SECRETARÍA DE INVESTIGACIÓN

UNIVERSIDAD SIGLO 21

Construct Validity of the Difficulties in Emotion Regulation Scale: Further Evidence Using Confirmatory Factor Analytic Approach

Leonardo Adrián Medrano and Mario Trógolo

Abnormal and Behavioural Psychology

Medrano and Trógolo, Abnorm Behav Psychol 2016, 2:2
http://dx.doi.org/10.4172/2472-0496.1000117

Research Article | Open Access

Construct Validity of the Difficulties in Emotion Regulation Scale: Further Evidence Using Confirmatory Factor Analytic Approach

Leonardo Adrián Medrano and Mario Trógolo*

Universidad Siglo 21. Córdoba, Argentina

Abstract

Background: The Difficulties in Emotion Regulation Scale (DERS) represents one of the most popular, comprehensive and well-established measure of emotion regulation, being widely used in clinical and nonclinical settings. Despite it widespread use, there is no agreement about the factorial structure and majority of prior research has been focused in replicate the original DERS model, while studies examining competing models are lacking. Thus, further examination is needed in order to ascertain the more appropriate factor structure. The present study sought to examine the latent factor structure of the DERS by testing several alternative models using a confirmatory factor analytic (CFA) strategy.

Methods: Six-hundred and nine adults (367 men) from general population aged from 18 to 51 years old completed the DERS.

Results: Findings did not support the original six-factor correlated model. Rather, CFA studies showed that a four-factor correlated model including lack of emotional clarity, no acceptance of emotional responses, difficulties engaging in goal-directed behavior, and impulse control difficulties had better fit to the data. Drawing on empirical research from affective neuroscience, a two correlated second-order CFA model accounting for the four factors was examined. The hypothesized two factors were represented by difficulties in emotion processing and difficulties in the regulation of emotional response. Results showed acceptable and similar goodness-of-fit indices compared to the four-factor correlated model, while test for model comparison revealed non-significant differences between fit of the two models.

Conclusion: Results indicate that both a four-factor correlated model and a two higher-order correlated factor model are adequate to explain the latent factor structure of DERS. However, the last model is recommended since it provides researchers with a more parsimonious, neurobiological-based conceptualization and assessment of emotion regulation. Limitations and directions for future investigation are also addressed.

Keywords: Emotion regulation; Factor structure; Construct validity; Confirmatory factor analysis

Introduction

The topic of emotion regulation (ER) has flourished in last decades [1] drawing attention from cognitive, social, developmental, personality, clinical, neuroscientific, educational, and traffic researchers [2-9]. The significant amount in research volume has become the field of ER one of the most active areas in contemporary psychology. Despite its popularity, currently there is no agreement regarding what ER is and/or what processes it encompasses, as reflected in many definitions existent in ER literature [10-13].

However, in an effort to integrate the diverse aspects of ER posited by different definitions, Gratz and Roemer proposed a comprehensive conceptualization of emotion regulation involving: (a) emotional awareness, (b) emotional clarity, (c) emotional acceptance, (d) impulse control, (e) ability to engage in goal-directed behavior while experiencing negative emotions, and (f) ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired. Based on this conceptualization, they also developed the Difficulties in Emotion Regulation Scale (DERS), a self-report 36-item measure which reflects difficulties in one or more aspects of ER listed above. Specifically, DERS subscales include nonacceptance of emotional responses (NONACCEPTANCE), difficulties engaging in goal-directed behavior (GOALS), impulse control difficulties (IMPULSE), lack of emotional awareness (AWARENESS), limited access to emotion regulation strategies (STRATEGIES), and lack of emotional clarity (CLARITY). The six dimensions were obtained through exploratory factor analysis (EFA) in a sample of 357 university students. All DERS subscales were moderately to strongly correlated, showed good internal consistency (Cronbach's α ranging from 0.80 to 0.89) as well as the total scale (α = 0.93) and adequate test-retest reliability for a period of 4-8 weeks (ρ_I = 0.88, p<0.01 for the total score, ρ_Is = 0.57 to 0.80 for subscales, all ps<0.01). In addition, significant correlations between DERS and measures of emotional avoidance, negative mood regulation and emotional expressiveness supported the convergent validity. Finally, relations of the DERS with deliberate self-harm and intimate partner abuse provided concurrent validity [14]. Taking together, these findings demonstrated the validity and reliability of DERS, representing to date one of the most comprehensive ER available measures, since it assesses multiple aspects of ER at once that are measured separately by other ER instruments [15].

