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Cognitive Emotion Regulation Questionnaire: Adaptation and Validation Study in Bangladeshi Culture

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Earlier research showed that cognitive emotion regulation implicitly and explicitly influences our behavior rigorously due to its vast function in controlling the cognition (e. g., Ochsner & Gross, 2005; Abdi, 2007). Despite the significance of this phenomenon in research, few validation studies have been done in other cultures after the development of the Cognitive Emotion Regulation Questionnaire (CERQ) by Garnefski et al. (2002). So, contemplating this point of view, the intent of the present study was to translate the CERQ into Bangla and validate in Bangladeshi culture extensively. A total of 1000 participants (49.25% males & 50.75% females) participated in the study. Exploratory Factor Analysis (EFA) which was done on sample 1 (n = 500) identified a four-factor of the CERQ with 23 items. When analyzed the data for sample 2 (n = 500) in Confirmatory Factor Analysis (CFA) it was revealed that the four-factor model with 23 items is an acceptable model fit [χ 2 (221) = 580.99, RMSEA = .06; RMR = .10; CFI = .90, GFI = .90] to the data. Moreover, the CERQ showed good internal consistency (α = .85 for the ACERQ part and .80 for the LACERQ part), strong convergent, and discriminant validity. Therefore, the Bangla version CERQ comes into sight to be valid and reliable and consequently may be used at a greater distance in future research on cognitive emotion regulation in the country.

Keywords: cognitive emotion regulation, Bangladeshi Culture, factor analysis, exploratory, confirmatory

After the development (Garnefski et al., 2001) of Cognitive Emotion Regulation Questionnaire (CERQ), the CERQ has developed and validated in many countries for clinical and psycho-social academic and research purpose in terms of its wide application (such as detect cognitive design of emotion regulation, identify emotional symptomatology and nature of maladaptive cognitive emotion regulation (CER), therapy and prevention of mental health problems, guide and treatment of psychological treatment etc.) and acceptance value to the academicians and researchers (Orgile' et al., 2018; Garnefski et al., 2005). Reviewing the literature (Such as Domı ´nguez-Sa ´nchez et al., 2013; Medrano et al., 2013) it is seen that most of the studies and validation have conducted relating to CERQ based on adult population. Although, few studies have been conducted on adolescents.

We cannot ignore the importance of adolescent life stage which is an inevitable stage of life span. Adolescents make up approximately 22% of the 605 million world population (Richter, 2006). It is an astounding interval of growth where an adolescent enters as a child but exits as an adult. Lots of physical, mental, emotional, moral, cultural, and cognitive changes occur in this period which influence later life (Sarafino & Armstrong, 1980). Considering this, the present researchers intend to validate and develop CERQ in the context of Bangladesh for deep knowledge on the nature of adolescents' emotion regulation.

Cognition is a mental process of obtaining knowledge and comprehension based on notion, experience, and the senses (Blomberg, 2011) while emotion is a feeling such as happiness, fear or hatred which can be caused by the situation that an individual in or the people he is with (Gross & Munoz, 1995) while emotion regulation is the faculty to dominance voicing of

emotions (Gross, 2002). Garnefsk et al. (2002) defined CER as the awareness, cognitive way of controlling emotionally evoking information which is a broader fragment of emotion regulation liable for monitoring, assessing, altering of emotional reactions (Ochsner & Gross, 2005).

Evidence suggests that (Stegge et al., 2004) as adolescents grow older their nature of emotion regulation strategies gently increase (from behavioral to cognitive strategies). It is evident that adolescents apply many CER strategies to a situation (e.g., stress, pain, depression, anxiety, frustration). So, adolescents' diverse types of cognitive emotional problems can be easily diagnosed, prevented, and treated with the use of those childhood CER strategies (Garnefski et al., 2007; Legerstee et al., 2010). In line with this, experts (such as Liu et al., 2016) focused on the scientific expansion of CER strategy during childhood and adolescence which can have a crucial preservative effect and lessen the likelihood of disorders. Standard development of CER strategy can play a key role for identifying, prevention and treatment of adolescent cognitive-emotional problem.

Some other instruments also measure emotion regulation process, for instance, Emotion Regulation Questionnaire (ERQ) (Gratz & Roemer, 2004), Trait Meta-Mood Scale (TMMS) (Gross & John, 2003), the Negative Mood Regulation Scale (NMR) (Salovey et al., 1995). The CERQ developed by Garnefski et al. (2001) was a unique questionnaire which specially stresses cognitive strategies of emotion regulation. As a result, the CERQ is popular worldwide due to its specific measure of the CER. It is a scale which measures a person's cognitive strategies of emotion controlling that he/she uses in replying to daunting and aggravating situations.

