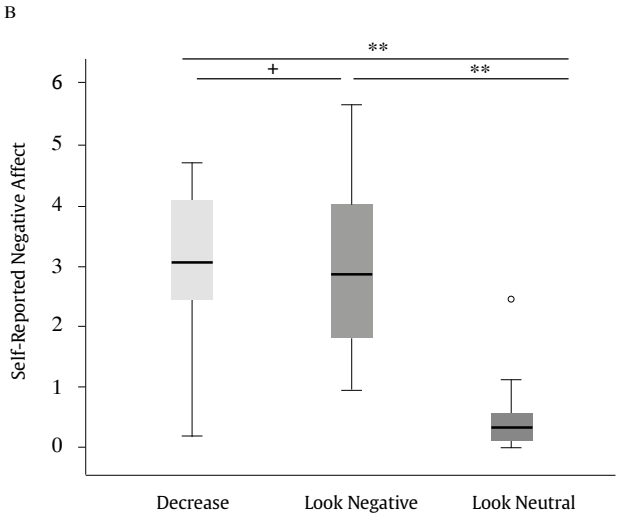

Figure 2B.
Sample II Self-reported negative affect after exposure to the three different types of stimuli (a) decrease instruction with negative image, (b) look instruction with negative image and, (c) look instruction with neutral image. Significant mean differences were found between the look neutral and decrease negative conditions, the look negative and look neutral conditions, and the look negative and the decrease conditions.

Results

Emotion Reactivity

Ratings of negative affect during the CRA task indicate that participants reported low negative affect after exposure to neutral images (Sample I Mean= 0.35, SD= .51 and Sample II Mean = 0.43, SD= .45). As expected, self-report negative affect was significantly higher for negative than neutral images (Sample I M= 2.94, SD= 1.34 and Sample II M= 3.30, SD= 1.11; as shown in Table 2). It is important to note that these differences were observed after we eliminated participants that did not show a significant difference between self-report negative affect to neutral and negative images (See Methods section).

Table 2.
Descriptive Statistics

	Sample I		Sample II	
	M	SD	M	SD
Decrease	2.71	1.35	2.77	1.09
Look Negative	2.94	1.34	3.30	1.11
Look Neutral	.35	.51	.43	.45
ER	2.58	1.28	2.87	1.08
CRA	.22	.77	.53	.77

Note. ER= Emotional Reactivity; CRA= Cognitive Reappraisal Ability.

Cognitive Reappraisal Ability

A significant difference between conditions was observed in both samples using a non-parametric Friedman ANOVA test (Sample I Chi - square (2) = 77.6, p <.001, Sample II Chi - square (2) = 63.98, p <.001). However, reductions in self-report negative affect while using reappraisal only reached trend levels in Sample I (look negative M= 2.94, SD= 1.34; decrease negative M= 2.71, SD= 1.35; Z= -1.800, p = .07, ρ= .17, 1-β= .25). The direction of the trend suggests that participants were attempting to use cognitive reappraisal and at least some were successful in their attempts. Participants in sample II showed a significant decrease in negative affect when using reappraisal (look negative M= 3.30, SD= 1.11; decrease negative M= 2.77, SD= 1.09), with a large effect size (Z= -3.859, p <.001, ρ= .48, 1-β= .29). See supplemental materials for exploratory self-report correlational results. (See Table 3 and 4).

Table 3.
ANOVA Friedman

	Rank	Chi-square (2)	Sig	Rank	Chi-square (2)	Sig
	Sample I			Sample II		
Decrease	2.37	77.600	.001	2.26	63.987	.001
Look Negative	2.63			2.73		
Look Neutral	1.00			1.01		

Table 4.
Wilcoxon means and standard deviations

	M	SD	Z	Sig	M	SD	Z	
	Sample I				Sample II			
Decrease	2.71	1.35	-1.800	.072	2.77	1.09	-3.859	.001
Look Negative	2.94	1.34			3.30	1.11		

Discussion

Although the cognitive reappraisal ability task used here has been widely used, to the authors knowledge, this is the first study that investigates if results replicate in two separate Mexican university student samples. Our results show evidence of congruence with previous literature, where cognitive reappraisal decreased self-reports of negative affect after viewing negative images.

