



Progenitors of final-year Senior High School [SHS] students' cognitive test anxiety: Examination preparedness, academic self-efficacy, and religiosity

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ABSTRACT

This study investigated progenitors of Cognitive Test Anxiety (CTA) of final-year Senior High School (SHS) students in Ghana, focusing on examination preparedness (EP), academic self-efficacy (ASE), and religiosity. The Transactional Model of Stress and Coping was the theory that undergirded the study. Using a cross-sectional survey design, the study targeted 8,656 final-year students in 10 senior high schools within the Cape Coast Metropolis, from which 370 students were selected through proportionate simple random sampling. Data were collected using structured questionnaires administered to the selected students, and all questionnaires were completed and returned. Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed using SPSS version 25, while Partial Least Squares Structural Equation Modeling (PLS-SEM) was performed using SmartPLS 4 to analyse the data. The results indicated that final-year SHS students exhibit high levels of progenitors of CTA with EP being the highest. The results also indicated that ASE and religiosity had a significant effect on CTA but EP showed no significant effect on CTA. The study recommended that educational stakeholders, including the Ministry of Education and school administrators, implement interventions to enhance ASE and address student test anxiety.

Keywords: Academic Self-Efficacy, Cognitive Test Anxiety, Examination Preparedness, Religiosity

I. INTRODUCTION

In general education, testing is essential for evaluating students' knowledge, abilities, and overall academic development. However, test anxiety, a condition that has a substantial impact on students' academic performance, is frequently brought on by the high stakes involved in exams. Test anxiety is a complex issue that can profoundly impact students' performance and mental health. It can present itself in different forms, such as emotional test anxiety, physiological test anxiety, behavioural test anxiety, and cognitive test anxiety (CTA). Emotional test anxiety refers to the feelings of fear, distress, panic, low self-esteem, frustration, and hopelessness that students may experience during assessments. Another type, physiological test anxiety, manifests through physical symptoms such as increased heart rate, sweating, dizziness, nausea, and panic. CTA, a specific subset of test anxiety, centers on the mental processes related to testing situations. This form of anxiety is marked by intrusive thoughts, negative self-talk, and concerns about performance that can disrupt concentration and hinder memory recall. Given the significant impact of CTA on academic performance, there is a pressing need to explore its progenitors to identify effective interventions that can help students manage and overcome these challenges (Cassady & Johnson, 2002; Zaromb et al., 2017; Cherry, 2020).

One significant progenitor of CTA is examination preparedness (EP) which involves learning to present the necessary knowledge clearly and in the specific format required by each exam component. This approach aims to showcase both competence and confidence in the subject matter (Whymark, 2016). EP is a significant progenitor of CTA because students who feel inadequately prepared often experience heightened levels of worry and self-doubt, which can lead to intrusive thoughts and negatively impact their performance during assessments. This was supported by a study conducted by Cassady (2004), which found that during the preparation phase, students with high CTA reported lower study skills compared to their peers with lower anxiety levels. Additionally, a study by Zabek (2001)



demonstrated a significant correlation between test preparedness and math test anxiety, supported by strong statistical evidence.

Academic self-efficacy (ASE) is also seen as a significant progenitor of Senior High School (SHS) students' CTA. Nasa (2014) defined ASE as the belief in one's ability to plan, execute, and manage performance in order to achieve specific goals. ASE is a significant progenitor of CTA because students who believe in their abilities to succeed are more likely to approach exams with confidence, reducing worry and fear of failure that contribute to anxiety during assessments. Jia et al. (2023) confirmed that ASE serves as a significant negative predictor of test anxiety. Their findings highlight the protective role of ASE against heightened anxiety during tests. Similarly, Lei et al. (2021) reported that ASE does not directly influence test anxiety. However, they discovered an indirect effect of ASE on test anxiety. This indirect relationship is mediated through academic buoyancy.

Apart from EP and ASE, religiosity also seen as a progenitor of SHS students' CTA. Religiosity is understood as the formal, institutional, and external expression of one's relationship with the divine, often operationalised through the specific practices and beliefs unique to a particular religious worldview and community (Iannello et al., 2019). Religiosity is a significant progenitor of CTA because individuals who actively engage in religious practices often find comfort and support in their faith, which can help mitigate feelings of anxiety and enhance their coping strategies during stressful examination periods. However, studies have produced contradictory findings. Franklin (2016) found that religiousness alone did not significantly predict CTA; however, incorporating Positive and Negative Religious Coping into the model significantly enhanced its predictive power. In contrast, McMahon and Biggs (2012) reported a contradictory result, indicating that religious well-being was not a significant predictor of anxiety.

Ideally, it is expected that final-year SHS students' CTA would be influenced by their EP, ASE, and religiosity. Students who are well-prepared for their exams would likely possess a deeper understanding of the subject matter, leading to greater confidence and reduced anxiety when facing assessments. Furthermore, those with high ASE would trust in their abilities to perform well, believing they have the skills necessary to succeed without undue stress. As a result, these individuals would experience lower levels of CTA, as their confidence in their academic capabilities would serve as a buffer against stress. Lastly, students with a strong sense of religiosity may find solace and support in their faith, helping to alleviate anxiety and fostering a positive mindset during examination periods. Together, these factors would create an environment where CTA is minimised, allowing students to approach their assessments with confidence and composure.

