

Psychometric Properties of Turkish Version of Difficulties in Emotion Regulation Scale-Brief Form (DERS-16)

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Abstract This study aimed to investigate the factor structure of the Difficulties in Emotion Regulation Scale-Brief Form (DERS-16) in a Turkish sample. It also aimed to determine whether the factor structure of the scale was equivalent across gender. The sample consisted of 316 undergraduate students (169 females and 147 males) aged between 18 and 28 years. Participants were asked to complete the DERS-16, Brief Symptom Inventory, Acceptance and Action Questionnaire-II, and Berkeley Expressivity Scale. Confirmatory factor analysis was conducted to investigate the factor structure of DERS-16, while multiple-group confirmatory factor analysis was carried out to test measurement invariance across sex. The results showed DERS-16 to exhibit robust psychometric properties, while its five-factor structure was equivalent across gender. DERS-16 scores were found to be significantly correlated with various psychological symptoms, emotional avoidance, and emotional expressivity. Furthermore, female participants scored higher than males on both overall DERS-16 and its Goals, Strategies, and Non-acceptance subscales. Taken together, these findings suggest that DERS-16 is a valid and reliable self-report measure of emotional dysregulation that exhibits cross-cultural validity in a Turkish sample.

Keywords Emotion regulation difficulties · Validity · Reliability · Measurement invariance · DERS-16

Emotion regulation has been defined as “intrinsic and extrinsic processes which are responsible for monitoring, assessing

and changing emotional reactions in order to obtain individuals’ goals” (Thompson 1994, pp. 27–28). Similarly, Gross (1998) states that emotion regulation is a process that influences what emotions people have, when and how they experience them, and how they express them. In order to conceptualize emotion regulation more comprehensively, Gratz and Roemer (2004) proposed, on the basis of previous studies, that ability to regulate emotions comprises various components. These components involve “awareness and understanding of emotions, acceptance of emotions, ability to control impulsive behaviors and to behave in accordance with desired goals when experiencing negative emotions, and the ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands” (Gratz and Roemer 2004, p. 42).

Effective use of emotion regulation skills has great importance in terms of individuals’ psychological wellbeing and functioning (Berking and Whitley 2014; Bridges et al. 2004). However, these skills may not always be practiced in a healthy way; therefore, difficulties in understanding, perceiving, and regulating emotions may lead individuals to experience or suffer emotional or psychological problems (Cicchetti et al. 1995; Gratz and Roemer 2004; Gross and Jazaieri 2014; Kring and Werner 2004; Werner and Gross 2010). More specifically, difficulties in emotion regulation have been shown to be associated with depression (Aldao et al. 2010; Berking et al. 2014; Ehring et al. 2010), anxiety disorders (Aldao et al. 2010; Bardeen and Fergus 2014; Mennin et al. 2005; Mennin et al. 2009; Salters-Pedneault et al. 2006), self-harm (Gratz and Roemer 2004; Gratz and Roemer 2008), borderline personality disorder (Gratz et al. 2006; Linehan 1993), post-traumatic stress disorder (Ehring and Quack 2010; Tull et al. 2007), and alcohol/substance use disorder (Fox et al. 2007; Fox et al. 2008).