After the development of the CERQ it is adapted and validated in different languages in many countries such as Iran (Abdi et al., 2010), Netherlands (Garneski & Kraaij, 2007), Spain (Domı ´nguez-Sa ´nchez, et al., 2013), China (Liu et al., 2016), Argentina (Medrano et al., 2013) etc. Nevertheless, no study has been done in Bangladeshi culture. Though Garneski et al. (2014) did a validation study on CERQ in Bangladeshi culture, but it is unpublished till now. So, considering the above literature review, rationale, and argument, the focus is on scientifically validating the CERQ in Bangladeshi culture. As such the present research intends to lay out a new tool for the assessment of cognitive strategies of emotion regulation for utilization on Bangla speaking adolescents.

Method

Participants:

In the present study 1064, eleventh grade, adolescent students of Dhaka Metropolitan City (DMC) participated. Among them 524 were males and 540 were females. Due to partial feedback 64 contributors were released. Finally, the data of 1000 participants were gathered and analyzed statistically. The respondents' average age is M age = 16.43 (SD age = 0.89).

Measure:

Cognitive Emotion Regulation Questionnaire (CERQ) developed by Garnefski et al. (2002) is a 36-item Likert type scale with five response alternatives ranging from 'almost never' (1) to 'almost always' (5). The adaptive and less adaptive score is obtained by summing all the items' scores, respectively. The original CERQ has revealed good psychometric properties. All subscales have good internal consistencies varying from .68 to .86 (Garnefski et al., 2002). The CERQ has nine sub-scales which are grouped under: Adaptive and Less Adaptive strategies. The Adaptive part incorporates five subscales such as acceptance, positive refocusing, refocus on planning, positive reappraisal, and putting into perspective. On the other hand, the Less Adaptive strategies cover four subscales such as self-blame, rumination, catastrophizing, and blaming others.

Procedure

Translating the scale into Bangla: Team translation method (Harkness, 2008) was followed for translation of the CERQ in Bangla. At first, the CERQ is translated and then inspected and revised carefully. Then six judges justify the translation and correct/refine wherever necessary. After that the adjudicators modified 11 CERQ items as these items had AI (Accuracy Index) values < 1. On the other

hand, adjudicators appraised an item yielding an RI (Relevancy Index) of 1 or .83 (RI = 6/6 or RI = 5/6) to be relevant or suitable (Karim & Nigar, 2014). All the items showed relevancy according to the judges. Finally, pretesting/pilot study was performed on 100 respondents and each participant was requested to comment on distinct aspects of the measure. The results are given below.

Table 1. Participants' opinion on various facets of the measure

	CERQ	
	Yes (%)	No (%)
Readable	88	12
Logical	96	04
Clear	95	05
Comprehensive	87	12
Easily answerable	98	02
Style and formatting	97	03

The above result indicates that the CERQ has adequate face and content validity. So, the final draft was ready for final testing.

Data acquisition. In the present study ethical rules of APA (American Psychological Association) was maintained rigorously. After obtaining the permission for data collection from the concerned 'schools and colleges', respondents were requested to fill up the questionnaires according to instruction. In this way, the paper-based surveys (3rd & final draft) were conducted, and data were accumulated from all the participants.

Data analyses. The data was analyzed in three phases by using SPSS. At first, item analysis was performed followed by Exploratory Factor Analyses (EFA) and Confirmatory Factor Analyses (CFA). The participants were categorized into two groups: odd numbered and even numbered participants. Data for the 500 odd numbered participants were subjected to EFA (first set) while data for the 500 even numbered participants were forced to CFA (second set).

Results

Factor structure of CERQ: It has two parts: Adaptive CERQ and Less Adaptive CERQ.

