

Influence of stress and coping strategies on undergraduate students' performance

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Received 29 March 2020
Revised 14 May 2020
21 August 2020
Accepted 10 September 2020

Abstract

Purpose – This study examined the causes of academic stress amongst undergraduate students in the Department of Quantity Surveying to ascertain whether stress has an influence on their academic performance.

Design/methodology/approach – This research explores the relationships between these constructs: academic stress, non-academic stress, coping strategies and academic performance, using a survey questionnaire to collect data from 190 undergraduate students in the Quantity Survey department. Descriptive statistics have been used to analyse the data and a path analytical approach has been adopted to evaluate the relationship between the constructs discussed in the paper.

Findings – Significant linear associations have been established between all the proposed paths and the outcome factor ($p < 0.00$). Coping strategies were an important mediator ($p = 0.000$), as they explained 32.9% of the association between academic stress and non-academic stress. However, the findings have shown that the stress faced by students is an optimal degree of stress that improves learning capabilities.

Practical implications – Explanation and clarification of the effects of academic and non-academic stress and coping mechanisms on the academic performance of university undergraduate students could help to reduce the risk of suicide amongst the teeming youths. It will also afford the university administration the opportunity to engender stress-free environment that is conducive for learning through the formulation of appropriate policies that promote “balanced learning” for the students. The outcome of this study may provide a launch pad for researchers who are interested in knowing how the possible causes of stress may impact on the health of university students.

Originality/value – The findings will be of great importance to the academic advisers and university administration in developing a flexible academic calendar and adopt policies that will eliminate academic stress and promote strategies to cope with non-academic stress. The study is the first attempt to examine academic stress, non-academic stress, coping strategies and academic performance in a single research in the Nigerian context due to limited literature found. This study has pedagogical implications to education practice by offering tertiary institutions the opportunity to appraise and devise a means of managing students' stress by identifying their needs and increase students' coping skills based on prevailing modalities that give students' opportunities to strengthen the strategies of coping.

Keywords Academic stress, Academic performance, Undergraduate students, Nigeria

Paper type Research paper

Introduction

Over the years, stress has become one of the “catchphrases” in our contemporary work environment and this has increased significantly the interest of researchers in studying the concept (Anderson and Pulich, 2001). However, most of these earlier studies have not considered stress-related research important, especially as it concerned students in Nigeria (Dada *et al.*, 2019). Despite the fact that Nigerian students endure hectic academic workloads,



participate in a large amount of extra-curricular activities and face stress from all aspects of their academic efforts, such as the challenge of hostel accommodation, amongst others (Bound *et al.*, 2009; Conner *et al.*, 2010), there is still little research on their impacts on students' performance.

Meanwhile, evidence abounds in literature that suggests that students do experience some degree of stress ranging from moderate stress to acute stress depending on the situation (Aherne, 2001; Yzer and Gilasevitch, 2018). For instance, the World Health Organisation (WHO, 2006) in a study conducted in the United States reported that about 48% of the students studied experienced stress in school. However, in a similar research conducted by the American College Health Association (ACHA) which was reported by Frazier *et al.* (2018), 34% of undergraduate students reported that stress negatively affected their academic performance, while 37% of students reported that stress did not affect their performance.

According to Anderson and Pulich (2001), by definition, not all stress is harmful. However, stress according to Phillips (2013) is the feelings and thoughts that someone perceive about the level of stress they are currently experiencing or over a period of time. In fact, Ye *et al.* (2019) argued that a suitable or moderate stress is required at some stages in life for self-growth, as it motivates people to dynamically progress. This underpinned Schafer (1996) who stated that stress is capable of having a positive impact in allowing persons to efficiently respond in an emergency situation. In a related development, while Shaw *et al.* (2017) argued that stress is an essential part of being a university student. However, university environment has the potential to provide both experiences; positive stress (eustress) and negative stress (distress) (Bush *et al.*, 1985; Brown and Ralph, 1999). This is because stress does not only affect individuals' interactive models but also the views and frame of mind.

Overstress can have serious effects on people by causing difficulties and distress. Overstress brings different thoughts to the mind of students and their effects could be grievous (Essel& Owusu, 2017). For some students, the effects of this can be debilitating to the point that it could lead to use of substance and suicidal attempts in some extreme cases (Yzer and Gilasevitch, 2018). The suicide rate amongst young adults between the ages of 15 and 24 has tripled since the 1950s, according to the ACHA (ACHA, 2009), and suicide is now the second most common cause of death amongst college students. When students struggle to cope with examination stresses, career decisions and social pressures, most students find themselves unable to cope with the situation at residential universities without the help of old friends and family. Ross *et al.* (1999) stated that 73% of university students consider their educational needs as their most significant cause for stress. Although Yumba (2010) asserted that regardless of how happy, wealthy, powerful or attractive one might be, stress is part of life, hence there is possibility that it may be experienced differently by students depending on the circumstances.

This study has become relevant in Nigeria for so many reasons. For example, the number of recorded cases of suicide and suicide attempts amongst undergraduate students in Nigerian universities has increased due to stress. In fact, Omigbodun *et al.* (2008) reported that Nigerian students have one of the highest suicide attempt rates, which is considerably higher than that of developed countries. This is supported by Mac-Leva *et al.* (2019) who argued that 11 students committed suicide (reported cases) alone in the first and second quarters of 2019. In fact, the World Health Organisation (WHO, 2016) ranked Nigeria the 15th highest suicide rate worldwide in its report on suicide per 100,000 people.