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Gratz and Roemer (2004) developed the “Difficulties in Emotion Regulation Scale (DERS)” to comprehensively evaluate various aspects of emotion regulation difficulties that pose relatively serious threats to psychological health or functioning. The 36-item scale is a self-report instrument comprising six subscales. These subscales are Awareness (lack of emotional awareness), Clarity (lack of emotional clarity), Non-acceptance (non-acceptance of emotional responses), Strategies (limited access to emotion regulation strategies), Impulse (impulse control difficulties), and Goals (difficulties engaging in goal-directed behavior). In their study, Gratz and Roemer (2004) reported that the six-factor structure of the scale yielded valid and reliable results. Furthermore, they found that the overall DERS score and subscale scores were correlated with negative mood regulation, emotional expressivity, and emotional avoidance, as well as clinically relevant measures such as self-harm and intimate partner abuse. Many studies conducted with non-clinical and clinical samples have also supported the validity and reliability of the scale (e.g. Bardeen et al. 2012; Fowler et al. 2014; Giromini et al. 2012; Lee et al. 2016; Neumann et al. 2010; Perez et al. 2012; Tull et al. 2007). Furthermore, studies have found that scores measured by the DERS and its subscales are sensitive to treatment effects, in that they are lower following treatments aimed at regulating emotions. For example, in a sample of women with substance dependence and bipolar personality disorder (BPD), improvements in emotion regulation and substance use problems following dialectic behavioral therapy were investigated. The results showed as emotion regulation improved, so the frequency of substance use decreased (Axelrod et al. 2011). Another study conducted on female outpatients with BPD and reporting recent deliberate self-harm revealed that changes in emotion dysregulation during emotion regulation group therapy resulted in reductions in BPD symptoms and deliberate self-harm behaviors (Gratz et al. 2015). Taken together, these findings suggest that DERS is a valid and reliable instrument for identifying emotion dysfunction, and is of clinical utility in the treatment of psychological disorders.

On the basis of its clinical utility, functionality, and effectiveness in planning treatments for various psychopathologies, Bjureberg et al. (2016) generated a 16-item version of the scale (DERS-16), removing the Awareness subscale and reducing the number of items from 36. Previous studies had concluded that the Awareness subscale had lower correlations with the other DERS subscales (Bardeen et al. 2012; Fowler et al. 2014; Gratz and Roemer 2004; Neumann et al. 2010; Tull et al. 2007). More specifically, Bardeen et al. (2012) proposed that the Awareness subscale might not in fact be measuring the same underlying construct as that measured by the other DERS subscales. Hence, DERS-16 comprises five subscales, namely Clarity, Goals, Impulse, Strategies, and Non-acceptance. This five-factor scale was found to have good reliability ($\alpha = .92$) and to be highly correlated with DERS ($r = .93$). Bjureberg’s

study also provided evidence of its construct validity, showing the overall DERS-16 score to be associated with depression, anxiety and stress, and self-harm behaviors (Bjureberg et al. 2016). In another study (Miguel et al. 2016) examining the psychometric properties of DERS and DERS-16, Cronbach’s alphas of DERS-16 scores ranged from .80 to .87, while its five-factor structure was verified by confirmatory factor analysis (CFA). The same study even suggested that using DERS-16 might be preferable to using DERS.

DERS has commonly been used to conceptualize emotion dysregulation and has provided substantial information concerning the planning and course of treatment (Gratz and Tull 2011; Gratz 2007; Gratz et al. 2014). In this respect, examining various components of DERS in different cultural contexts presents an important opportunity to identify typical features of emotion regulation. Furthermore, a scale that is valid and reliable across different cultures underscores its relevance and importance in identifying and measuring the target construct (Miguel et al. 2016). Several studies in different cultures have highlighted the cross-cultural adaptability of DERS (e.g., Giromini et al. 2012; Miguel et al. 2016; Neumann et al. 2010). Similarly, the psychometric properties of DERS have also been examined in Turkish adult (Rugancı and Gençöz 2010) and adolescent (Sartaş-Atalar et al. 2015) samples. Moreover, recent studies conducted with Turkish samples have highlighted the mediating role of emotion regulation difficulties. For example, in a sample of 246 male gambler, overall DERS score was found to be a significant partial mediator in the relationship between alexithymia and pathological gambling (Elmas et al. 2017). Another study demonstrated that emotion regulation difficulties mediated the relationship between childhood traumas and depression, and post-traumatic stress symptoms (Alpay et al. 2017). Overall, these studies have indicated that Turkish versions of DERS support the original factor structure proposed by Gratz and Roemer (2004), thereby establishing its cross-cultural validity and clinical relevance.