Table 2. Correlation matrix (R-matrix 2) for Adaptive CERQ

Items	cerq5	cerq8	cerq14	cerq15	cerq16	cerq17	cerq18	cerq19	cerq21	cerq22	cerq23	cerq25	cerq26	cerq27	cerq28	Adaptive CERQ
cerq5	1															
cerq8	.298**	1														
cerq14	.009	.025	1													
cerq15	.173**	.165**	.321**	1												
cerq16	.153**	.172**	.280**	.605**	1											
cerq17	.185**	.186**	.239**	.563**	.672**	1										
cerq18	.236**	.348**	.153**	.343**	.455**	.498**	1									
cerq19	.147**	.123**	.158**	.403**	.487**	.572**	.516**	1								
cerq21	.173**	.255**	.139**	.384**	.402**	.375**	.394**	.330**	1							
cerq22	.070	.115*	.171**	.320**	.306**	.302**	.332**	.231**	.539**	1						
cerq23	.170**	.180**	.069	.214**	.265**	.241**	.272**	.157**	.358**	.458**	1					
cerq25	.101*	.100*	.184**	.264**	.242**	.234**	.199**	.301**	.341**	.281**	.268**	1				
cerq26	.104*	.093*	.162**	.250**	.221**	.283**	.169**	.235**	.287**	.254**	.157**	.459**	1			
cerq27	.088*	.207**	.130**	.173**	.183**	.152**	.233**	.151**	.247**	.282**	.321**	.310**	.405**	1		
cerq28	.136**	.168**	.133**	.254**	.263**	.210**	.223**	.202**	.306**	.251**	.308**	.331**	.333**	.426**	1	
Adaptive CERQ	.384**	.431**	.388**	.622**	.653**	.651**	.640**	.577**	.659**	.596**	.548**	.553**	.528**	.541*	.557**	1

Note. n = 500; average inter-item correlation = .26; average item-total correlation = .55.
** p < .01; * p < .05.

Due to negative correlation, item analysis was performed for the Adaptive and Less Adaptive CERQ items separately.

Item analysis (Adapted CERQ). The item analysis was done for the 16 items of the Adaptive CERQ (four items were removed in the adjudication stage of translation). The correlation-matrix (data not shown) contained nine negative values guiding us to keep the item no. 07 out of the study. So, 15 items were kept for factor analysis. The inter-item correlations for these items are shown in Table 2. The figures in this Table depict that out of 105 inter-item correlation coefficients, 101 (88.90%) were significant.

Item analysis (Less Adapted CERQ). The item analysis was done for 14 items of the Less Adaptive CERQ (two items were removed in the adjudication stage of translation). The correlation-matrix (data not shown) contained 18 negative values guiding us to keep item no. 33, 34, 35, and 36 out of the study. So, 10 items were kept for factor analysis. The inter-item correlations for these items are shown in Table 3. The figures in this Table indicate that out of 45 inter-item correlation coefficients, 43 (95.5%) were significant. Thus, 25 CERQ items (15 Adaptive CERQ & 10 Less Adaptive CERQ) were finally kept in this stage.

Exploratory factor analysis. Data for the 25-item CERQ was therefore secured for EFA. Principal Component technique (varimax rotation) was used for EFA. The Eigen Value extracted a 7-factor solution, responsible for 59.99% of the total variance (data not shown). Although the scree plot (Cattle, 1966) indicates a clear break after the 4th component (Figure 1) guiding us to retain four components.

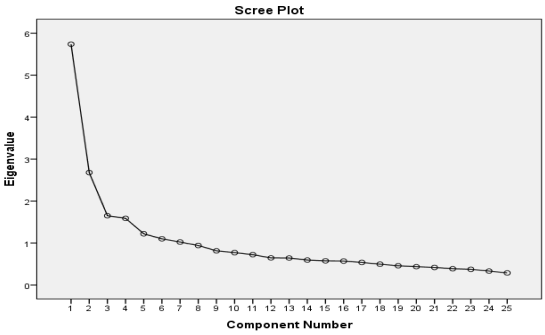

Figure 1. The scree plots are generated in EFA for 25 items

Contemplating Cattle's view, data were compelled to another EFA ceiling. The number of factors to four with all factor loadings < .40

Table 3. Correlation Matrix (R-matrix 4) for the Less Adaptive CERQ

Items	cerq2	cerq3	cerq4	cerq10	cerq11	cerq12	cerq29	Cerq30	cerq31	Cerq32	Less Adaptive CERQ
cerq 2	1										
cerq 3	.384**	1									
cerq 4	.494**	.366**	1								
cerq10	.194**	.198**	.250**	1							
cerq11	.162**	.253**	.214**	.397**	1						
cerq12	.128**	.205**	.167**	.364**	.462**	1					
cerq29	.131**	.105*	.125**	.142**	.140**	.067	1				
cerq30	.228**	.236**	.251**	.377**	.289**	.268**	.365**	1			
cerq31	.168**	.124**	.144**	.288**	.182**	.170**	.249**	.374**	1		
cerq32	.050	.151**	.128**	.281**	.334**	.276**	.239**	.365**	.496**	1	
Less Adaptive CERQ	.528**	.522**	.563**	.616**	.591**	.532**	.464**	.671**	.580**	.584**	1

Note. n = 500; average inter-item coefficients .24; the average inter-item coefficients .57.