Consistent with previous reports, university students in both samples self-reported negative affect was greater for negative images compared to neutral images. Interestingly, negative affect scores in neutral images in our Mexican samples were lower (neutral: sample I M= 0.35, SD= 0.51; sample II M= 0.43, SD= 0.45; negative: sample I M= 2.94, SD= 1.34; sample II M=3.30, SD= 1.11) compared with

American young adults or university students (neutral: M= 1.27; negative: M= 2.95; Shermohammed et al., 2017)however, is believed to impair the functioning of prefrontal-based neural systems, which could result in lessened effectiveness of CR under stress. This study tested the behavioral and neurobiological impact of acute stress on CR. While undergoing fMRI, adult participants (n = 54; and diverse American undergraduate student samples (neutral: M=1.68, SD= 0.64; negative: M= 5.36, SD= 1.35; Quinn & Joormann, 2020).

According to the World Values Survey (WVS, 2010-2014), Mexico is a country of traditional values (i.e., it emphasizes family and religion) and self-expression (i.e., it highlights tolerance to diversity and demands participation in making decision). Likewise, Mexicans express or inhibit emotions in order to relate to others (Inglehart et al., 2014). Thus, the relatively lower emotional reactivity scores obtained in our samples may be related to cultural overall needs (Matsumoto et al., 2008).

The reappraisal and maintain instructions while viewing negative images led to changes in self-report affect ratings in the predicted direction. University students reported less negative affect for the reappraisal than the maintain instruction. However, this difference was only significant in the sample where the training was given verbally (i.e., Sample II). The difference (.53) for sample II was similar to some observed (.68) in American young adult and university student samples (Shermohammed et al., 2017)however, is believed to impair the functioning of prefrontal-based neural systems, which could result in lessened effectiveness of CR under stress. This study tested the behavioral and neurobiological impact of acute stress on CR. While undergoing fMRI, adult participants (n = 54. However, it was less to some previously reported (1.50) in American undergraduate students (Moser et al., 2010); and (1.25) in a diverse undergraduate student sample (Quinn & Joormann, 2020).

There was a significant difference between conditions in Sample II, however, this was only a trend in Sample I. This difference may be due to the method of delivery of the training instructions. This effect may be related to individual (e.g., cognitive reappraisal ability and/or a stressor's intensity; Ford & Troy, 2019) or contextual factors (e.g., type and intensity of the emotion; Aldao & Nolen-Hoeksema, 2010, 2012) or due to the design and characteristics of the study (e.g., terminology used as regulation instructions; Webb et al., 2012) behavioral, and physiological measures. A systematic search of the literature identified 306 experimental comparisons of different emotion regulation (ER. It is important to mention that previous studies have used visual and auditory instructions, however, even though they detail the training prior to the experimental task, it is not very clear whether it was verbal or written.

Experimental conditions in previous studies have demonstrated cultural influences on emotion regulation strategy choice when facing negative stimuli (Mehta et al., 2017), the frequency of reappraisal use (Qu & Telzer, 2017), visual fixation in the face of emotional stimuli (Bebko et al., 2019), and brain activation (Qu & Telzer, 2017). These studies suggest that the process of emotion regulation may be influenced by cultural and contextual factors. However, it is not yet clear whether the differences in self-report affect during the emotion regulation task are related to culture.

Our study is significant because it replicates findings from a widely used task in a Mexican university student sample. Moreover, our results bring to light crucial implications for the use of this experimental task. For instance, our results demonstrate only significant differences in the sample where training instructions were given verbally highlight the importance of giving instructions clearly and precisely before the experimental task. This is congruent with Jackson et al., (2000) which affirms that it is vital to ensure that participants understand what they are asked to do in response to each instruction.

This study, as with all, has limitations. For example, both samples were comprised of undergraduate and graduate students that only included participants from northern Mexico. Therefore, it is not clear if our results would be generalizable to community samples and may not be representative of other Mexican samples. The samples were also limited in size so future studies should include larger community samples specially to test construct validity of these tasks. Further, future studies should include longitudinal designs to test if CRA is predictive of mental health.

