



Psychometric Properties of the Persian Version of the Perth Emotional Regulation Competency Inventory

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Abstract

Background and Objective: The Perth Emotional Regulation Competency Inventory (PERCI) was designed to assess healthy and unhealthy behavioral responses to maladaptive conditions and stressful life events. The current study aimed to investigate the psychometric properties of the PERCI in a sample of Iranian students.

Materials and Methods: In order to evaluate the psychometric properties of PERCI, 379 (including 201 males and 178 females) students of Kermanshah University of Medical Sciences (KUMS) were selected using the available sampling method (between June 2018 and Feb 2019). Subjects completed the PERCI, Cognitive Emotion Regulation Questionnaire (CERQ), Difficulties in Emotion Regulation Scale (DERS), Penn State Worry Questionnaire (PSWQ), and the Beck Anxiety Inventory (BAI). Thereafter, Cronbach's alpha coefficient, convergent and divergent validity, as well as confirmatory factor analysis, were performed using Lisrel (version 8.5) and SPSS (version 25) software packages.

Results: The participants' mean age was 25.31 ± 7.26 years, and the majority of them (53%) were female. The result of internal consistency of the total score and its subscales using Cronbach's alpha was calculated to be in the range of 0.66-0.94. The results of factor analysis supported the eight-factor structure of the PERCI for positive (controlling experience, inhibiting behavior, activating behavior, and tolerating emotions) and negative (controlling experience, inhibiting behavior, activating behavior, and tolerating emotions) emotion regulation strategies in the sample of Iranian students (RMSEA=0.07, CFI=0.90, NFI=0.89). Furthermore, the results pointed out that the positive factors of the PERCI had a positive and significant relationship with positive cognitive emotion regulation strategies ($P < 0.05$), and it displayed a negative and significant correlation with difficulties in emotion regulation, anxiety, and worry ($P < 0.05$).

Conclusions: In general, the results of the present study indicated the appropriate psychometric properties of the Persian version of PERCI. This inventory can be used in treatment interventions and future studies to access adaptive and maladaptive reactions.

Keywords: Competency, Emotional regulation, Reliability, Validity

Background

Gross defines emotion regulation as “the process through which individuals affect what emotion to have, when to experience it, and how to experience and express it” [1]. Adaptive emotional regulation entails awareness and experience of emotions, healthy and efficient evaluation of the emotional experiences, as well as suitable behavioral reactions to emotions [2]. The role of emotional regulation in psychopathology has received more attention in recent decades [3], and abnormal levels of positive or negative emotions have been pointed out among the diagnostic criteria for many disorders, such as eating disorders, depression, and anxiety [4]. On the other hand, difficulties in emotion regulation and failure to employ adaptive emotional regulation

strategies will result in emotional dysregulation. Emotional dysregulation plays a major role in the onset and persistence of a wide range of mental disorders, such as substance abuse, generalized anxiety disorder, post-traumatic stress disorder, and borderline personality [5].

Every individual goes through a variety of emotions and tries to deal with them in effective or ineffective ways. The significance of emotional regulation and management has increased in proper social and adaptive behavior over the recent decades [6]. Individuals' ability and competencies in regulating their emotions are among the significant concepts in the field of emotion regulation. Emotional Competency refers to the ability of understanding,

managing, and expressing the social and emotional aspects of one's life. It includes the methods of managing life tasks, such as learning, making connections, problem-solving, and adapting to the complex needs of self and others. These capabilities include self-awareness, impulse-control, cooperation, and caring for oneself and others as well [7]. According to Saarni, emotional competency is defined as the appropriate management of emotions in emotionally stimulating social interactions. In fact, what is deduced from various definitions of emotional competency is that it is a broad structure, including the comprehension and regulation of emotions [8]. Numerous studies have been conducted in the field of therapeutic applications [9] and the development of various emotional regulation strategies [10]. An abundance of tools has been introduced for the evaluation of emotional regulation ability and its components, among which the following could be mentioned: the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), Bar-On emotional intelligence [11], Schutt's self-report list [12], and Goleman's emotion quality list (ECI-360) [13]. Despite their positive aspects, each of these tools has its distinct limitations. One important limitation of emotional competency tools is that they are self-reported instead of evaluating skills. In fact, adults' self-reported emotional competency scales are only weakly correlated with skill tests [14]. On the other hand, all emotional-regulation evaluation tools employed so far have considerable limitations that confine their ability to generate a general index of emotions. These tools are mainly criticized for inconsistency with contemporary emotional regulation theories or failing to evaluate emotional regulation through a specific method (for instance, by putting positive and negative emotions together) [15].