To sum up, the present study aims to investigate the psychometric properties of DERS-16 in a sample of undergraduate students. For this purpose, the five-factor structure of DERS-16 (Clarity, Goals, Impulse, Strategies, and Non-acceptance) was tested using CFA. Furthermore, in order to test whether its factor structure is equivalent across male and female participants, multiple-group confirmatory factor analysis (measurement invariance) was conducted. Finally, correlations between difficulties in emotion regulation and psychological symptoms (subscales of the Brief Symptom Inventory-BSI), emotional expressivity, and emotional avoidance were also examined to provide evidence of its construct validity and clinical relevance. Investigating the factor structure of DERS-16 in a Turkish sample will strengthen its cross-cultural utilization, in turn enabling cross-cultural comparisons to be made, facilitating Turkish clinical practice and research in emotion regulation, and resulting in an easier (i.e. shorter) form to administer.

Method

Sample

Our sample consisted of 316 undergraduate students from various departments of Ankara University, aged between 18 and 28 years ($M = 21.23$, $SD = 2.10$). Of these participants, 53.5% were female ($N = 169$) and 46.5% were male ($N = 147$).

Measures

Difficulties in Emotion Regulation Scale-Short Form (DERS-16) The scale is a 16-item self-report measure, developed by Bjureberg et al. (2016) as a brief form of DERS (Gratz and Roemer 2004). DERS-16 is used to evaluate various aspects of emotion regulation difficulties. It comprises five subscales, namely Clarity (e.g., “I have difficulty making sense of my feelings”), Goals (e.g., “When I’m upset, I have difficulty getting work done”), Impulse (e.g., “When I’m upset, I feel out of control”), Strategies (e.g., “When I’m upset, I start to feel very bad about myself”), and Non-acceptance (e.g., “When I’m upset, I feel like I am weak”). As with DERS, the items in DERS-16 are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). Higher scores indicate greater emotion dysregulation. In Bjureberg et al.’s (2016) original study, DERS-16 showed excellent internal consistency ($\alpha = .92$) and good test-retest reliability ($r = .85$).

Turkish Translation of DERS-16 First we obtained permission to translate DERS into Turkish from the corresponding author in Bjureberg et al.’s (2016) original study. Next, the Turkish items of DERS-16 were extracted from the Turkish version of DERS, again with the corresponding author’s permission (Rugancı and Gençöz 2010). Thereafter, the scale was back-translated by two bilingual researchers. Both the Turkish and back-translated versions of DERS-16 were sent via email to the corresponding author for DERS-16 (Johan Bjureberg) to review. Based on feedback from both Johan Bjureberg and Professor Kim Gratz (one of the developers of DERS), the Turkish DERS-16 was then finalized.

Brief Symptom Inventory (BSI) The BSI is a 53-item self-report inventory, developed by Derogatis (1993) as a brief form of Symptom Checklist (SCL-90). It is used to assess individuals’ psychological symptoms. The items of BSI are rated on a 5-point Likert scale ranging from 1 (not at all) to 5 (extremely). The Turkish version of the scale has five symptom dimensions: depression (e.g. “feeling lonely”), anxiety (e.g. “feeling tense of keyed up”), negative-self (e.g. “feeling blocked in getting things done”), somatization (e.g. “feeling weak in parts of body”), and hostility (e.g. “getting into frequent arguments”) (Durak-Batıgün et al. 2002; Şahin and Durak 1994). Higher scores indicate a greater increase in

psychological symptom severity. Research conducted with university students demonstrated satisfactory internal consistency, ranging from .75 to .88 for the subscales (Şahin and Durak 1994). In the present study, Cronbach alpha coefficients of the subscales ranged from .80 to .91.