We demonstrate that a Spanish computerized task reliably reduced negative affect reports in university students while instructed to regulate. Future studies should include larger and more diverse samples to further explore emotion regulation ability and frequency. It would also be useful to explore test-retest reliability of the task to evaluate temporal stability of CRA. Likewise, it would be interesting to explore the contextual and individual factors necessary to ensure the success of emotion regulation. Research in this field has the potential to inform possible treatment or prevention of psychopathology in university students which is a transitory stage of life where individuals are exposed to several potentially stress inducing changes. It is clear that emotion regulation strategies such as cognitive reappraisal can lead to decreased symptoms (Aldao et al., 2010; Hu et al., 2014; Schäfer et al., 2017), thus further research in this field is crucial -- especially those that include experimental designs.

This research has not received specific aid from agencies of the public sector, commercial sector or non-profit entities.

Conflicts of interest: none.

References

Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy, 48*(10), 974–983. https://doi.org/10.1016/j.brat.2010.06.002

Aldao, A., & Nolen-Hoeksema, S. (2012). The influence of context on the implementation of adaptive emotion regulation strategies. *Behaviour Research and Therapy, 50*(7–8), 493–501. https://doi.org/10.1016/j.brat.2012.04.004

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

Arens, E. A., Balkir, N., & Barnow, S. (2013). Ethnic variation in emotion regulation: Do cultural differences end where psychopathology begins? *Journal of Cross-Cultural Psychology, 44*(3), 335–351. https://doi.org/10.1177/0022022112453314

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology, 127*(7), 623–638. https://doi.org/10.1037/abn0000362

Bebko, G. M., Cheon, B. K., Ochsner, K. N., & Chiao, J. Y. (2019). Cultural Differences in Perceptual Strategies Underlying Emotion Regulation. *Journal of Cross-Cultural Psychology, 50*(9), 1014–1026. https://doi.org/10.1177/0022022119876102

Berenzon, S., Lara, M., Robles, R., & Medina-Mora, M. (2013). Depresión: Estado del conocimiento y la necesidad de políticas públicas y planes de acción en México. *Salud Publica Mex, 55*(1), 74–80.

Buhle, J. T., Silvers, J. A., Wager, T. D., Lopez, R., Onyemekwu, C., Kober, H., Weber, J., & Ochsner, K. N. (2014). Cognitive Reappraisal of Emotion: A Meta-Analysis of Human Neuroimaging Studies. *Cerebral Cortex, 24*(11), 2981–2990. https://doi.org/10.1093/cercor/bht154

Cabello, R., Salguero, J. M., Fernández-Berrocal, P., & Gross, J. J. (2013). A spanish adaptation of the emotion regulation questionnaire. *European Journal of Psychological Assessment, 29*(4), 234–240. https://doi.org/10.1027/1015-5759/a000150

Corral-Frías, N. S., Velardez Soto, S. N., Frías-Armenta, M., Corona-Espinosa, A., & Watson, D. (2019). Concurrent Validity and Reliability of Two Short Forms of the Mood and Anxiety Symptom Questionnaire in a Student Sample from Northwest Mexico. *Journal of Psychopathology*

and Behavioral Assessment, 41(2), 304–316. https://doi.org/10.1007/s10862-019-09738-x

Diaz, A., & Eisenberg, N. (2015a). The Process of Emotion Regulation Is Different From Individual Differences in Emotion Regulation: Conceptual Arguments and a Focus on Individual Differences. *Psychological Inquiry, 26*(1), 37–47. https://doi.org/10.1080/1047840X.2015.959094

Diaz, A., & Eisenberg, N. (2015b). The process of emotion regulation is different from individual differences in emotion regulation: Conceptual arguments and a focus on individual differences. *Psychological Inquiry, 26*(1), 37–47. https://doi.org/10.1080/1047840X.2015.959094

Evans, T. M., Bira, L., Gastelum, J. B., Weiss, L. T., & Vanderford, N. L. (2018). Evidence for a mental health crisis in graduate education. *Nature Biotechnology, 36*(3), 282–284. https://doi.org/10.1038/nbt.4089

Ford, B. Q., Gross, J. J., & Gruber, J. (2019). Broadening Our Field of View: The Role of Emotion Polyregulation. *Emotion Review, 11*(3), 197–208. https://doi.org/10.1177/1754073919850314

Ford, B. Q., & Troy, A. S. (2019). Reappraisal Reconsidered: A Closer Look at the Costs of an Acclaimed Emotion-Regulation Strategy. *Current Directions in Psychological Science, 28*(2), 195–203. https://doi.org/10.1177/0963721419827526

Geisinger, K. (2003). Testing and assessment: An empirical review and recommendations. In *Handbook of Psychology Assessment Psychology* (Vol. 10, pp. 95–118). John Wiley & Sons, Inc.

