

VALIDATION OF A SHORT VERSION OF THE EMOTIONAL CRISIS SCALE FOR THAI UNDERGRADUATES

Arunya Tuicomepee

Faculty of Psychology, Chulalongkorn University, Bangkok, Thailand 10330

ABSTRACT:

Background: In recent decades, societies worldwide have experienced an increased risk of environmental disasters, difficulties in the political environment, as well as threats from advanced technologies. The lives of college and university students are becoming more complicated as a result of these risks. This study aimed to examine the psychometric properties of a short version of the Emotional Crisis Scale in Thai undergraduates.

Method: The Emotional Crisis Scale (ECS) consists of 3 subscales: precipitating event (PE), ineffective problem-solving (IPS), and functionally debilitating mental state (FDMS). There are 12 items in the scale with 4 items for each subscale. Internal Consistency for the scale and subscales were examined using a sample of 548 college and university students from public and private universities nationwide in Thailand. Their mean age was 19.96 ± 1.43 years old. Confirmatory factor analyses were conducted to determine whether the measurement model fit the data. A Pearson's correlation with the 21-Depression, Anxiety and Stress Scale (DASS-21) was computed to assess concurrent validity.

Results: The psychometric properties of the scale demonstrated good reliability with a Cronbach's alpha of .85 (.60, .66, and .74 for the subscales, respectively). The scale construct validity was confirmed by the first order of confirmatory factor analysis, which revealed that the model fit with the empirical data (Chi-square = 66.21; $df = 49$; $p = .05$; CFI = 0.99; TLI = 0.99; RMSEA = .03). Scale convergent validity was examined and it demonstrated an acceptable criterion validity: a moderate positive correlation with the DASS-21 (.38-.60 $p < .01$).

Conclusion: The short version of the emotional crisis scale can be instrumental in evaluating emotional overload and crisis among undergraduates. This scale may be appropriate to use in helping with early identification and interventions that addresses mental health and emotional well-being issues among undergraduates.

Keywords: Emotional crisis; Scale validation; Thai undergraduates

DOI:

Received: November 2016; Accepted: January 2017

INTRODUCTION

Tragedies among college students, including suicide, murder, homicide, and fatal physical abuse, among others, all of which cause or are caused by emotional crises, have been reported repeatedly through various media [1]. At the same time, they draw wide attention from the public, who view these

tragic incidents as critical. The increase in issues of emotion and stress among college and university students has become remarkable and broadly recognized, leading to a number of studies that attempt to shed light on student problems in order to identify causes of tension and related emotional issues. Experiencing a loss or having difficulty adjusting to new circumstances as college students can disrupt student's normal day-to-day functioning and lead to emotional crisis. Emotional crisis refers

* Correspondence to: Arunya Tuicomepee
E-mail: atuicomepee@gmail.com

Cite this article as: Tuicomepee A. Validation of a short version of the emotional crisis scale for Thai undergraduates. *J Health Res.* 2017; 31(4): 315-22. DOI:

to a state of mind that includes feelings of insecurity resulting from the environment, a personal dilemma, or psychological distress caused by some precipitating event or series of events [2].