The original version of the Emotional Regulation Competency Inventory (PERCI) was standardized by Preece et al. [10]. This 32-item questionnaire was developed based on Gross's extended process model in emotion regulation. Due to the limitations of other tools for the assessment of emotional competency, the present study sought to specify the psychometric properties of this inventory in a sample of Iranian students. Furthermore, the PERCI's standardization has been carried out in communities with distinct and individualistic cultures; therefore, the investigation of the psychometric properties of this inventory in communities with different cultures could help its external validity.

Objectives

The current study aimed to investigate the

psychometric properties of the PERCI in a sample of Iranian students.

Materials and Methods

The statistical population of the current study included all undergraduate students in Kermanshah University of Medical Sciences during the 2018-2019 academic year, and the study sample included 379 students (201 female and 178 male) that were randomly selected from the statistical population. The inclusion criteria for volunteers were 1. being a student and, 2. willingness to participate in the study. Individuals whose questionnaires were partially completed or not completed were excluded from the study. Participants were informed that their participation was voluntary and that they could withdraw from the study at any time. They were also informed about confidentiality, and informed consent was obtained from all participants.

The researcher attended the respective classes and provided the students with a sufficient explanation of the research objectives and the questionnaires. Regarding the sample size of studies by factor analysis, some references [16] have suggested a sample size of 5-10 people per item. Given that the PERCI consists of 32 items, a sample size of 379 cases appears to be sufficient. To standardize the PERCI, the questions were first translated into Persian and the mistakes in translation were then corrected by an English language Ph.D. student. The inventory was administered to several students as a pilot test so that ambiguities in the questions were identified and corrected for the final application. The internal consistency method (Cronbach's alpha) was used to examine the PERCI's reliability, and the following three methods were used to examine its validity: structural validity (confirmatory factor analysis), as well as convergent and divergent validity (examination of the PERCI's correlation with the questionnaires of emotional regulation, worry, social anxiety, and depression). Cronbach's alpha coefficient, convergent and divergent validity, as well as confirmatory factor analysis, were performed using Lisrel (version 8.5) and SPSS (version 25) software packages.

Perth Emotional Regulation Competency Inventory

Based on the extended process model of emotion regulation, Preece et al. developed an updated questionnaire that addressed many of the defects in previous tools. This questionnaire consists of 32 items and evaluates one's efficiency and competency in the regulation of positive and negative emotions. The

items are scored on a 7-point Likert scale. This questionnaire is composed of eight sub-scales, four of which are related to the regulation of negative emotions (negative-controlling experience, negative-inhibiting behavior, negative-activating behavior, negative-tolerating emotions), while four factors pertain to the regulation of positive emotions (positive-controlling experience, positive-inhibiting behavior, positive-activating behavior, positive-tolerating emotions). The results of the study by Preece et al. [10] indicated that this inventory had suitable psychometric properties and factor structure.

Cognitive Emotion Regulation Questionnaire

This 36-item questionnaire aims to evaluate the subscales of cognitive emotion regulation (self-blame, rumination, acceptance, positive refocusing, refocus on planning, positive reappraisal, perspective-taking, catastrophizing, and blaming of others). The cognitive emotion regulation questionnaire (CERQ) was developed by Garnefski, Kraaij, and Spinhoven [17] to evaluate the cognitive strategies each individual adopts after experiencing threatening events or stresses in life. Garnefski et al. (2001) used Cronbach's alpha coefficient to examine the psychometric properties of the CERQ and obtained coefficients of 0.91, 0.87, and 0.93, respectively. The test's reliability was also examined in Iran through the correlation of total score and subscale scores of the test, ranging from 0.40-0.68 with an average of 0.56, all of which were statistically significant [18].