Gómez, O., & Calleja, N. (2016). Regulación Emocional: Definición, red nomológica y medición. *Revista Mexicana de Investigación En Psicología, 8*(1), 96–117.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Hendricks, M. A., & Buchanan, T. W. (2016). Individual differences in cognitive control processes and their relationship to emotion regulation. *Cognition and Emotion, 30*(5), 912–924. https://doi.org/10.1080/02699931.2015.1032893

Hu, T., Zhang, D., Wang, J., Mistry, R., Ran, G., & Wang, X. (2014). Relation between Emotion Regulation and Mental Health: A Meta-Analysis Review. *Psychological Reports, 114*(2), 341–362. https://doi.org/10.2466/03.20.PR0.114k22w4

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin, E., & Puranen, B. (n.d.). *World Values Survey: Round Six—Country-Pooled Datafile Verson:* http://www.worldvaluessurvey.org/WVSContents.jsp. JD Systems Institute

Jackson, D., Malmstadt, J., Larson, C., & Davidson, R. (2000). Suppression and enhancement of emotional responses to unpleasant pictures. *Psychophysiology, 37,* 515–522.

Lang, P. J., Greenwald, M. K., Bradley, M. M., & Hamm, A. O. (1993). Looking at pictures: Affective, facial, visceral, and behavioral reactions. *Psychophysiology, 30*(3), 261–273.

Levecque, K., Anseel, F., De Beuckelaer, A., Van der Heyden, J., & Gisle, L. (2017). Work organization and mental health problems in PhD students. *Research Policy, 46*(4), 868–879. https://doi.org/10.1016/j.respol.2017.02.008

Madera-Carrillo, H., Zarabozo, D., Ruiz-Díaz, M., & Berriel-Saez, P. (2015). *El Sistema Internacional de Imágenes Afectivas (IAPS) en población mexicana Autoevaluación con maniquíes y etiquetas.* Universidad de Guadalajara.

Matsumoto, D., Yoo, S. H., Nakagawa, S., & Multinational Study of Cultural Display Rules. (2008). Culture, emotion regulation, and adjustment. *Journal of Personality and Social Psychology, 94*(6), 925–937. https://doi.org/10.1037/0022-3514.94.6.925

McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion, 20*(1), 1–9. https://doi.org/10.1037/emo0000703

Mehta, A., Young, G., Barber, A., & Suri, G. (2017). Emotion regulation choice: Differences in U.S. and Indian Populations. *The International Journal of Indian Psychology, 4*(94), 202–2019.

Moser, J. S., Most, S. B., & Simons, R. F. (2010). Increasing negative emotions by reappraisal enhances subsequent cognitive control: A combined behavioral and electrophysiological study. *Cognitive, Affective, & Behavioral Neuroscience, 10*(2), 195–207. https://doi.org/10.3758/CABN.10.2.195

Organización Panamericana de la Salud. (2017). *Depresión y otros trastornos mentales comunes. Estimaciones sanitarias mundiales.* Organización Panamericana de la Salud.

Picó-Pérez, M., Radua, J., Steward, T., Menchón, J. M., & Soriano-Mas, C. (2017). Emotion regulation in mood and anxiety disorders: A meta-analysis of fMRI cognitive reappraisal studies. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 79*, 96–104. https://doi.org/10.1016/j.pnpbp.2017.06.001

Qu, Y., & Telzer, E. H. (2017). Cultural differences and similarities in beliefs, practices, and neural mechanisms of emotion regulation. *Cultural Diversity and Ethnic Minority Psychology, 23*(1), 36–44. https://doi.org/10.1037/cdp0000112

Quinn, M. E., & Joormann, J. (2020). Executive control under stress: Relation to reappraisal ability and depressive symptoms. *Behaviour Research and Therapy, 131*, 103634.