Previous literature has shown that some of the tragedies and negative life events happening to students, especially those at the university level, cause severe distress and emotional crisis. Students in severe distress and emotional crisis may have difficulty in studying, maintaining a social life, or cultivating an interpersonal relationship. Stress and emotional crisis have been proven as related to academic problems, coping strategies, and happiness and psychological well-being [3-6]. In 2013, Tuicomepee et al. [7] examined paradigms and ranges of emotional crisis found among college and university students by interviewing eight students who had been suffering from emotional crises. Subsequently, a scale for assessing emotional crisis in college students was developed. The Emotional Crisis Scale (ECS) consisted of 36 items from 3 subscales: precipitating event (PE), ineffective problem-solving (IPS), functionally debilitating mental state (FDMS). The 36-item SCS had a good level of internal consistency, measured with Cronbach's alpha, at .93 with separate components' values of .85, .86, and .88, respectively. Confirmatory factor analysis using 376 students was conducted to find the construct validity and proved that this three-component emotional crisis measurement model was consistent with the empirical data (Chi-square = 0.04, df = 1, p = .841, GFI = 1.00, AGFI = 1.00, RMR = .00, RMSEA = .00). The convergent validity of the 36-item scale was tested by finding the correlation of this newly developed tool against the Depression, Anxiety and Stress Scale (DASS-21). Results revealed that this assessment tool had a positive linear relationship with the Anxiety and Depression Scale at a moderate to high level ($r = .72$ and $.60$, respectively, at $p < .01$). After that, test-retest reliability was conducted with 34 college students: each student took this Emotional Crisis Scale twice with a 2-week interval. It was found that the first assessment scores had a positive linear relationship with the retaken scores at the moderate to strong level ($r = .63$, $p < .01$).

The original ECS is lengthy, containing 3 subscales and 36 items. It is a self-report scale that takes about ten minutes to complete. This study therefore aimed to develop a short version of the 36-item ECS and to assess its reliability and validity.

This short version scale could be a helpful resource for psychologists in college and university counseling centers to effectively and efficiently identify those students with a high emotional crisis tendency and also be better prepared for lesser risks.

METHODS

This paper was a part of two main research projects entitled "Development of psychological intervention for wellness enhancement in university students with emotional crisis tendency through the internet" and "Effect of online individual existential counseling on wellness of undergraduates with neuroticism" The study was granted by the Ethical Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (COA No. 181/2556). Details of research method are as below.

Participants

The participants were 548 college and university students from public and private universities nationwide in Thailand. They were enrolled in Psychology courses. The participants (232 males and 316 females) had a mean age of 19.96 ± 1.43 years old. The majority were second year students ($n=191$), followed by first-year students ($n=150$), fourth-year students ($n=106$), and third-year students ($n=101$). Only one percent of the sample ($n=5$) had past experience with mental health professionals.

Instruments

This study utilized a self-administered questionnaire comprising the following three sections:

1. The first part of the questionnaire was designed by the researcher to tap basic demographic information, including gender, age, years of study, GPA etc.

2. The Emotional Crisis Scale (36-ECS), which was developed by Tuicomepee et al. [7] to measure emotional crisis among Thai undergraduates. This scale consisted of three subscales: precipitating event (PE), ineffective problem-solving (IPS), functionally debilitating mental state (FDMS). Each of the 36 items was to be rated from 0 ("not true at all") to 3 ("true nearly all the time), based on how the respondent had been feeling over the past month. Scores were summed to yield a total score ranging from 0–100; the higher the total score, the greater the respondent's level of reported emotional crisis. Tuicomepee et al.

reported that the 36-ECS had good internal consistency ($\alpha=0.89$ when applied to a nationwide undergraduate student population of 577 subjects), and satisfactory test-retest reliability ($r=0.87$). Its subscales found that the range of internal consistency was from 0.85 to 0.88.

3. The Depression Anxiety and Stress Scale (21-DASS). This scale is a self-report instrument developed by Lovibond and Lovibond [8] to measure the extent to which the individual is experiencing depression, anxiety, and/or stress. The DASS-21 consists of three subscales, each containing seven items which are to be rated from 0 to 3. The chosen responses are summed together and, in the case of the DASS-21, multiplied by two to obtain a final score. The scale demonstrates high internal consistency for the subscales ($\alpha=0.94$ for the depression scale; $\alpha=0.87$ for the anxiety scale; and $\alpha=0.91$ for the stress scale) [9].

Data collection

A multi-stage sampling method with three steps was used. First, colleges and universities around the country were selected (based on private or public, size of institution). The colleges and universities had to have a university counseling center on campus so that the students had some familiarity with psychological services. Second, students were selected from several schools and faculties to ensure representativeness and maximize their chance to be selected. Third, convenience sampling by research assistants was used to collect questionnaires. All questionnaires with information of the project and consent form to comply with research ethical standards were administered to students at a university campus setting as part of the convenience sampling. The students filled out the questionnaire voluntarily. Research assistants who were a gate keeper were available during data collection to answer questions. To increase statistical power and ensure a good representation of the population, at least 600 students were invited to fill out the questionnaire. Five hundred and forty eight questionnaires were completed.

