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Cognitive, Emotion and Social Behavior in Reflecting Academic Stress

Nicko Dharma Pradana[a], Fatwa Tentama[b]*

[a,b]*Faculty of Psychology, Ahmad Dahlan University, Yogyakarta, Indonesia*

[a]*Email: nickodharmapradana93@gmail.com*

[b]*Email: fatwa.tentama@psy.uad.ac.id*

Abstract

The purpose of this study is to test the construct validity and construct reliability of the academic stress scale and examine the aspects and indicators that can form academic stress variables. Academic stress is measured by three aspects, namely cognitive, emotion, and social behavior. The population in this is students at the Faculty of Psychology, being in the final semester, and currently preparing a thesis at a private University "X" Yogyakarta. The sample in this study consists of 60 students. The sampling technique uses accidental sampling, and the data collection method is an academic stress scale. Research data were analyzed with Structural Equation Modeling (SEM) through the SmartPLS 3.2.8 program. Based on the results of data analysis, the aspects and indicators that make up the academic stress variable are declared valid and reliable. The dominant aspect that reflects academic stress is an emotion and the weakest aspect that reflects academic stress is a cognitive aspect. This shows that all aspects and indicators can reflect and shape academic stress. Thus, the measurement model can be accepted because the theory that describes the academic stress has been in accordance with the empirical data obtained from the subject.

Keywords: Academic stress; cognitive; emotional; social behavior; structural equation modeling.

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* Corresponding author.

1. Introduction

Education is one aspect that is very important for human life. Through the education process, humans will have the knowledge and skills needed to prepare for their future. High school transition to college experienced by individuals can cause various pressures. This can have psychological, academic, and social effects [1]. Academic stress on students arises when they experience psychological stress that comes from various academic assignments creating its burden [2]. Academic stress experienced by students varies. Usually, as students progress and pass each semester, academic stress tends to be higher [3]. Bashir and Ramay [4] say that stress causes reduced individual performance. This is in line with academic stress, which also has the same impact. When a personal experiences stress, it will result in impaired academic ability which can result in decreased academic achievement [5, 6], causing anxiety, nervousness, digestive disorders, endless worries, tension, and pain in the neck or shoulder [7], reduce sleep quality [8] and cause sleep disturbances [8], reduce learning motivation and persistence in learning [9]. It has a negative effect on physical and mental health [10], causing symptoms of depression and depression [11, 12, 13], as well as increasing burnout [8]. Academic stress is correlated with mental disorders and anxiety [14], and low emotional intelligence [15]. Besides, academic stress can also be caused by pressure from parents [14], low self-esteem and low academic self-efficacy [16]. Conversely, parental support, and involvement can reduce academic stress [11]. Other things that can cause academic stress are maladaptive perfectionists [17], lack of physical activity (sports) [18], and lack of learning motivation [9]. Research on academic stress continues to develop. The results showed a significant correlation between academic stress and academic achievement [19, 20, 21, 22, 23, 24, 25, 26]. Furthermore, Reference [27] said there was a relationship between academic stress and emotional intelligence. Reference [28] also said that there is a relationship between academic stress and subjective wellbeing. Stress is an uncomfortable condition when an individual experiences an imbalance between situational demands and their resources [29]. Reference [30] explained that stress is a condition when individuals feel that the state of their environment feels tiring and not in accordance with their coping abilities. Stress occurs when a person experiences demands that exceed his ability to make adjustments. This shows that the stress condition occurs when there is a gap or imbalance between demands and abilities [31]. Meanwhile, academic stress can be defined as students' negative perceptions of the expectations of parents and teachers regarding the high academic achievement they expect [32]. Reference [33] states that academic stress is a depressing situation experienced by a person where there are academic demands that are marked by various reactions, including physical, emotional, cognitive, and behavioral reactions. Meanwhile, Reference [34] describe academic stress as a response that arises because there are too many demands and tasks that students must do. Academic stress refers to pressures that are felt due to demands regarding academic achievement [35]. Reference [36] mentions three aspects of stress, including 1) Emotional, psychological symptoms when individuals feel stressed. The symptoms shown are anxiety, irritability, depression, nervousness, and excessive feelings of sadness and guilt. 2) Cognitive, which is impaired thinking function such as difficulty in concentrating, being forgetful, difficulty in making decisions, worries about the future, feeling threatened, imagining something frightening, experiencing obstacles in communication, worrying about things that are not important, and afraid of getting bad judgments. 3) Social behavior, which is a behavior disorder that occurs when an individual experiences stress, this disorder is shown as difficulties in socializing, self-measurement, delaying work assignments, and fear of meeting lecturers.