Psychiatric or health-related cases are becoming more prevalent, possibly as a result of stress-induced substance abuse amongst the youths. Furthermore, the persistent rise in the number of withdrawals due to poor academic performance and examination malpractices often create concerns in the minds of students, which also necessitated the need to carefully analyse the effect of these stressors on the academic performance of students. However, Gustems-Carnicer *et al.* (2019) reported that many university administrators pay little

attention to the influence of stress and coping strategies on students' academic achievement; the situation in Nigeria is no different.

This work is exploratory in nature and aims to explore the relationship between sources of academic stress, coping strategies and academic performance in the built environment amongst undergraduates. This research focused on exploring how undergraduate students perceive stress and the effects on their academic performance. A conceptual model is provided to show the interrelationships amongst four major constructs: sources of academic stress, sources of non-academic stress, strategies for stress coping and academic performance with focus on students. It was conceptualized in the model (see [Figure 1](#)) that the effects of sources of stress on academic performance are mediated by strategies for stress management and the effects of sources of stress directly influence academic performance. The study shows the linkages amongst the constructs in the model with a concise review of related empirical researches where conclusion was drawn to suggest directions for future empirical research and interventions. Based on this conceptual framework and evidence that exist in literature, the study made the following propositions:

- H1.* Academic stress is positively related to academic performance
- H2.* Academic stress is positively related to coping strategy
- H3.* Coping strategy is positively related to academic performance
- H4.* Non-academic stress is positively related to academic performance
- H5.* Non-academic stress is positively related to coping strategy
- H6.* Coping strategy mediated in the relationship between academic stress, non-academic stress and academic performance

Theoretical perspective to stress

Stress is a key subject in the social sciences, particularly in behavioural studies, and in research that focuses on the study of life. The uniqueness of stress could be seen between an individual and the environment that the person resides that may result in the lack or excess of his or her involvement which might put his or her well-being at risk ([Lazarus and Folkman, 1984](#)). This study is consistent with this concept of stress and takes into account theories that view the effects of stress on academic performance through the relationship between the person and the environment. Hence, the study considers interactional (person–environment [P-E]) theory and the transactional theory of stress as very relevant theories that underpin the conceptual model proposed.

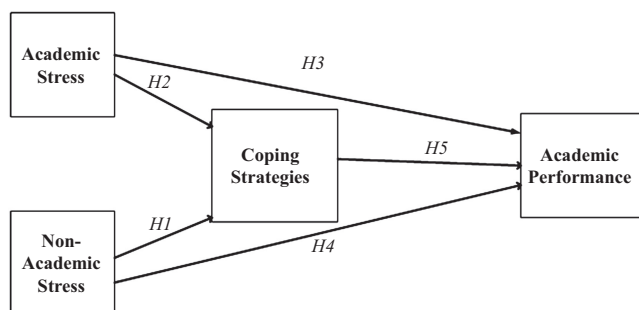


Figure 1.
Conceptual model

The transaction theory is an extension to an interactional epistemological stance (van Staden, 1984); however, the controversy is only based on the interactional theorist's notion that individuals and objects functioning in a situation may have specific characteristics that can be distinguished irrespective of the situation. While transaction theorists have argued that these features can only be depending on the situation assessed. Transactional theory shows that stress is the direct consequence of a transaction that affects and therefore threatens the well-being of an individual and the environment (Folkman and Lazarus, 1986; Lazarus and Folkman, 1984). Whereas, interactional theory (P-E) examines the relationship between the characteristics of individuals and the environment, where the individual influences not only his or her environment but also the environment affects the individual. Interactional theory, however, distinguishes between objects and people, asserting that each of them has unique characteristics that also exist independently of the circumstance, whilst transactional theorists asserted that the characteristics of both the individual and the environment are contextually created and interpreted through situation-specific transactions.

Despite the major contribution made by the transactional stress theory, the idea of assessment was criticized because it is too simple and since it did not always take an individual's past, future, aspirations and identities into account (Harris *et al.*, 2014). Lazarus (2006) underscored this assertion by emphasizing that transactional stress theory failed to consider the effects of coping in particular social environment. However, P-E theory considered coping as an equilibrium point that could help an individual in psychosocial adjustment over the extent of stressful instances (Amponsah *et al.*, 2020). The theory further explained that people may consider stressful behaviours to be challenging or terrifying based on their individual differences. It is therefore, reiterated that individuals perceive stress when there is a lack of fit either between the extent to which the student's attitudes and abilities satisfy the expectations of academic work or the extent to which the school environment fulfils the student's aspirations. This is owing to the fact that the satisfaction and academic performance of students are dependent on interaction between the individual and the environment (Gilbreath *et al.*, 2011).