Acceptance and Action Questionnaire II (AAQ-II) The AAQ-II is a self-report measure, developed by Bond et al. (2011) to assess acceptance, psychological flexibility, and experiential avoidance. The items of the scale (e.g. “I am afraid of my feelings”) are rated on a 7-point Likert scale ranging from 1 (never true) to 7 (always true). Higher scores indicate higher levels of psychological avoidance.

The scale was adapted for Turkish use by Meunier et al. (2014). This adaptation yielded a single factor consisting of 7 items. Scores on the scale were found to be associated with depression, anxiety, and thought suppression. Meunier et al. (2014) found its internal consistency to be .88, its test-retest reliability .78. These results show it to be a reliable and valid measure of psychological avoidance. In the present study, Cronbach’s alpha of the total AAQ-II was .89.

Berkeley Expressivity Questionnaire (BEQ) Developed by Gross and John (1995), the BEQ is a 16-item self-report measure with three subscales: Positive Expressivity (e.g. “When I am happy, my feelings show”), Negative Expressivity (e.g. “It is difficult for me to hide my fear”), and Impulse Strength (e.g. “I sometimes cry during sad movies”). Each item is rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Gross and John 1995). Higher scores indicate greater emotional expressivity. The questionnaire was adapted for Turkish use by Akın (2011); Cronbach’s alpha coefficients ranged from .74 to .88, the test-retest reliability coefficients from .66 to .85. In the present study, we used total BEQ score as a measure of emotional expressivity. Cronbach’s alpha of the BEQ was calculated as .81.

Procedure

The present study was approved by the Ethics Committee of Ankara University. All participants were given an informed consent form that included the aim of the study, and were told that they were free to leave the study at any time. They received no payment for their participation. Data collection was carried out in classroom settings. Once subjects voluntarily agreed to participate they were given the questionnaires to complete, which took approximately 15 min.

Data Analysis

In order to examine the psychometric properties of DERS-16, confirmatory factor analysis (CFA) was conducted. Furthermore, multiple-group CFA was performed to

examine whether the factor structure of DERS-16 would be invariant across male and female participants, using Analysis of Moment Structures (AMOS) 21 statistical package software. Cronbach's alpha coefficients were calculated to assess the internal consistency of overall DERS-16 and its subscales. In addition, Pearson's correlation analysis was conducted to examine the relationship between DERS-16 scores and other psychological or emotional measures. In order to compare the scores on DERS-16 of male and female participants, independent sample *t*-tests were carried out.

Results

Descriptive Statistics

The items in DERS-16 and the other continuous variables in the present study were determined as being within the acceptable range of normality (Tabachnick and Fidell 2001). Descriptive statistics for DERS-16 for the total sample and the two gender groups are presented in Table 1. As Table 1 shows, there were statistically significant differences between male and female participants in terms of emotion dysregulation.

More specifically, females scored higher than males on the subscales of Goals, Strategies, and Non-acceptance. For each significant difference, the effect size (Cohen-*d* statistic; Cohen 1988) was calculated. The results showed that the effect sizes of these differences were medium (0.5 for Goals, 0.4 for Strategies, and 0.4 for Non-acceptance), indicating relatively substantial differences in emotion regulation difficulties between males and females.

Factor Structure of DERS-16

CFA was conducted to investigate the psychometric properties of the Turkish DERS-16 in a sample of undergraduate students. Accordingly, the proposed five-factor structure of DERS-16, which is allowed to be correlated, was tested using

CFA with maximum likelihood estimation method and covariance matrices. For an acceptable model fit, the following criteria were determined: Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Tucker-Lewis Index (TLI) greater than or equal to .90; Chi-square/degrees of freedom (χ^2/df) lower than 3; and Root Mean Square Error of Approximation (RMSEA) of .05 or less (Byrne 2016; Hu and Bentler 1999; Kelloway 1998; Kline 2005). A chi-square difference test was used to compare the nested models (Steiger et al. 1985; Tabachnick and Fidell 2001).