Studies (Awabil et al., 2017; Dontuo, 2020; Donkor, 2023) on CTA in Ghana suggest that students often display high levels of CTA, which has been identified as a major factor contributing to the declining performance of SHS students in their West African Senior School Certificate Examination (WASSCE). For instance, a study by Awabil et al. (2017) indicated that second year SHS students (control group) in the Komenda Edina Eguafo Abrem Municipality of Ghana who were not exposed to cognitive restructuring and study skills counselling exhibited high levels of examination anxiety. This was later confirmed by Donkor (2023) which revealed that SHS students in the Jomoro Municipality of Ghana exhibited high levels of examination anxiety about the WASSCE. Dortuo (2020) also revealed that the high levels of examination anxiety in SHS students in the Wa Municipality of Ghana negatively correlated with their academic performance in Mathematics, English Language and Science. However, the 2023 WASSCE results showed a different trend. This is because final-year SHS students achieved significant improvements in their performance on the WASSCE, marking the highest results in four years. A substantial percentage of students earned grades between A1 and C6 across all major subjects. Specifically, 73.11% of candidates received grades between A1 and C6 in English Language, reflecting a notable increase from previous years. In Core Mathematics, 62.23% achieved similar grades, while Integrated Science and Social Studies saw 66.82% and 76.76% of students, respectively, attaining these grades (Bonney, 2023; Frimpong, 2023).

These patterns provide an essential context for understanding the factors influencing CTA among final-year SHS students, particularly in relation to EP, ASE, and religiosity. Improvements in exam performance, such as those seen in the 2023 WASSCE results, suggest that enhanced EP and stronger self-efficacy may help students manage their anxiety more effectively. However, concerns about CTA persist as 235 schools had their results withheld due to cheating behaviours evidenced by the alleged use of artificial intelligence-generated answers, and the results of some students cancelled for possessing unauthorised materials and mobile phones in examination halls (Osei, 2023). Given that religiosity may offer coping mechanisms to reduce anxiety, how do EP, ASE, and religiosity collectively impact CTA?

The literature review revealed a notable knowledge gap. Previous studies (Zabek, 2001; Cassady, 2004; McMahon & Biggs, 2012; Franklin, 2016; Jia et al., 2023) have not examined the combined influence of religiosity, ASE, and EP on students' CTA. Instead, these factors have generally been studied in isolation. This gap highlights the need for research that considers how these variables collectively impact CTA among students. In addition to this knowledge gap, the study addresses a geographical and population gap. In Ghana, there has been no research examining the combined effects of religiosity, ASE, and EP on students' CTA. Existing studies over the past decade have largely focused on other populations such as university students (Bakete & Akurugu, 2023; Bedu-Addo & Gyasi, 2023) and junior high school students (Koramoah & Danyoh, 2022). Studies done at the SHS level focused on other individual



variables (Awabil et al., 2017; Donkor, 2023) without looking at the combined effects of religiosity, ASE, and EP on SHS students' CTA. This lack of research in the Ghanaian setting underscores the need for a localised understanding of these factors on SHS students. The study sought direction through the following research question and hypotheses:

1.1 Research Question

What is the level of final-year students' progenitors of CTA?

1.2 Research Hypotheses

1. H_0 : There is no statistically significant effect of EP of SHS students on their CTA.
2. H_0 : There is no statistically significant effect of SHS students' ASE on their CTA.
3. H_0 : There is no statistically significant effect of SHS students' religiosity on their CTA.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Transactional Model of Stress and Coping

The Transactional Model of Stress and Coping, developed by Richard Lazarus and Susan Folkman (1984), provides a framework for understanding stress as a dynamic interaction between individuals and their environment. Rather than viewing stress as a mere response to external pressures, this model emphasises the role of personal interpretation and coping processes in shaping the stress experience. The model describes two key stages in this process: primary appraisal and secondary appraisal. In the primary appraisal stage, individuals assess whether a situation is irrelevant, benign-positive, or stressful. When a situation is perceived as stressful, it is further classified as a threat, challenge, or harm/loss. The secondary appraisal stage follows where individuals evaluate the resources they have to cope with the stressor. At this stage, students consider whether they possess sufficient skills, support, or coping mechanisms to handle the challenge. The model outlines two main coping strategies that mediate responses to stress: problem-focused coping and emotion-focused coping. Problem-focused coping is directed at managing or altering the source of stress, while emotion-focused coping is aimed at regulating emotional reactions to the stressor (Lazarus & Folkman, 1984).

The Transactional Model of Stress and Coping offers valuable insights into how final-year SHS students manage CTA, particularly concerning EP, ASE, and religiosity. According to this model, stress arises from an individual's evaluation of external demands and their perceived ability to handle those challenges. In this study, students with high ASE are likely to view exam-related pressures as surmountable, employing adaptive coping strategies that reduce anxiety. In contrast, those who feel inadequately prepared may perceive exams as significant threats, resulting in increased CTA. Furthermore, religiosity can influence students' coping styles, potentially providing comfort and enhancing resilience during stressful periods. By applying the Transactional Model to this context, the study can explore the intricate relationships between personal perceptions, coping responses, and levels of CTA experienced by final-year SHS students.