Statistical analyses

To measure test reliability, the Cronbach's alphas of each scale were calculated. Confirmatory factor analyses were conducted to determine whether the measurement model fit the data well. A Pearson's correlation with the DASS-21 was computed to assess concurrent validity; the researchers expected a moderate negative

correlation between the newly developed scales and the criteria.

RESULTS

Item selection and short version scale development

Internal item quality was the primary criterion that was used in this study to select the items from the original scale (the original scale is shown in Table 1) for the short version, as suggested by the conceptual framework of emotional crisis from Tuicomepee et al. [7], Stanton, et al. [10] and Widaman et al. [11]. The procedure of item selection included the following steps.

Step 1: Confirmatory factor analysis and CITC calculation of separate components, based on the data collected from 3,362 undergraduates; only the items with positive CITC over .3 and representing core emotional crisis concept were selected.

Step 2: To keep only 4 items in each component, the researcher picked the 4 items with the highest factor loading and CITC from the items selected in each component in the prior stage. If the factor loading and CITC of any selected items were inconsistent or the item did not represent core emotional crisis concept, the research team would together consider its fitness from the item content.

Step 3: The result revealed 7 items with negative CITC and factor loading below .3-- items 4, 8, and 12 in Pressure Environment; item 16 in Ineffective Problem Solving; and items 25, 29, and 33 in Dysfunctional Mental State -- all of which were deleted before the repeated analysis was run.

Step 4: The results from confirmatory factor analysis and CITC calculation of separate components after item deletion showed that all the selected items had factor loading between .44 and .67 and CITC between .35 and .63. The research team selected the top four items from each component: items 3, 5, 7, and 11 from Pressure Environment; items 15, 21, 22, and 23 from Ineffective Problem Solving; and items 26, 27, 30, and 36 from Dysfunctional Emotional State. After that, another confirmatory factor analysis and CITC calculation for each component were run again. The 12-item SCS based on 3,362 subjects demonstrated internal consistency with a Cronbach's alpha .859. Results are shown in Table 2.

The 12-item SCS scale reliability and validity assessment

Reliability examination: This study examined the validity and reliability of the 12-item SCS in

Table 1 Mean (Standard Deviation) and CITC of items on 36-item SCS (N=3,362)