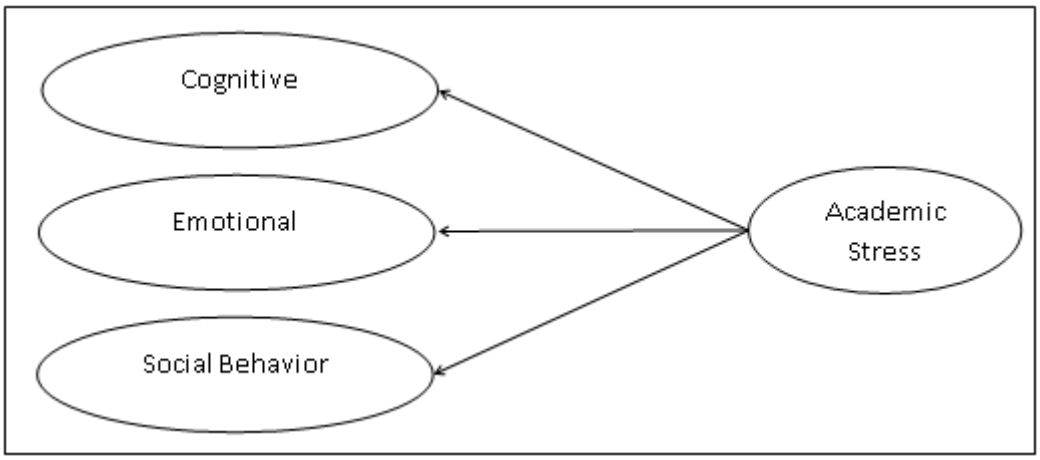

Figure 1: Conceptual framework of academic stress

Based on Figure 1 above, this study hypothesizes that the aspects of cognitive, social, and social behavior are capable of forming academic stress variables. One approach that can be used in testing the construction of a measuring instrument is Confirmatory Factor Analysis (CFA). Confirmatory Factor Analysis (CFA) is one of the main approaches in factor analysis. Confirmatory Factor Analysis (CFA) can be used to test aspects of a construct. This test is used to model measurement so that it can describe aspects in reflecting latent variables, namely academic stress, by looking at the loading factor of each aspect that forms a construct. Confirmatory Factor Analysis (CFA) is also used to test the construct validity and construct reliability of latent construct indicators [37]. Confirmatory Factor Analysis (CFA) used in this study is the second order Confirmatory Factor Analysis (2^{nd} Order CFA), a measurement model that consists of two levels. The first level of analysis is carried out from aspects to its indicators, and the second analysis is carried out from latent variables to its aspects [37]. Based on the description above, the formulation of the problem in this study are: 1) Is the academic stress scale valid and reliable? 2) Are the aspects of emotional, cognitive, and social behavior capable of forming academic stress variables? The purpose of this study is to: 1) Test the validity and reliability of the academic stress scale, and 2) Test the aspects and indicators that can form academic stress variables.

2. Research method

2.1. Population, Sample, and Sampling Technique

The population in this study are students in the Faculty of Psychology, which are in their final semester and are preparing their thesis at the private University "X" Yogyakarta. The sample in this study consists of 60 students. The sampling technique used is accidental sampling in which samples are taken randomly but fulfilling the requirements as samples from certain populations.

