

Development and validation of the academic stress inventory

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Abstract

This study aimed to develop and validate an Academic Stress Inventory for high school students at SMAN 1 Probolinggo. Utilizing a modified Borg & Gall Research and Development (R&D) model, the inventory was based on Gadzella & Masten's (2005) framework, encompassing academic stressors and reactions. Initially comprising 52 items, it was pilot-tested with 203 tenth-grade students using a cross-sectional design. The sample size was obtained using simple random sampling to ensure a representative sample of the student population. Validity was assessed using Pearson Correlation, resulting in 51 validated items. The inventory showed high reliability with a Cronbach's Alpha of 0.934. It categorizes academic stress into low, moderate, and high levels. The data collection procedure involved administering the inventory during school hours. This validated tool addresses a critical gap at SMAN 1 Probolinggo, providing a structured measure of academic stress. Its application promises to enhance stress management programs, fostering a supportive academic environment and promoting student well-being and success

Keywords: academic stress; inventory; senior high school students

1. Introduction

Academic stress is a common challenge faced by students in their educational journey. Research conducted by Arsy & Annisa (2022) at Kartika VIII-1 High School indicates that 28.4% of students experience very high levels of stress, 27.2% experience high levels, 25% experience moderate levels, 10.2% experience very low levels, and 9.1% experience low levels. This data highlights the prevalence and varying degrees of academic stress among students. Further insights from Puspitasari et al. (as cited in Asmita, 2021) reveal that academic stress can arise from both internal and external factors. Internal factors include a predisposition towards negative thinking, a personality that struggles with stress tolerance, and self-defeating beliefs. On the other hand, external factors encompass a more rigorous curriculum, parental pressure to achieve high academic performance, and the societal expectation to elevate one's social status through educational success.

Observations at SMAN 1 Probolinggo, a leading school in the city, underscore the intense academic environment faced by students. The school maintains high academic standards, as evidenced by the average Minimum Competency Standard (SKM) reaching 80, which poses significant student challenges. This demanding academic environment is further intensified by the education system's lack of specialization tracks in the 10th grade, requiring students to engage with all subjects and face higher academic demands than their middle school experience. Consequently, many students at SMAN 1 Probolinggo exhibit symptoms of academic stress, including health issues, academic procrastination, and even truancy. This situation underscores the critical need for effective strategies to manage and mitigate academic stress, ensuring that students can navigate their educational journeys successfully and healthily.

Sarafino and Smith (as cited in Oktavia et al., 2019) provide a comprehensive explanation of the negative impacts of academic stress, which can affect individuals both physically and psychologically. Physically, individuals may experience trembling in the hands and feet, headaches, and significant weight changes. These physical symptoms can be alarming and may interfere with daily activities and overall well-being. Psychologically, academic stress influences individuals in various dimensions. Emotional reactions such as anxiety, excessive fear, and anger are common, and these intense emotions can disrupt a student's ability to focus and perform academically. Cognitive reactions, such as overthinking, are also prevalent, further exacerbating emotional distress and leading to behavioral changes.

Moreover, individuals experiencing academic stress may exhibit maladaptive behaviors. These can include avoidance behaviors, such as academic procrastination and truancy, where students delay or avoid their responsibilities and school attendance. The stress may also lead to substance abuse, including the misuse of alcohol and other addictive substances, as a coping mechanism. In more severe cases, there is a potential for self-destructive behaviors or even suicidal tendencies, highlighting the critical need for early intervention and support. Understanding these impacts underscores the importance of developing effective strategies to manage and mitigate academic stress, ensuring that students receive the necessary support to navigate their educational experiences healthily and successfully. Addressing academic stress comprehensively can help prevent these negative outcomes and promote a more positive and productive academic environment (Finishia et al., 2020).

Based on the aforementioned points, it is essential to develop an instrument that allows for the systematic and scientific measurement of academic stress levels among high school students. Such a tool would not only aid in the early identification of students who are at risk of experiencing academic stress but also provide deeper insights into the factors contributing to this stress. Interviews with guidance counselors at SMAN 1 Probolinggo revealed that the school currently lacks a specific tool to measure academic stress. Therefore, a high school academic stress inventory was developed based on the framework by Gadzella & Masten (2005), which categorizes academic stress into two main aspects: academic stressors and reactions to these stressors. Indicators of academic stressors include frustration, conflict, pressure, change, and self-imposition, while reactions to stressors encompass physiological, cognitive, emotional, and behavioral responses.

The primary objective of this research is to develop and validate a high school academic stress inventory that can be utilized as a guidance and counseling instrument to measure students' academic stress levels. By identifying stress through this inventory, guidance counselors can provide early interventions to prevent the negative impacts of academic stress on students. The development of this inventory is expected to fill the current gap in tools available at SMAN 1 Probolinggo and offer a more structured approach to addressing academic stress, ultimately contributing to the well-being and academic success of the students. Additionally, having a validated instrument allows for more accurate data collection and analysis, facilitating targeted strategies to support students in managing stress effectively.

2. Method

This study employed a Research & Development (R&D) approach, following a modified version of the Borg and Gall (1983) model. The research process was conducted in several systematic steps to ensure the development of a reliable and valid academic stress inventory for high school students. The initial phase involved a comprehensive literature review and data collection to understand the existing academic stress constructs and measurement tools. Based

on the collected information, a detailed plan was developed outlining the objectives, target population, and methodological approach. A preliminary draft of the academic stress inventory was created, incorporating items that reflect the identified dimensions of stressors and reactions to stressors as per Gadzella & Masten (2005). This draft was pilot-tested with a small group of students to identify any issues related to item interpretation, response format, and overall usability. Feedback from this testing phase was used to make necessary revisions, and the inventory was finalized (Rahman, 2019).

The study was conducted from May to June 2024 at SMA Negeri 1 Probolinggo, a high school implementing the kurikulum merdeka. The target population for this study consisted of 10th-grade students, representing a critical stage in secondary education where academic stress is often prominent. A sample of 203 participants was obtained through simple random sampling, ensuring that each student in the 10th grade had an equal chance of being included in the study. Data collection involved administering the finalized academic stress inventory to the selected participants. Responses were recorded and tabulated using Microsoft Excel to convert answers into numerical scores for subsequent analysis. The validity of the inventory was assessed using Pearson Correlation, which measured the strength and direction of the relationship between individual items and the overall construct they intended to measure. Reliability was tested using Cronbach's Alpha to determine the internal consistency of the inventory items. Data analysis was conducted with the assistance of SPSS software, providing insights into the prevalence and dimensions of academic stress among high school students, thereby contributing to the development of effective interventions and support strategies.

3. Results and Discussion

3.1 Result

The development and validation of the Academic Stress Inventory for high school students at SMAN 1 Probolinggo involved a meticulous and systematic process. Initially, the conceptual framework for the inventory was derived from the established model of academic stress proposed by Gadzella & Masten (2005), which delineates academic stress into two primary aspects: academic stressors and reactions to these stressors. The academic stressors include indicators such as frustration, conflict, pressure, change, and self-imposition. In contrast, reactions to stressors encompass physiological, cognitive, emotional, and behavioral responses. This dual-aspect approach ensures a comprehensive assessment of the multifaceted nature of academic stress experienced by students.

Table 1 provides a comprehensive overview of the item validation and reliability testing results. Each sub-variable was scrutinized for validity and reliability, including frustration, conflict, pressure, change, self-coercion, physiological reactions, cognitive reactions, emotional reactions, and behavioral reactions. The initial draft of the inventory comprised 52 items meticulously designed to capture the diverse indicators of academic stress. Each item was formulated based on a thorough literature review and expert consultations to ensure relevance and clarity. The development phase included several iterations, incorporating feedback from pilot testing with a small group of students to refine the items further.

Following the pilot phase, the inventory was administered to a larger sample of 203 tenth-grade students at SMAN 1 Probolinggo. This sample size was determined to be adequate for validation purposes, providing a robust dataset for statistical analysis. The data collection process was carefully monitored to ensure the accuracy and reliability of the responses. The items were then subjected to validity testing using Pearson Correlation, with a predetermined

significance threshold set at $r = 0.195$ for a sample size of $N=100$. This threshold was chosen based on conventional standards for psychological testing, ensuring that only items with a strong correlation to the overall construct of academic stress were retained. Out of the initial 52 items, 51 items surpassed the validity threshold, confirming their relevance and accuracy in measuring academic stress. One item, "I consume alcohol or drugs," did not meet the validity criterion and was subsequently removed from the inventory. This rigorous validation process ensured that the remaining items accurately represented the intended constructs without redundancy or ambiguity.

The next phase involved assessing the reliability of the inventory using Cronbach's Alpha, a measure of internal consistency. The inventory achieved a high Cronbach's Alpha score of 0.934, significantly above the acceptable threshold of 0.70, indicating excellent reliability. This high score reflects the consistent performance of the items in measuring the same underlying construct, ensuring that the inventory produces stable and reliable results across different administrations.