CFA results indicated that the model fit the data well ($\chi^2(df = 94, N = 316) = 258.250$, $\chi^2/df = 2.75$, CFI = .94, GFI = .91, TLI = .93, RMSEA = .07). All factor loadings of the 16 items on their own factors were found to be significant ($p < .001$). The factor loadings and standard errors of the items are presented in Table 2. Based on the suggested modification indices, error variances of the items on the same factor were correlated. Accordingly, three correlated errors (items 5–6, 5–14, and 12–14) were included in the model. A χ^2 difference test was carried out following each correlation (Tabachnick and Fidell 2001) and all modifications made statistically significant differences to the model's fit (p for $\Delta\chi^2 < .05$), resulting in a better fit of the data ($\chi^2(df = 91, N = 316) = 229.124$, $\chi^2/df = 2.52$, CFI = .95, GFI = .92, TLI = .94, RMSEA = .07). The intercorrelations and covariances among the subscales of DERS-16 are shown in Table 3.

Reliability of DERS-16

To analyze internal consistency and reliability, Cronbach's alpha coefficients were calculated for overall score and each subscale of DERS-16. The internal consistency coefficients were found to be .92 for overall DERS-16, .84 for Clarity, .84 for Goals, .87 for Impulse, .87 for Strategies, and .78 for Non-acceptance, which are also presented in Table 2. Split-half reliability was also calculated for overall DERS-16. The Guttman split-half coefficient was .88, while Cronbach's alpha coefficients were found to be .86 and .88 for the two randomly divided parts of the scale.

Table 1 Descriptive statistics of DERS-16

	Total sample		Male (N = 147)		Female (N = 169)		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
DERS-16 total	38.71	12.76	35.79	11.45	41.26	13.32	−3.83***
Clarity	4.91	1.88	4.74	1.94	5.06	1.82	−1.50
Goals	9.42	3.06	8.55	2.91	10.17	2.98	−4.88***
Impulse	6.40	3.04	6.30	2.94	6.48	3.31	−.53
Strategies	11.40	4.94	10.30	4.35	12.36	5.23	−3.77***
Non-acceptance	6.58	3.02	5.90	2.52	7.17	3.29	−3.84***

*** $p < .001$

Table 2 Factor loadings, standard errors, and Cronbach’s alphas of DERS-16 subscales

Factor	Item	Factor loading	SE	Cronbach’s alpha
Clarity	1 I have difficulty making sense out of my feelings.	.77	0.06	.84
	2 I am confused about how I feel.	.95	0.07	
Goals	3 When I am upset, I have difficulty getting work done.	.71	0.06	.84
	7 When I am upset, I have difficulty focusing on other things.	.85	0.05	
	15 When I am upset, I have difficulty thinking about anything else.	.83	0.06	
Impulse	4 When I am upset, I become out of control.	.83	0.05	.87
	8 When I am upset, I feel out of control.	.82	0.06	
	11 When I am upset, I have difficulty controlling my behaviors.	.86	0.05	
Strategies	5 When I am upset, I believe that I will remain that way for a long time.	.78	0.06	.87
	6 When I am upset, I believe that I’ll end up feeling very depressed.	.75	0.06	
	12 When I am upset, I believe that there is nothing I can do to make myself feel better.	.68	0.06	
	14 When I am upset, I start to feel very bad about myself.	.77	0.06	
	16 When I am upset, my emotions feel overwhelming.	.83	0.06	
Nonacceptance	9 When I am upset, I feel ashamed with myself for feeling that way.	.74	0.06	.78
	10 When I am upset, I feel like I am weak.	.76	0.07	
	13 When I am upset, I become irritated with myself for feeling that way.	.71	0.07	

SE, Standard error

Validity of DERS-16

In order to examine the construct validity of DERS-16, correlations between DERS-16 scores and measures on emotional expressivity and emotional avoidance (inflexibility) were computed. As shown in Table 4 and consistent with our expectations, overall DERS-16 score and its subscales were all significantly correlated with emotional avoidance, in accordance with Gratz and Roemer’s (2004) findings. Furthermore, overall DERS-16 score and Clarity, Strategies, and Non-acceptance subscales were negatively correlated with emotional expressivity. Goals and Impulse were also slightly correlated with emotional expressivity.

