Factorial Structure of The Depression, Anxiety, Stress Scale (DASS) Among University Students: The Impact of Counseling Services

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Abstract. Depression, anxiety and stress symptoms are common in the university student population. Hence, it is important to have evidence-based measurement for Indonesian students. The objective of this paper is to examine the factor structures of the Depression, Anxiety, and Stress Scale (DASS-42) among Indonesian university students. The DASS was administered to 1440 university students at the State University of Jakarta. The 42-item DASS will be analyzed using Confirmatory Factor Analysis (CFA). The study found that the DASS has good reliability. The reliability of the depression scale was 0,93, the anxiety scale was 0,88, stress scale 0,89. To develop the 21-item DASS form, the 7 items with the highest factor loadings for each sub-scale. The Indonesian DASS-21 demonstrated the goodness of fit for the college student population which would be beneficial for counseling services regarding reliable measurement for depression, anxiety, and stress. It is recommended that the DASS-21 categorization as the baseline data for evaluating of counseling effectiveness. **Keywords:** Depression, Anxiety, and Stress Scale (DASS), Indonesian college student, confirmatory factor analysis.

1 INTRODUCTION

Since the beginning of university life, students have coped with psychological and psychosocial challenges connected to developing an autonomous personal life. Students f Those struggles make them vulnerable to mental health problems. Depression and anxiety are some of the most common mental disorders among university students. Negative mood related to depression and anxiety from the tripartite model of anxiety and depression is characterized by symptoms of elevated negative affect or general distress and low levels of positive affect and physiological hyperarousal [1].

According to Duffy, Twenge, and Joiner [2] mental health symptoms have nearly doubled in college student populations. The trend also happened in Indonesia.

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Based on the Indonesian Health Survey in 2023, depression among youth (15-24 years old) is the highest prevalence [3]. Study shows that anxiety (51.1%) is the highest mental disorder that occurs among college students, followed by depression (25.0%) and stress (38.9%). Among those 5.7% had severe to extremely severe depression, 20.1% had severe to extremely severe anxiety and 8.3% had severe to extremely severe stress [4]. The result is in line with the study conducted by Romadhona, Fitriyana, Ibnusantosa, and Respati [5] that found anxiety is the most common mental health problem among college students during the pandemic.

Mental health predicts academic success during university especially depression, anxiety, and stress hurt the academic, personal, and social life of students. Eisenberg, Golberstein, and Hunt [6] found that depression is a significant predictor of lower GPAs and an increase in the risk of dropping out of college without graduating. Deng et al. [7] found that academic stress positively impacts students' depression levels. Bowman et al. [8] argue anxiety and negative affect are related to a lack of prospective memory. On the other hand, depression, anxiety, and stress are negatively related to students' health and quality of life Freitas et al [9], life satisfaction Lopes & Nihei [10], resiliency Zhang et al [11], positive mental well-being Bibi, Lin, Zhang, & Margraf [12].

1.1 Depression, Anxiety, and Stress

Mental health predicts academic success during university especially depression, anxiety, and stress hurt the academic, personal, and social life of students. Eisenberg et al. [6] found that depression is a significant predictor of lower GPA and an increase in the risk of dropping out of college without graduating. Depression and anxiety have overlapping symptoms. Studies show that depression and anxiety have significant correlations [13], [14]. the presence of significant anxiety symptoms generally predicts depression [14]. The substantial correlation between depression and anxiety leads to overlapping items in self-report measurement.

The Depression, Anxiety, and Stress Scales Lovibond & Lovibond [1] is a widely used measurement to diagnose depression and anxiety. Several studies have established the DASS psychometric properties in both clinical and nonclinical groups [15], [16], [17]. The original DASS consisted of 42 items with 14 items in each subscale of depression, anxiety, and stress [1]. Then Lovibond and Lovibond [1] proposed for each sub-scale consisting of 2-6 items describing each respective syndrome [18].