2.2. Data Collection Method

Academic stress is measured using a scale with a differential semantic scaling model. The scale of this study was compiled by researchers with reference to stress aspects, according to [36], namely cognitive, emotional, and social behavior. Examples of each item from aspects of cognitive, emotional, and social behavior can be

seen in Table 1, Table 2, and Table 3 below.

Table 1: Sample item of cognitive aspect

When I work on assignment in an unconducive situation, I am....						
Focusing	1	2	3	4	5	Difficult to concentrate
Calm	1	2	3	4	5	Frustrated

Table 2: Sample item of emotional aspect

When attending a lecture, I feel....						
Motivated	1	2	3	4	5	Bored
Optimistic	1	2	3	4	5	Pessimistic

Table 3: Sample item of behavior aspect

When working on an assignment, I....						
Do it soon	1	2	3	4	5	Postpone it
Do it independently	1	2	3	4	5	Work together with friends

Blueprints that are used as a reference in preparing the academic stress scale can be seen in Table 4 below.

Table 4: The Blueprint of the academic stress scale

Aspect	Indicators	Item numbers	Total
Cognitive	• Difficulty concentrating	1,2,3,4,5,6	6
	• Forgetful		
	• Difficult to make decisions		
	• Concerns about the future		
	• Feel threatened		
	• Imagine something scary		
	• Experiencing obstacles in communication		
	• Worrying about things that are not important		
	• Fear of getting a bad score		
Emotional	• Anxious	7,8,9,10,11,12	6
	• Getting angry		
	• Depression		
	• Nervous		
	• Excessive feelings of sadness and guilt		
Social behavior	• Difficulty in socializing	13,14,15,16,17,18	6
	• Tend to be introvert		
	• Delay doing work		
	• Fear of meeting a mentor		
Total			18

2.3. Construct Validity and Construct Reliability

The construct validity and reliability test in this study use the outer model testing through the smartPLS 3.2.8 program. The construct validity test consists of the convergent validity test and the discriminant validity test. Convergent validity can be seen from the loading factor value and Average Variance extracted of > 0.5 [38]. According to [39], the higher the loading factor score, the more important the role of loading will be in interpreting the factor matrix. Loading factor and AVE value of above 0.5 are considered significant [38]. While discriminant validity can be seen from comparing the roots of the Average Variance Extracted (AVE) between aspects in which it must be higher than the correlation with other aspects [38]. The construct reliability test was carried out to show the internal consistency of the measuring instrument by looking at the value of composite reliability and Cronbach alpha. A higher value would indicate the consistency of each item in measuring latent variables. According to [39], the expected composite reliability and Cronbach alpha values are > 0.7, and the value 0.6 is still acceptable [38].

2.4. Data Analysis Technique

The data in this study were analyzed using the outer model with the 2nd Order CFA approach through the SmartPLS 3.2.8 program. According to Abdillah and Hartono [40], Partial Least Square (PLS) is a variant-based Structural Equation Model (SEM) that can simultaneously test measurement models to test validity and reliability.