The validated inventory categorized academic stress into three levels based on total scores: low (51-102), moderate (103-153), and high (154-204). This categorization facilitates the identification of students experiencing varying levels of academic stress, enabling timely and appropriate interventions. The application of this inventory is expected to enhance the early detection and management of academic stress, thereby mitigating its adverse effects on students' well-being and academic performance.

Table 1. Blueprint and results of validity and reliability tests of the academic stress inventory

Sub-variables	Indicators	Item	Pearson Correlation	Cronbach's Alpha
Stressor	Frustration	. I am disappointed with friends who bully me about my academic abilities.	0.565	0,934
		. I am disappointed that I did not achieve a top ranking in class.	0.482	
		. I experience financial problems that affect my academic activities.	0.502	
		. I am very disappointed when I fail to achieve my goals.	0.528	
		. I am frustrated because I cannot finish my assignments on time.	0.592	
		. I am frustrated because my parents do not support my choice of major.	0.601	
		Conflict	7.	
8. When assignments pile up, I get confused about which one to prioritize.	0.457			
9. I am confused about whether to attend school or not on a "sandwich day" (an active school day between two holidays).	0.322			
Pressure	10.	I receive assignments with short deadlines.	0.430	
		11. My parents demand that I get good grades.	0.298	
			0.279	
			0.466	

		12. My parents expect me to be multi-talented (having many skills, including good academic performance).	0.549 0.434
		13. I have a heavy workload at school.	
		14. The teacher gives assignments that are difficult for me to complete.	
		15. The school sets high academic standards.	
Change		16. I am not enthusiastic about studying in class because I often stay up late for entertainment (games, hanging out, K-dramas, etc.).	0.406
		17. I am struggling to adapt to the changes in the curriculum (Kurikulum Merdeka).	0.560 0.454
		18. There is a change in study culture from middle school to high school that I have not been able to follow.	0.393
		19. I am unmotivated to study certain subjects because of a change in teachers.	0.482
		20. Changes in my subject interests make me confused about choosing a major and career.	0.336
		21. I have become unmotivated to study because the person who motivated me to study is no longer around (broke up, passed away, moved away).	
Self-Coercion		22. During exams, I feel anxious even though I have studied hard.	0.563
		23. I tend to procrastinate (school assignments, instructions and directions from teachers, etc.).	0.450
		24. I have negative thoughts when facing school assignments or exams.	0.628
		25. Even when I am sick, I force myself to go to school so I don't fall behind in my lessons.	0.281 0.456
		26. I feel forced to choose a certain major because of the influence of others (parents, family, friends, etc.).	
Reaction to stressors	Physiological	27. I often sweat excessively (on my palms, forehead, feet).	0.294 0.458
		28. I tend to stutter when speaking (cannot speak clearly).	0.637 0.663
		29. My body tends to tremble in unexpected situations.	0.387 0.238

	30.	I am exhausted from dealing with academic demands.	0.564
	31.	I have stomach and digestive problems.	
	32.	I have breathing problems.	
	33.	I experience drastic changes in my weight (either gaining or losing).	
Cognitive	34.	I tend to dwell on how severe the stress I experience is.	0.679
	35.	When I feel stressed, I have difficulty identifying the causes of that stress.	0.655
	36.	I am an overthinker (thinking excessively or imagining something that hasn't happened yet).	0.634 0.656
	37.	I find it hard to stay positive when I am overthinking.	0.683
	38.	I have tried to come up with solutions to my stress, but I have failed.	
Emotional	39.	I feel anxious when attending school.	0.604 0.692
	40.	I feel anxious in certain subjects.	0.498 0.669
	41.	I feel guilty/angry at a certain teacher.	0.485 0.405
	42.	I worry when about to take an exam.	
	43.	I am afraid of getting bad grades on exams.	
	44.	I am afraid of failing in the future.	
Behavioral	45.	I often cry.	0.607
	46.	I smoke when I am stressed or depressed.	0.200 0.211
	47.	I take medication (tranquilizers, sleeping pills, etc.).	0.540 0.278
	48.	I isolate myself when I am stressed.	0.126 0.376
	49.	I have attempted suicide.	0.527
	50.	I consume alcohol or drugs.*	
	51.	I tend to blame others to calm myself down.	
	52.	I engage in self-harm.	