The DASS scale is a self-report tool designed to maximize the differences between symptoms of depression and anxiety and to reveal their common features called stress. The DASS was developed to measure ubiquitous emotional states that are clinically significant and are usually described as depressive conditions, anxiety,

and stress [1]. The original DASS consists of 42 items with three subscales-depression, anxiety, and stress 14 items for each scale. The depression scale is intended to assess the condition of dysphoria, despair, devaluation of life, self-humiliation, lack of interest, anhedonia, and inertia. The Anxiety Scale is intended to assess the effects of anxiety on autonomic nerve arousal, effects on muscle movement, situational anxiety, and subjective experiences of the effects of anxiety. The Stress Scale is intended to assess the difficulty of relaxing, and the response to nervousness, irritability/anxiety, over-reactivity, and impatience [1].

The DASS has been translated into many languages and has been shown to have good validity [16]. However, the significant limitations of the DASS-42 questionnaire are length and time-consuming. Therefore, shortened versions were created which are the 21 and 12 item E.-H. Lee et al. [19] which is the most used in university settings. In the initial development and validation study of the DASS-21, Lovibond and Lovibond [1] suggested a three-factor oblique structure rather than a uni-dimensional or a two-dimensional structure. The suggestion is similar to other studies' findings conducted Wise, Harris, and Olver [20] and Oei, Sawang, Goh, and Mukhtar [21].

Both long and short version of The DASS have been translated into many languages and have been empirically evaluated in diverse cultures. Nevertheless, the factorial validity of the different versions of this scale has never been evaluated in Indonesian students. Therefore, it is vital to have well-established and cross-culturally fit measurements when assessing the symptoms of depression, anxiety, and stress in the Indonesian sample. The objectives of the present study were to investigate the Indonesian version of the DASS-42 reliability among college students.

The current study is to explore the potential of the DASS to act as one tripartite model of depression and anxiety, as it is understood and applied to university students. We also search for the international transferability of the DASS by testing the three-factor structure in an Indonesian sample of university students and exploring its validity. The valid and reliable DASS would be an advantage to counselors for the early detection of mental health problems among university students.

2 METHOD

2.1 Participants and Procedures

The population of this study was undergraduate students studying at the State University of Jakarta between the 2021-2023 academic year—a total of 1440 undergraduate students (158 male, 1282 female). The sampling used was accidental sampling. After being filtered due to significant missing data, the total number of students who participated in this study was 1372. Students were recruited through the psychoeducational program and counselling services by the university counseling

center. Participation was voluntary and consent, and their responses will not be reported to the program or the university administration.

Table 1. Demographic Properties of the Sample

Gender	Female	1282
	Male	158
Class off	2015	9
	2016	15
	2017	44
	2018	137
	2019	205
	2020	234
	2021	242
	2022	223
	2023	54
	unknown	277
Faculty	Social science	177
	Economic	118
	Psychology	117
	Art and language	181
	Education	351
	Mathematic and natural science	138
	Technics	112
	Physical education	3
	Unknown	243

2.2 Measures

The measure used was the long version of Depression Anxiety Stress Scales (DASS) consisting of 42 items with three groups of 14 items, each representing feelings and behaviours associated with depression, anxiety, and stress. The participants were asked to rate how well each item described their state during the previous week on a four-point, scale ranging from 0 (Did not apply to me at all), 1 (Applied to me to some degree, or some of the time), 2 (Applied to me to a considerable degree, or a good part of time), and 3 (Applied to me very much, or most of the time). The previous Indonesian version of DASS's reliability coefficient is 0.954 for the Depression Scale, 0.903 for the Anxiety Scale, and 0.917 for the Stress Scale. The DASS 42 assessed five levels of emotional disturbance, ranging from normal, mild, moderate, severe, and extreme [1].

2.3 Data Analysis

The 42-item DASS will be analyzed using Confirmatory Factor Analysis (CFA). CFA provides an understanding of the covariation among a set of indicators and examines the underlying dimensions of the instrument (factors) and the pattern of item-factor relationships (factor loadings) [22]. Based on the analysis, 7 items with the highest factor loading will be used to formulate the 21-item DASS. The model fit will follow the recommendation from Hu and Bentler (1999): RMSEA < .05, NFI (Relative Fit Index [RFI], Non-normed Fit Index [NNFI], Incremental Fit Index [IFI], RNI, CFI, or GFI) > .90, and parsimony indexes > .80. SPSS version 23 was used in this study for the reliability and validity analysis. A variety of statistical tests were provided by CFA for the evaluation of model fit through the display of the statistical model's goodness of fit [23]. Both descriptive analysis and CFA were conducted using SPSS 23.