Similarly, Yumba (2008) alluded to the fact that transactional theory complements interaction theory by suggesting that stress is a transaction between someone and their environment. To this extent, there are two key developments that make up this transaction: the psychological assessment and the coping strategy. However, the individual assessment of demands and capabilities could be influenced by a number of factors, including personality, situational demands, coping skills, previous experience, time lapse and any current stress situations that have already occurred (Prem *et al.*, 2017). Against this backdrop, we considered the fusion of these theoretical viewpoint very important in understanding the effects of stress on students' academic performance, as the intense interaction between the person and the environment sometimes exceeds the capacity of the individual to deal with, making it necessary to cope with it (Lazarus and Folkman, 1984).

We therefore used the interactional P-E theory and transactional stress theory to develop our conceptual framework to examine the effects of stress and coping strategies on the performance of undergraduate students.

Causes of stress and academic performance of students

The need to excel academically by university students is one of the major causes of stress that often make university experience in some cases stressful in the life of students. A plethora of empirical research has been conducted that has explored the effects of stress on the academic performance of undergraduate or college students (For example, Siraj *et al.*, 2014; Chan *et al.*, 2018; Dada *et al.*, 2019). Many of such studies identified the cause of academic stress from different perspectives. For example, some researchers (such as Nonis, 1997; Mistry *et al.*, 2009;

[Bistricky et al., 2017](#)) reported that factors responsible for stress amongst college students range from financial constraints, academic workload, poor time management and interactive problems with peer groups, faculty officers to a host of others factors. This finding was underpinned by [Talib and Zia-ur-Rehman \(2012\)](#), who claimed that excess course load, sleep problems and social activities are amongst the causes of stress for undergraduate students affecting their academic performance. Several studies have concluded that stress has multiple impacts on the academic activities of students and may result in poor academic performance.

However, [Khan et al. \(2013\)](#) posited that stress occurs when the pressure on the person surpasses the assets at his disposal to deal with the situation. This underscores the assertion of [Richlin-Klonsky and Hoe \(2003\)](#) who observed that if a severe and protracted stress is experienced, it can lead to poor academic performance. This, often times, resulted into a student's inability to get involved in school's social activities, which may lead to potentially destructive behaviours through the abuse of substance. Nonetheless, recognising the contradictions between self-imposed environmental stress (stressors) and the capacity of the individual to meet these campus life requirements is what [Topper \(2007\)](#) and [Malach-Pines and Keinan \(2007\)](#) found stressful.

University students are confronted with different stressors which could be academic or non-academic related in nature. Many studies have identified the effects on the academic performance of students at different levels of academic stress or stressor. [Aldwin and Greenberger \(1987\)](#) recognised that the most common source of stress for students is academic problems. In a related development, [Siraj et al. \(2014\)](#) posited that stress has negative impact on the understanding of the academic curriculum. This is because academic performance remains the most essential considerations amongst students in higher level of education. [Dusselier et al. \(2005\)](#) stated in a similar study that there is a strong relationship between stress and diminished academic performance. Stress linked to academic activity was correlated with various negative outcomes, such as poor academic performance and ideation for suicide ([Clark and Rieker, 1986](#); [Nonis, 1997](#)). According to [Akgun and Ciarrochi's \(2003\)](#) study, academic stress is also negatively linked to academic performance.

Stress can have both positive and negative implications ([Yzer and Gilasevitch, 2018](#)), unfavourable stress is capable of hindering and reducing mastery of curriculum amongst students and thus leads to students' poor academic performance. This study considers financial, emotional, family and health-related stress as non-academic stress. Financial stress becomes a serious issue particularly to young adult students when it appears, they cannot meet their financial obligations, and this also leads to health-related (psychological) or emotional stress ([Heckman et al., 2014](#)). Evidence from literature has shown that non-academic sources of stress are capable of affecting students' academic performance negatively. For instance, [Mistry et al. \(2009\)](#) reported that perceived family's economic stress and financial constraints can lead to emotional distress in students and inhibit their academic performance. This is underscored by [Bistricky et al. \(2017\)](#) who identified financial strain as one of the commonly faced stressors by college students and stated that if the stressors are not well managed, it may lead to compromised academic performance. In the same vein, [Yzer and Gilasevitch \(2018\)](#) contended that stress has been linked to a range of health problems such as depression, most especially, when students are unable to manage their stress and the resultant effect is negative results, which includes declining academic achievement and use of substance. The findings are in consonance with [Frazier et al. \(2018\)](#), who reported that 24% of undergraduate students studied in 2016 by ACHA experienced stress that are health-related issues such as difficulties in sleep, while about 23% reported stress affected their poor mental health. Health-related stress has been reported to have influence on academic performance of students and the findings varied from country to country. However, [Pascoe et al. \(2020\)](#) asserted that self-reported level of stress such as depression is linked to poorer academic

performance of students. These studies affirmed the importance of many degree of stress dimensions on stress related results such as academic performance.