** p < .01 level (2-tailed). * p < .05 level (2-tailed).

suppressed (Discarding item 08 and 14 due to loading at < .40). Finally, a four-factor solution of the CERQ was identified which explained together 49.45% of the total variance (Table 4) which seems to more explainable to the CERQ.

Table 4: Rotated Factor Matrix for a Reduced Set of CERQ Items (Item 08 and 14 Discarded)

Item numbers	Factors loading			
	F1	F2	F3	F4
Item 15	.70			
Item 16	.80			
Item 17	.83			
Item 18	.66			
Item 19	.69			
Item 21	(.45)	.49		
Item 22		.56		
Item 23		.57		
Item 25		.61		
Item 26		.64		
Item27		.73		
Item 28		.69		
Item 10			.59	
Item 11			.51	
Item 12			.47	
Item 29			.53	
Item 30			.68	
Item 31			.68	
Item 32			.73	
Item 2				.76
Item 3				.64
Item 4				.78
Item 5				.66
Eigenvalue	3.44	2.86	2.81	2.27
Variance explained	14.95	12.41	12.22	9.88
Cronbach's (standardized) α	.84	.78	.74	.72

Note. n = 500.

Factor 1 is responsible for 14.95% of the variance, Factor 2 is responsible for 12.41% of the variance, Factor 3 is responsible for 12.22% of the variance, and finally Factor 4 accounts for 9.88% of the variance. We grouped item 21 (due to cross-loading) under Factor 2, and the factor of its bigger loading and best conceptual fit. Thus, Factor 1 includes item nos. 15, 16, 17, 18, and 19 which we phrase as 'Refocus on Positive Thought and Planning'; Factor 2 incorporated item nos. 21, 22, 23, 25, 26, 27, and 28 which we expression as 'Positive Reappraisal and Putting into Perspective'; Factor 3 encompasses item nos. 10, 11, 12, 29, 30, 31, and 32 which we name as 'Rumination and Catastrophizing'; and Factor 4 constitute of item nos. 2, 3, 4, and

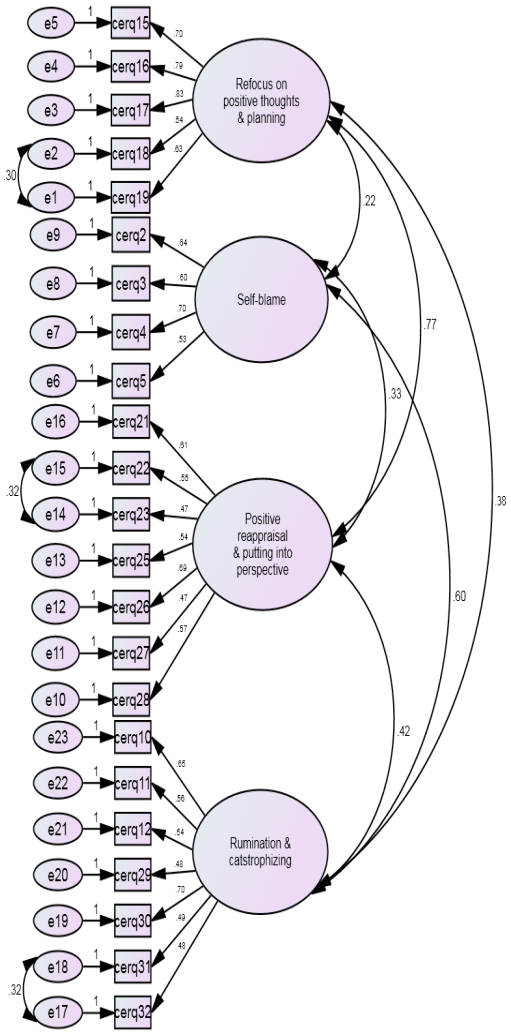

Figure 2. Factor structure of the CERQ.

Table 5. Model fit indices obtained in CFA for 23-item CERQ.

	χ^2	df	$\chi^{2/df}$	RMSEA	RMR	CFI	GFI
Unmodified fit indices	707.5*	224	3.12	.06	.11	.86	.88
Modified fit indices	580.99*	221	2.63	.06	.10	.90	.90

n = 500. * p < .05.