Pennsylvania State Worry Questionnaire

Pennsylvania State Worry Questionnaire (PSWQ) consists of 16 items and is scored on a 5-point Likert scale (ranging from not at all true to completely true). The scores on this scale range from 16-80, with higher scores indicating higher levels of trait worry. The PSWQ has shown a good internal consistency (14). The Iranian PSWQ presented a high internal consistency (0.88) and test-retest reliability coefficient (0.79) [19].

Difficulty in Regulating Emotions Scale

This scale consists of 36 items which are scored on a 5-point Likert scale. Higher scores suggest more difficulties in emotional regulation [20]. The results of the exploratory factor analysis in the Iranian sample revealed eight factors for this scale, six of which were subordinate to the subscales in the scale of difficulty in regulating the emotions, and the other two factors were omitted due to the loading of only one item. Moreover, All subscales of this scale had a significant relationship with Beck Depression and Anxiety Questionnaire

($P < 0.05$) [21].

Beck's Anxiety Inventory (BAI)

Beck's Anxiety Inventory (BAI) is a tool for the assessment of general anxiety among a variety of disorders. The inventory is made up of 21 questions, is scored simply, and focuses on specific prevalent symptoms of anxiety, such as physical and cognitive symptoms. Good validity and internal consistency have been reported for BAI among clinical and non-clinical samples [22].

Results

The present study was conducted on 379 students with a mean age of 25.31 ± 7.26 years (age range: 18-52 years). In terms of gender, 201 (53%) cases were female and 178 (47%) subjects were male. Regarding marital status, 293 (77.3%) participants were single and 86 (22.7%) cases were married. The mean total score was 99.61 ± 28.68 .

The results of the independent t-test indicated that the total emotional adequacy score was significantly higher in males (95.49 ± 32.12), compared to that in females (98.21 ± 13.01) ($t(377) = -0.836$, $P = .403$). Moreover, the results of multivariate variance analysis illustrated that males and females were only significantly different in the N-Act subscale (Hotelling's Trace $F(8, 370) = 2.135$, $P = 0.032$, partial Eta squared = 0.04).

Reliability

The result of internal consistency of the total score and its subscales using Cronbach's alpha was calculated to be in the range of 0.66 to 0.94.

Correlation between subscales and total score

As displayed in Table 1, a significant and positive relationship was observed between the total score and its subscales with correlation coefficients ranging from 0.30-0.90, indicating a correlation between the total score and its subscales.

Confirmatory factor analysis

Confirmatory factor analysis was conducted to identify the one-factor, two-factor, four-factor, and eight-factor structures of the emotional regulation competency inventory. Fit indices of Chi-square to the degree of freedom (X^2/df), Comparative Fit Index (CFI), Good Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Incremental Fit Index (IFI), Relative Fit Index (RFI), Normalized Fit Index (NFI), Non-Normalized Fit Index (NNFI), Standardized Residual Mean Squared Root (SRMR), and the Root Mean Square Error of Approximation (RMSEA) were used to assess the fitness of the model. The X^2/df ratios lower than

Table 1. Cronbach's alpha and correlation between total emotional regulation competency inventory (score and its subscales)

	Cronbach Alpha	Negative	Positive	N-sub	N-Inh	N-Act	N-Tol	p-Sub	P-Inh	P-Act	P-Tol
Total score	0.94	0.89**	0.90**	0.78**	0.81**	0.74**	0.58**	0.83**	0.77**	0.79**	0.78**
Negative	0.91	-	0.61**	0.88**	0.86**	0.87**	0.63**	0.63**	0.49**	0.52**	0.52**
Positive	0.92		-	0.52**	0.59**	0.46**	0.40**	0.86**	0.89**	0.90**	0.89**
N-Sub	0.84			-	0.72**	0.74**	0.38**	0.63**	0.37**	0.43**	0.44**
N-Inh	0.84				-	0.66**	0.40**	0.56**	0.95**	0.50**	0.45**
N-Act	0.84					-	0.38**	0.49**	0.33**	0.39**	0.42**
N-Tol	0.66						-	0.37**	0.30**	0.36**	0.40**
P-Sub	0.77							-	0.66**	0.69**	0.68**
P-Inh	0.81								-	0.74**	0.65**
P-Act	0.84									-	0.70**
	0.68										-