2.2 Empirical Review

CTA primarily involves the psychological reactions experienced during examinations, characterised by persistent worrying, self-defeating thoughts, and fears about achievement that interfere with focus and impair the ability to retrieve learned information (Cherry, 2020; Ünal-Aydın et al., 2021). Given the growing concern over cognitive test anxiety among students, numerous empirical studies have examined the influence of examination preparedness, academic self-efficacy, and religiosity on students' cognitive test anxiety. For instance, Cassady (2004) investigated the impact of CTA throughout the learning-testing cycle. The study involved 124 undergraduate students enrolled in educational psychology courses at a Midwestern university in the United States. Instruments used included measures for CTA ($\alpha = .93$), perceived threat of upcoming tests ($\alpha = .85$), self-reported study skills ($\alpha = .86$), note-taking skills, emotionality ($\alpha = .86$), test performance ($\alpha = .91$), and post-test attributions for performance ($\alpha = .72$). During the preparation phase, findings indicated that students with high CTA, compared to those with lower anxiety levels, reported lower study skills ($d = .83$), perceived tests as more threatening ($d = 1.18$), and took less effective test notes. Also, Zabek (2001) conducted a quantitative study to examine the relationship between math-test anxiety and test preparedness. A questionnaire was developed and distributed to high school students across eight districts in British Columbia, resulting in 322 responses (a 67% response rate). The findings showed a significant correlation between test preparedness and math-test anxiety, with strong statistical evidence ($R = .531$, $R^2 = .282$, $p < .05$).

Likewise, Lei et al. (2021) applied a conditional process model to investigate the relationship between ASE and test anxiety, as well as the psychological mechanisms underlying this relationship through academic buoyancy and peer support. A sample of 560 Chinese high school students completed questionnaires measuring ASE ($\alpha = .88$), academic buoyancy ($\alpha = .86$), peer support ($\alpha = .88$), and test anxiety ($\alpha = .85$). Data analysis included descriptive statistics, zero-



order correlations, and structural equation modeling (SEM). The findings indicated that ASE did not have a significant direct effect on test anxiety ($p = .745$); however, an indirect effect of ASE on test anxiety was found through academic buoyancy ($\beta = -.364$, $p < .001$). Also, Jia et al. (2023) investigated the effect of ASE on test anxiety among higher vocational college students. A total of 2,231 students from Shandong Province participated in the study, completing the ASE Questionnaire ($\alpha = .901$), the Meaning in Life Questionnaire ($\alpha = .861$), and the Test Anxiety Scale ($\alpha = .855$). Data were analysed using descriptive statistics, correlation analysis, structural equation modeling, and multi-group analysis. The findings showed that ASE was a significant negative predictor of test anxiety ($\gamma = -0.298$, $p < .01$).

Franklin (2016) also explored the relationships between religiousness, religious coping methods, and CTA among African-American college students. A convenience sample of 121 African-American students (97 females and 24 males), aged 18 to 39, from a historically Black university. Measures included religiousness ($\alpha = .839$), religious coping ($\alpha = .898-.911$), and CTA ($\alpha = .767$). Religiousness alone did not significantly predict CTA ($F(1,88) = .074$, $p > .786$), but adding Positive and Negative Religious Coping (PRC and NRC) significantly improved the model (ΔR^2 , $F(3,86) = 2.847$, $p < .042$). NRC was the strongest predictor ($r_{a(bc)} = .298$). Also, McMahon and Biggs (2012) investigated spirituality and intrinsic religious orientation as coping mechanisms for exam anxiety among 89 undergraduate psychology students at Queensland University of Technology. The findings showed that religious well-being was not a significant predictor of anxiety. However, existential well-being, measured by the Spiritual Well-Being Scale, emerged as the strongest predictor of reduced anxiety ($\beta = .30$, $t(3,85) = 3.090$, $p < .05$).

In summary, the reviewed literature demonstrates that EP, ASE, and religiosity have each been examined in relation to CTA. However, the findings remain inconclusive, particularly regarding the roles of ASE and religiosity, with some studies reporting significant relationships (Zabek, 2001; Cassady, 2004; Jia et al., 2023) while others found no direct effects (McMahon & Biggs, 2012; Lei et al., 2021). Furthermore, most existing studies have focused on undergraduate or college students in developed countries (Cassady, 2004; Jia et al., 2023; Franklin, 2016; McMahon & Biggs, 2012), with limited attention given to senior high school students in sub-Saharan Africa. In addition, previous studies (Zabek, 2001; Cassady, 2004; McMahon & Biggs, 2012; Franklin, 2016; Lei et al., 2021; Jia et al., 2023) have largely investigated these factors independently, with little empirical evidence examining their combined influence on CTA. Consequently, this study seeks to address these gaps by investigating the extent to which EP, ASE, and religiosity predict CTA among final-year Senior High School students.

III. METHODOLOGY

3.1 Research Design

Grounded in the positivist paradigm, the study adopted the quantitative research approach and utilised a cross-sectional survey design. The cross-sectional survey design was appropriate for this study as it enabled the assessment of religiosity, ASE, EP, and CTA among final-year senior high school students at a single point in time without manipulating any variables. This approach provides a snapshot of the population, allowing for the objective measurement of students' behavioural tendencies and perceptions (Nardi, 2018; Wang & Cheng, 2020). This design is widely used in educational and social science research to examine relationships and identify trends within large populations. This design has also been employed in related studies, including those by Mensah et al. (2024) and Kwarteng et al. (2024).