Remor, E. (2006). Psychometric properties of a European Spanish version of the Perceived Stress Scale (PSS). *The Spanish Journal of Psychology, 9*(1), 86–93.

Reynolds, C., & Ramsay, M. (2003). Bias in Psychological Assessment:An Empirical Review and Recommendations. In *Handbook of Psychology Assessment psychology* (Vol. 10, pp. 67–94). John Wiley & Sons, Inc.

Schäfer, J. Ö., Naumann, E., Holmes, E. A., Tuschen-Caffier, B., & Samson, A. C. (2017). Emotion Regulation Strategies in Depressive and Anxiety Symptoms in Youth: A Meta-Analytic Review. *Journal of Youth and Adolescence, 46*(2), 261–276. https://doi.org/10.1007/s10964-016-0585-0

Shermohammed, M., Mehta, P. H., Zhang, J., Brandes, C. M., Chang, L. J., & Somerville, L. H. (2017). Does Psychosocial Stress Impact Cognitive Reappraisal? Behavioral and Neural Evidence. *Journal of Cognitive Neuroscience, 29*(11), 1803–1816. https://doi.org/10.1162/jocn_a_01157

Trommsdorff, G., & Rothbaum, F. (n.d.). Development of emotion regulation in cultural context. *Regulation Emotions: Culture, Social Necessity, and Biological Inheritance*, 85–120.

Troy, A. S., Shallcross, A. J., & Mauss, I. B. (2013). A Person-by-Situation Approach to Emotion Regulation: Cognitive Reappraisal Can Either Help or Hurt, Depending on the Context. *Psychological Science, 24*(12), 2505–2514. https://doi.org/10.1177/0956797613496434

Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: A meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin, 138*(4), 775–808. https://doi.org/10.1037/a0027600

Zaehringer, J., Jennen-Steinmetz, C., Schmahl, C., Ende, G., & Paret, C. (2020). Psychophysiological Effects of Downregulating Negative Emotions: Insights From a Meta-Analysis of Healthy Adults. *Frontiers in Psychology, 11*, 470. https://doi.org/10.3389/fpsyg.2020.00470

Supplemental material

Supplemental Table 1. Normality tests for each scale used in all two samples.

	Sample I		Sample II	
Measure/subscale	Shapiro-Wilks	Sig.	Shapiro-Wilks	Sig.
Task				
DA	.975	.380	.979	.669
LNA	.974	.351	.977	.569
LA	.700	.000	.824	.000
ER	.964	.188	.965	.282
CRA	.937	.018	.944	.057
ERQ				
CR	.974	.425	.972	.440
ES	.954	.080	.939	.040
PSS	.978	.573	.984	.852
MASQ				
AA	.871	.000	.832	.000
AD	.977	.532	.978	.657
GD	.960	.129	.905	.004

Note. DA= Decrease Affect; LNA= Look Negative Affect; LA= Look Neutral Affect; ER= Emotional Reactivity; CRA= Cognitive Reappraisal Ability; ERQ= Emotion Regulation Questionnaire; CR= Cognitiv l Frequency; ES= Expressive Suppression; PSS = Perceived Stress Scale; MASQ= Mood and Anxiety Symptoms Questionnaire; AA = Anxious Arousal; AD = Anhedonic Depression; GD = General Distress.

Supplemental Table 2. Descriptive Statistics for Sample I and II.

	Sample I		Sample II	
Measure/subscale	M	SD	M	SD
Task				
ER	2.58	1.28	2.87	1.08
CRA	.22	.77	.53	.77
ERQ				
CR	15.87	4.84	15.52	4.79
ES	17.00	5.40	18.65	5.26
PSS	27.69	7.69	27.80	6.74
MASQ				
AA	14.35	4.02	16.20	7.07
AD	20.88	6.42	22.35	5.80
GD	16.73	6.04	17.82	7.79

Note. ER= Emotional Reactivity; CRA= Cognitive Reappraisal Ability; ERQ= Emotion Regulation Questionnaire; CR= Cognitive Reappraisal Frequency; ES= Expressive Suppression; PSS = Perceived Stress Scale; MASQ= Mood and Anxiety Symptoms Questionnaire; AA = Anxious Arousal; AD = Anhedonic Depression; GD = General Distress.