Table 2. Fit indices of one-factor, two-factor, four-factor, and eight-factor models Perth Emotional Regulation Competency Inventory

Fit indicator	RMSEA	NNFI	RFI	IFI	CFI	NFI	GFI	AGFI	SRMR	X2/df	P	X2
One factor	.17	.90	.90	.90	.90	.89	.50	.46	.10	63.11	.001	5396.59
Two factor	.09	.94	.93	.95	.95	.93	.76	.72	.08	4.35	.001	2012.68
Four factor	.17	.90	.89	.91	.91	.90	.49	.46	.10	11.55	.001	5288.07
Eight factor	.07	.96	.94	.97	.97	.95	.82	.78	.07	3.02	.001	1319.08

RMSEA: Root Mean Square Error of Approximation, NIFI: Non-Normalized Fit Index, RFI: Relative Fit Index, IFI: Incremental Fit Index, CFI: Comparative Fit Index, NFI: Normalized Fit Index, GFI: Good Fit Index, AGFI: Adjusted Goodness of Fit Index, SRMR: Standardized Residual Mean Squared Root, X2/df: degree of freedom

three generally indexes are suggestive of the good fit of the model. Nonetheless, this index is immensely influenced by the sample size, and values larger than three can still indicate the fitness of the model considering the sample size.

The RMSEA coefficients smaller than 0.08, SRMR values smaller than 0.05, CFI, GFI, AGFI, IFI, RFI, NFI, and NNFI fit indices higher than 0.90 (values between 0.80 and 0.90; good and boundary fitness), as well as AGFI values higher than 0.85, generally indicate that the fit indices of structural equation models are acceptable. The results of one-factor, two-factor, four-factor, and eight-factor indices of emotional regulation competency inventory demonstrated in Table 2 indicate that the fit indices

of the eight-factor model are better than those of the other models.

Convergent and divergent validity

As presented in Table 3, the total score of the emotional regulation competency inventory and its subscales have a positive and significant relationship with difficulties in emotional regulation, depression, worry, and social anxiety (P<0.05), pointing to convergent reliability. On the other hand, the total score of the emotional regulation competency inventory and its subscales have a negative and significant relationship with emotional regulation (P<0.05), suggesting the divergent reliability of the scale.

Table 3. Emotional regulation competency inventory's convergent and divergent validity

Excitement regulation	Total score	Negative	Positive	N-sub	N-Inh	N-Act	N-Tol	p-Sub	P-Inh	P-Act	P-Tol
DRESs	-0.38**	-0.31**	-0.37**	-0.27**	-0.29**	-0.25**	-0.20**	-0.29**	-0.32**	-0.34**	-0.34**
Depression	0.30**	0.30**	0.25**	0.34**	0.30**	0.30**	0.01	0.30**	0.22**	0.20**	0.17**
PSWQ	0.32**	0.30**	0.27**	0.29**	0.28**	0.29**	0.10	0.27**	0.24**	0.21**	0.22**
Social anxiety	0.35**	0.33**	0.30**	0.29**	0.30**	0.29**	0.19**	0.33**	0.24**	0.23**	0.27**
Excitement regulation	0.23**	0.21**	0.20**	0.22**	0.18**	0.22**	0.03	0.28**	0.15**	0.12**	0.15**

DERS: Difficulties in Emotion Regulation Scale, PSWQ: Penn State Worry Questionnaire

Discussion

The present study aimed to investigate the psychometric properties of the emotional regulation competency inventory in a sample of Iranian students. The results of confirmatory factor analysis supported this PERCI's eight-factor model. In this study, positive inhibiting behavior,

positive controlling experience, positive activating behavior, and positive tolerating emotions were considered emotional regulation competency strategies associated with positive emotions, while negative inhibiting behavior, negative controlling experience, negative activating behavior, and negative tolerating emotions were regarded as

emotional competency strategies associated with negative emotions. The results of the current study are consistent with the results of a study by Preece et al. (10). In fact, the eight-factor model proposed by Preece et al. revealed to be consistent with the present study which was conducted on a student sample in Iran.