3 RESULT AND DISCUSSION

The descriptive data shows that

The result of CFA shows that model fit of 42-item DASS is RMSEA=0.085 [0.083, 0.086], CFI=0.753, TLI=0.740, x^2= 33584.095 (p=0.00), and SRMR=0.075. In order to have better fitness for the DASS, the confirmatory factor analysis was run for searching shorter and higher factor loading.

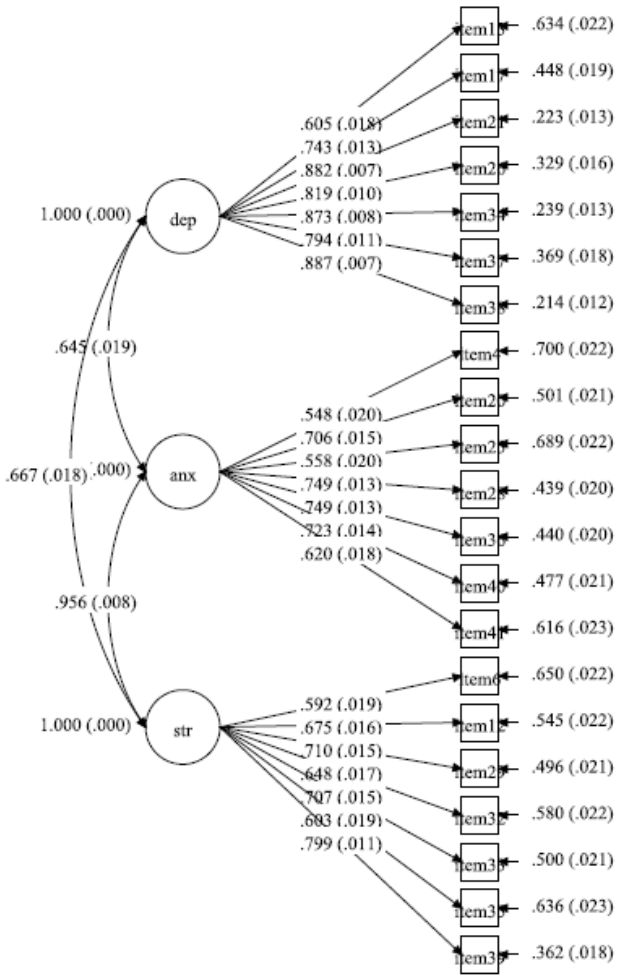

Figure 1. Structural model for the three subscales and one total scale. Factor loadings of each item on the latent variables are represented with arrows. The numbers above the items indicate how much of the variance was explained.

The factorial validity of the factor structure and the CFA results in the current study demonstrated that the scale fit the factor structure well for the 21-item DASS. The result of RMSEA=0.087 [0.084, 0.091], CFI=0.889, TLI=0.875, x^2= 17818.127 (p=0.000), and SRMR=0.054. In addition, the result for the reliability of the DASS showed that all the sub-scale has excellent reliability. The reliability for the depression scale was 0,93, the anxiety scale was 0,88, and the stress scale 0,89. Therefore the DASS could be further examined to search the shorter version.

Table 2. Scale Descriptive Statistics and Alpha Reliability Coefficients.

No	Item	M	SD	Skewness	Kurtosis	Alpha if item deleted
Depression						
3	I couldn't seem to experience any positive feeling at all	1.55	0.93	0.05	-0.89	.926
5	I just couldn't seem to get going	2.10	0.92	-0.72	-0.45	.924
10	I felt that I had nothing to look forward to	2.20	0.86	-0.75	-0.41	.924
13	I felt sad and depressed	2.42	0.78	-1.17	0.59	.924
16	I felt that I had lost interest in just about everything	2.08	0.98	-0.68	-0.72	.925
17	I felt I wasn't worth much as a person	2.33	0.93	-1.17	0.19	.921
21	I felt that life wasn't worthwhile	1.98	1.08	-0.60	-1.00	.919
24	I couldn't seem to get any enjoyment out of the things I did	1.79	1.00	-0.25	-1.08	.924
26	I felt down-hearted and blue	1.97	1.02	-0.54	-0.94	.918
31	I was unable to become enthusiastic about anything	1.91	1.02	-0.43	-1.01	.925
34	I felt I was pretty worthless	2.12	1.04	-0.86	-0.56	.919
37	I could see nothing in the	1.70	1.09	-0.23	-1.25	.919