Supplemental Table 3. Reliability for Sample I and II.

	Sample I		Sample II	
Measure/subscale	α	AIC	α	AIC
ERQ				
CR	.61	.20	.65	.23
ES	.74	.41	.78	.46
PSS	.90	.47	.89	.44
MASQ				
AA	.70	.18	.88	.42
AD	.84	.39	.84	.39
GD	.85	.41	.92	.58

Note. ERQ= Emotion Regulation Questionnaire; CR= Cognitive Reappraisal Frequency; ES= Expressive Suppression; PSS = Perceived Stress Scale; MASQ= Mood and Anxiety Symptoms Questionnaire; AA = Anxious Arousal; AD = Anhedonic Depression; GD = General Distress.

Sex differences

Man-Whitney test show no significant differences between female and male in cognitive reappraisal ability in both samples (sample I female: M= .19, SD= .88; male: M= .28, SD= .60; Z= -.990. p = .32, ρ= .41, 1-β= 0.23; sample II female: M= .48, SD= 0.65; male: M = .85, SD= 1.07; Z= -.714. p = .67, ρ= .41, 1-β= 0.14). However, these results should be viewed with caution as the samples are very small and are not equivalent in size.

Supplemental Table 4. Sex differences in cognitive reappraisal ability

	Rank	Rank	Z	U	*P*	ρ	1-β
			Sample I				
	Female n= 26	Male n= 19					
CRA	21.35	25.26	-.990	204.000	.32	.41	0.23
			Sample II				
	Female n= 31	Male n= 8					
CRA	19.34	22.56	-.714	103.500	.47	.41	0.14

Note. CRA= Cognitive Reappraisal Ability.
Sample I n= 45 because survey data was only available for 45 people.
Sample II n=39 because survey data was only available for 39 people.
p = statistical significance; 1-β = statistical power; ρ = effect size.

A significant difference between task conditions was observed when dividing the sample in male and female participants in both samples using a non-parametric Friedman ANOVA test (Sample I female: Chi - square (2) = 39.84, p =.001, male: Chi - square (2) = 31.42, p = .001; Sample II female: Chi - square (2) = 51.19, p=.001, male: Chi - square (2) = 12.25, p = .002). However, reductions in self-report negative affect while using reappraisal only reached trend levels in male participants in sample I (female: look negative M= 3.22, SD= 1.43; decrease negative M= 3.07, SD= 1.38; Z= -.429, p = .66, ρ= .10, 1-β= .05; male: look negative M= 2.49, SD= 1.13; decrease negative M= 2.21, SD= 1.23; Z= -1.73, p = .08, ρ= .23, 1-β= .08). Female participants in sample II showed a significant decrease in negative affect while using cognitive reappraisal but only reached trend levels in male participants (female: look negative M= 3.44, SD= 1.08; decrease negative M= 2.95, SD= 1.02; Z= -3.65, p = .001, ρ= .46, 1-β= .38; male: look negative M= 2.99, SD= 1.10; decrease negative M= 2.13, SD= 1.20; Z= -1.68, p = .09, ρ= .74, 1-β= .23). The direction of the trend suggests that male participants attempted to use cognitive reappraisal and at least some were successful in their attempts. These results should be viewed with caution because the sample sizes are very small.

Supplemental Table 5. Negative affect by task conditions in male and female participants

Sex	Conditions	M	SD	Chi-square (2)	Sig
		Sample I			
	Decrease	3.07	1.38		
Female	Look Negative	3.22	1.43	39.84	.001
	Look Neutral	.44	.59		
	Decrease	2.21	1.23		
Male	Look Negative	2.49	1.13	31.42	.001
	Look Neutral	.25	.43		
		Sample II			
	Decrease	2.95	1.02		
Female	Look Negative	3.44	1.08	51.19	.001
	Look Neutral	.44	.48		
	Decrease	2.13	1.20		
Male	Look Negative	2.99	1.10	12.25	.002
	Look Neutral	.40	.37		

Note. Sample I female n=26 and male n=19; Sample II female n= 31 and male n= 8.