3.2 Study Area

The study was conducted in the Cape Coast Metropolis in the Central Region of Ghana. Cape Coast Metropolis is widely recognised as an educational hub due to its concentration of well-established second-cycle institutions. The study focused on the 10 public senior high schools within the metropolis, which are registered under the Ministry of Education and administered by the Ghana Education Service (GES). These schools are Adisadel College, Mfantsipim School, Wesley Girls' High School, St. Augustine's College, Holy Child School, Ghana National College, Aggrey Memorial A.M.E. Zion Senior High School, University Practice Senior High School (UPSHS), Academy of Christ the King, and Cape Coast Technical Institute. The presence of these diverse public senior high schools makes the Cape Coast Metropolis an appropriate setting for examining the influence of EP, ASE, and religiosity on CTA among final-year senior high school students.

3.3 Target Population

The target population comprised all final-year students in the 10 senior high schools within the Cape Coast Metropolis, totalling 8,656 students. These final-year students were chosen as the unit of analysis because they had completed most of the senior high school curriculum and were preparing for their final certificate examinations (WASSCE), making them ideal subjects for measuring the variables of interest.

3.4 Sampling and Sample Size

Using a proportionate simple random sampling technique, 370 students were selected from across all 10 schools in the Metropolis. This sample size and distribution ensured representation from each school, with the specific numbers detailed in Table 1 of the study. Data collection instruments were distributed to all selected students, achieving a 100% response rate as all 370 distributed items were returned. The choice of final-year students was deemed appropriate as their impending examinations provided a relevant context for assessing how their levels of EP, religiosity, and ASE might affect their CTA.

Table 1

Population and Sample

School	Population	Sample
University Practice SHS	765	33
Wesley Girls SHS	967	41
Mfanstipim SHS	1058	45
St. Augustine's College	750	32
Academy of Christ the King SHS	188	8
Adisadel College	1,400	60
Oguaa Sec. Tech School	464	20
Ghana National College	914	40
Holy Child College	750	32
Aggrey Memorial School	1400	60
Total	8656	370

3.5 Data Collection Instruments and Procedures

The instrumentation of this study consisted of a structured closed-ended questionnaire divided into five sections to collect relevant data on the variables under investigation. Section A focused on gathering demographic information, specifically participants' age and gender, to provide a foundational understanding of the sample. Section B assessed religiosity using a 20-item scale adapted from Katz and Schmida (1992), with 10 items measuring observance of religious practices and 10 items assessing religious beliefs. These items were measured to capture the participants' level of engagement with religious practices and their underlying religious beliefs. Section C measured academic self-efficacy with a 40-item scale adapted from Gafoor and Ashraf (2006), designed to assess students' confidence in their academic abilities. Section D evaluated examination preparedness through a self-developed 10-item scale, which aimed to assess students' readiness and strategies for preparing for exams. Finally, Section E measured cognitive test anxiety using a 27-item scale adapted from Cassady and Johnson (2002), focusing on students' emotional and psychological responses related to test-taking. All items across the sections were formatted using a five-point Likert scale, ranging from strongly disagree to strongly agree, to capture the intensity of the participants' responses.

Prior to the commencement of data collection, the researchers obtained an introductory letter from the Department of Arts Education, University of Cape Coast. The letter was presented to the heads of the selected public Senior High Schools in the Cape Coast Metropolis to seek official permission to conduct the study. This formal introduction facilitated access to the schools and established a cordial relationship between the researchers and the school authorities. Following approval, arrangements were made with the school management to identify appropriate periods for administering the research instruments without disrupting normal academic activities. The researchers personally visited each of the selected schools and explained the purpose and significance of the study to the final-year students. Participants were informed that their participation was entirely voluntary and that they could decline or withdraw from the study at any stage without any adverse consequences. They were also assured that all responses would be treated with strict confidentiality and anonymity and that the information provided would be used solely for academic and research purposes. Structured questionnaires were administered directly to the selected students using the proportionate simple random sampling procedure. The researchers remained available throughout the administration process to clarify any items that participants found unclear while avoiding any influence on their responses. Completed questionnaires were collected immediately after completion, ensuring a high response rate and minimising the likelihood of missing data.

3.6 Data Analysis

The data for this study were analysed using frequency, percentages, mean, and standard deviation with the aid of SPSS version 25 and Partial Least Squares Structural Equation Modeling (PLS-SEM) with the support of SmartPLS 4 statistical software. This methodology was selected for its effectiveness in handling complex statistical models that incorporate multiple latent and observed variables (Hair et al., 2011; Hair et al, 2019). Both the measurement and structural models underwent evaluation. In assessing the measurement model, we evaluated the reliability of the outer



model using Cronbach's alpha and composite reliability. Convergent validity was examined through the average variance extracted (AVE), while the model's validity was further assessed through discriminant validity tests. To evaluate discriminant validity, we applied three key criteria: the Heterotrait-Monotrait ratio (HTMT) and the Fornell-Larcker criterion, ensuring the distinctiveness of the latent variables.