Items	Item description	M	SD	CITC subscale	CITC total scale
Component 1: Precipitating event (PE) ($\alpha = .85$)					
1	I have been faced with incidents that made me lose my confidence and am no longer my old capable self.	1.19	.66	.41	.44
2	My life has fallen to the point that even a little provocation can suddenly distress me deeply.	1.09	.72	.57	.45
3	Problems with study, friends, and family all bombard me at the same time.	1.14	.78	.58	.46
4	My life seems stagnant that made me live my life each day without any improvement.	2.06	.82	.43	.04
5	I have lost my significant person and feel disoriented without him/her around me.	.84	.78	.55	.51
6	I can't cope with my academic challenges and have to depend on others.	.85	.81	.46	.40
7	Things have struck me very hard so I have become so discouraged and cannot bear anything anymore.	.99	.75	.60	.55
8	My life is like being in a trap that I have never once been liberated from the thrall of pressure and tension.	2.09	.77	.59	.07
9	My grade is so low that it causes me trouble, such as repeating the class or ineligible for student loan.	1.03	.78	.57	.49
10	I have failed some courses which delays my graduation.	1.11	.84	.50	.44
11	My family members quarrel so often that I get sick of being in the middle.	1.05	.75	.51	.55
12	I am so sad because my boyfriend/girlfriend broke up with me that I want to do something just to scorn my cursed life.	2.08	.81	.56	.09
Component 2: Ineffective problem solving (IPS) ($\alpha = .86$).					
13	I can't control what is happening in my mind.	.84	.78	.43	.45
14	I don't know what to expect from my future.	.57	.79	.44	.38
15	When having a problem, I usually keep it to myself for fear of losing my pride.	.71	.77	.42	.53
16	When encountering difficulties, it seems like no one understands me that drives me to cry.	1.89	.83	.64	.18
17	I escape from all the problem to sleep, for I simply don't want to be aware of anything.	.86	.81	.46	.44
18	When having a problem, I try every way to cope to no avail.	.99	.85	.59	.41
19	I am so tired that I wish I could let go of everything.	1.14	.77	.58	.54
20	I am furious and easily get teary-eyed.	1.23	.97	.58	.46
21	Under pressure, I am stressed out and sobbing.	.63	.74	.58	.49
22	I always ask "why" but can never find an answer.	.90	.73	.65	.53
23	When anything disturbs my feelings, I will keep to myself and don't want to talk with anyone.	.90	.79	.50	.59
24	I choose to ignore any thing that disturbs my feelings for fear that I can't stand it.	1.04	.78	.52	.45
Component 3: Functionally debilitating mental state (FDMS) ($\alpha = .88$)					
25	I am worried that the existing problem will spin out of control.	1.53	.83	.54	.18
26	I am so occupied with the problem that I can't concentrate on anything.	1.05	.72	.62	.58
27	My thoughts keep visiting negative events that are yet to come.	1.16	.80	.60	.56
28	I am so worried that I lose my motivation to study.	1.06	.81	.60	.54
29	I can't get rid of all obsessions in my head.	1.88	.81	.63	.16
30	I believe no one actually understands me.	.88	.83	.55	.58
31	I can't let go of anything that makes me be ruminant, impatient, and agitated.	1.20	.95	.60	.50

Table 1 Mean (Standard Deviation) and CITC of items on 36-item SCS (N=3,362) (cont.)

Items	Item description	M	SD	CITC subscale	CITC total scale
32	I feel dizzy.	1.18	.85	.53	.45
33	I feel fatigue and listless.	1.75	.74	.55	.01
34	I feel uneasy and achy all over the body.	1.23	.78	.55	.40
35	I feel tense in my neck, shoulders, back, and trunk.	1.17	.90	.50	.48
36	I am so stressed that I want to cry.	1.08	.85	.60	.58

Table 2 CITC calculations and second order confirmatory factor analysis of the developed 12-item SCS from data of 3,362 undergraduates

New	Old item	CITC for the scale	CITC for the subscales	Second order CFA non fitted (beta)
Component 1: Precipitating event (PE) ($\alpha = .686$) second order loading = 0.900				
1	3	0.446	0.441	0.520
2	5	0.511	0.462	0.597
3	7	0.547	0.499	0.641
4	11	0.533	0.475	0.623
Component 2: Ineffective problem solving (IPS) ($\alpha = .727$) second order loading = 0.902.				
5	15	0.543	0.503	0.632
6	21	0.508	0.522	0.59
7	22	0.531	0.532	0.620
8	23	0.585	0.510	0.683
Component 3: Functionally debilitating mental state (FDMS) ($\alpha = .734$) second order loading = 0.917				
9	26	0.583	0.577	0.673
10	27	0.537	0.544	0.621
11	30	0.586	0.503	0.675
12	36	0.521	0.489	0.600