Differences by education level

Man-Whitney test show significant differences between graduate and undergraduate student in cognitive reappraisal ability

in sample I (undergraduate: M= -.02, SD= 0.66; graduate: M= .52, SD= 0.80; Z= -2.473. *p* = .01, ρ= .73, 1-β= .61). However, no significant differences were observed between undergraduate and graduate students in sample II (undergraduate: M= .52, SD= 0.55; graduate: M = .54, SD= 0.88; Z= -.489. *p* = .65, ρ= .02, 1-β= .04). However, these results should be viewed with caution as the samples are very small and are not equivalent in size.

Supplemental Table 6. Cognitive reappraisal ability differences by education level

	Rank	Rank	Z	U	*p*	ρ	1-β
			Sample I				
	Undergraduate n= 24	Graduate n= 21					
CRA	18.48	28.17	-2.473	143.500	.01*	.73	.61
			Sample II				
	Undergraduate n= 15	Graduate n= 25					
CRA	21.67	19.80	-.489	170.00	.65	.02	.04

Note. CRA= Cognitive Reappraisal Ability.
Sample I n= 45 because survey data was only available for 45 people.
p = statistical significance; 1-β = statistical power; ρ = effect size.
* *p*= .01

A significant difference between task conditions was observed when dividing the sample in graduate and undergraduate students in both samples using a non-parametric Friedman ANOVA test (Sample I undergraduate: Chi - square (2) = 37.65, *p* =.001, graduate: Chi - square (2) = 35.34, *p* = .001; Sample II undergraduate: Chi - square (2) = 26.27, *p*=.001, graduate: Chi - square (2) = 38.22, *p* = .001). Graduate students in sample I showed a significant decrease in negative affect when using reappraisal (sample I undergraduate: look negative M= 2.62, SD= 1.28; decrease negative M= 2.69, SD= 1.42; Z= -.691, *p* = .49, ρ= .05, 1-β= .04; graduate: look negative M= 3.25, SD= 1.38; decrease negative M= 2.73, SD= 1.36; Z= -2.76, *p* = .006, ρ= .37, 1-β= .18). Undergraduate and graduate students in sample II showed a significant decrease in negative affect when using reappraisal (undergraduate: look negative M= 3.32, SD= 0.97; decrease negative M= 2.79, SD= 1.02; Z= -2.85, *p* = .004, ρ= .53, 1-β= .24; graduate: look negative M= 3.29, SD= 1.20; decrease negative M= 2.75, SD= 1.15; Z= -2.65, *p* = .008, ρ= .45, 1-β= .30).

Supplemental Table 7. Negative affect by task conditions in undergraduate and graduate participants

Scholarship	Conditions	M	SD	Chi-square (2)	Sig
		Sample I			
	Decrease	2.69	1.42		
Undergraduate	Look Negative	2.62	1.28	37.65	.001
	Look Neutral	.41	.48		
	Decrease	2.73	1.36		
Graduate	Look Negative	3.25	1.38	35.34	.001
	Look Neutral	.30	.59		
		Sample II			
	Decrease	2.79	1.02		
Undergraduate	Look Negative	3.32	.97	26.27	.001
	Look Neutral	.51	.59		
	Decrease	2.75	1.15		
Graduate	Look Negative	3.29	1.20	38.22	.001
	Look Neutral	.38	.34		

Note. Sample I undergraduate n= 24 and graduate n= 21; Sample II undergraduate n= 15 and graduate n= 25.

Correlations among emotion regulation (frequency and ability) Stress, and Symptoms

The two measurements of cognitive reappraisal (frequency, measured by ERQ scores, and ability, as measured by the CRA task) were not significantly associated with one another in either sample (Sample I rho= -.14 *p* = .33; Sample II rho= .01 *p* = .93). As shown in Supplemental Table 8 and 9, Column 2, CR was not significantly related to perceived stress, anxious arousal, anhedonic depression, general distress and expressive suppression. For CRA (Column 3), similar non-significant relationships were found. As CR, CRA was not significantly related to perceived stress, anxious arousal, anhedonic depression, general distress and suppression expressive. Only in sample II, a positive and significant correlation was found between emotional reactivity and both measures of cognitive reappraisal (CR r = .33 *p* = .03 and CRA rho = .42 *p* = .006). It is important to note that our measures of emotional reactivity and CRA share a term (look negative ratings), thus, these results should be interpreted with caution. Both samples demonstrated significant and positive correlations between perceived stress, anxious arousal, anhedonic depression and general distress. There was a significant association between ES and emotional reactivity and CR only in sample II (rho= .30 *p*=.05).