Since its seminal work, the DERS has been translated and validated across a number of countries including France, Portugal, Mexico, Netherlands, Argentina, United States, Spain, Australia, Hungary,

***Corresponding author:** Mario Trógolo, Universidad Siglo 21. Córdoba, Argentina, Tel: +54-0351-158061362; E-mail: mario.trogolo@gmail.com

Received May 10, 2016; **Accepted** June 20, 2016; **Published** June 24, 2016

Citation: Medrano LA, Trógolo M (2016) Construct Validity of the Difficulties in Emotion Regulation Scale: Further Evidence Using Confirmatory Factor Analytic Approach. Abnorm Behav Psychol 2: 117. doi:10.4172/2472-0496.1000117

Turkey, Italy, in both clinical and nonclinical samples [16-28]. Overall, studies provided support for the original six-factor structure, but only after some parameter re-specifications of the model and/or deleting items [15,19,25,26], while other studies retained the six-factor model despite some goodness-of-fit-indices indicate poor model fit [22,27]. In contrast, there have been some other studies which found a factor structure somewhat different. For example, based on confirmatory factor analysis (CFA) Tejeda et al. [18] did not confirm the six-factor structure in a sample of Mexican adolescents. They largely reduced the number of items and found that a shortened version of the DERS comprised by 24-item and four factors fit well to the data. These factors were AWARENESS, NONACCEPTANCE, GOALS and CLARITY. Also, Cooper et al. [24] did not provide confirmatory evidence for the original six-factor model. Rather, they found that an abbreviated 25-item version and five factors in which the AWARENESS dimension was removed fit better to the data. Finally, in Spain Hervás and Jódar [23] reported a five-factor solution in which items belonging to IMPULSE and STRATEGIES subscales merged into a single factor which was labelled as lack of emotional control.

Notably, most psychometric studies of DERS using a CFA strategy did not examine the plausibility of alternative measurement models relative to the original six-factor correlated model. There have been, however, some exceptions which provided mixed results. Specifically, Fowler et al. [21] found that a five-factor correlated model excluding the AWARENESS subscale and the six-factor correlated model produced equivalent fit indices. In a similar vein, Bardeen et al. [20] compared uncorrelated vs correlated six- and five-factor models (i.e., removing the AWARENESS dimension), as well as the tenability of 36-item one-factor model and a reduced 30-item one-factor model (i.e., excluding items of the AWARENESS subscale). They found good fit indices for both the correlated five- and six-factor models and non-significant difference between the two models' fit emerged. Nonetheless, a further second-order CFA with two uncorrelated higher-order factors, including one second-order all six DERS subscales and the other second-order factor all factors except AWARENESS, revealed that the AWARENESS factor provided a markedly lower contribution to the general DERS factor relative to the other five latent factors of the DERS. Furthermore, the five DERS factors showed stronger intercorrelations and shared covariation that was not explained by their relations with the AWARENESS subscale, leading the authors to advocate for a more parsimonious five-factor model without AWARENESS. Collectively, findings indicate that there is some degree of uncertainty regarding the number of factors that best represent the latent structure of the DERS.

A particular issue that was not addressed before concerns to the adequacy of items contained in the STRATEGIES subscale. According to Gratz and Roemer [14], emotion regulation strategies used by individuals are important in delineating their capability or difficulties in regulating emotions adaptively. However, the extended practice of measure specific emotion regulation strategies regardless the context assumes that certain strategies are intrinsically either adaptive or maladaptive. Because of this, Gratz and Roemer [14] proposed items that assess the subjective appraisal of one's ability to effectively regulate emotions instead, "with the hope that this would take into account the contextually dependent nature of adaptive regulation strategies" (p. 43). As such, items from STRATEGIES dimension make difficult to drawn meaningful conclusions about strategies used by individuals to regulate emotions and its operationalization may actually reflects emotional self-efficacy (ESE). The construct of ESE is defined as the perceived ability to cope with negative emotions [29]. Common applications of ESE include a person's belief in their abilities to ameliorate negative emotional states and to reestablish normal emotional states [30]. Consistent with the definition, many items' content of the STRATEGIES subscale appears refers to ESE beliefs (e.g. "When I'm upset, I believe that I'll end up feeling very depressed"; "When I'm upset, I believe that wallowing in it is all I can do"; "When I'm upset, I believe that there is nothing I can do to make myself feel better"). Empirical evidence suggests, however, that ESE is different from ER and, indeed, ESE is to be considered a precursor of ER [31]. Thus, we hypothesized that a refined operationalization of the DERS in which STRATEGIES subscale is removed may more accurately represents the underlying structure of the scale. A markedly increase in model fit of the hypothesized model relative to alternative models would support our assumption that STRATEGIES factor may not belong to the ER construct.

Additionally, studies from affective neuroscience pointed out that there are different brain systems underlying to emotion regulation difficulties-related processes. Particularly, reduced emotional awareness and difficulties in perceiving and experiencing emotions have been associated with lower activation of subcortical regions including the anterior cingulate cortex, insula, amygdala and striatum, indicating that these brain areas are relevant to processing of emotional stimuli [32,33]. On the other hand, neuroimaging studies comparing cocaine addict and intermittent explosive disorder with healthy individuals indicate that prefrontal cortex, especially the dorsolateral prefrontal cortex, play a critical role in impulse control and task performance [34]. The different pattern of neural correlates suggest that AWARENESS, NONACCEPTANCE and CLARITY subscales of DERS may be clustered into a general factor representing difficulties in emotion processing, while GOALS and IMPULSE may be clustered into a general factor reflecting difficulties in the regulation of emotional response. To our best knowledge, such an approach has not yet been tested to examine the latent structure of the DERS. A two higher-order factor solution would provide support for the distinction between difficulties in emotion processing and difficulties in the regulation of emotional response.