No	Item	M	SD	Skewness	Kurtosis	Alpha if item deleted
	future to be hopeful about					
38	I felt that life was meaningless	1.82	1.13	-0.41	-1.25	.918
42	I found it difficult to work up the initiative to do things	1.91	1.00	-0.41	-1.01	.927
Anxiety						
2	I was aware of dryness of my mouth	1.56	1.02	-0.06	-1.12	.883
4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	1.42	1.08	0.08	-1.28	.875
7	I had a feeling of shakiness (e.g., legs going to give way)	1.43	1.09	0.10	-1.27	.877
9	I found myself in situations that made me so anxious I was most relieved when they ended	2.47	0.77	-1.39	1.19	.881
15	I had a feeling of faintness	2.37	0.81	-1.11	0.43	.880
19	I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion	1.08	1.10	0.59	-1.02	.881
20	I felt scared without any	1.90	1.07	-0.50	-1.06	.873

No	Item	M	SD	Skewness	Kurtosis	Alpha if item deleted
	good reason					
23	I had difficulty in swallowing	0.61	0.87	1.35	0.95	.880
25	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	1.25	1.11	0.32	-1.26	.874
28	I felt I was close to panic	2.21	0.95	-0.88	-0.39	.874
30	I feared that I would be "thrown" by some trivial but unfamiliar task	2.31	0.89	-1.07	0.12	.882
36	I felt terrified	2.22	0.91	-0.86	-0.33	.875
40	I was worried about situations in which I might panic and make a fool of myself	2.24	0.95	-0.99	-0.18	.876
41	I experienced trembling (e.g., in the hands)	1.43	1.07	0.12	-1.24	.874
Stress						
1	I found myself getting upset by quite trivial things	2.03	0.89	-0.47	-0.74	.892
6	I tended to over-react to situations	2.06	0.91	-0.56	-0.70	.890
8	I found it difficult to relax	1.96	0.98	-0.49	-0.88	.895
11	I found myself getting upset rather easily	2.20	0.87	-0.79	-0.31	.889

No	Item	M	SD	Skewness	Kurtosis	Alpha if item deleted
12	I felt that I was using a lot of nervous energy	2.42	0.82	-1.30	0.87	.892
14	I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting)	1.98	0.94	-0.50	-0.76	.892
18	I felt that I was rather touchy	2.06	0.95	-0.60	-0.74	.890
22	I found it hard to wind down	1.85	1.05	-0.35	-1.17	.899
27	I found that I was very irritable	1.99	0.99	-0.54	-0.87	.889
29	I found it hard to calm down after something upset me	2.36	0.86	-1.13	0.28	.891
32	I found it difficult to tolerate interruptions to what I was doing	1.95	0.94	-0.40	-0.89	.889
33	I was in a state of nervous tension	1.83	1.03	-0.35	-1.07	.892
35	I was intolerant of anything that kept me from getting on with what I was doing	1.62	0.99	-0.06	-1.06	.891
39	I found myself getting agitated	2.28	0.88	-0.99	-0.01	.889