We also computed correlations between DERS-16 scores and measures of psychological distress (subscales of BSI) to examine the predictive validity of DERS-16. The results

showed that there were positive and strong correlations between all the subscales of BSI and all DERS-16 scores, ranging from .28 to .69.

Measurement Invariance across Sex

Multiple-group CFA was conducted to determine whether the factor structure of DERS-16 was invariant across female and male participants. For this analysis, the steps proposed by Brown (2006, pp. 269-270) were followed. First, two CFAs were conducted for male and female participants separately. The results of these analyses yielded good fit indices for both samples: (Females: $\chi^2(df = 91, N = 169) = 169.934$, $\chi^2/df = 1.87$, CFI = .96, GFI = .90, TLI = .94, RMSEA = .07; Males: $\chi^2(df = 91, N = 147) = 181.703$, $\chi^2/df = 2.00$, CFI = .92, GFI = .86, TLI = .89, RMSEA = .08). Next, measurement invariance was tested on models with equality constraints, namely configural invariance, metric invariance, factor covariance invariance, and error invariance. Configural invariance (Model 1) refers to the model with no equality constraints, incorporating baseline models for males and females simultaneously. Configural invariance models must have an acceptable fit; this is a prerequisite for proceeding to the analysis of measurement invariance. As shown in Table 5, configural invariance here did have an acceptable fit in relation to the data. Next we specified a metric invariance model (Model 2), in which factor loadings are constrained to be equal across groups. Third, we specified a factor covariance invariance model (Model 3), in which factor covariance is constrained to be equal across groups. Finally, an error variance invariance model (Model 4) in which error variances are

Table 3 Intercorrelations and factor covariances between DERS-16 scores

	1	2	3	4	5	6
1. DERS-16 total	1	–	–	–	–	–
2. Clarity	.52**	1	.40***	.36***	.42***	.39***
3. Goals	.80**	.35**	1	.69***	.78***	.61***
4. Impulse	.82**	.30**	.59**	1	.78***	.68***
5. Strategies	.91**	.37**	.67**	.69**	1	.73***
6. Non-acceptance	.77**	.32**	.49**	.56**	.61**	1

Factor covariances between DERS-16 scores presented bold

** $p < .01$, *** $p < .001$

Table 4 Correlations between DERS-16 subscales and subscales of BSI, AAQ-II, and BES

	DERS-16					
	DERS-16 total	Clarity	Goals	Impulse	Strategies	Non-acceptance
Emotional avoidance	.69**	.47**	.55**	.49**	.65**	.50**
Emotional expressivity	-.28**	-.32**	-.16*	-.14*	-.29**	-.22**
BSI						
Anxiety	.65**	.43**	.48**	.50**	.62**	.49**
Depression	.62**	.45**	.48**	.40**	.62**	.44**
Negative self	.69**	.43**	.49**	.50**	.66**	.55**
Somatization	.48**	.39**	.33**	.36**	.44**	.37**
Hostility	.58**	.28**	.39**	.56**	.55**	.40**

* $p < .05$, ** $p < .01$. BSI, Brief Symptom Inventory

the same across groups was specified (Byrne 2016). The fit indices of the models are presented in Table 5.