A final issue surrounding research into DERS is the widespread use of a global score (i.e., by summing subscale scores) with intend to measure the ER domain [2,6,14,17,18,23,26,32-39]. As noted by Furr [40], such form of scoring assumes that factors are strongly correlated and that the correlations can be explained by the effect of a higher-order factor. However, studies that conducted higher-order CFA with DERS did not provide strong evidence for a more general factor accounting for the intercorrelations among DERS subscales. For example, Côte et al. [16] found that a six-factor second-order model did not produce an adequate fit. Similarly, Fowler et al. [21] indicated that neither a six-factor second-order model nor a five-factor second-order model fitted well to the data. In addition, Bardeen et al. [20] found support for five- and six-factor second-order models, but whereas chi-square difference test indicated that these second-order factors significantly diminish the model fit compared to DERS first-order models, other tests for comparing models showed non-significant differences between first- and second-order models, leading to equivocal conclusions.

In summary, although previous research has demonstrated the relevance and the utility of DERS scale in measuring difficulties in emotion regulation or emotional dysregulation, evidence regarding the factor structure that best represents the internal structure of the scale, the appropriateness of some items, and the suitability for utilizing the DERS total score are so far not conclusive. Additionally, given that ER may differ importantly among cultures [3] more research with samples from different cultural backgrounds is needed, which could contribute to reveal the extent to which features of ER are generalizable across different cultures. Thus, the aim of the present study was to provide further evidence of the construct validity of DERS by using CFA to test several competing models in order to ascertain the more appropriate factor structure.

Materials and Methods

Participants and procedure

Six-hundred and nine adults from general population of Cordoba, Argentina, were recruited for participation using a convenience sampling. The sample consisted of 367 men (60.3%) and 242 women (39.7%) ranging from 18 to 51 years old (M= 22.41; SD= 3.56). All the participants filled voluntarily a paper version of the questionnaires, after receiving complete information about purposes of the study and anonymity were assured.

may lead to significant value of $\Delta\chi$ even when the difference is trivial,

Measure

Difficulties in emotion regulation scale: The DERS [14] is a 36-item self-report measure which assesses difficulties in different aspects involved in the regulation of emotions: lack of emotional awareness (AWARENESS; 6 items), lack of emotional clarity (CLARITY; 5 items), nonacceptance of emotional responses NONACCEPTANCE; 6 items), difficulties engaging in goal-directed behavior (GOALS; 5 items), impulse control difficulties (IMPULSE; 6 items) and limited access to emotion regulation strategies (STRATEGIES; 8 items). Participants are asked to indicate how often the items apply to themselves using a five-point Likert scale, with 1 = almost never (0–10%), 2 = sometimes (11%–35%), 3 = about half the time (36%–65%), 4 = most of the time (66%–90%), and 5 = almost always (91%–100%). Higher scores on each subscale indicate greater difficulties in emotion regulation. Preliminary evidence in Argentina [15] suggests good psychometric properties of DERS, with adequate reliability for all subscales (alpha coefficients ranging from 0.70 to 0.87) except for STRATEGIES subscale (Cronbach's alpha = 0.54) and concurrent validity with personality measures.

Data analysis

Confirmatory factor analyses were carried out to test the latent structure of the DERS. The original correlated six-factor model was tested first (Model 1). All items were constrained to their expected factors, with no secondary loadings. Item factor loadings were freely estimated and factor variances were scaled to a value of 1. Then, two correlated five-factor models were tested. In one model, all DERS subscales except the AWARENESS factor were included (Model 2). The other model included all factors except the STRATEGIES subscale (Model 3). As in the original model, all items were fixed to their respective factors and factor loadings were freely estimated. Next, four higher-order CFA models were used to test whether: (a) correlated five and six-factor models aforementioned could be modeled as the effects of a second-order factor and thus examined the tenability of using DERS total score (Model 1a; Model 2a; and Model 3a): (b) correlated five-factor model without STRATEGIES subscale could be explained by two second-order factors (i.e., difficulties in emotion processing and difficulties in the regulation of emotional response) and, therefore, examined the plausibility of the hypothesized higher-order model (Model 4). In these models, the first-order DERS factor intercorrelations within the correlated first-order models were deleted and direct effects from higher-order factors to each of the DERS first-order factors were added [40,41].

Following guidelines for CFA studies [42,43], overall model fit was examined through different goodness-of-fit-indices: the absolute fit index ($\chi 2$), the goodness of fit index (GFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). GFI and CFI values greater than 0.90 and RMSEA values smaller than 0.08 indicate acceptable model fit, while values greater than 0.95 in GFI and CFI and smaller than 0.05 in RMSEA are indicative of excellent fit.

Additionally, difference between models' fit was analyzed using the chi-square difference test; $\Delta\chi^2$ [44]. A significant difference between two comparable models indicates a significant decrement in model fit. However, since chi-square test is highly sensitive to sample size, it may lead to significant value of $\Delta\chi^2$ even when the difference is trivial, especially in large samples [45]. Thus, additional test for comparing models were used. One alternative test included examining changes in CFI (Δ CFI). According to Cheung and Rensvold [46] ΔCFI is unaffected by sample size and, therefore, reduce the probability of Type I error compared to chi-square statistic. A value of ΔCFI smaller than or equal to 0.01 indicates that the differences between models fit are non-significant. Another alternative test involved examining the Akaike's Information Criterion (AIC), which allows for the comparison among multiple competing models simultaneously [47]. The AIC is based on a trade-off between model fit and model complexity, providing information for the identification of the most parsimonious model for a group data [48]. The smaller AIC value is, the most parsimonious the model is. Finally, reliability analysis (Cronbach's coefficient alpha) of each subscale was conducted to analyze internal consistency.