3.7 Ethical Considerations

This study prioritised ethical considerations through comprehensive measures to protect participants' rights and dignity. Initial approval was obtained from the University of Cape Coast's Institutional Review Board and Department of Arts Education. The research team emphasised participant privacy and anonymity, implementing verbal consent procedures to facilitate open communication. Students were informed that participation was voluntary, with the right to withdraw at any time, and that data would be used solely for academic purposes. These ethical safeguards aimed to create an environment conducive to honest participation while maintaining data integrity and participant trust. The careful attention to ethical protocols enhanced both the study's ethical standing and data quality. Written informed consent was subsequently obtained.

IV. FINDINGS & DISCUSSION

4.1 Background Characteristics of the Respondents

Table 2 presents the results on the respondents' background characteristics.

Table 2

Background Characteristics of the Respondents

Demography	Subscale	Frequency	Percentages (%)
Gender	Male	188	50.8
	Female	182	49.2
Age	Below 15 years	10	2.7
	16 - 20 years	352	95.1
	21 and above	8	2.2

Table 2 shows that male respondents (188; 50.8%) slightly outnumbered female respondents (182; 49.2%), indicating a nearly balanced gender distribution in the study. In terms of age, most participants (95.1%) were between 16 and 20 years, with a small percentage (2.7%) under 15 years and 2.2% aged 21 and above. This distribution suggests that the study predominantly included respondents aged 16-20, aligning with the typical age range of final-year senior high school students.

4.2 Level of Final-year SHS Students' Progenitors of CTA

Table 3 displays the findings regarding the level of EP, ASE, and religiosity among final-year SHS students. The responses were measured on the scale 1= Uncertain; 2 = Strongly Disagree; 3= Disagree; 4= Agree and 5, = Strongly Agree. The overall mean was interpreted as 1.00- 1.9= (low) 2.0- 3.4= (moderate) and 3.5-5.0= (high).

Table 3

EP, ASE, Religiosity, and CTA

Constructs	Mean	SD	Level
EP	4.03	.50	High
ASE	3.93	.50	High
Religiosity	3.76	.60	High

From Table 3, the mean score for EP is 4.03 (SD = .50), indicating a high level. This implies that students generally agree with statements related to their preparedness for exams. This suggests that students feel relatively confident in their ability to tackle exams effectively. The mean score for ASE is 3.93 (SD = .50), showing a high level, also reflecting an agreement with statements about their academic capabilities, showing that students believe in their ability to perform well academically. Religiosity has a mean score of 3.76 (SD = .60), indicating a high level, which also falls within the agree range, suggesting that students are moderately engaged in religious practices or beliefs, which might influence their academic behaviours and ethical standards. Put together, the result implies a general agreement across all three progenitors of CTA, indicating that students are positively inclined towards their EP, ASE, and religiosity. The relatively small standard deviation values imply that the responses were moderately homogeneous, with most students sharing similar levels of confidence in their progenitors of CTA.

4.3 Measurement Model Assessment

In PLS-SEM, assessing the measurement model is essential before proceeding with hypothesis testing, as it verifies the validity and reliability of the constructs within the proposed model. This assessment focuses on internal consistency, convergent validity, and discriminant validity to ensure the model's suitability for testing the study's hypotheses. The following subsections present the statistical results for validity and reliability assessments.

4.3.1 Internal Consistency and Convergent Validity of Constructs

Hair et al. (2019) identify composite reliability, Cronbach's alpha (α), and Average Variance Extracted (AVE) as key statistical criteria for assessing validity and reliability, particularly in evaluating the convergent validity of constructs. Table 4 and Figure 2 present the statistical results for convergent validity, detailing indicator loadings, Cronbach's alpha, composite reliability, and AVE values for each construct.

Table 4

Internal Consistency and Convergent Validity of the Model

	Loadings	α	CR (rho_a)	CR (rho_c)	AVE
ASE		.849	.852	.885	.525
ASE25	.708				
ASE26	.750				
ASE27	.692				
ASE32	.752				
ASE34	.727				
ASE35	.695				
ASE36	.745				
CTA		.731	.756	.831	.552
CTA22	.707				
CTA23	.818				
CTA26	.765				
CTA27	.673				
EP		.529	.530	.760	.514
EP2	.700				
EP6	.755				
EP7	.696				
Religiosity		.663	.672	.802	.512
RA3	.819				
RA4	.842				
RA5	.590				
RP15	.565				

The results of the measurement model evaluation reveal that most indicator loadings for the constructs meet or approach the acceptable threshold of .70, with slight deviations in some items. This is because, as stated by Hair et al. (2021), an item with a factor loading greater than .5 can be retained if the Average Variance Extracted (AVE) is .5 or higher. Specifically, the ASE construct exhibits loadings ranging from .692 to .752, indicating that the indicators generally explain over 50% of the variation in the construct. For internal consistency reliability, the ASE construct shows strong internal consistency, as evidenced by Cronbach's alpha ($\alpha = .849$) and composite reliability (CR rho_c = .885), both exceeding the recommended threshold of .70. The AVE for ASE is .525, suggesting satisfactory convergent validity (Hair et al., 2011; Hair et al, 2019). The CTA construct also demonstrates reliable internal consistency, with Cronbach's alpha of 0.731 and CR rho_c of .831. Indicator loadings for CTA range from .673 to .818, and the AVE value of .552 confirms adequate convergent validity, indicating that the construct captures the underlying concept well. For the EP construct, reliability is more modest, with a Cronbach's alpha of .529 and composite reliability of .76. Loadings for EP range from .696 to .755, and the AVE of 0.514 meets the minimum threshold for convergent validity, suggesting that the indicators moderately reflect the construct (Hair et al., 2011; Hair et al, 2019). Finally, the Religiosity construct achieves acceptable reliability, with Cronbach's alpha of .663 and CR rho_c of .802. Indicator loadings for Religiosity vary from .565 to .842, and the AVE of .512 meets the threshold for convergent validity (Hair et al., 2011; Hair et al, 2019). Overall, these results indicate that, with few exceptions, the constructs demonstrate adequate reliability and convergent validity for the indicators, supporting their suitability for further analysis in the study.