A χ^2 difference test was used to compare the nested models with equality constraints (Brown 2006). Significant results for a χ^2 difference test indicate that a model with a smaller χ^2 has a statistically better fit (Hu and Bentler 1999). As shown in Table 5, χ^2 difference values were insignificant for each constrained model, indicating that the factor structure of DERS-16 was invariant across males and females. CFI and RMSEA values are also used to compare nested models (Chen 2007; Cheung and Rensvold 2002); Δ CFI values of less than 0.010 and Δ RMSEA values of less than 0.015 indicate that a model is completely invariant (Chen 2007). In the present study, Δ CFI and Δ RMSEA values did not exceed .01. Taken together, these findings indicate that the five-factor structure of DERS-16 fit the data equally for male and female participants.

Discussion

The present study investigated the factor structure of DERS-16, a self-report measure of various aspects of emotion dysregulation, in a sample of Turkish undergraduate students. The correlated five-factor structure of the scale, proposed by

Bjureberg et al. (2016), was verified in our sample using CFA. In terms of our reliability analysis, DERS-16 demonstrated good to excellent internal consistency and split-half coefficients for overall DERS-16 and its subscales. Consistent with the findings of the original study (Bjureberg et al. 2016) and those of another (Miguel et al. 2016), our results showed DERS-16 scores to demonstrate adequate psychometric properties, indicating that the scale is a valid and reliable self-report measure of emotion dysregulation.

Specifically, the findings of the present study provide evidence of the validity of DERS-16. As an indicator of its construct validity, as expected we found significant positive correlations between all DERS-16 scores and emotional avoidance—the latter indicating the occurrence of experiential avoidance, involving escaping from specific events such as affects, thoughts, memories, and bodily sensations experienced as aversive (Hayes et al. 1996). In addition, DERS-16 scores were negatively correlated with emotional expressivity—the latter referring to behavioral changes relevant to the experience of distinct emotions (Gross and John 1995). Taken together, these correlations suggest that DERS-16 is a valid measure for conceptualizing emotion dysregulation. Consistent with this finding Gratz and Roemer (2004) also reported significant correlations between emotional avoidance and emotional expressivity, and DERS scores.

Table 5 Fit indices for the models across males and females

Model	χ^2	df	χ^2/df	$\Delta\chi^2$	Δdf	CFI	RMSEA
Model 1	448.251	222	2.019	—	—	.921	.057
Configural invariance							
Model 2	448.262	223	2.010	.010	1	.921	.057
Metric invariance							
Model 3	448.902	224	2.004	.651	2	.922	.057
Factor covariance invariance							
Model 4	456.470	227	2.011	8.219	5	.920	.057
Error variance invariance							

CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; df , degrees of freedom

As for its predictive validity, we found correlations between DERS-16 scores and BSI scores (depression, anxiety, negative self, somatization, and hostility). As noted earlier, numerous studies over the past decades have found that difficulties in regulating emotions are associated with various psychological disorders and maladaptive behaviors (e.g., Aldao et al. 2010; Cicchetti et al. 1995; Gratz and Tull 2011; Gross and John 1995; Linehan 1993; Mennin et al. 2009). In particular, it has been shown that emotion-relevant processes (e.g., rumination, expressional suppression) play a central and notable role in mood disorders and anxiety disorders (Aldao et al. 2010; Ehring et al. 2010; Mineka and Sutton 1992). Taken together, our findings support the notion that emotions and emotion regulation difficulties underlie the development and persistence of various psychological problems, verifying their clinical relevance to emotions and emotion dysregulation and providing evidence for the predictive validity of DERS-16.

The present study also aimed to determine whether the proposed structure of DERS-16 is appropriate to use with both males and females. Our results showed that the factor structure of DERS-16 was equivalent (invariant) across male and female participants. In other words, all items of DERS-16 evaluate the underlying construct among males and females similarly, demonstrating that the scale is not biased against males or females. This finding supports the generalizability of the scale's construct validity across male and female participants in our sample. The authors of the original study of DERS-16 (Bjureberg et al. 2016) emphasized that their samples consisted mainly of women, and therefore their results provided no information on their generalizability to men. To the best of our knowledge only one study, using an adolescent sample (Neumann et al. 2010), has investigated measurement invariance of DERS (Gratz and Roemer 2004) on the basis of its subscales. This study more or less supports our results, demonstrating that in contrast with the other subscales those of Clarity, Impulse, and Strategies yielded strong factorial invariance.