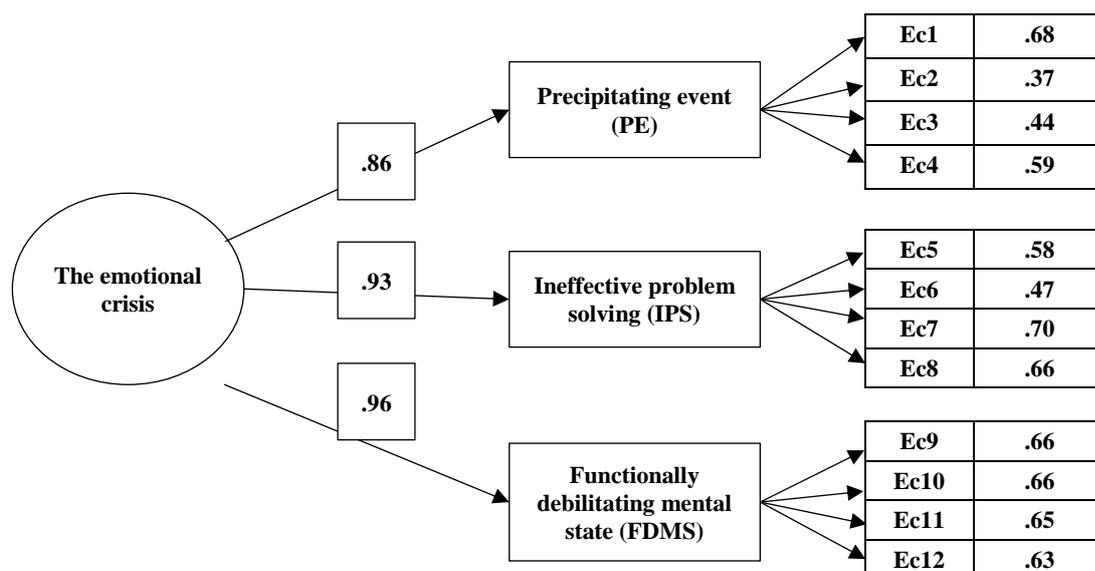
Table 3 CITC Calculations and second order confirmatory factor analysis of the 12-item SCS from data of 548 undergraduates

Item	CITC for the 12-item Scale	CITC for the subscales	First order factor loading	Second order factor loading	R ²
Component 1: Precipitating event (PE) ($\alpha = .60$)					
1	.56	.42	.68	.93	46.0
2	.32	.34	.37		13.9
3	.37	.37	.44		19.4
4	.49	.40	.59		35.0
Component 2: Ineffective problem solving (IPS) ($\alpha = .66$)					
5	.47	.47	.58	.93	33.8
6	.44	.25	.47		22.0
7	.61	.53	.70		49.3
8	.57	.55	.66		43.6
Component 3: Functionally debilitating mental state (FDMS) ($\alpha = .74$)					
9	.58	.57	.58	.96	43.8
10	.57	.59	.47		42.9
11	.57	.52	.70		42.1
12	.61	.47	.66		39.6

a different sample of 548 undergraduates. The findings indicated that the internal consistencies of the scales as measured by Cronbach's alphas were .85 (the whole scale) and .60 (PE), .66 (IPS), and .74 (DMS); which indicates that the three subscales had

good reliability as shown in Table 3.

Construct and criterion validity: Regarding its construct validity, the second –order three-factor model of the 12-item SCS was conducted to assess the unidimensional factor structure. The results



Chi-square = 66.21; df = 49; p = .05; CFI = 0.99; TLI = 0.99; RMSEA = .03

Figure 1 The CFA for second order construct of three-factor model of 12-item SCS

Table 4 Correlation coefficients of the subscales of 12-item SCS and DASS-21

Scale	1	2	3	4	5	6	7
1. Total emotional crisis(EC)	-						
2. Precipitating event (PE)	.78**	-					
3. Ineffective problem solving (IPS)	.89**	.53**	-				
4. Functionally debilitating mental state (FDMS)	.88**	.54**	.69**	-			
5. Depression scale –DASS 21	.57**	.43**	.44**	.60**	-		
6. Anxiety scale –DASS 21	.51**	.38**	.40**	.51**	.64**	-	
7. Stress scale –DASS 21	.59**	.47**	.45**	.59**	.69**	.74**	-

**p<.01

suggest that the measurement model of the scale fit the data very well (Chi-square = 66.21; df = 49; p = .05; CFI = 0.99; TLI = 0.99; RMSEA = .03). The factor loading of each item varied between moderate to high; the item factor loading and CITC are detailed in Table 3 and Figure 1. Finally, a Pearson's correlation with the depression anxiety and stress subscales of DASS-21 was computed to assess concurrent validity. Findings revealed a moderate positive correlation between a 12-item SCS scale, its subscales and the criterion, as shown in Table 4.

