

ATTRIBUTION STYLES AS A PREDICTOR OF SECONDARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN ANAMBRA STATE

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Abstract

The study investigated the predictive influence of attribution styles on secondary school students' academic achievement in Biology. Three research questions, guided the study, with three null hypotheses tested at 0.05 alpha levels. A co-predictive research design was adopted. A sample of 594 SS2 students, drawn from the 24,102 Senior Secondary Year Two (SS2) students offering Biology in Anambra State, was drawn using multistage sampling procedure. Two instruments: Attribution Styles Questionnaire (ASQ) and Biology Score Proforma (BSP), containing students' achievement scores in biology, for the 2024/2025 academic session, were used for data collection. The adapted instrument (ASQ) validated by three experts was subjected to reliability testing, using Cronbach alpha method, to yield a coefficient value of 0.87. Data collected were analyzed using regression analyses. The findings revealed among others that attribution styles accounted for 9.4% variance in students' academic achievement in Biology. On gender, the study revealed that while attribution styles significantly contributed to male students' academic achievement, the contrary were recorded for the female students. Furthermore, the study revealed that attribution styles is a significant predictor of secondary school students' academic achievement in Biology. On relative contributions of individual dimensions of attribution styles, the study revealed that all the dimensions of attribution styles individually and jointly, significantly predicted students' academic achievement in biology, except for internal versus external dimension of attribution styles. Based on the findings, it was recommended among others that Biology teachers should encourage students to develop positive attribution styles by helping them associate academic success with effort, determination, and effective study practices.

Keywords: Academic Achievement, Attribution Styles, Biology, Gender

Introduction

Biology is one of the science subjects studied in Nigerian secondary schools. Asuzu and Okoli (2019) defined biology as a natural science that studies the living world; how it functions, what these functions are, how living things came into existence and their interaction with each other and their environment. It is a natural science concerned with the study of life and living organisms (Nwuba and Osuafor, 2021). In other words, biology is a branch of science that studies living things and their interactions with each other and their environment. Biology, as a subject, is very important in nation building as well as scientific and technological development. Uzoma and Okoli (2019) opined that a sound knowledge of biology is needed in our everyday lives as well as in many fields of study and industries such as medicine, pharmacy, nursing, agriculture, and

engineering. On a similar note, Pat-Anyaeji and Okeke (2019) emphasized that the knowledge of biology helps one in understanding the world in its natural processes and with the knowledge obtained create a better environment to live in. Hence, biology, in general, provides the knowledge applied in every sphere of life today ranging from food production, environmental protection and conservation of resources, bioengineering and agriculture, prompting its inclusion in the secondary school curriculum in Nigerian secondary schools.

Considering the above advantages and the subject's nature of little or no mathematical calculations, Nwuba and Osuafor (2021) opined that the biology has popularity among students and as a result has the highest enrollment by students in external examinations when compared to other science subjects. Notwithstanding its importance and popularity among students, the recorded performance of students in the subject in external examinations over the years has remained unsatisfactory and inconsistent as seen in the statistic report of WAEC from 2019 to 2023. That is, for 2019, for aggregate of A1-C6, a percentage pass of 55.63 was recorded, 63.23% in 2020, 58.09% in 2021, 64.16% in 2022 and 54.69% in 2023 showing that students' performance in the subject over the years has remained slightly above average and inconsistent.

Many researchers (Ufommadu & Okoli, 2019; Uzoma & Okoli, 2019) have attributed this unsatisfactory performance to many factors among which include; lack of adequate laboratory facilities and instructional aids, unconducive learning environment, high student-teacher ratio and wide content of secondary school biology curriculum. Similarly, Nwuba and Osuafor, (2021), in their study, noted that the widespread reliance on traditional teaching methods in the classroom has prompted a number of studies on environmental factors to find solutions and ways to curtail them, in efforts to enhance students' achievement in the subject. Despite these concerted efforts by education stakeholders through provision of incentives, resources and organization of workshops, for teachers at subsidized rates, it is sad to note that students' achievement in Biology has not yet increased to the expectancy of stakeholders. In light of the premise, current researchers recognizing the cumbersome nature of the biology curriculum and the abstractness of its contents have argued on the need to reposition efforts from environmental factors to student related personal variables, as these variables most at times drive motivation and interest, which in turn influences academic achievement. In the course of literature review, the study identified attribution styles and study habits as student personal variables that plays significant roles in students' level of

comprehension, attentiveness and interest in learning biology, and thus was motivated to ascertain their predictive influence on their academic achievement in the subject.

Attribution is simply defined as an individuals' assessment of causes of actions and behaviours of others. Okadigbo and Unachukwu, (2022) defined it as an individual's consistent manner of evaluating the causes or effects of the positive and negative events that transpire in their life. Specifically, Yongmei and Qiao (2024) noted that attribution styles are the relatively stable attribution tendency formed by individuals in the long-term process of inferring and judging the causes of behavior based on relevant information and clues. It refers to how individuals explain the causes of events or behaviors, whether they attribute them to internal factors such as their own abilities or external factors such as luck or situational factors (Devi, 2023). Hence, attribution styles, in the context of the study, may simply be defined as the way students explain the cause of events that happen to them. In education today, the concept of attribution style has become important based on its contributions to academic performance, self-esteem, and resilience in the face of setbacks. In their study, Okadigbo and Unachukwu (2022) noted that a positive or negative attribution style is one that tends to habitually explain the pleasant or unpleasant events due to a trait of the individual. Similarly, Akanaeme, Kalu and Onyishi (2022) posited that attribution styles manifest in formal education process as students utilize them to infer or explain the reasons of events or outcomes, helping them draw conclusions about any behaviour displayed via various approaches.

In their study, Akanaeme et al. (2022) opined that attribution in education is classified into two types: External attribution that involves assigning the cause of occurrences around one to external variables such as luck and others' contributions; and internal attribution the involves relating events or behaviour to internal elements such as effort and personal skill. However, in a more comprehensive form, which the study adopted, Peterson et al. cited in Devi (2023), noted that attribution styles are classified into three dimensions; internal versus external, stable versus unstable, and global versus specific. According to Devi (2023), internal versus external attribution style occurs when a person attributes the cause of an event to his or her own personal characteristics (traits, or abilities) or eternal forces like luck; stable versus unstable attribution style occurs when a person attributes the cause of an event to stable (unchangeable factors) or unstable (changeable factors) events and finally, global (controllable) versus specific (uncontrollable) (if the

uncontrollable events are attributed to causes present in a variety of situations (global attributions), as opposed to more circumscribed causes (specific attributions)). