Confirmatory Factor Analysis of the Perceptions of Academic Stress Scales

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Abstract

Stress is a condition that must be experienced by humans, including students. This happens because every student will always be faced with a condition to meet the demands of the environment. Students will experience stress if they feel they do not have the ability to meet these academic demands. Therefore, an instrument is needed that can measure academic stress felt by students. This study aims to test the construct validity of the Perceptions of Academic Stress Scale (PASS)-Adaptation of Bedewy & Gabriel. Before conducting factor analysis, the adaptation and modification process of the instrument was carried out. The adaptation process was carried out to change the language, from English to Indonesian. The modification process was carried out to adjust the items to the situation and conditions of Indonesian students. The research subjects came from Surabaya State University students, who were in semesters 1, 3 and 5. The validity of the PAS construct was sought using Confirmatory Factor Analysis (CFA). To obtain the factors underlying the PAS-Bedewy & Gabriel Adaptation, it was done through 2 stages. Based on the five stages of extraction, 3 supporting theoretical factors were obtained. Factor 1: which relates to perceived academic load, supported by items no. 3, 6, 7 and 8; Factor 2: which relates to examinations, supported by items no. 10 and 11. Factor 3: which relates to confidence in completing assignments or lectures, supported by items no. 5, and 13. The study supports Bedewy & Gabriel's first theoretical construct, which is based on 3 factors namely Factor 1: pressures to perform; Factor 2: perceptions of workload; Factor 3: academic self-perceptions.

Introduction

Everyone will always face a challenging environment, whether as a child or an adult. Each environmental challenge will be faced by each person in their own way. When a person faces environmental challenges, they will also perform assessment activities. Whether the environmental challenge is stressful or not.

A person who perceives that the environmental challenge is very high, so that it exceeds their capacity or the ability to overcome it, will experience stress (Agolla & Ongori, 2009; Kania, 2014), or the ability to adjust to it (Busari, 2012). Stress as an imbalance between environmental demands and the individual's ability to meet these demands (Topper, 2007). The greater the gap between environmental demands and the ability to cope with these demands, the greater the impact on the person, including tension, distress, and anxiety (Lundgren, 2016).

In recent years, "stress has become an important topic in academic circles" (Agolla & Ongori, 2009; Aina & Wijayanti, 2019). Academic stress has been identified as a detrimental problem across different countries, cultures, and ethnic groups (Wong et al., 2006). Academic stress is students' perception of the pressure they face, time constraints to complete assignments, academic workload, and their academic self-perception (Bedewy & Gabriel, 2015). Academic stress is students' perceptions of the pressures they face, time constraints to complete assignments, academic workload, and their academic self-perception (Bedewy & Gabriel, 2015).

Research shows that there are many factors that cause academic stress. Academic stress caused by academic activities, including inappropriate studying habits and time management problems (Hill et al., 2018); academic assignments (Pascoe et al., 2020), including tasks or projects that are very difficult. In addition to the stress associated with academic tasks, academic stress is also caused by social and emotional factors, including conflict or situations faced with professors or peers (Agolla & Ongori, 2009; Pascoe et al., 2020) and other people living in the same domestic premises (Agolla & Ongori, 2009); the feeling of not belonging, and lack of emotional support Pascoe et al., 2020). Another factor that can cause academic stress is the amount of time spent on academic mobility (Hill et al., 2018).

Actually, academic stress is a natural condition experienced by every student. However, if it is not handled from the start, it will worsen the student's condition. therefore, it is necessary to identify the symptoms of academic stress early, which can be seen in anxiety, depression, decrease exercise, changes in eating habits, and sleep disturbance (Backović et al., 2012); digestive disorder (Ongori, 2007). These symptoms are experienced by students more than once (Ongori, 2007); in addition, the symptoms increase every month (Eswi et al., 2013).

While some experts say that academic stress can have a positive effect, others say the opposite (Fairbrother & Warn, 2003). The main impact of academic stress is a decrease in academic performance (Kaplan et al., 2005), which leads to a decrease in academic achievement (Zia-Ur-Rehman & Sharif, 2014). Students who experience academic stress, will consider that all academic tasks are too overwhelming (Ollfors & Andersson, 2007); this has the impact of feeling overwhelmed by their academic tasks (Huan et al., 2008) and feeling worried about the success of their studies (Huan et al., 2008; Kaplan et al., 2005; Murberg & Bru, 2004; Schraml et al., 2012).

Given the magnitude of the impact of academic stress on student academic performance, an early treatment is needed that can prevent academic stress from getting worse. One way to detect academic stress early on is to periodically measure students' academic stress levels. Therefore, a standardized academic stress measurement instrument is needed.

Several studies developed academic stress scales (Rustam & Tentama, 2020), including:

1. Scale for Assessing Academic Stress (SAAS) was developed by Sinha, Sharma, and Nepal (2001)
2. Perceived Stress Scale (PSS), was developed by Cohen (1994)
3. Student-Life Stress Inventory (SSI) was developed by Gadzella (1994)
4. Lakaev Academic Stress Response Scale (LARS) was developed by Lakaev (2009)
5. Depression Anxiety Stress Scale (DASS) was developed by Lovibond and Lovibond (1995)
6. Perception of Academic Stress Scale (PAS) was by Bedewy and Gabriel (2015)

The purpose of the study was to develop a measurement scale through the process of adaptation and modification of PAS - Bedewy and Gabriel (2015) for Indonesian students.

Method

In this study, PASS - Bedewy and Gabriel (2015) was developed through two stages, including:

1. Translation stage, i.e., from a. from English to Bahasa Indonesia; and b. from Bahasa Indonesia to English. At this stage, two translators were needed. The first translator is a lecturer from the English department, the second translator is a lecturer from the Psychology department who has proficiency in English. The purpose of the back translation was to verify whether the initial version was equivalent to the original scale. The result at this stage was the PAS – The First Format Adaptation.

Table 1. PAS – The First Format Adaptation

No	Original Version	Translation 1 (Indonesian Version)	Translation 2 (English Version)
	Stresses related to academic expectations		*Stresses related to academic expectations*
1	Competition with my peers for grades is quite intense	*Persaingan dengan teman-teman saya untuk nilai cukup ketat*	The competition between I and friends is quite tight for getting a good score.
2	My teachers are critical of my academic performance	*Guru saya kritis terhadap akademik saya*	My teacher is critical of my academics
3	Teachers have unrealistic expectations of me	*Guru memiliki harapan yang tidak realistis tentang saya*	The teacher has unrealistic expectations about me
4	The unrealistic expectations of my parents stress me out	*Harapan yang tidak realistis dari orang tua saya membuat saya stress*	The unrealistic expectations from my parents stress me out

No	Original Version	Translation 1 (Indonesian Version)	Translation 2 (English Version)
	Stresses related to faculty work and examinations		*Stresses related to faculty work and examinations*
5	The time allocated to classes and academic work is enough	*Waktu yang dialokasikan untuk kelas dan pekerjaan akademik sudah cukup*	The time allocated for class and academic work is enough
6	The size of the curriculum (workload) is excessive	*Ukuran kurikulum (beban kerja) berlebihan*	The load of Curriculum is excessive
7	I believe that the amount of work assignment is too much	*Saya percaya bahwa jumlah penugasan terlalu banyak*	I believe that the number of assignments is too much
8	Am unable to catch up if getting behind my work	*Saya tidak dapat mengejar ketinggalan pekerjaan*	I can't catch up with work
9	I have enough time to relax after work	*Saya punya cukup waktu untuk bersantai setelah bekerja*	I have enough time to relax after work
10	The examination questions are usually difficult	*Pertanyaan ujian biasanya sulit*	The questions in the examination are usually difficult
11	Examination time is short to complete the answers	*Waktu ujian singkat untuk menyelesaikan jawaban*	The time allotment in the examination is too short to complete the answers
12	Examination times are very stressful to me	*Waktu ujian sangat menegangkan bagi saya*	The time during examination is very stressful for me
	Stresses related to students' academic self-perceptions		*Stresses related to students' academic self-perceptions*
13	Am confident that I will be a successful student	*Saya yakin bahwa saya akan menjadi siswa yang sukses*	I am sure that I will become a successful student
14	Am confident that I will be successful in my future career	*Saya yakin bahwa saya akan sukses dalam karir masa depan saya*	I am sure that I will succeed in my future career
15	I can make academic decisions easily	*Saya dapat membuat keputusan akademis dengan mudah*	I can make academic decisions easily
16	I fear failing courses this year	*Saya takut gagal kursus tahun ini*	I am afraid of failing the course this year
17	I think that my worry about examinations is weakness of character	*Saya pikir kekhawatiran saya tentang ujian adalah kelemahan karakter*	I think my concern about the exam is character flaws

No	Original Version	Translation 1 (Indonesian Version)	Translation 2 (English Version)
18	Even if I pass my exams, am worried about getting a job	*Bahkan jika saya lulus ujian, saya khawatir tentang mendapatkan pekerjaan*	Even if I pass the exam, I'm worried about getting a job

2. Modification Stage: the next step is to distribute the first test format to limited subjects, to students who have the same characteristics as the research subjects. The results of the limited try out were reorganized into the Second Format Adaptation Scale.

Table 2. PAS – The Second Format Adaptation

No	Translation (Indonesian Version)	Translation (English Version)	Modification
1.	Persaingan dengan teman-teman saya untuk nilai cukup ketat	*The competition between I and friends is quite tight for getting a good score.*	Saya dan teman-teman bersaing sangat ketat untuk mendapatkan nilai yang bagus.
2.	Guru saya kritis terhadap akademik saya	*My teacher is critical of my academics*	Dosen saya memonitoring dan mengevaluasi nilai saya
3.	Guru memiliki harapan yang tidak realistis tentang saya	*The teacher has unrealistic expectations about me*	Saya merasa tidak sanggup memenuhi target akademik yang ditetapkan dosen saya
4.	Harapan yang tidak realistis dari orang tua saya membuat saya stress	*The unrealistic expectations from my parents stress me out*	Saya merasa stress jika dituntut orang tua meraih prestasi akademik
5.	Waktu yang dialokasikan untuk kelas dan pekerjaan akademik sudah cukup	*The time allocated for class and academic work is enough*	Saya merasa waktu yang ditetapkan oleh dosen dalam tugas terstruktur dan mandiri cukup
6.	Ukuran kurikulum (beban kerja) berlebihan	*The load of Curriculum is excessive*	Saya merasa beban semester berlebihan
7.	Saya percaya bahwa jumlah penugasan terlalu banyak	*I believe that the number of assignments is too much*	Saya menganggap jika tugas-tugas dari dosen berlebihan
8.	Saya tidak dapat mengejar ketinggalan pekerjaan	*I can't catch up with work*	Saya tidak bisa menyelesaikan tugas-tugas dari dosen
9.	Saya punya cukup waktu untuk bersantai setelah bekerja	*I have enough time to relax after work*	Saya merasa kewalahan dengan tugas yang banyak karena sering menunda mengerjakan

No	Translation (Indonesian Version)	Translation (English Version)	Modification
10.	Pertanyaan ujian biasanya sulit	*The questions in the examination are usually difficult*	Menurut saya soal-soal yang dibuat dosen dalam ujian sulit
11.	Waktu ujian singkat untuk menyelesaikan jawaban	*The time allotment in the examination is* too short *to complete the answers*	Menurut saya waktu dalam mengerjakan ujian singkat/kurang
12.	Waktu ujian sangat menegangkan bagi saya	*The time during examination is very stressful for me*	Menurut saya setelah ujian adalah waktu bebas
13.	Saya yakin bahwa saya akan menjadi siswa yang sukses	*I am sure that I will become a successful student*	Saya merasa yakin bahwa IPK saya akan naik
14.	Saya yakin bahwa saya akan sukses dalam karir masa depan saya	*I am sure that I will succeed in my future career*	Saya tidak yakin saya akan bekerja menjadi apa setelah lulus
15.	Saya dapat membuat keputusan akademis dengan mudah	*I can make academic decisions easily*	Saya sudah memiliki rencana pengerjaan skripsi
16.	Saya takut gagal kursus tahun ini	*I am afraid of failing the course this year*	Saya takut IPK semester ini turun
17.	Saya pikir kekhawatiran saya tentang ujian adalah kelemahan karakter	*I think my concern about the exam is character flaws*	Menurut saya ujian harus dihadapi bukan dikhawatirkan
18.	Bahkan jika saya lulus ujian, saya khawatir tentang mendapatkan pekerjaan	*Even if I pass the exam, I'm worried about getting a job*	Saya merasa kelulusan tidak menjanjikan langsung mendapatkan pekerjaan

3. Try Out Stage: At this stage, using 1553 research subjects, the correlation coefficient moved from 0.935 to 0.944. The results of the perceived academic stress scale reliability test showed a coefficient of 0.942 alpha Cronbach.