DISCUSSION

This study aimed to develop an emotional crisis scale that was short enough to be practical for use in large scale studies of college and university students in practice settings. The present study first developed a 12-item ECS and tested the second order and three factor structures of the 12-item ECS

with a sample of 3,362 undergraduates from the study of Tuicomepee et al. [7]. Considering the items of this new version, there are points suggesting the measure developed in the present study may be particularly appropriate for examining emotional crisis in a nonclinical sample.

First, the new 12-item ECS has 4 items measuring difficulties in academic and interpersonal relationships with significant persons (friends and family) as unmanageable and stressful events. Those items were

“Problems with study, friends, and family all bombard me at the same time”

“I have lost my significant person and feel disoriented without him/her around me”

“Things have struck me very hard so I have

become so discouraged and cannot bear anything anymore”

“My family members quarrel so often that I get sick of being in the middle.”

These results are consistent with previous literature [3-7, 12]. For instance, the study of Gerdes and Mallinckrodt [12] indicated that academic and social life difficulties are important key components for students' adjustment to college. Students with motivation to learn, well-managing academic demands, a clear sense of purpose, and general satisfaction with the academic environment demonstrate healthy college adjustment.

Second, this 12-item ECS suggests that lack of resources, such as no perceived support and poor emotional regulation over the course of precipitating events, can be the best indicator of emotional crisis among college and university students. Regarding undergraduates' use of problem solving strategies, the items of the new 12-ECS demonstrated 4 items of coping activities. As mentioned by Lazarus and Folkman [13], coping is a process by which individuals try to deal with their significant personal or situational demands. Ineffective coping efforts such as not seeking support and emotional avoidance were items created for this subscale. This scale captures critical coping activities that contribute to emotional overload. Two items were not-seeking-support coping strategies

“When having a problem, I usually keep it to myself for fear of losing my pride.”

“When anything disturbs my feelings, I will keep to myself and don't want to talk with anyone.”

The other two items were emotional avoidance coping strategies

“Under pressure, I am stressed out and sobbing.”

“I always ask “why” but can never find an answer.”

In addition, four of the 12 items identified psychological distress symptomatology. Those items were

“I am so occupied with the problem that

I can't concentrate on anything.”

“My thoughts keep visiting negative events that are yet to come.”

“I believe no one actually understands me.”

“I am so stressed that I want to cry.”

This subscale clearly found that under crisis circumstances, undergraduates would present their emotional distress symptoms as poor concentration, or having ruminant thoughts and negative moods such as feeling extremely anxious and depressed. The specific characteristic of less to moderate severe psychological distress may be due to the nonclinical sample of this study.

The present study also investigated the psychometric properties of the new 12-item ECS in order to ascertain whether it represented an appropriate assessment of emotional crises of undergraduate students. This was achieved by first testing the second order and three factor structures of the 12-item ECS when applied to a sample of 548 undergraduates from this study. The short version had a good consistency with its face validity and a very strong goodness of fit index. The model had first-order and second-order factor loadings between .44 and .96 and a good statistical significance level at .01 [14, 15]. In all, this measurement model can explain the variations of the observable variables at a good level. The short version scale's factor reliability and convergent validity was then examined by assessing its relationship with three states of negative affect – depression, anxiety, and stress – as measured by the DASS-21[9]. As discussed earlier, the measure used in the present study is particularly appropriate for examining emotional crisis in undergraduate students who are nonclinical. Additional research is needed to replicate the present findings with more severe psychological distress symptomatology. It would also be potentially quite useful to examine whether this scale can best capture particular types of symptomatology (e.g., anxiety, depression, posttraumatic stress disorder) across time in a variety of populations. Thus, although the present findings are promising with regard to the potential benefit of a brief scale measuring undergraduate emotional crisis, much additional research is needed to address this important question.