*invalid item

3.2 Discussion

The findings of this study provide substantial insights into the academic stress experienced by high school students, specifically at SMAN 1 Probolinggo. The successful development and validation of the Academic Stress Inventory illuminate several critical aspects related to both the measurement and implications of academic stress. Firstly, the reliability and validity of the inventory, evidenced by a Cronbach's Alpha of 0.934 and the validation of 51 out of 52 items, underscore its robustness as a tool for assessing academic

stress. The removal of one invalid item (“I consume alcohol or drugs”) due to its low Pearson Correlation value demonstrates the rigorous methodological approach employed to ensure the accuracy and reliability of the inventory. This high internal consistency indicates that the inventory can reliably measure the constructs it was designed to assess, thereby providing accurate data for identifying and addressing academic stress among students.

The categorization of academic stress into three levels—low, moderate, and high—based on total scores allows for nuanced understanding and targeted interventions. This stratification is crucial for guidance counselors at SMAN 1 Probolinggo as it enables them to tailor their support strategies according to the severity of stress experienced by individual students. By identifying students with high levels of academic stress early, counselors can implement preventive measures to mitigate the adverse effects of stress on students' well-being and academic performance.

Moreover, the study highlights the multifaceted nature of academic stress, encompassing physiological, cognitive, emotional, and behavioral responses. This comprehensive framework, based on Gadzella & Masten (2005), provides a holistic view of how academic stress manifests and impacts students. For instance, physiological responses such as excessive sweating and trembling, cognitive responses like overthinking and difficulty staying positive, emotional responses including anxiety and fear of failure, and behavioral responses such as avoidance and substance abuse are all critical indicators that need to be addressed through targeted interventions.

The implications of these findings are significant in the context of the demanding academic environment at SMAN 1 Probolinggo, where high academic standards and rigorous curricula contribute to elevated stress levels among students. As noted in previous research, such as the studies by Arsy & Annisa (2022) and Puspitasari et al. (as cited in Asmita 2021), both internal factors (e.g., negative thinking, low-stress tolerance) and external factors (e.g., rigorous curriculum, parental pressure) play a role in the development of academic stress. The insights gained from this study emphasize the importance of a balanced approach to academic expectations and the provision of adequate support systems for students.

The development of the Academic Stress Inventory addresses a critical gap at SMAN 1 Probolinggo, providing a structured and scientific tool for measuring academic stress. This inventory not only aids in the early identification of students at risk of high academic stress but also offers valuable data that can inform the design of effective stress management programs. By leveraging this tool, educators and counselors can develop evidence-based strategies to foster a supportive and less stressful academic environment, ultimately enhancing students' overall well-being and academic success.

Despite these significant contributions, the study is not without limitations. One notable limitation is the reliance on self-reported data, which can be subject to bias. Students may underreport or overreport their stress levels due to social desirability or misunderstanding of the items. Additionally, the cross-sectional nature of the study limits the ability to draw causal inferences about the relationship between academic stress and its various determinants. Longitudinal studies are needed to examine how academic stress evolves over time and the long-term impacts on students' mental health and academic performance. Furthermore, the sample was limited to tenth-grade students at a single high school, which may restrict the generalizability of the findings. Future research should include a more diverse sample across different grades and schools to enhance the external validity of the inventory.

The implications for guidance and counseling at SMAN 1 Probolinggo are profound. The validated inventory provides a reliable tool for counselors to systematically assess academic

stress and identify students who may need additional support. Counselors can use the inventory to track changes in students' stress levels over time, enabling them to evaluate the effectiveness of interventions and adjust strategies as needed. Moreover, the data gathered from the inventory can inform the development of targeted stress management programs that address specific stressors and responses identified among students. For instance, programs can be designed to improve coping skills, enhance time management, and foster a supportive school environment.

4. Conclusion

This research successfully developed a reliable and valid tool that comprehensively measures academic stress, encompassing both stressors and reactions to stressors. The inventory's high reliability, evidenced by a Cronbach's Alpha of 0.934, and the validation of 51 items confirm its robustness and utility in accurately assessing the multifaceted nature of academic stress experienced by students. The Academic Stress Inventory categorizes stress levels into low, moderate, and high, allowing for nuanced identification and targeted interventions. Despite its contributions, the study acknowledges certain limitations, such as the reliance on self-reported data and the cross-sectional nature of the research, which may affect the generalizability of the findings. Future research should consider longitudinal approaches and more diverse samples to further validate the inventory and expand its applicability.

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