4.3.2 Discriminant Validity

To assess the quality of the proposed model, a discriminant validity analysis was performed to confirm that the constructs are theoretically distinct from each other (Franke & Sarstedt, 2019). In PLS-SEM, discriminant validity is commonly evaluated using the Fornell-Larcker criterion, the Heterotrait-Monotrait (HTMT) ratio, or both (Hair et al., 2011; Hair et al, 2019). This study examines discriminant validity using both criteria, which are detailed in the following paragraphs. According to the Fornell-Larcker criterion, discriminant validity is achieved when the square root of the AVE for each construct exceeds its correlations with other constructs, as recommended by (Fornell & Larcker, 1981). Tables 5 and 6 in this study confirms that the model meets this criterion, thereby establishing its discriminant validity.

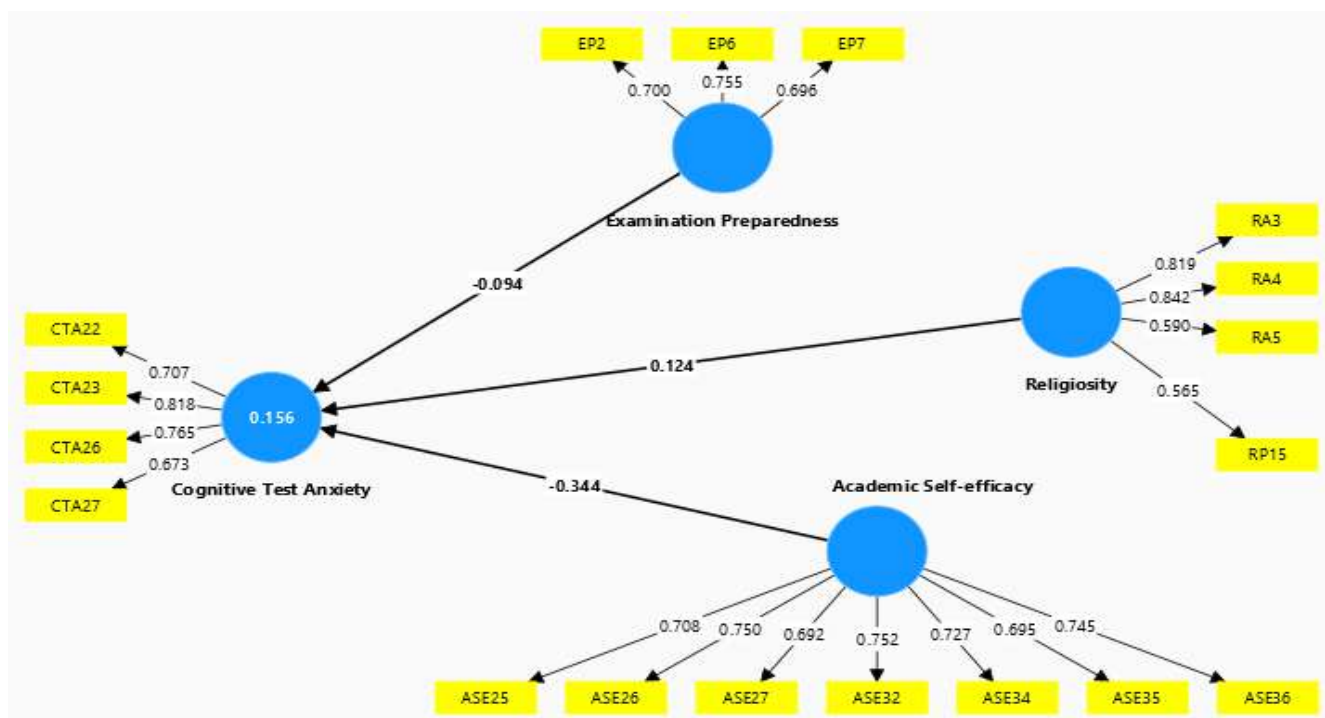


Figure 1
Measurement Model

Table 5
HTMT

	ASE	CTA	EP	Religiosity
ASE				
CTA	.449			
EP	.288	.220		
Religiosity	.131	.196	.193	

Using the HTMT ratio, discriminant validity is achieved when the average correlations between items across different constructs are significantly lower than the correlations of items within the same construct, with none of the HTMT values exceeding the .90 threshold (Hair et al., 2011; Henseler et al., 2015). In this study, the HTMT values between ASE, CTA, EP, and Religiosity are all well below this threshold, with the highest HTMT value being .449 between ASE and CTA. This indicates that the constructs in the model are theoretically distinct from one another, as shown in Table 4. Therefore, the HTMT results confirm the discriminant validity of the model.