Coping strategy and academic performance

The subject of stress, stressor, coping strategies and academic performance amongst university students has attracted attention in many countries, especially in Asia, Europe and Australia (Akgun and Ciarrochi, 2003; Madhyastha *et al.*, 2014; Väisänen *et al.*, 2018). Meanwhile, there is dearth of research on the impacts of stress, stressor and coping strategies on academic performance in Nigeria. Coping has been described by researchers as a procedure involving various cognitive and behavioural policies that is key in the management of stress (Folkman and Moskowitz, 2004; Gustems-Carnicer *et al.*, 2019). There are two main approaches to coping as espoused in literature, problem-focused and emotion-focused. Problem-focused style of coping emphasises on the source of stress and this is also referred to as approach coping (Gustems and Calderon, 2013), while emotion-focused (avoidance coping) style places premium on how to handle individual state of mind and feelings related to the causes of stress (Folkman and Lazarus, 1985). Nevertheless, problem-focused coping style is adjudged to be the most adaptive (Crockett *et al.*, 2007; Wijndaele *et al.* 2007), while emotion-focused coping style is considered less effective coping strategies (Crockett *et al.*, 2007; Wijndaele *et al.* 2007).

Many of these studies dwell on types or strategies of coping with stress amongst students with little or no attention on their effects on academic attainment and how coping mediates in the relationship between stressor and academic performance. However, Struthers *et al.* (2000) explored the relationship between the academic stress of college students and the grade of courses, it was stated that the grade of students in courses is affected not by emotion-focused coping strategies. In a similar study conducted amongst medical students, Madhyastha *et al.* (2014) reiterated the vital need for programmes to manage stress and improvement in coping skills through training to assist students in managing stress and to develop positive coping strategies. In the same vein, Balila *et al.* (2014) indicated that college students need to be prepared with effective coping mechanisms in order to have a good academic life so as to ensure higher academic performance.

From the literature review, evidence abound that some of the previous studies have examined the impact of stress or causes of stress on academic performance of different categories of students across various fields of human endeavour ranging from strategic management to educational psychology. Though the findings have been inconclusive, for instance, Frazier *et al.* (2018) emphasised that ACHA reports of 2016 showed that 34% of students agreed that stress had effects on their academic performance, while 37% agreed that stress had no effect on their academic achievement. Also, some earlier studies examined the relationship between coping strategies or stress management and student's performance using different constructs or scales (e.g. Morgan, 2017; Maykrantz and Houghton, 2018). Some of these studies reported significant positive or negative relationship, while some concluded that no relationship was found. Furthermore, few studies also investigated impact of financial stress (non-academic) and coping strategies amongst students (Madzhi, 2015; Tesfaw and Yitayih, 2018). Scouring databases did not throw up studies particularly in the Nigerian context that examine the four constructs presented in this paper in a single research. Hence, this paper represents the first attempt to examine academic stress, non-academic stress, coping strategies and academic performance in a single study in Nigeria.

Research methodology

The study adopted a questionnaire survey design; however, an extensive literature review was conducted in order to develop the questionnaire which was self-administered to the

target audience within the study environment. The review of related current literature was done in order to capture background knowledge about the concept of stress and its attendant implication for university students in developing the questionnaire. Suitable and appropriate data on the causes of stress between university students and the impact on their academic performance in Nigeria were collected using the questionnaire. The population of the study was 726 which was clustered into five (100–500 levels), and the sample size of 251 was determined based on [Krejci and Morgan's \(1970\)](#) table. Clustering sampling technique helps researchers to collect data by dividing the sample into small and more efficient classes that [Ahmed \(2009\)](#) found most appropriate for institution surveys. The research was therefore limited in scope to students at the Department of Quantity Survey at the Federal University of Technology, Minna, Nigeria.

The data used for this study were obtained from a sample of undergraduate students in the Department of Quantity Surveying from 100 level to 500 level in order to have a representative sample of all students in the department. The collection of the data was done during the 10th week of the second semester in a 14-week semester. This timing for the collection of the data was strategic because it was believed that students especially those in 100 level who had just left secondary schools were mostly likely to experience stress during the late part of a semester. Overall, 251 questionnaires were randomly administered in each level based on the sample size determined from the total sample size in relation to the population of the level to the total population, of which 190 were completed and valid for further analysis. The research used five key variables to measure sources of academic stress: excessive workload, examination and test format, academic pressure and expectation, study habits and classroom condition. Non-academic sources of stress were measured with latent variables namely: financial, emotional, family, and health-related factors, while coping strategies were measured by two latent variables. Students were asked to self-report on their academic performance, which was evaluated by a measure that provided students with a list of ten items. Many of the questions were adapted from the National College Health Assessment (NCHA) study, which looked at how academic performance was affected. The questionnaire was pre-tested amongst colleagues and students to examine whether there was any ambiguity or difficulty that may hinder proper understanding of the questions. This was to ensure that there was no confusion on questions likely to result in poor quality of the information that could require excessive deletion of items during the measurement model evaluation. This was also used to enhance the psychometric soundness of the instrument, which could easily be interpreted from the way it was constructed and intended ([Sekaran, 2003](#)). [Memona et al. \(2017\)](#) emphasised that the pre-testing process would help to resolve any inadequacies before the instrument is administered to target audience in order to remove bias.

Therefore, with respect to the reliability and validity of the psychometric instrument used in measuring academic performance effect of stress on students, the internal consistency of the construct was examined for reliability to ensure that all items that constituted the scale measured the same underlying attribute. Hence, Cronbach's alpha coefficient was employed, and [Oyewobi \(2014\)](#) reported that values equal to 0.6 or above could be considered acceptable in exploratory research. The Cronbach's alpha values for all the constructs used in this study were 0.7 and above as seen in [Table 2](#). Respondents were requested to rate each of the identified items of measurement on a five-point Likert scale demarcating different levels of agreement ranging from 5 = strongly agree (SA), 4 = agree(A), 3 = not sure(N), 2 = disagree(D), 1 = strongly disagree (SA).

Empirical data analysis

A partial least square structural equation modelling (PLS-SEM) was adopted for data analysis using SmartPLS software version 2.0 M3 ([Ringle et al., 2005](#)) to test the hypothetical

paths described in this paper. The study was exploratory in nature and thus employing PLS-SEM was considered as the most appropriate analytical tool. PLS-SEM was chosen for this study for many reasons. PLS-SEM, for instance, uses composites to model latent variables and also uses the form of latent variable that could be modelled by a sequential relationship link (i.e. path model) (Rigdon, 2014). PLS calls for less distributional assumptions regarding models and small sample sizes, however, Rigdon (2014) cautioned that it should not be an excuse to use it in research. Construction management researchers had used PLS to check path models and validate theory (Oyewobi, 2014; Jimoh *et al.*, 2019). There were two exogenous latent variables (academic and non-academic stress) and two endogenous variables (coping strategies and academic performance) examined in this study. Table 1 illustrated the latent variables considered and each construct was measured on a five-point

Latent variable	Indicators	Loadings	Indicators reliability	Composite reliability	AVE	<i>p</i> -values
Academic stress	Excessive Workload	0.787	0.619	0.845	0.645	0.000
	Examination and Test Format	0.855	0.73			0.000
	Academic Pressure and Expectation	0.765	0.585	0.000		
Non-academic stress	Financial Stress	0.814	0.663	0.862	0.676	0.000
	Emotional Stress	0.863	0.745			0.000
	Health related Stress	0.787	0.619			0.000
Academic performance	Low productivity	0.827	0.684	0.912	0.633	0.000
	Poor concentration	0.856	0.732			0.000
	Truancy (Absconding academic activities)	0.736	0.542			0.000
	Amnesia (reduced ability to remember what was thought)	0.831	0.69			0.000
	Lack of resourcefulness (initiative)	0.752	0.565			0.000
	Inadequate preparation for Examination	0.763	0.582			0.000
Coping strategy	Student coping strategies	0.870	0.756	0.821	0.696	0.000
	University coping strategies	0.798	0.637			0.000

Table 1. Results summary for reflective outer models

Latent variable	Cronbach's alpha	Academic performance	Academic stress	Coping strategy	Non-academic stress	<i>R</i> square
Academic performance	0.8831	<i>0.795</i>				0.6477
Academic stress	0.7243	0.727	<i>0.803</i>			
Coping strategy	0.7674	0.6554	0.54	<i>0.835</i>		0.3288
Non-academic stress	0.7594	0.6603	0.696	0.5144	<i>0.813</i>	

Note(s): Diagonals represent the square root of the average variance extracted (AVE) while the other entries represent the correlations

Table 2. Fornell-Larcker criterion analysis for checking discriminant validity

Likert-type scale with responses ranging from 1 (“strongly disagree”) to 5 (“strongly agree”) with several items.

Measurement model

There is two-step approach to reporting PLS-SEM results: an assessment of the measurement model and structural model. According to Rizer *et al.* (2016), measurement model needs to show satisfactory quality before the assessment of the structural model is conducted. The study examined the convergent validity, reliability of items and their internal consistency. Table 1 shows the item loadings, indicators reliability, composite reliability (CR), average variance extracted (AVE) and *p*-values for individual item reliability. However, in order to assess a reflective measurement model, this involves analysing indicator reliability, internal consistency reliability, convergent validity and discriminant validity that are within acceptable thresholds. For example, all the factor loadings shown in the table have values above the 0.7 threshold needed for this form of exploratory analysis (Jimoh *et al.*, 2019).

In this study, the preliminary evaluation of the measurement model indicated that some indicators had outer loadings below the acceptable 0.70, then following Hair *et al.* (2014), it was recommended that outer loading indicators whose outer standardised loadings were smaller than 0.40 should be removed from the measurement model. Further iterations were conducted on the model, and indicators with outer loadings between 0.40 and 0.70 were deleted while only those above the required threshold were retained. One factor was dropped from non-academic stress, two indicators were dropped from academic stress measures, and six were retained from academic performance measures. From Table 1, it shows that CR and AVE were above the 0.7 and 0.5 acceptance levels (Chin, 2010) threshold, suggesting internal consistency, reliability and also providing the necessary support for convergent validity. However, CR of 0.6 or higher is considered appropriate for exploratory research (Hair Jr. *et al.*, 2014).

Finally, to ensure that the latent variables in the model varied enough from each other, discriminant validity (Table 2) was tested using the Fornell and Larcker (1981) test, which allows the square roots of the AVE for each latent variable to be greater than other latent variables correlation values. Consequently, the findings provided in Table 2 showed that all latent variables satisfy the Fornell–Larcker criterion for discriminant validity (Fornell and Larcker, 1981). Hence, the results of the measurement model assessment presented in Table 2 depicted that the measurement model was acceptable.