4. Factor Analysis Stage: the subjects used in this study are different from the subjects used in the try-out stage. The details are as follows:

Table 3. Distribution of Subjects Based on Gender

	Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	392	20.09	20.09	20.09
	Female	1559	79.91	79.91	100.00
	Total	1951	100.00	100.00	

Table 4. Distribution of Subjects Based on Semesters

	Semester	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	1156	59.25	59.25	59.25
	3	487	24.96	24.96	84.21
	1	308	15.79	15.79	100,00
	Total	1951	100.00	100.00	

Table 5. Distribution of Subjects Based on Faculty

	Department	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Arts and Language	204	10.46	10.46	10.46
	Business and Economy	302	15.48	15.48	25.94
	Math and Natural Science	230	11.70	11.70	37.72
	Engineering	271	13.80	13.80	51.61
	Law and Social Science	149	7,64	7,64	59.25
	Education	795	40.75	40.75	100.00
Total		1951	100.00	100.00	

Factor analysis on PASS - Bedewy & Gabriel Adaptation was conducted in 5 stages. The table below illustrates the items that failed at each stage, because they did not meet the criteria.

Table 6. Stage 1-4 of PAS Adaptation Factors Analysis

Factor	Item	No	Stage 1	Stage 2	Stage 3	Stage 4
Academic Expectation	The competition between I and friends are quite tight	1	.504	.439		
	My teacher is critical of my academics	2	.539	.538	.630	.629
	My teacher has unrealistic expectations of me	3	.525	.593	.611	.630

Factor	Item	No	Stage 1	Stage 2	Stage 3	Stage 4
	The unrealistic expectations from my parents stress me out	4	.375			
Workload and Examination	The time allocated for class and academic work is enough	5	.529	.555	.612	.645
	The load of curriculum is excessive	6	.577	.563	.622	.637
	I believe that the number of assignments is too much	7	.621	.625	.640	.667
	I can't catch up with work	8	.595	.589	.640	.640
	I have enough time to relax after work	9	.298			
	The questions in the examination are usually difficult	10	.583	.523	.627	.683
	The time allotment in the examination is too short to complete the answers	11	.547	.533	.688	.737
	The time during examination is very stressful to me	12	.347			
University Students' Academic Self-perception	I am sure that I will become a successful student	13	.586	.651	.695	.824
	I am sure that I will succeed in my future career	14	.492			
	I can make academic decision easily	15	.481			
	I am afraid of failing the course this year	16	.346			
	I think my concern about this exam is character flaws	17	.601	.478		
	Even if I pass the exam, I'm worried about getting a job	18	.585	.611	.488	
	Total	18				

Based on table 6 above, it appears that only 8 out of 18 items proceed to stage 5.

Table 7. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.746
Bartlett's Test of Sphericity	Approx. Chi-Square	2503.119
	Df	28
	Sig.	.000

Based on the results above, the KMO MSA value is 0.746. Because the KMO value is> 0.5, factor analysis can be continued because it meets the requirements for the KMO MSA value.

Table 8. Communalities

	Initial	Extraction
PAS3	1.000	.574
PAS5	1.000	.519
PAS6	1.000	.580
PAS7	1.000	.539
PAS8	1.000	.642
PAS10	1.000	.571
PAS11	1.000	.669
PAS13	1.000	.708

Extraction Method: Principal Component Analysis

Based on the results above, all items have an extraction value greater than 0.5, so it can be concluded that all items can be used to explain the factors.

Table 9. Rotated Component Matrix

	Component		
	1	2	3
PAS3	.735	.097	.155
PAS5	-.058	.313	.646
PAS6	.694	.296	-.108
PAS7	.581	.448	.028
PAS8	.795	-.024	.099
PAS10	.239	.716	.023
PAS11	.064	.812	.078
PAS13	.191	-.155	.805

Based on the results table 9 it can be seen that all factor loading values are greater than 0.5. Based on these results, it can be concluded that:

- Factor 1, consisting of items 3, 6. 7 and 8
- Factor 2, consisting of items 10 and 11
- Factor 3, consisting of items 5 and 13

Conclusion

This research resulted in 3 factors, namely:

1. Factor 1: related to perceived academic load, supported by items no. 3, 6, 7 and 8
2. Factor 2: related to exams, supported by item no. 10 and 11
3. Factor 3: which relates to the confidence of completing assignments or lectures, supported by item no. 5, and 13

The results of this study support the theoretical construct used by Bedewy and Gabriel to develop the PASS in college students, which consists of 3 factors, namely: (1) the academic expectations subscale (four items), (2) the workload and examinations subscale (eight items), and (3) the students' academic self-perceptions sub-scale (six items). These items related to academic stress were converted into a 5-point Likert-type questionnaire of 18 items, resulting in PAS.