Results

Confirmatory factor analyses

Goodness-of-fit indices for different models are summarized in Table 1. As shown in the table, correlated five and six-factor first-order models generally did not provide an adequate fit to the data. Only the RMSEA met the specified guidelines. Similarly, none of the four higher-order models revealed acceptable fit to the data. Except for the RMSEA, none of the goodness-of-fit indices met or exceeded the specified guidelines. Therefore, we decided to conduct further CFA testing a revised four-factor correlated model in which AWARENESS and STRATEGIES factors were removed (Model 5). This model provided best fit to the data. All of the goodness-of-fit indices reached the specified guidelines. In addition, chi-square difference tests [correlated four-factor vs correlated six-factor: $\Delta\chi^2$= 540.92 (df= 152, p<0.01); correlated four-factor vs correlated five-factor without the AWARENESS subscale: $\Delta\chi^2$= 268.02 (df= 59, p<0.01); correlated four-factor vs correlated five-factor without the STRATEGIES subscale: $\Delta\chi^2$= 237.86 (df= 82, p<0.01)] indicated that the revised correlated four-factor model provided a significantly better fit to the data relative to alternative first-order models. Moreover, the ΔCFIs were uniformly >0.01 and AICs comparison suggested that four-factor model was the most parsimonious model. Thus, both the correlated five-factor and six-factor models appear to provide a significantly poorer fit to the data compared to the correlated four-factor model (Table 1).

All of the factor loadings within the correlated four-factor model were significant (ps<0.01). Completely standardized factor loadings from this model are presented in Table 2. The inter correlations between DERS four-factor model were all significant (ps<0.01; Table 3). An additional second-order CFA was carried out to examine whether inter correlations between DERS four-factors could be explained for a more general higher-order factor (Model 6). As indicated in Table 3, this model generally showed poor fit. None of the goodness-of-fit indices, except the RMSEA, met or exceeded the specified guidelines. Finally, we tested whether an alternative higher-order model containing two correlated second-order factors, could account for the associations between DERS four-factor model (Model 7). One second-order factor had CLARITY and NONNACEPTANCE loaded on it and the order second-order factor had IMPULSE and GOALS loaded on it. By doing so, we examined the tenability of the hypothesized two-factor model (i.e., difficulties in emotion processing and difficulties in the regulation of emotional response) accounting for inter correlations between the revised DERS four-factors. This model generally provided adequate fit to the data. All of the goodness-of-fit indices, except the GFI, met the specified guidelines. The two factors were strongly correlated (r= 0.63, p<0.01) and completely standardized loadings on the second-order factors were generally large: NONCACCEPTANCE= 0.90, CLARITY= 0.46, IMPULSE= 0.73, GOALS= 0.83. In addition, standardized factor loadings from the two-factor model were all significant (ps<0.01) and similarly to those from four-factor correlated model (Tables 2 and 3).

Further comparison between the two second-order correlated factor model and the four-factor correlated model yielded a non-significant difference in model fit [$\Delta\chi^2$= 0.5 (df= 1, p>0.05); ΔCFIs ≤0.01]. Thus, whereas for the two higher-order correlated factor model some goodness-of-fit indices did not meet our a-priori benchmark levels indicative of adequate fit, test for comparison between models fit did not support the superiority of one model relative to another.

	χ^2	df	CFI	GFI	RMSEA	AIC
Model 1	1256.78*	335	0.87	0.86	0.07	1398.77
Model 2	983.88*	242	0.87	0.88	0.07	1099.88
Model 3	953.72*	265	0.89	0.88	0.06	1073.72
Model 1[a]	1403.24*	344	0.85	0.85	0.07	1527.24
Model 2[a]	1030.84*	247	0.87	0.87	0.07	1136.84
Model 3[a]	1083.21*	270	0.87	0.87	0.07	1193.21
Model 4	1052.70*	269	0.87	0.87	0.07	1164.70
Model 5	715.86*	183	0.90	0.90	0.07	811.86
Model 6	746.76*	185	0.89	0.89	0.07	838.76
Model 7	716.36*	184	0.90	0.89	0.07	810.36

Table 1: Summary of goodness-of-fit indices for alternative DERS models.

Lastly, post-hoc re-specification of the four-factor correlated model and the two second-order correlated factor model were carried out. In both models, modification indices indicated that allow to co-vary errors from item 25 ("When I'm upset, I feel ashamed with myself for feeling that way") and item 15 ("When I'm upset, I become embarrassed for feeling that way") would increase model fit. After allowing the errors of these conceptually similar items to co-vary, goodness-of-fit indices were acceptable [Four-factor correlated model: χ^2= 598.9 (df= 182, p<0.01); CFI= 0.92; GFI= 0.91; RMSEA=0.06; AIC=696.90. Two second-order factor correlated model: χ^2= 599.51 (df= 183, p<0.01); CFI= 0.92; GFI= 0.91; RMSEA=0.06; AIC=695.51]. Comparison between the re-specified models showed non-significant difference in models fit [$\Delta\chi^2$= 0.6 (df= 1, p>0.05); ΔCFIs ≤0.01]. Hence, the present findings support both the models and, therefore, remaining analysis was conducted with the four-factor and the two second-order factor correlated models.