Structural model

The study assessed the structural model to be satisfactory after meeting the following criteria. Such criteria included path coefficients, path significance R^2 values of endogenous latent variables and predictive validity (Q^2). The R -square measures the model's predictive accuracy by approximating the sum of variance in each of the endogenous latent variables described (Sarstedt *et al.*, 2014). A higher R^2 value corresponds to a higher predictive potential of the model that Chin (1998) indicated could vary from 0.67, 0.33 or 0.19 (substantial, medium or low, respectively) for latent endogenous variables in the inner path model. For the two endogenous latent variables, the determination coefficient, R^2 , was 0.329 for the coping strategies and 0.648 for academic performance as shown in Table 2 and Figure 2.

The path model of the endogenous latent variables of stress impact on academic performance is shown in Figures 2 and 3. According to the rule of thumb, for a given endogenous variable, Q^2 value higher than zero means that the path model's predictive accuracy is appropriate for that particular variable. The values were above zero for all the latent endogenous variables. All structural paths proposed were significant ($p = 0.05$)

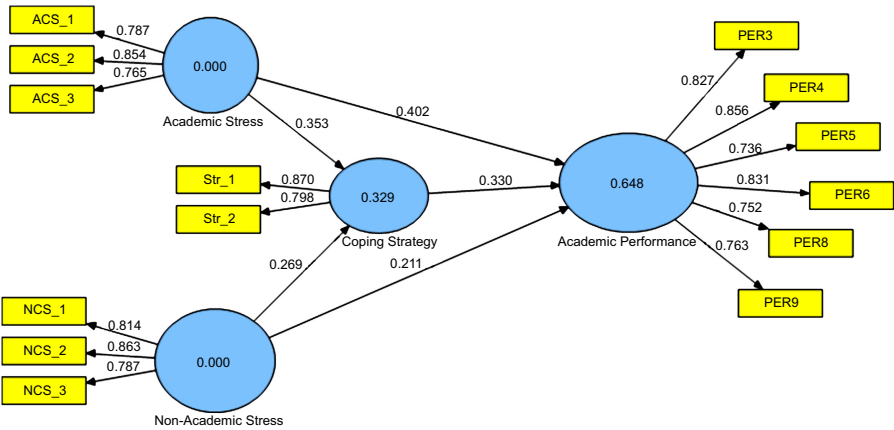


Figure 2. Resulting path coefficients with loadings and R²

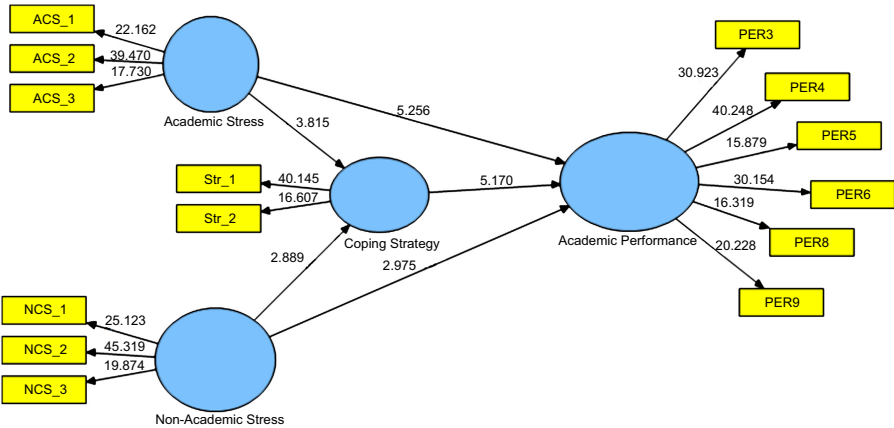


Figure 3. Resulting path significance (T-statistics)

(Sarstedt *et al.*, 2014). The proposed paths were evaluated for each loading path using *t*-values. As a cut-off point, the following *t*-values were used: *t*-value above 1.65 indicates that the path coefficient is significant at $p \leq 0.10$; *t*-value above 1.96 indicates that the path coefficient is significant at $p \leq 0.05$ and when the critical *t*-value is above 2.57, $p \leq 0.01$ is assumed to be significant. Table 3 indicates the results of the tested hypothesised paths. As shown in Table 3, all *t*-values were higher than 1.96 significance level, which is an indication that all the paths were statistically significant at 95% confidence level; therefore, all manifest variables were significant in explaining the latent variables involved in the model (Jimoh *et al.*, 2019). An evaluation of the strength and the significance of the path coefficients indicated that all the six hypotheses were supported (H1, H2, H3, H4, H5, and H6).

Furthermore, to evaluate the predictive relevance of the model Stone–Geisser’s Q^2 (Sarstedt *et al.*, 2014) was assessed using SmartPLS blindfolding procedure. Blindfolding involves sample reuse procedure that allows for omission of certain part of the data point in the endogenous construct’s indicators which then calculate the parameters with the remaining data points (Sarstedt *et al.*, 2014). The model establishes predictive significance if Q^2 value is greater than 0 (Rigdon, 2014; Sarstedt *et al.*, 2014). Both Q^2 values for coping

Hypothesis	Relationship	Co-efficient	T statistics	p-values	Supported	Influence of stress and coping strategies
H1	Academic Stress is positively related to Academic Performance	0.4023	5.289	0.000	Yes	
H2	Academic Stress is positively related to Coping Strategy	0.353	3.8624	0.000	Yes	
H3	Coping Strategy is positively related to Academic Performance	0.3298	5.2816	0.000	Yes	
H4	Non-Academic Stress is positively related to Academic Performance	0.2107	3.0171	0.001	Yes	
H5	Non-Academic Stress is positively related to Coping Strategy	0.2687	2.9498	0.001	Yes	
H6	Coping Strategy mediate in the relationship between Academic stress, Non-Academic stress and Academic Performance				Yes	

Table 3.
Results of the hypotheses tested

strategies (0.226) and purchase intention (0.409) were more than 0, this shows that the model had sufficient predictive relevance.