However, the results of research in the field do not match the theoretical concept. Where based on factor analysis, 4 supporting factors are obtained, namely

Factor 1: pressures to perform.

Factor 2: perceptions of workload.

Factor 3: academic self-perceptions.

Factor 4: time restraints

In addition, Bedewy and Gabriel also revised their PAS, which can be seen in Table 9:

Table 9. Comparison of PAS with PAS-Revised

No	Original Version	The final version of the Perceptions of Academic Stress (PAS) scale
1	Competition with my peers for grades is quite intense	Am confident that I will be a successful student
2	My teachers are critical of my academic performance	Am confident that I will be a successful in my future career
3	Teachers have unrealistic expectations of me	I can make academic decisions easily
4	The unrealistic expectations of my parents stress me out	The time allocated to classes and academic work is enough
5	The time allocated to classes and academic work is enough	I have enough time to relax after work
6	The size of the curriculum (workload) is excessive	My teachers are critical of my academic performance
7	I believe that the amount of work assignment is too much	I fear failing courses this year

No	Original Version	The final version of the Perceptions of Academic Stress (PAS) scale
8	Am unable to catch up if getting behind my work	I think that my worry about examinations is weakness of character
9	I have enough time to relax after work	Teachers have unrealistic expectations of me
10	The examination questions are usually difficult	The size of the curriculum (workload) is excessive
11	Examination time is short to complete the answers	I believe that the amount of work assignment is too much
12	Examination times are very stressful to me	Am unable to catch up if getting behind the work
13	Am confident that I will be a successful student	The unrealistic expectations of my parents stress me out
14	Am confident that I will be successful in my future career	competition with my peers for grades is quite intense
15	I can make academic decisions easily	The examination questions are usually difficult
16	I fear failing courses this year	Examination time is short to complete the answers
17	I think that my worry about examinations is weakness of character	Examination times are very stressful to me out
18	Even if I pass my exams, am worried about getting a job	Even if I pass my exams, am worried about getting a job

In addition to moving the position of item numbers, one of the revisions made was the absence of information about theoretical constructs.

The factor analysis comparison between PAS - Bedewy & Gabriel 2015 and PAS - Adaptation is as follows:

Table 10. Comparison of PAS 2015 results with PAS Adaptation

No.	Factor	PASS – Bedewy & Gabriel 2015				PASS - Adaptation		
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3
	Stresses related to academic expectations							
1	Competition with my peers for grades is quite intense	1 (0.75)						

No.	Factor	PASS – Bedewy & Gabriel 2015				PASS - Adaptation		
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3
2	My teachers are critical of my academic performance	1 (0.41)						
3	Teachers have unrealistic expectations of me				4 (0.52)	1		
4	The unrealistic expectations of my parents stress me out	1 (0,72)						
	Stresses related to faculty work and examinations							
5	The time allocated to classes and academic work is enough				4 (0.59)			3
6	The size of the curriculum (workload) is excessive		2 (0.78)			1		
7	I believe that the amount of work assignment is too much		2 (079)			1		
8	Am unable to catch up if getting behind my work				4 (0.46)	1		
9	I have enough time to relax after work				4 (0.63)			
10	The examination questions are usually difficult		2 (0.47)				2	
11	Examination time is short to complete the answers				4 (0.47)		2	

No.	Factor	PASS – Bedewy & Gabriel 2015				PASS - Adaptation		
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3
12	Examination times are very stressful to me	1 (0.50)						
	Stresses related to students' academic self-perceptions							
13	Am confident that I will be a successful student			3 (0.67)				3
14	Am confident that I will be successful in my future career			3 (0.71)				
15	I can make academic decisions easily			3 (0.45)				
16	I fear failing courses this year			3 (0.48)				
17	I think that my worry about examinations is weakness of character	1 (0.44)						
18	Even if I pass my exams, am worried about getting job		2 (0.52)					

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