Reliability

Cronbach's alpha was calculated to assess internal consistency. Results indicate that all DERS subscales had good internal consistency with coefficients higher than 0.70. Corrected inter-total correlation was adequate (≥ 0.30) for all subscales [49]. Table 4 presents additional information about internal consistency of DERS factors (Table 4).

Discussion

Over the past decades, the construct of ER attracted burgeoning interest among professional and researchers across different

Item	Model 1				Model 2	
	NONACCEPTANCE	CLARITY	GOALS	IMPULSE	PROCESSING	RESPONSE
ders12	0.57				0.57	
ders21	0.59				0.59	
ders29	0.81				0.81	
ders25	0.63				0.63	
ders11	0.63				0.63	
ders30	0.76				0.76	
ders9		0.61			0.61	
ders5		0.71			0.71	
ders7		0.64			0.64	
ders1		0.60			0.60	
ders26			0.80			0.80
ders18			0.80			0.79
ders33			0.71			0.71
ders20			0.41			0.41
ders13			0.71			0.71
ders19				0.88		0.88
ders14				0.85		0.86
ders32				0.82		0.82
ders27				0.71		0.71
ders36				0.62		0.62
ders3				0.44		0.44

Notes: NONACCEPTANCE = Nonacceptance of Emotional Experiences subscale; CLARITY = Lack of Emotional Clarity subscale. GOALS = Difficulty Engaging in Goal-Directed Behavior subscale; IMPULSE = Impulse Control Difficulties subscale; Model 1 = four-factor DERS model; Model 2 = two-factor DERS model; PROCESSING = Difficulties in Emotion Processing; RESPONSE = Difficulties in the Regulation of Emotional Response.

Table 2: Completely standardized factor loadings from confirmatory factor analysis of items of DERS.

Factor	1	2	3	4
1. NONACCEPTANCE	-			
2. CLARITY	0.31	-		
3. GOALS	0.36	0.21	-	
4. IMPULSE	0.38	0.18	0.54	-

Notes: NONACCEPTANCE = Nonacceptance of Emotional Experiences subscale; CLARITY = Lack of Emotional Clarity subscale. GOALS = Difficulty Engaging in Goal-Directed Behavior subscale; IMPULSE = Impulse Control Difficulties subscale. All rs significant (p<0.01; two-tailed)

Table 3: Inter corelations among the DERS four-factor model.

	No. of	Cronbach's	Range of item	Range of interitem
	items	Alpha	total correlations	correlations
NONNACEPTANCE	6	0.84	0.56 - 0.62	0.43 - 0.64
CLARITY	4	0.73	0.47 - 0.56	0.30 - 0.50
GOALS	5	0.81	0.39 - 0.69	0.31 - 0.64
IMPULSE	6	0.87	0.43 - 0.79	0.35 - 0.80
PROCESSING	10	0.82	0.33 - 0.64	0.31 - 0.65
RESPONSE	11	0.88	0.34 - 0.70	0.15 - 0.80

Notes: NONACCEPTANCE = Nonacceptance of Emotional Experiences subscale; CLARITY = Lack of Emotional Clarity subscale. GOALS = Difficulty Engaging in Goal-Directed Behavior subscale; IMPULSE = Impulse Control Difficulties subscale; PROCESSING = Difficulties in Emotion Processing; RESPONSE = Difficulties in the Regulation of Emotional Response.

Table 4: Internal consistency for DERS subscales.

disciplines, which reflects in the increasing number of published works [1], theoretical models [50], and measures purport to capture this construct [15]. Among the self-report measures, the Difficulties in Emotion Regulation Scale [14] represents one of the most popular, comprehensive and well-established measure. Notwithstanding its widespread use, extant data regarding the factorial structure is inconsistent and, hence, further examination of the DERS is needed.

In addition, majority of psychometric studies has focused on replicating Gratz and Roemer's [14] original six-factor correlated model of the measure, while the feasibility of alternative models were not tested [19,22,25,27]. To our best knowledge, there are only two studies which compared several competing models. However, given that these studies have been entirely conducted with samples of university students [20] or psychiatric inpatients [21], generalizability of the results to general population is uncertain. The purpose of the present study was to fill this gap by analyzing the latent factor structure of the DERS in a large sample of individuals from general population.