Total effect and mediation analysis

The study assessed the coping strategies' mediating effects on students' academic performance by first assessing the overall effects. The study adopted Sarstedt *et al.*'s (2014) suggested method in estimating the overall effects.

For academic stress-coping strategies-academic performance;

$$\text{Total effect} = \text{Direct effect} + \text{Indirect effect} = 0.402 + 0.33 \times 0.353 = 0.52$$

For non-academic stress-coping strategies-academic performance;

$$\text{Total effect} = \text{Direct effect} + \text{Indirect effect} = 0.211 + 0.269 \times 0.33 = 0.30$$

The direct effect between academic stress and non-academic stress against academic performance values were 0.402 and 0.211, respectively, and they were significant at 99% confidence level. Using the formula provided by Sarstedt *et al.* (2014), the variance accounted for (VAF) was determined. The result of VAF values calculated were 0.30 and 0.52 for non-academic stress and academic stress. Therefore, given Hair *et al.* (2014) thumb rule, if VAF >80%, it is total mediation, if it is within 20%–80% partial mediation, and there is no mediation if it is <20%. Consequently, the study concluded that coping strategies partly mediate the relationship between academic and non-academic stress and academic performance. The results in Table 3 supported H6.

Summary of findings and discussion

This study examined the effect of stress on the academic performance of Quantity Surveying students using PLS-SEM to evaluate the conceptual model's hypothetical path. The results indicated that both academic and non-academic stress had an impact on student performance and that coping strategies employed by students could also mediate the effects. All the latent exogenous variables were significant determinants of students' academic performance as shown by the sizes of the coefficients and t-statistic values of all the hypothetical paths. The significance of all the paths included in the model as shown by PLS-SEM results indicated that all the latent variables contributed to the variance explained by

the model. A thorough examination of the structural loadings on academic stress revealed that the highest loading factor was correlated with examination stress. This supported the assertion of [Shirom \(1986\)](#) who demonstrated that examination-related stress and excessive assignment are the most stressful source of academic stress. The findings are also consistent with [Mehfooz and Sonia \(2017\)](#) who emphasized that academic requirements contributed significantly to stress rates amongst students.

In testing [hypothesis 1](#) that reported academic stress is positively linked to academic performance, the study examined the overall effect of the academic stress source and found the highest impact on performance as shown by the size of the coefficient value ($r = 0.402$) and t -statistics ($t = 5.256, p \leq 0.00$). This suggests that the academic stress (positive stress [eustress]) (according to [Bush et al., 1985](#); [Brown and Ralph, 1999](#)) is significantly associated with academic performance, and this indicates that eustress is a propelling stress that is capable of enhancing academic performance of students. This finding was consistent with [Bankston and Min \(2002\)](#), who concluded that there is a significant positive relationship between stress and academic performance of college students. However, the findings are not in consonance with the results of the study carried out by [Steckler et al. \(2005\)](#) and [Akgun and Ciarrochi \(2003\)](#), which concluded that academic pressure is negatively associated with academic performance. The outcome of the study showed a positive and important relationship in testing [hypothesis 2](#), which indicated that academic stress is positively linked to coping strategy. It shows that it is essential to understand the important role of having effective coping strategies to reduce the impact of stressor on students, as these will help to improve their academic performance. For university students, the relationship between stress and coping is also important. Coping, however, is a key variable for minimising or reducing stress ([Gustems & Calderon, 2013](#)) and avoiding adverse educational results ([Tavolacci et al., 2013](#)).

The study examined [hypothesis 3](#) which assessed whether coping strategies is positively associated with academic performance effects of stress, and it was found that coping strategies has significant positive relationship with academic performance. This finding is consistent with empirical research findings reported by [Maykrantz and Houghton \(2018\)](#), which indicated that positive relationships exist between coping strategies (constructive thought strategies) and performance by enhancing individual performance.