To develop the 21-item DASS form, the 7 items with the highest factor loadings for depression sub-scale are item 13 (I felt sad and depressed), item 17 (I felt I wasn't worth much as a person), item 21 (I felt that life wasn't worthwhile), item 26 (I felt

down-hearted and blue), item 34 (I felt I was pretty worthless), item 37 (I could see nothing in the future to be hopeful about), and item 38 (I felt that life was meaningless). For the anxiety subscale, the highest factor loadings are item 4 (I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion), item 20 (I felt scared without any good reason), item 25 (I as aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat), item 28 (I felt I was close to panic), item 36 (I felt terrified), item 40 (I was worried about situations in which I might panic and make a fool of myself), and item 41 (I experienced trembling (e.g., in the hands). For the stress sub-scale the highest factor loadings are item 6 (I tended to over-react to situations), item 12 (I felt that I was using a lot of nervous energy), item 29 (I found it hard to calm down after something upset me), item 32 (I found it difficult to tolerate interruptions to what I was doing), item 33 (I was in a state of nervous tension), item 35 (I was in a state of nervous tension), and item 39(I found myself getting agitated).

The DASS is a popular instrument used to identify and distinguish between depression, anxiety, and stress. The scale was developed to investigate the mental health problems regarding negative emotions (depression, anxiety, and stress). In this study, the DASS was investigated psychometrically in terms of reliability and its factorial loading in the Indonesian sample.

The validity of the DASS was evaluated through the CFA. The Indonesian version of the DASS comprised three factors with 42 items and 14 items for depression, anxiety, and stress scale. The study showed that 42 DASS has an unfit model. The 42 DASS was an unfit model shown in other studies such as CFA conducted by Makara-Studzińska et al. [16] which found an unfit model of the 42 DAAS. However, the results contradicted from the study conducted by Bilgel and Bayram [24] and Widyana and Sumiharso [17] which found that the DAAS 42 has a fit model. Due to the differences in findings, a modified model with three correlated factors, and intercorrelations between measurement errors of individual items to find a better version of the DASS.

The shorter version of the DASS-21 showed good reliability for the Indonesian college student population. All three scales and the total scores displayed an acceptable degree of internal consistency, meaning the DASS-21 can be reliably used to assess college students' psychological distress. The results obtained in the current study are similar to those obtained in previously conducted studies in other college populations for example study conducted by Sugiana Sugara et al. [25] on the Indonesian adult, by Burckhardt, Manicavasagar, Batterham, Hadzi-Pavlovic, and Shand [26] on Chinese college students and Camacho, Cordero, and Perkins [27] among Latino college students. In addition, the internet-administered version of DASS-42 is also a good fit for Indonesian adults [17]. The DASS has been

recognized as a reliable and good measure for college students in various countries including Asian countries [28], [29], [30], [31].

Study by Osman et al. [31] found that some items in the DASS 21 do not uniquely contribute to only one specific factor. It was suggested that for using adapted DASS 21 rather than raw DASS 21 and rearranging the items in a more proper sub-scale [32]. This is because translated versions of the DASS-21 from Western cultures into non-Western cultures might not accurately preserve item meanings and the original internal structure of the scale, especially in Asian cultures [21].

The DASS 21 shows better goodness of fit than the 42 version Makara-Studzińska et al. [16] also describe sufficient reliability and validity of the 21 DASS. The good reliability and validity of the DASS 21 were also found by several researchers [27], [33], [25], [18]. In the college population, the DASS 21 has Therefore, reformulation of the 42 DASS to a shorter version of 21 DASS is an evidence-based decision making.

There are several limitations of this study, First, the DASS 42 was collected through self-report which might include bias. Second, the respondents were homogeneous, from a student population in one university, it is likely the results of this study may not be representative of the general population. In addition, heterogeneous populations might result in a better-fit model.

The good psychometric properties of the DASS 21 for college students would be beneficial for early detection of psychological distress among college students. The 21 DASS could be used as screening tools for counseling services. The DASS 21 has significant guidance for treatment decisions, each categorization could be used as baseline data for the evaluation of the counseling result. It was concluded that the DASS could give important information for counsellors to provide effective counseling services.

4 CONCLUSION

Based on the study findings, the Indonesian DASS-21 demonstrated the goodness of fit for the college student population. The 21-DASS is reliable for all three scales. The findings could benefit counseling services regarding reliable measurement for depression, anxiety, and stress. In addition, further examination of the validity and reliability of this scale needs to be carried out by other researchers. Finally, reliable measurements of depression, anxiety, and stress could be utilized as baseline data for assessment and evaluation of counseling effectiveness.

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