First-order CFAs analyses did not replicate the original six-dimension model proposed by Gratz and Roemer [14]. Also, our results indicated that both the alternative five-factor model recommended by Bardeen et al. [20] with all DERS factors excepting AWARENESS and our hypothesized five-factor model (i.e., removing the STRATEGIES subscale) were not supported by data. Subsequent second-order CFA models were conducted to examine the tenability of four higher-order models: a six-factor second-order model, a five-factor second-order model with all DERS subscales except AWARENESS as primary factors; a five-factor second-order model with all DERS subscales except STRATEGIES as primary factors; and a fourth model containing the hypothesized two second-order correlated factors (i.e., difficulties in emotion processing and difficulties in the regulation of emotional response), including one second-order factor with AWARENESS, CLARITY and NONACCEPTANCE loaded on it, and the second-order factor with GOALS and IMPULSE loaded on it. Once again, our results did not provide confirmatory evidence for any of the proposed models. Instead, we found that a DERS four-factor correlated model with CLARITY, NONACCEPTANCE, GOALS and IMPULSE had acceptable fit.

Thus, our CFA results suggest that the AWARENESS subscale should not be included in the DERS. The validity of the AWARENESS factor has been extensively discussed earlier by Bardeen et al. [20], who argued that this factor may not belong to the emotion regulation construct and advocated for a more parsimonious, five-factor model of DERS. However, it should be noted that, unlike others DERS factors, the AWARENESS subscale has all reversed items. Although reverse-keyed items are often used to control for response bias [51] and thus enhance the quality of responses, there is evidence suggesting that they may lead to problems; particularly poor model fit of the factor models [52]. Therefore, it is unclear to what extent the lack of validity of the AWARENESS subscale found in the present and previous studies may be due to response biases resulting from the reversed items. Another issue concerning to the AWARENESS subscale is the type of internal attention being evaluated. In fact, items from the subscale ("I am attentive to my feelings"; "I pay attention to how I feel") appear to refer to how attentive to emotional experience an individual is. As previously indicated by Salter-Pedneault et al. [6], it seems possible that the way AWARENESS subscale is operationalized may not distinguish between beneficial and maladaptive types of internal attention. In sum, we note that researchers should be wary about discarding the AWARENESS factor until these methodological issues could be addressed.

According to our expectations, we also found that the STRATEGIES subdeteriorated model fit. As we have stated, the STRATEGIES factor contain items reflecting an individual's belief that emotion regulation strategies will be ineffective and that negative emotions will continue whatever he/she do. Thus, items do not examine strategies of ER in which respondent actually engage in, but instead probe whether the individual believes that he or she is able to lessen negative emotions and avoid being overwhelmed [22]. That is, it is possible that items pertaining to STRATEGIES subscale may in fact measure emotional self-efficacy beliefs, which are different from ER [31]. Therefore, future research may wish to review the subscale content and reconsider items in order to ensure a more valid measure of ER strategies.

An additional two second-order CFA analysis showed that the proposed four-factor correlated model of DERS can be accounted by two general factors, consistent with our distinction between difficulties in emotion processing and difficulties in the regulation of emotional response. Specifically, one factor includes CLARITY AND NONACCEPTANCE primary DERS subscales, while the other factor includes GOALS and IMPULSE subscales. Both the first-order four-factor correlated model and the two second-order correlated factor model of DERS indicated similar goodness-of-fit indices. In addition, tests for model comparison revealed that the higher-order model did not provide a significant increase in model fit relative to the lower-order model. Hence, the present findings support both the models.

To sum up, results of the study indicate that the difficulties in emotion regulation construct may be better conceptualized either as involving lack of emotional clarity, lack of emotional acceptance, difficulties in goal-directed behavior, and difficulties in impulse control; or in terms of difficulties in emotion processing and difficulties in the regulation of emotional response. However, because of the model parsimony and theoretically-consistent with empirical findings from affective neuroscience, we recommend for a more refined conceptualization and assessment of ER based upon difficulties in emotion processing and difficulties in the regulation of emotional response. Moreover, in agreement with previous research [21], we advised against the use of a global DERS score because second-order models produced weak fit.

Notwithstanding the implications listed above, several limitations warrant mentioning. First, the sample was recruited from general population and, therefore, results cannot be applicable to clinical samples. Thus, future research replicating the study in clinical samples would be useful to ensure the generalizability of the present findings. Second, although it was not the aim of this study, evidence for external validity of DERS is necessary. Further research analyzing relations between DERS and measures of depression, anxiety and other relevant outcome measures would provide additional validation of our findings. In addition, comparing DERS scale with other measures of ER used in the literature, such as the Emotion Regulation Questionnaire [53] or the Trait Meta-Mood Scale [54], in relation to criterion of interest, would also be valuable to provide incremental validity of the DERS. Finally, the current study relies upon a cross-sectional design, which does not enable us to make conclusions about the temporal sequence of ER. As suggested by Bardeen et al. [20], it seems reasonable that one must be able to properly identify emotions before to engage in some regulatory effort to alter or control the emotion according to one's goals, although they do not guarantee that the emotion will be successfully regulated. From this perspective, lack of emotional clarity and lack of emotional acceptance are processes that come first in the emotion regulation sequence, while difficulties in impulse control and engaging in goal-directed behavior come later in the temporal chain. Future investigation collecting data at multiple time points and using structural equation modeling would be particularly useful to test whether difficulties in emotion processing (i.e., CLARITY and NONACCEPTANCE) influence the use of dysfunctional emotion regulation strategies, leading to difficulties in the regulation of emotional response (i.e., GOALS and IMPULSE). For example, non-acceptance of emotional responses may conduct individuals to engage in rumination strategies, causing distraction and interfering with he/she's current goals. Such approach would provide support for the temporal sequence approach of ER.