[Hypothesis 4](#) proposed that *non-academic stress is positively related to academic performance*. The result of the PLS-SEM underscored the proposition by showing a positive significant relationship between non-academic source of stress and students' academic achievement. A critical look at the analysis showed that emotional dimension has the most contribution to the non-academic source of stress followed by financial dimension, which in turn impacted on the academic performance of students. This alluded to the fact that non-academic stressful events experienced by students are not harmful stresses but those that motivates students to carry out their academic tasks ([Anderson and Pulich, 2001](#)). The findings presented here indicated that, although students experience stress, they have no negative impact on their academic achievements. This is corroborated by the findings of [Gelow et al. \(2009\)](#) that a state of emotional stress has been reported to have a significant positive relationship with observed school performance. In other words, the stress experienced by the students could be regarded as an optimal level of stress needed to improve their academic performance ([Kaplan and Sadock, 2000](#)). However, these findings are inconsistent with the observation of previous researchers such as [St. John \(1998\)](#) and [Al-Dubai et al. \(2011\)](#) who asserted that non-academic stressors include social and financial problems and that these problems often lead to low levels of academic performance. The study also tested [hypothesis 5](#), and the findings showed that there was a positive significant relationship between non-academic source of stress and coping strategy. [Mistry et al. \(2009\)](#) asserted that emotional distress could happen to students and inhibit their academic

performance as a result of apparent family's economic pressure and financial limitations. However, [Moradi et al. \(2011\)](#) reported that emotional intelligence had a positive relationship with problem-solving coping strategies.

Hypothesis 6 which stated that *coping strategy mediates in the relationship between academic stress, non-academic stress and performance* was also tested. The findings revealed that coping strategies partially mediated in the relationship between academic stress, non-academic stress and students' academic performance. This aligns to the conclusion of [Weinstein et al. \(2009\)](#) that adaptive stress responses and coping partially or fully mediated the relation between mindfulness and emotional well-being. More so, the findings of a research study by [Struthers et al. \(2000\)](#) found that a problem-focused coping and motivation, but not emotion-focused coping, affected the relationship between academic pressure and grade of course amongst college students. In a similar vein, [Park et al. \(2014\)](#) considered a problem-solving coping style to be an active coping mechanism for stressful students. However, [Neveu et al. \(2012\)](#) observed that cognitive avoidance coping strategies can lead individual students to disengage from their studies, which compounds the effects of stress and negatively affects their academic future. Whereas, problem-focused coping responses could alleviate the negative impact of stress and lead to more positive academic results ([Doron et al., 2009](#)).

Limitations of the research

This study was not without its limitations. It examined the relationship amongst causes of stress (academic and non-academic), effects of coping strategies and academic performance of university undergraduates. The research employed a quantitative technique using cross-sectional data obtained using questionnaire survey. In spite of the nature of data collected, the study did not consider gender influence on how stress could be felt by the students. Secondly, the majority of the students involved in the study were in higher levels only 45% were in 100 and 200 levels of their study. This may likely affect the generalisation of the findings as those in lower levels may feel the impact of stress more than those in higher levels who might have developed a working coping strategy. The study only carried out a cumulative analysis of all levels of students and reported the results at that level. It would be informative to conduct an analysis at each level (fresh to senior) to see the differences in future study. It will be interesting to know whether the findings will be different amongst female students, specifically because they are more susceptible to abuse from male peers and lecturers. The study was limited to the Quantity Surveying students of the Federal University of Technology, Minna, Nigeria thereby making generalisation to the population of Quantity Surveying in Nigeria impossible. Finally, the study did not analyse the influence of stress psychological effects on academic performance, although it will be exciting to know if there are variations on how stress impact female and male students' academic performance.

Theoretical and practical implications

This study examined two major theories to underpin the conceptual model developed in this paper. Stress theories were employed to explain the mechanism through which stress is experienced in persons. These theories used various viewpoints to identify a vital aspect of stress formation. When acknowledged, research will help individuals and university administrators develop effective approaches to stress management. Interactional theory, for example, has shown that adaptive response can only minimise stress by increasing the degree of fit between students and the environment. Any aspect of either the individual or the situation needs to be improved in order to enhance the mental well-being of those concerned. In addition, the transactional stress theory establishes that the stress itself emerges from the

internal interactions the students are involved in along with their situations. Even with the impact of external influences, the stress levels depend largely on how students evaluate themselves. Therefore, students will only be able to achieve better control of their emotional state and perform better by adjusting how they assess the situation.

However, there is no evidence from literature regarding any study that examined the mediating effects of coping strategies in the relationship between academic stress and academic performance as well as non-academic stress and academic performance in a single conceptual model. This study has thus demonstrated that coping strategies partially mediated the relationship between both academic stress, non-academic stress and academic performance. Academic stress associated directly with coping strategies and academic performance, while same relationship existed between non-academic stress, coping strategies and academic performance. This study has pedagogical implications to education practice in Nigeria. It offers tertiary institutions in the country the necessity to appraise sources of undergraduate students' stress by identifying their needs and device means of managing them in a way that will increase their coping skills via prevailing modalities that will provide students opportunities to strengthen the effects of coping practice.

Conclusion

This study examined the effect of stress on the academic performance of Quantity Surveying students using PLS-SEM to evaluate the conceptual model presented in the paper. This subject has received a number of attentions, despite the increasing efforts of researchers on it, the rate of suicides and suicidal attempts is on the increase especially amongst university undergraduates in Nigeria. Previous studies have concentrated largely on developed countries and medical students. This study developed and tested a conceptual model that described a number of latent variables hypothesised to impact the academic performance of students. The results of analysis using PLS-SEM gave credence to the conceptual model and all the proposed hypotheses. The results indicated that both academic and non-academic stress had an impact on students' performance and that coping strategy employed by students could also mediate the effects. The conceptual model developed in this study could provide a foundation for future studies determined to know how university curricula could be designed to alleviate these problems.

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