Table 6
Fornell-Larcker

	ASE	CTA	EP	Religiosity
ASE	.725			
CTA	-.368	.743		
EP	.188	-.144	.717	
Religiosity	-.049	.131	.114	.715

The Fornell-Larcker criterion was applied to assess discriminant validity by comparing the square root of the average variance extracted (AVE) values along the diagonal with the correlations between constructs. In this analysis, the square root of AVE for each construct is greater than its inter-construct correlations, thereby confirming discriminant validity. For instance, the square root of AVE for ASE is .725, which is higher than its correlations with CTA (-.368), EP (.188), and Religiosity (-.049). Similarly, the square root of AVE for CTA (.743), EP (.717), and Religiosity (.715) also exceed their respective correlations with other constructs. This demonstrates that each construct is distinct and measures a unique concept within the model, supporting the overall discriminant validity of the research model.

4.3.3 Multicollinearity Assessment

This assessment was conducted to confirm that the model is free from collinearity issues resulting from high correlations among constructs. The variance inflation factor (VIF) was used to detect multicollinearity, as it reflects the extent to which regression weights may be inflated, potentially biasing hypothesis test results. Table 7 presents the VIF values for the current model.

Table 7

Multicollinearity results

	ASE	CTA	EP	Religiosity
ASE		1.042		
CTA				
EP		1.053		
Religiosity		1.018		

According to Ringle et al. (2023), a model is considered free from collinearity issues when variance inflation factor (VIF) values are below 5. Based on this criterion, the current model shows no signs of collinearity, as all VIF values fall well below the threshold. Specifically, the VIF values for ASE, CTA, EP, and Religiosity range from 1.018 to 1.053. Thus, any significant associations observed among these variables in the structural model can be considered unbiased and unaffected by multicollinearity.

4.4 Structural Model Results

The primary objective of the structural model assessment was to examine whether EP, ASE, and Religiosity predict CTA among final-year SHS students. The structural model was evaluated using the bootstrapping method. Figure 3 presents the bootstrapping analysis results, including the t-values for both the outer and inner models, path coefficients (β), and the coefficient of determination (R^2). Additional results from the structural model assessment, as outlined in Tables 8 and 9, include the significance levels of the hypotheses and the model's predictive relevance (Q^2).

Table 8

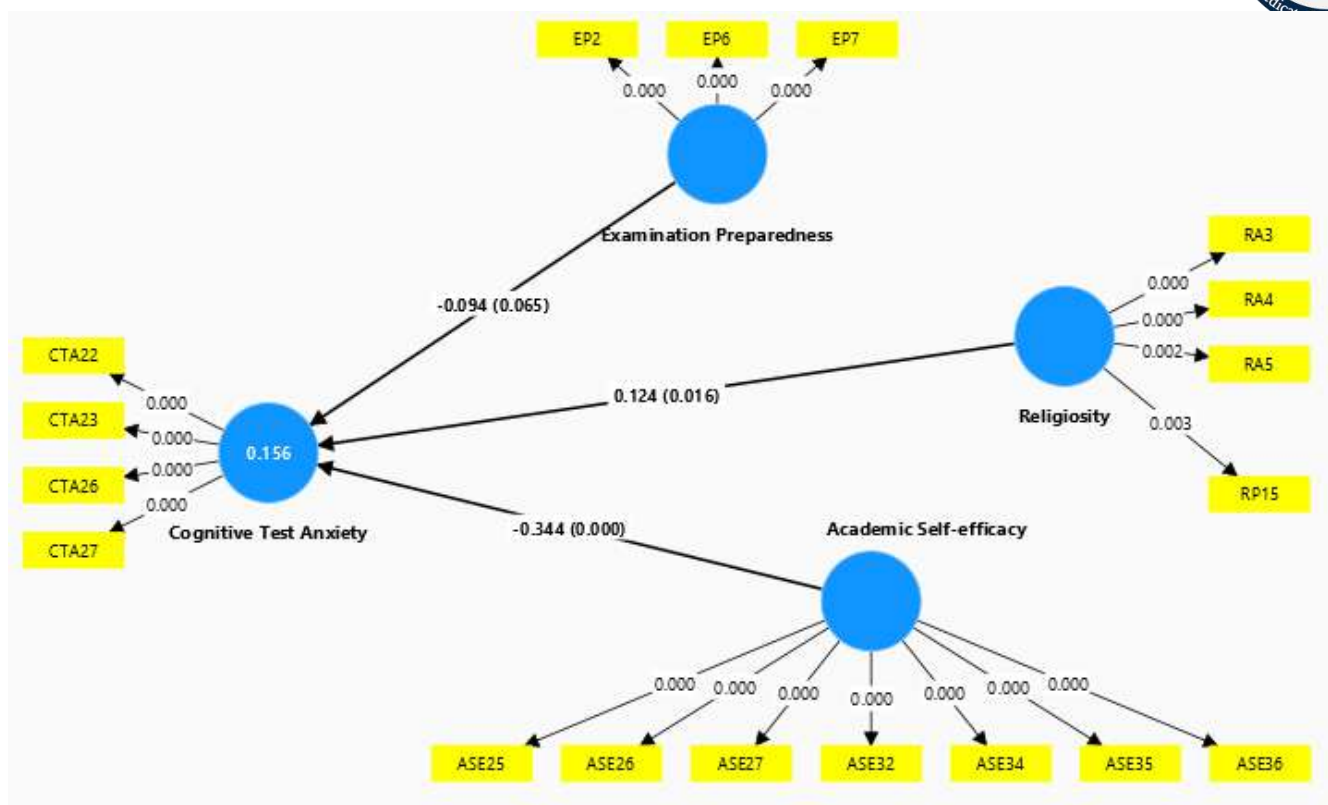
Bootstrapping results

	Path	β	SD	t	p	f^2	Decision
H1	EP -> CTA	-.094	.051	1.845	.065		Reject
H2	ASE -> CTA	-.344	.053	6.531	.000	.135	Accept
H3	Religiosity -> CTA	.124	.052	2.410	.016	.018	Accept