Conclusion

Beyond the limitations, we note that this is the first study to compare the Gratz and Roemer [14] model of ER with several alternative models in a large sample of general population. This approach is recommended to decide the best factorial structure underlying a scale [37], since testing single models allows to examine the adequacy of the model, but it cannot speaks of the validity of the model above another models. Our findings indicate that both a four-factor correlated model and a two higher-order correlated factor model of DERS are adequate. However, the last model is recommended since it provides researchers with a more parsimonious, neurobiological-based conceptualization and assessment of the ER construct.

References

1. Gross J (2007) Handbook of emotion regulation (2nd edn). Guilford Press, New York.
2. Salters-Pedneault K, Roemer L, Tull M, Rucker L, Mennin, D (2006) Evidence of broad deficits in emotion regulation associated with chronic worry and generalized anxiety disorder. Cognit Ther Res 30: 469-480.
3. Mesquita B, Albert D (2007) The cultural regulation of emotions. In Gross J (ed). Handbook of Emotion Regulation. Guilford Press, New York.
4. Shipman K, Zeman J (2001) Socialization of children's emotion regulation in mother-child dyads: A developmental psychopathology perspective. Dev Psychopathol 13: 317-336.
5. Pollock N, McCabe G, Southard A, Zeigler-Hill V (2016) Pathological personality traits and emotion regulation difficulties. J Individ Differ 95: 168-177.
6. Vujanovic A, Zvolensky M, Bernstein A (2008) The interactive effects of anxiety and emotion dysregulation in predicting anxiety-related cognitive and affective symptoms. Cognit Ther Res 32: 803-817.
7. Ochsner KN, Silvers JA, Buhle JT (2012) Functional imaging studies of emotion regulation: a synthetic review and evolving model of the cognitive control of emotion. Ann N Y Acad Sci 1251: E1-24.
8. Sutton R, Mudrey-Camino R, Knight C (2009) Teachers emotion regulation and classroom management. Theory Pract 48: 130-137.
9. Trógolo M, Melchior F, Medrano LA (2014) The role of difficulties in emotion regulation on driving behavior. Journal of Behavior, Health & Social Issues 6: 107-117.
10. Cole P, Martin S, Dennis T (2004) Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. Child Dev 75: 317-333.
11. Eisenberg N, Spinrad T (2004) Emotion-related regulation: Sharpening the definition. Child Dev 75: 334-339.
12. Gross J (1999) Emotion regulation: Past, present, future. Cogn Emot 13: 551-573.
13. Thompson R (1994) Emotion regulation: A theme in search of definition. Monogr Soc Res Child Dev 59: 25-52.
14. Gratz K, Roemer L (2004) Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. J Psychopathol Behav Assess 26: 41-54.
15. Medrano LA, Trógolo M (2014) Validación de la Escala de Dificultades en la Regulación Emocional en la población universitaria de Córdoba, Argentina. Universitas Psychologica 13: 15-26
16. Côté G, Gosselin P, Dagenais I (2013) Évaluation multidimensionnelle de la régulation des émotions: propriétés psychométriques d'une version francophone du Difficulties in Emotion Regulation Scale. Journal de Thérapie Comportementale et Cognitive 23: 63-72.
17. Coutinho J, Ribeiro E, Ferreirinha R, Dias P (2009) The Portuguese version of the Difficulties in Emotion Regulation Scale and its relationship with psychopathological symptoms. Revista de Psicología Clínica 37: 145-151.
18. Tejeda M, García R, González-Forteza C, Palos P (2012) Propiedades psicométricas de la escala "Dificultades en la Regulación Emocional" en español (DERS-E) para adolescentes mexicanos. Salud Ment 35: 521-526.
19. Neumann A, van Lier PA, Gratz KL, Koot HM (2010) Multidimensional assessment of emotion regulation difficulties in adolescents using the Difficulties in Emotion Regulation Scale. Assessment 17: 138-149.
20. Bardeen J, Fergus T, Orcutt H (2012) An examination of the latent structure of the difficulties in emotion regulation scale. J Psychopathol Behav Assess 34: 382-392.
21. Fowler JC, Charak R, Elhai JD, Allen JG, Frueh BC, et al. (2014) Construct validity and factor structure of the difficulties in Emotion Regulation Scale among adults with severe mental illness. J Psychiatr Res 58: 175-180.
22. Perez J, Venta A, Garnaat S, Sharp C (2012) The difficulties in emotion regulation scale: factor structure and association with nonsuicidal self-injury in adolescent inpatients. J Psychopathol Behav Assess 34: 393-404.
23. Hervás G, Jódar R (2008) Adaptación al castellano de la Escala de Dificultades en la Regulación Emocional. Clínica y Salud 19: 139-156.
24. Cooper JL, O'Shea AE, Atkinson MJ, Wade TD (2014) Examination of the difficulties in emotion regulation scale and its relation to disordered eating in a young female sample. Int J Eat Disord 47: 630-639.
25. Kökönyei G, Urbán R, Reinhardt M, Józan A, Demetrovics Z (2014) The difficulties in emotion regulation scale: factor structure in chronic pain patients. J Clin Psychol 70: 589-600.
26. Ruganci R, Gencöz T (2010) Psychometric properties of a Turkish version of the difficulties in emotion regulation scale. J Clin Psychol 66: 442-455.
27. Giromini L, Velotti P, de Campora G, Bonalume L, Cesare Zavattini G (2012) Cultural adaptation of the difficulties in emotion regulation scale: Reliability and validity of an Italian version. J Clin Psychol 68: 989-1007.