With regard to gender differences in emotion regulation difficulties, we found that females scored significantly higher than male respondents on the subscales of Goals, Strategies, and Non-acceptance. Consistent with these findings, previous studies have generally shown females to record significantly higher scores than males for difficulties engaging in goal-directed behavior (Goals) and accepting emotional responses (Non-acceptance) (Miguel et al. 2016; Neumann et al. 2010; Saritaş-Atalar et al. 2015). On the other hand, other studies have found no significant difference in DERS scores between males and females (e.g., Giromini et al. 2012; Miguel et al. 2016; Rugancı and Gençöz 2010) or have found males reporting significantly higher levels of Awareness (not included in DERS-16) than females reported (Neumann et al. 2010; Saritaş-Atalar et al. 2015). In order to clarify these inconsistent findings on gender differences in emotion dysregulation, these differences should be considered in future research.

Given its clinical utility and relevance, measuring emotion regulation difficulties has become crucial in terms of treatment planning for clinical disorders. Berking et al. (2008) reported that acceptance, tolerance, and active modification of emotions were important in terms of mental health and treatment outcome. Furthermore, several studies found that emotion regulation-targeted treatments contributed to decreases in DERS scores (Gratz et al. 2015; Gratz et al. 2014; Gratz and Tull 2011). In another study, conducted on a sample of women with substance dependence and borderline personality disorder, emotion regulation difficulties (overall score and scores for Impulse, Awareness, Clarity, and Strategies) decreased significantly during treatment (Axelrod et al. 2011). These studies stress the importance of dealing with emotion dysregulation in the course of psychological treatment. In our study, we also found that difficulties in emotion regulation were associated with the development of various psychological disorders. Hence, through our study we provide further support for the use of DERS-16 in conceptualizing emotion regulation difficulties in clinical settings, having demonstrated that it has good construct validity and high internal consistency.

Although the current study provided evidence of the psychometric soundness of DERS-16 in a sample of undergraduate students in a Turkish culture, it has several limitations that should be addressed in future research. First, like those of many previous studies our sample consisted of university students aged between 18 and 28 who have relatively few difficulties in emotion regulation. Future research is needed to investigate the factor structure of DERS-16 in a sample whose age range is broader, in order to extend the generalizability of the findings to other age groups. Similarly, an examination of the psychometric properties of DERS-16 should be conducted on a clinical population, i.e., one experiencing greater emotion regulation difficulties compared with that experienced by a normal population, to provide information for clinical practice and specific, targeted interventions. Second, with regard to the reliability analysis we were unable to conduct a test-retest because of timing problems. Future research is required to carry out a test-retest of DERS-16 in order to provide further evidence of its robustness. Third, all the measures in this study were based on self-report questionnaires and thus the possibility that some element of bias might have affected the validity of the conclusions should be borne in mind. Fourth, although the present study provides information about the cross-cultural validation of DERS-16, it did not aim to compare scores of emotion dysregulation in different cultural contexts. Further research involving the conduct of multiple-group analyses may help to reveal possible cultural differences in emotion regulation.

Nevertheless, the results of the present study support the use of the five-factor structure of DERS-16 in a sample of undergraduate students and suggest that it is a promising tool for identifying emotion regulation difficulties that are particular to certain psychological problems. Further, it has contributed

to existing literature on the cross-cultural validity of DERS-16. Taking these findings together, we believe that our study can help to facilitate Turkish research on emotion regulation, promote cross-cultural feasibility of DERS-16, and provide an intervention basis for clinically relevant difficulties.

Compliance with Ethical Standards

Conflict of Interest On the behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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