Table 9

Coefficient of Determination and Predictive Relevance

	R-square	R-square adjusted	Predictive Relevance
CTA	.156	.149	.126

**Figure 2***PLS-SEM Bootstrap Results*

This study examined the levels of the progenitors of CTA. The results indicated that final year students possess high levels of progenitors of CTA with the highest being EP ($M = 4.03$, $SD = .50$), followed by ASE ($M = 3.93$, $SD = .50$) and religiosity ($M = 3.76$, $SD = .60$). With EP, ASE, and religiosity as predictors, this study also investigated their effects on CTA among final-year SHS students. The results provide partial support for the proposed hypotheses. The first hypothesis (H1), which posited that EP would negatively impact CTA, was not supported as the results were not statistically significant ($\beta = -.094$, $t = 1.845$, $p = .065$). This outcome suggests that in this sample, EP does not notably reduce CTA, diverging from prior findings like those of Zabek (2001), who identified a significant relationship between preparedness and anxiety in math tests. Differences in academic context or subject-specific anxiety may explain the non-significant relationship found in this study.

Conversely, the second hypothesis (H2), which proposed that ASE negatively influences CTA, was supported, as indicated by a significant path coefficient ($\beta = -.344$, $t = 6.531$, $p = .0001$) and a moderate effect size ($f^2 = .135$). This result aligns with previous research by Jia et al. (2023), who found ASE to be a strong negative predictor of test anxiety, and Lei et al. (2021), who identified an indirect effect of ASE on test anxiety mediated by academic buoyancy. The current findings emphasise ASE's critical role in reducing CTA, underscoring the importance of self-efficacy as a psychological buffer against anxiety in high-stakes testing situations.

The third hypothesis (H3), which predicted a positive relationship between Religiosity and CTA, was also supported, with a significant positive path coefficient ($\beta = .124$, $t = 2.410$, $p = .016$), though the effect size was small ($f^2 = .018$). This result is consistent with studies such as Franklin (2016), who found religious coping methods influenced CTA among African-American students, and suggests that while religiosity may contribute to CTA, its impact is limited. The findings indicate that religiosity may heighten CTA by introducing an element of moral or existential pressure, though further research is necessary to clarify the underlying mechanisms.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

In conclusion, this study underscores the influence of EP, ASE, and Religiosity on CTA among final-year SHS students. The findings revealed that ASE significantly reduces CTA, suggesting that students with higher self-efficacy are better equipped to manage test-related anxiety. However, EP showed no significant effect on CTA, indicating that simply being prepared may not be sufficient to alleviate test anxiety in this sample. Religiosity, while positively associated with CTA, had a limited impact, suggesting that religious beliefs may sometimes add pressure without



strongly alleviating anxiety. Collectively, these findings highlight ASE as a primary factor in reducing CTA and suggest that both academic and emotional readiness play key roles in how students handle exam stress.

5.2 Recommendations

In light of these findings, it is recommended that educational stakeholders, including the Ministry of Education and school administrators, implement interventions to enhance ASE and address test anxiety among students. Programmes focused on building students' self-efficacy through workshops on positive self-belief and resilience could substantially reduce CTA levels. Since the effect of EP on CTA was not significant, it may be valuable to explore additional supportive strategies beyond academic preparation, such as emotional regulation and stress-management training. For students who experience religious pressures, integrating coping strategies that acknowledge and support personal beliefs could also prove beneficial. These comprehensive measures can foster a balanced approach to academic preparation, ultimately enhancing students' confidence, reducing their anxiety, and promoting better academic outcomes.

This study has several limitations that should be acknowledged when interpreting the findings. First, the sample focused exclusively on final-year SHS students from a specific educational and cultural setting, which may limit the generalisability of the results. Future research could address this by including a more diverse sample across different regions or educational levels to determine if the relationships between EP, ASE, Religiosity, and CTA are consistent across various demographics. Additionally, the reliance on self-reported data introduces the potential for social desirability bias, especially regarding sensitive topics such as religiosity and test anxiety. Adopting a mixed-methods approach or a longitudinal design could offer a more nuanced understanding of how these variables evolve and interact over time. Further studies could also examine additional moderating or mediating factors, such as emotional intelligence, resilience, or peer support, which may influence the link between ASE and CTA. Given the non-significant impact of EP on CTA in this study, exploring other aspects of test preparedness, like mental readiness or self-regulation skills, could provide deeper insight into the factors contributing to test anxiety. Qualitative insights from students about their experiences with test anxiety and coping strategies could also enhance understanding of these dynamics and guide the creation of more tailored intervention strategies.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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