28. Sighinolfi C, Norcini A, Rocco L (2010) Difficulties in emotion regulation scale (DERS): The Italian translation and adaptation. Psicoterapia Cognitiva Comportamentale 16: 141-170.

29. Muris P (2001) A brief questionnaire for measuring self-efficacy in youths. J Psychopathol Behav Assess 23: 145-149.

30. Zullig K, Matthews-Ewald M, Valois R (2016) Weight perceptions, disordered eating behaviors, and emotional self-efficacy among high school adolescents. Eat Behav 21: 1-6.

31. Suveg C, Zeman J (2004) Emotion regulation in children with anxiety disorders. J Clin Child Adolesc Psychol 33: 750-759.

32. van der Velde J, Servaas M, Goerlich K, Bruggeman R, Horton P, et al. (2013) Neural correlates of alexithymia: A meta-analysis of emotion processing studies. Neurosci Biobehav Rev 37: 1774-1785.

33. Etkin A, Egner T, Kalisch R (2011) Emotional processing in anterior cingulate and medial prefrontal cortex. Trends Cogn Sci 15: 85-93.

34. Moeller S, Froböse M, Konova A, Misyrlis M, Parvaz M, et al. (2014) Common and distinct neural correlates of inhibitory dysregulation: Stroop fMRI study of cocaine addiction and intermittent explosive disorder. J Psychiatr Res 58: 55-62.

35. Buckholdt K, Parra G, Jobe-Shields L (2010) Emotion dysregulation as a mechanism through which parental magnification of sadness increases risk for binge eating and limited control of eating behaviors. Eat Behav 11: 122-126.

36. Glenn CR, Klonsky ED (2009) Emotion dysregulation as a core feature of borderline personality disorder. J Pers Disord 23: 20-28.

37. Snorrason I, Smari J, Olafsson R (2010) Emotion regulation in pathological skin picking: Findings from a non-treatment seeking sample. J Behav Ther Exp Psychiatry 41: 238-245.

38. Soenke M, Hahn K, Tull M, Gratz K (2010) Exploring the relationship between childhood abuse and analogue generalized anxiety disorder: The mediating role of emotion dysregulation. Cognit Ther Res 34: 401-412.

39. Staples AM, Mohlman J (2012) Psychometric properties of the GAD-Q-IV and DERS in older, community-dwelling GAD patients and controls. J Anxiety Disord 26: 385-392.

40. Furr M (2011) Scale construction and psychometrics for social and personality psychology. Sage, London.

41. Brown T (2006) Confirmatory factor analysis for applied research. Guilford Press, New York.

42. Browne M, Cudeck R (1993) Alternative ways of assessing model fit. In Bollen K, Long J (eds.) Testing Structural Equation Models. Sage, Newbury Park. California

43. Hu L, Bentler P (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Modeling 6: 1-55.

44. Costa DS (2015) Reflective, causal, and composite indicators of quality of life: A conceptual or an empirical distinction? Qual Life Res 24: 2057-2065.

45. Kelloway E (1995) Structural equation modelling in perspective. J Organ Behav 16: 215-224.

46. Cheung G, Rensvold R (2002) Evaluating goodness-of-fit indexes for testing measurement invariance. Struct Equ Modeling 9: 233-255.

47. García M, Castellana N, Rapelli C, Koegel L, Catalano M (2014) Criterios de información y predictivos para la selección de un modelo lineal mixto. Saberes 6: 61-76.

48. Bozdogan H (1987) Model selection and Akaike's information criterion (AIC): The general theory and its analytical extensions. Psychometrika 52: 345-370.

49. Nunnally J, Bernstein I (1995) Teoría psicométrica. McGraw-Hill, Madrid.

50. Hervás G, Vázquez C (2006) La regulación afectiva: modelos, investigación e implicaciones para la salud mental y física. Rev Psicol Gen Apl 59: 9-36.

51. Paulhus D (1991) Measurement and control of response bias. In Robinson J, Shaver P, Wrightsman L (eds.) Measures of Personality and Social Psychological Attitudes. Academic Press, San Diego, California.

52. Weijters B, Baumgartner H, Schillewaert N (2013) Reversed item bias: an integrative model. Psychol Methods 18: 320-334.

53. Gross J, John O (2003) Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. J Pers Soc Psychol 85: 348-362.

54. Salovey P, Mayer J, Goldman S, Turvey C, Palfai T (1995) Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In Pennebaker J (ed.) Emotion, Disclosure, and Health. American Psychological Association, Washington, DC.

Citation: Medrano LA, Trógolo M (2016) Construct Validity of the Difficulties in Emotion Regulation Scale: Further Evidence Using Confirmatory Factor Analytic Approach. Abnorm Behav Psychol 2: 117. doi:10.4172/2472-0496.1000117