Supplemental Table 8. Exploratory results Pearson and Spearman correlations between emotional reactivity, cognitive reappraisal frequency, CRA, perceived stress, anxious arousal, anhedonic depression, general distress and suppression expressive frequency Sample I.

	1	2	3	4	5	6	7	8
1. ER								
p	-							
ρ								
1-β								
2. CR	-.14							
p	.36							
ρ	.37	-						
1-β	.95							
3. CRA	.25	-.14						
p	.07	.33						
ρ	.50	.38	-					
1-β	.97	.95						
4. PSS	.08	.19	-.22					
p	.56	.21	.14					
ρ	.29	.43	.46	-				
1-β	.93	.96	.97					
5. AA	.00	.07	-.09	.49**				
p	.97	.62	.51	.001				
ρ	.07	.27	.31	.70	-			
1-β	.97	.92	.93	.99				
6. AD	-.03	.11	-.15	.77**	.37*			
p	.80	.46	.31	.001	.01			
ρ	.19	.33	.39	.87	.60	-		
1-β	.91	.94	.95	1	.98			
7. GD	-.05	.23	.09	.65**	.56**	.64**		
p	.72	.12	.51	.001	.001	.001		
ρ	.23	.47	.31	.81	.75	.80	-	
1-*β*	.91	.97	.93	.99	.99	.99		
8. ES	.08	.00	.24	-.19	-.10	-.24	-.25	
p	.58	.98	.10	.20	.49	.10	.09	
ρ	.28	.05	.49	.44	.32	.49	.50	-
1-β	.92	.98	.97	.96	.93	.97	.97	

Note. ER= Emotional Reactivity; CR= Cognitive Reappraisal Frequency; CRA= Cognitive Reappraisal Ability; PSS = Perceived Stress Scale; AA = Anxious Arousal; AD = Anhedonic Depression; GD = General Distress; ES= Expressive Suppression. CRA and AA are not normal data, so there are Spearman correlations.
n= 45 because survey data was only available for 45 people. p = statistical significance; ρ = effect size; 1-β = statistical power.
* sig= .01
** sig= .05

Supplemental Table 9. Exploratory results Pearson and Spearman correlations between emotional reactivity, cognitive reappraisal frequency, CRA, perceived stress, anxious arousal, anhedonic depression, general distress and suppression expressive frequency Sample II.

	1	2	3	5	6	7	8
1. ER							
p	-						
ρ							
1-β							
2. CR	.33*						
p	.03						
ρ	.57	-					
1-β	.97						
3. CRA	.42**	.01					
p	.006	.93					
ρ	.65	.11	-				
1-β	.97	.94					
4. PSS	.11	.19	-.17				
p	.49	.22	.33				
ρ	.33	.44	.39				
1-β	.93	.95	.94				
5. AA	.03	.05	.07				
p	.85	.75	.65	-			
ρ	.17	.22	.27				
1-β	.91	.90	.91				
6. AD	.03	.24	-.13	.48**			
p	.83	.12	.41	.002	-		
ρ	.18	.49	.36	.69			
1-β	.91	.96	.94	.98			
7. GD	.11	.19	-.05	.77**	.71**		
p	.50	.24	.72	.001	.001	-	
ρ	.33	.43	.24	.87	.84		
1-β	.92	.95	.90	.99	.99		
8. ES	.30*	.30*	.06	-.10	-.02	-.14	
p	.05	.05	.70	.51	.86	.37	-
ρ	.55	.55	.24	.32	.17	.38	
1-β	.97	.97	.91	.92	.92	.94	

Note. ER= Emotional Reactivity; CR= Cognitive Reappraisal Frequency; CRA= Cognitive Reappraisal Ability; PSS = Perceived Stress Scale; AA = Anxious Arousal; AD = Anhedonic Depression; GD = General Distress; ES= Expressive Suppression. CRA, ES, AA and GD are not normal data, so there are Spearman correlations. p = statistical significance; ρ = effect size; 1-β = statistical power.
n= 40.
* sig= .01
** sig= .05