3. Result

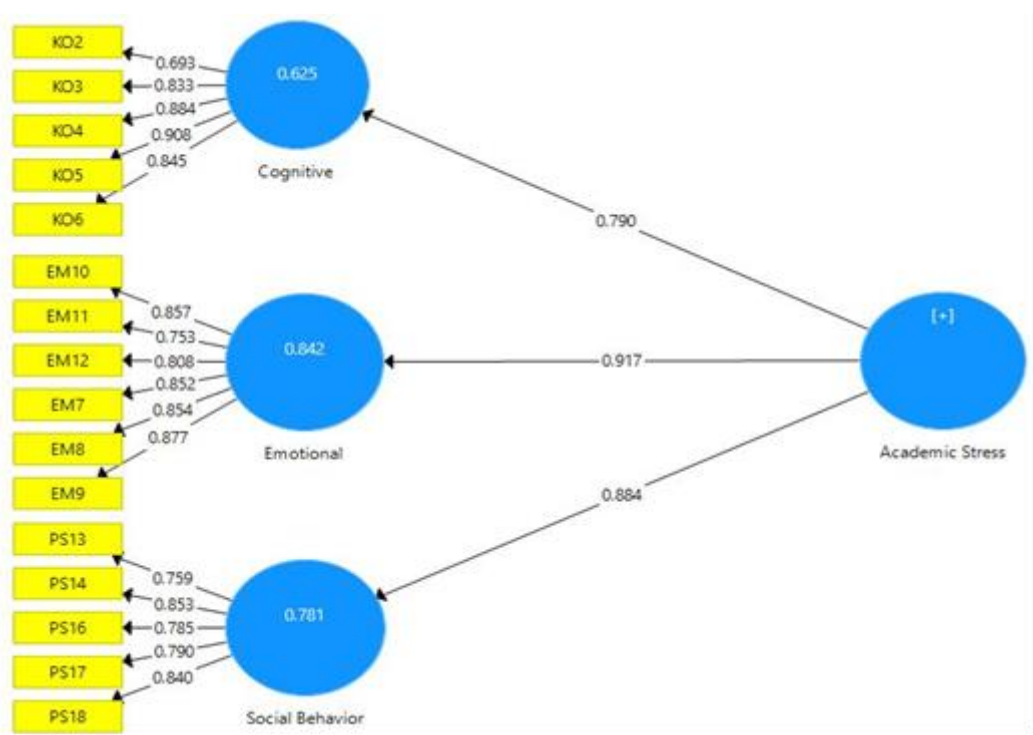

Figure 2: Outer model of the academic stress scale

The analysis results of the outer stress academic scale model using the SmartPLS 3.2.8 program can be seen in

Figure 2 below.

3.1. Construct Validity Test

3.1.1. Convergent Validity

Convergent validity test is performed by testing the outer model seen from the loading factor value and Average Variance Extracted (AVE). This test is done by looking at the value of above 0.5. Based on the data analysis, it was found that the value of loading factors from variables to aspects and from aspects to indicators are > 0.5. A loading factor of 0.5 or more is considered to have a validation that is strong enough to explain latent constructs [41]. The results of convergent validity testing can be seen in Table 5 and Table 6.

Table 5: Loading factor (variable-aspect)

Aspect	Loading factor	Explanation
Cognitive	0.790	Valid
Emotional	0.917	Valid
Social behavior	0.884	Valid

Table 6: loading factor (aspect-item)

Item	Loading factor	Explanation
KO2	0.693	Valid
KO3	0.833	Valid
KO4	0.884	Valid
KO5	0.908	Valid
KO6	0.845	Valid
EM10	0.857	Valid
EM11	0.753	Valid
EM12	0.808	Valid
EM7	0.852	Valid
EM8	0.854	Valid
EM9	0.877	Valid
PS13	0.759	Valid
PS14	0.853	Valid
PS16	0.785	Valid
PS17	0.790	Valid
PS18	0.840	Valid

Furthermore, the results of the convergent validity test indicate that the value of the Average Variance Extracted (AVE) is > 0.5. The Average Variance Extracted (AVE) value of the academic stress variable is 0.509, and the value of each aspect can be seen in Table 7.

Table 7: Average Variance Extracted (AVE) value of academic stress

Aspect	AVE	Explanation
Cognitive	0.699	Valid
Emotional	0.697	Valid
Social behavior	0.650	Valid

3.1.2. Discriminant Validity

The results of the discriminant validity test show that the root value of the Average Variance Extracted (AVE) in each aspect is higher than the root value in other aspects so that the discriminant validity criteria are met. The AVE root value of the academic stress variable can be seen in Table 8 below.

Table 8: Root value of Average Variance Extracted (AVE) of academic stress

Aspect	Emotional	Cognitive	Social behavior
Emotional	**0.835**	0.565	0.783
Cognitive	0.565	**0.836**	0.524
Social behavior	0.783	0.524	**0.806**

3.2. Construct Reliability Test

Construct reliability testing is done by testing the outer model, which is seen from the value of composite reliability and Cronbach alpha. This test is done by looking at the value of above 0.7. It is because this value determines the reliability of the construct.