Moreover, the results pointed out that the emotional regulation competency inventory had a favorable internal consistency. In accordance with the results of the study by Preece et al., the Cronbach's alpha coefficients obtained for the total scale and all of the factors were excellent [10]. Furthermore, the questionnaires of emotional regulation, difficulty in emotional regulation, worry, social anxiety, and depression were used to determine the convergent and divergent reliabilities of the PERCI. Based on the results, the negative subscales of the emotional regulation competency inventory had a positive and significant correlation with difficulties in emotional regulation, depression, worry, and social anxiety which indicates convergent reliability. On the other hand, the positive subscales of emotional regulation competency had a negative and significant relationship with emotional regulation, pointing to divergent reliability of the scale.

As one of the emotional inadequacy strategies, inhibiting behaviors are generally accompanied by isolation-seeking behaviors, as well as negative verbal and nonverbal expressions. Inhibiting behaviors facilitate negative emotions and other responses, such as fear and catastrophic thoughts. Therefore, researchers use this concept to develop a better understanding of emotional disorders given the extensive association between inhibiting behaviors and negative emotional states [23]. Some studies regard inhibiting behaviors as important risk factors for the development of depression and anxiety disorders [24]. The strategies of controlling experience result in emotional inadequacy by disabling individuals to regulate their positive and negative emotions. In fact, as a result of these strategies, individuals do not have the required ability to be aware of their emotions, accept them, control impulsive behaviors, and act in accordance with the desired objectives [25].

As mentioned earlier, the ability to control positive and negative emotions and select the appropriate strategies in various emotional situations is among the most important emotional regulation elements [10]. Negative activating behaviors result in experiencing more unpleasant emotions, failing to prevent impulsive behavior, increased feelings of hope and arousal, and being more doubtful about the consequence of actions, further leading to increased worry and avoiding behaviors. In

addition, the individual would find it difficult to concentrate on carrying out their tasks and responsibilities when dealing with pleasant situations. All of the aforementioned issues will result in emotional inadequacy [26].

The strategies of tolerating emotions refer to the ability to experience and withstand positive and negative psychological situations and the capacity of tolerating discomfort. Inappropriate strategies of tolerating emotions make individuals find emotions unbearable. These people do not accept the existence of emotions and feel confused and ashamed of them since they underestimate their ability to cope with emotions. They are constantly searching for immediate solutions to relieve their negative emotions and are not even able to embrace their positive emotions and describe them as inconceivable. Consequently, individuals find it difficult to regulate emotions and it leads to more difficulty in emotion regulation [27].

The present study had several limitations that could be considered by future studies. Firstly, this study was conducted on a non-clinical sample of students; therefore, future studies could investigate the psychometric properties of the examined tool in general and clinical populations. Secondly, the present study did not assess the test-retest reliability which should be examined by future studies.

Conclusions

Overall, the results of the present study suggested that the Persian version of the emotional regulation competency inventory demonstrated acceptable validity and reliability in a sample of Iranian students. Emotional regulation strategies are divided into two groups: emotional competency strategies associated with positive emotions and emotional competency strategies associated with negative emotions according to PERCI. The results of the present study supported these strategies. Therefore, the Persian version of the PERCI could be used in research and clinical studies as a valid inventory. Furthermore, the psychometric properties of this inventory are suggested to be examined in other general and clinical populations as well.

Compliance with ethical guidelines

All the ethical principles were considered in the present study. The participants were informed about the purpose of the study and the implementation of the stages.

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Authors' contributions

Ali Akbar Foroughi and Zahra Sadat Mahdiun developed the

original idea and participated in the study execution. All authors provided comments and approved the final manuscript.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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