CONCLUSION

The 12-item Emotional Crisis Assessment

Inventory modified from the Emotional Crisis Assessment Inventory has high overall reliability. The measurement model confirmatory factor analysis showed high consistency with empirical data. Moreover, the results of convergent validity measured from correlation with the Depression Anxiety and Stress Scale and the Depression Scale revealed a good positive linear relationship between this short version and both scales. As a result, it is believed that this short, improved version can be instrumental in evaluating emotional overload and crisis among undergraduates. This scale can be appropriate to use in helping with early identification and interventions that address mental health and emotional well-being issues among undergraduates. The three subscales of the 12-item ESC can be used to identify those who are at risk for crises and foster informal support networks with peers and faculty. Prevention programs among these non-clinical undergraduates can be initiated by the coordinated efforts of student affairs and mental health professionals in colleges and university.

ACKNOWLEDGEMENT

The project is supported by The Chulalongkorn University Ratchadaphisek Somphot Endowment Fund, Chulalongkorn University, Bangkok, Thailand.

REFERENCES

1. Crary D. Mental illness strains school counselors. USA Today News. 2007, April 19. [Data File]. [cited 2016 Nov]. Available from: http://www.usatoday.com/news/health/2007-04-19-mental-illness-schools_n.htm
2. Myer RA, James RK, Moulton P. This is not a fire drill: crisis intervention and prevention on college campuses. Hoboken, NJ: Wiley and Sons; 2011.
3. Abdulghani HM. Stress and depression among medical students: a cross-sectional study at a medical college in Saudi Arabia. Pakistan Journal of Medical Sciences. 2008; 24(1): 12-7.
4. Benton SA, Robertson JM, Tseng W-C, Newton FB, Benton SL. Changes in counseling center client problems across 13 years. Professional Psychology: Research and Practice. 2003; 34(1): 66-72. doi: 10.1037/0735-7028.34.1.66
5. Hyun JK, Quinn BC, Madon T, Lustig S. Graduate student mental health: needs assessment and utilization of counseling services. Journal of College Student Development. 2006; 47(3): 247-66. doi: 10.1353/csd.2006.0030
6. Ramasoot W. Sources of stress in Chulalongkorn University undergraduate students. Bangkok: Faculty of Psychology, Chulalongkorn University; 2004. [Unpublished].
7. Tuicomepee A, Kotrajaras S, Taephant N. Research report on emotional crisis. Bangkok: Faculty of Psychology, Chulalongkorn University; 2013. [Unpublished].
8. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther. 1995 Mar; 33(3): 335-43.
9. Lovibond PF, Lovibond SH. Manual for the depression anxiety stress scales. 2nd ed. Sydney: Psychology Foundation; 1998.
10. Stanton JM, Sinar EF, Balzer WK, Smith PC. Issues and strategies for reducing the length of self-report scales. Personnel Psychology. 2002; 55(1): 167-94. doi: 10.1111/j.1744-6570.2002.tb00108.x
11. Widaman KF, Little TD, Preacher KJ, Sawalani GM. On creating and using short forms of scales in secondary research. In: Secondary data analysis: an introduction for psychologists. Washington, D.C.: American Psychological Association; 2011. p. 39-61.
12. Gerdes H, Mallinckrodt B. Emotional, social, and academic adjustment of college-students: a longitudinal-study of retention. Journal of Counseling and Development. 1994; 72(3): 281-8. [cited 2016 Nov]. Available from: <https://search.proquest.com/docview/219008434?accountid=15637>
13. Lazarus R, Folkman S. Stress, appraisal and coping. New York: Springer Publishing; 1984.
14. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham R L. Multivariate data analysis. 6th ed. New Jersey: Pearson; 2006.
15. Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. New York: McGraw-Hill; 1994.