Table 9: Composite reliability and Cronbach alpha value of academic stress

Variable	Cronbach alpha	Composite reliability	Explanation
Academic stress	0.929	0.509	Reliable

The results of construct reliability testing in Table 9 shows that the academic stress scale has good reliability, and it means that the aspects that measure academic stress variables meet unidimensional criteria. This is indicated by the value of Cronbach alpha of 0.929 and composite reliability of 0.509. The validity and reliability test of this construct produce valid and reliable items that are able to reflect academic stress, namely the items numbers 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18. While the items that are not able to reflect academic stress are the items numbers 1 and 15. The analysis of research data using the outer model testing shows that the measurement model can be accepted because all aspects of academic stress can reflect the variables formed.

4. Discussion

Based on the results of the analysis of construct validity and reliability, the aspects and indicators that make up the academic stress scale are declared valid and reliable. This shows that all aspects and indicators can reflect and shape academic stress variables. The most dominant aspect that can reflect academic stress is an emotion with a loading factor of 0.917. The emotional aspects are described with anxiety, irritability, depression,

nervousness, and excessive feelings of sadness and guilt. Data at the research location shows that students feel anxious and depressed in preparing their thesis because there are many parts that need revising every time they consult their thesis. They are afraid of not being able to revise and afraid of not being able to fulfill the request of the thesis supervisor. This makes students also feel nervous when they want to meet the supervisor. In addition, the time that is getting closer to the deadline makes students feel anxious. Students are required to be quick in preparing their thesis because there is an evaluation every three months for the development of the thesis. Some students feel sad because they have to pay for the extension of thesis preparation again because the normal time for thesis preparation is up. The weakest aspect that is able to reflect academic stress is a cognitive aspect with a loading factor of 0.790. It is described by difficulty in concentrating, being forgetful, difficulty in making decisions, worries about the future, feeling threatened, imagining something frightening, experiencing obstacles in communication, worrying about things that are not important, and fearing getting a bad judgment from others. Findings at the research location show that students before thesis guidance often imagine something "frightening" about their thesis supervisors and worry a lot about things that do not necessarily occur, such as thinking of difficulties in revising their thesis and the supervisors hindering the progress of thesis preparation. It also impacts on the obstruction of student communication with the supervisor, and the student finally feels threatened by the situation. The findings of previous studies which also measure academic stress also support the results of this study. These studies include research conducted by Gonzalez, Hernandez, and Torres [42], showing that academic stress measurement meets reliability requirements with a Cronbach alpha value of 0.910. Reference [43] also prove in their research that the academic stress scale meets reliability requirements with a Cronbach alpha value of 0.870. Furthermore, the results of Castillo, Saez, Perez, and Castillo-Navarrete [44] showed a reliable academic stress scale with a Cronbach alpha value of 0.920, Mulyadi, Rahardjo, and Basuki [16] academic stress scale fulfilled the reliability requirements with a Cronbach alpha value of 0.875, the results of Jun and Choi's research [45] showed a reliable academic stress scale with a Cronbach alpha value of 0.810, and the results of Yeo and Lee's research [46] showed that the academic stress scale had met the reliability requirements with a Cronbach alpha of 0.810. This comparison shows that the academic stress scale has a better Cronbach alpha value of 0.929. This shows that the academic stress scale from the results of this study is appropriate to be used or applied in revealing student academic stress, especially for final semester students who are completing or preparing their thesis because it is supported by the results of good construct validity and reliability. The results of this study are expected to provide an overview of the construct validity and construct reliability on the academic stress scale for final year students who are completing their thesis so that they can be used as a reference for further research related to academic stress.

5. Conclusion

The conclusions of this study are 1) Academic stress scale is valid and reliable. 2) All aspects and indicators that can form academic stress variables include cognitive aspect, emotion, and social behavior. The most dominant aspect of reflecting academic stress variables is emotion, and the weakest aspect of reflecting academic stress is the cognitive aspect. In this study, academic stress scale measurement model that is fit with empirical data obtained from the subject is formed.

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