Table 6. Factor loadings from EFA and CFA on CERQ (Four-factor model)

Item numbers	Factors loadings							
	F1: Refocus on positive thoughts & planning		F2: Positive reappraisal & putting into perspective		F3: Rumination & Catastrophizing		F4: Self-blame	
	EFA	CFA	EFA	CFA	EFA	CFA	EFA	CFA
Item 15	.70	.70						
Item 16	.80	.79						
Item 17	.83	.83						
Item 18	.66	.54						
Item 19	.69	.63						
Item 21	(.45)		.49	.61				
Item 22			.56	.55				
Item 23			.57	.47				
Item 25			.61	.54				
Item 26			.64	.69				
Item27			.73	.47				
Item 28			.69	.57				
Item 10					.59	.65		
Item 11					.51	.56		
Item 12					.47	.54		
Item 29					.53	.48		
Item 30					.68	.70		
Item 31					.68	.49		
Item 32					.73	.48		
Item 2							.76	.64
Item 3							.64	.60
Item 4							.78	.70
Item 5							.66	.53
Eigenvalue	3.44		2.86		2.81		2.27	
Variance explained (%)	14.95		12.41		12.22		9.88	

5 which we word as 'Self-blame'. Among these sub factors, Factor 1 and Factor 2 characterize the Adaptive CERQ part and Factor 3 and Factor 4 represent the Less Adaptive CERQ part of the scale.

Confirmatory factor analysis (CFA). It was performed on the second set of data. Goodness-of-fit was gauged using Chi-square, RMSEA, CFI, RMR, and GFI. However, the CFA in the present study revealed that the four-factor model pointed out for the CERQ in EFA is a good fit to the data (Table 5).

The adjusted fit indices showed an acceptable model fit to the data χ 2 (221) = 580.99, RMSEA = .06, RMR = .10, CFI = .90, GFI = .90 (Figure 2).

From the above figure, we can see that factor loadings of the four factors ranged from .47 to .83. The correlation between latent variables varied from .22 to .77. This correlation and factor loading showed that these four latent variables are inseparable factor structures of CERQ. The following Table 6 shows the coefficients comparison between CFA and EFA stages.

Validity: As mentioned by the experts, the Bangla version CERQ has fine and acceptable face and content validity (See Table 1). The ACERQ has a positive and significant correlation ($r = .21$, $p < .01$) with EIS (Emotional Intelligence Scale) while LACERQ has a positive and significant ($r = .07$) correlation with HS (Hostility Scale). This relationship denotes that the scale has a sound convergent validity. On the contrary, the negative and significant correlation between HS and ACERQ ($r = -.10$) and EIS and LACERQ ($r = -.06$), shows that the scale has a good divergent validity (Table 7).

Table 7. Correlation of Bangla CERQ (both ACERQ & LACERQ) with the EIS and HS

Scale	ACERQ	LACERQ	EIS	HS
ACERQ	1			
LACERQ	.35**	1		
EIS	.21**	-.06	1	
HS	-.10**	.07*	-.16**	1

** $p < .01$. * $p < .05$.

Reliability: In terms of reliability, the internal consistency (Cronbach's α) for the Bangla version of Adaptive CERQ was .85 while .80 for the Less ACERQ. The detailed reliability analysis is given following Table 8.

The above Table 9 indicates that the CERQ has good psychometric properties in the context of Bangladesh like other countries. Undoubtedly the CERQ would be the standard psychometric scale for estimating adolescents' CER in the perspective of Bangladesh.

Discussion

The present study intended to validate and adapt CERQ into Bangla language for the use of adolescents with Bangladesh in perspective. The findings are minutely inconsistent with the original and other adaptations. Most of the adaptation contained 36 items with nine factors (such as Medrano et al., 2013; Liu et al., 2016; Domı ´nguez-Sa ´nchez et al., 2013 etc.). Compared to original CERQ, the adapted scale contains 23 items underneath four components. 'Acceptance' and 'Other Blame' of the CERQ subscale are totally dropped in the present study. But item no. 5 (I think that I have to accept that this has happened) of the 'Acceptance' subscale

Table 8. Cronbach's α of the respective scale

Name and dimensions of the scales		Unstandardized α		
The Scale	Dimensions	Sample 1(500)	Sample 11(500)	Combined sample :1000
ACERQ		.84	.85	.85
	Refocus on Positive Thoughts and Planning (RPTP)	.83	.82	.83
	Positive Reappraisal and Putting into Perspective (PRPP)	.77	.77	.77
LACERQ		.77	.80	.80
	Rumination and Catastrophizing (RC)	.74	.76	.75
	Self-blame (SB)	.72	.71	.71

Table 9. Comparison of psychometrics of Bangla CERQ with other validation studies across different countries and samples

Study	Sample	N	Country/ Language	Extracted Factors	Alpha
Uzzaman and Karim (2017)b	Adolescent	1000	Bangladesh/ Bangla	4 (23 items)	.71 to .83
Abdi et al. (2010)	University Students	503	Iran/Persian	9	.64 to .82
Garneski and Kraaij (2007)a	Adult general people	611	Netherland/ English	9	.75 to .87
Domı ´nguez-Sa ´nchez et al. (2013)	General people	872	Spain/ Spanish	9	.62 to .90
Orgile' et al. (2018)	Children	582	Spain/ Spanish	9	.56 to .75
Liu et al. (2016).	Elementary students	1403	China /Mandarin	9	.66 to .73
Medrano et al. (2013)	University Students	359	Argentina/ Spanish	9	.59 to 83
Garnesk, Hossain., & Kraaij (2014)	Adolescents	379	Bangladesh/ Bangla	7	.68 to .87

Note: S = Sample, A = Adolescent, B = University students, C = Adult general people, D = General people, E = Children, F = Elementary students, a Original developer b Present author

is included under the 'Self-blame' subscale of the adapted CERQ. The other seven subscales are merged into four subscales in the present study with their respective items. However, one study supports the present study directly. For example, Garnefski et al. (2017) found seven factors of CERQ in the validation of Bangladeshi culture. So, this factor reduction is not the first.

Yoon et al. (2008) reported that 50% of items abolished, based on item and factor analysis, in any validation study is acceptable for a big measure. On the other hand, Barke et al. (2012) argued that above 35% variance explanation is acceptable for good measure though all the factors of the present CERQ together explain 50%.

Now raise the question why does validation of CERQ in Bangladeshi culture is different from other cultures? The simple answer is the need to validate the CERQ further in Bangladeshi culture. In line with this, the difference between the Netherlands and Bangladeshi culture, social rivalry, agitation, custom and practice, individual differentiation between western and eastern countries, reaction style, nature of family type may differ. However, the reliability and validity measure of the adapted CERQ (both ACERQ & LACERQ) are consonant with other adaptations. Both ACERQ and LACERQ have high internal consistency compared to other adaptations (See Table 9). Similarly, ACERQ has a positive and significant correlation with EIS and a significant and negative correlation with HS which indicates congruent and divergent validity of the ACERQ. Similarly, LACERQ has a positive and significant correlation with HS and a negative and significant correlation with EIS which indicates congruent and divergent validity of the LACERQ for the Bangladeshi adolescent. This consistency denotes that the CERQ is steady over the cultures.

Finally, the adapted Bangla version CERQ holds 23 items with four subscales under two broad strategies. These are Adaptive Strategies and Less Adaptive Strategies. Adaptive strategies contain 12 items under two subscales such as 'Refocus on Positive Thought and Planning' (5 items) and 'Positive Reappraisal and Putting into Perspective' (7 items). Similarly, Less Adaptive strategies contain 11 items under two subscales such as 'Rumination and Catastrophizing' (7 items) and self-blame' (4 items). The adapted CERQ carries five response alternatives from

'Totally Disagree (1) to Totally Agree (5)'. A higher score indicates a higher adapted CER, and a lesser score indicates less adapted CER. Therefore, the validated and adapted CERQ can be contemplated as a sound and good scale for computing CER of adolescent students in the perspective of Bangladeshi culture.

Limitations and future study

Like the other studies, the present study has some drawbacks. Firstly, the study was done based on Dhaka Metropolitan City (DMC) which did not cover the whole country. In addition, the sample (N = 1000) is minor compared to the population (52,000). Even the conclusions are only applicable for adolescent students. So, it is impossible to generalize it for other types of adolescents. In this case, future researchers can overcome the above-mentioned limitations in their research. Since the socio-cultural perspective is different from the genesis country (English: Second Language/Netherlands). Therefore, a contrast group can give a better direction for improving reliability and validity of the CERQ from the perspective of Bangladesh. In closing, despite some challenges, the Bangla version CERQ denoted satisfactory reliability and validity in the context of Bangladesh. It is expected that the CERQ would be useful for clinical practice, academic study, developmental psychologist, psycho-social workers, and the research implicating the adolescent study in Bangladesh.

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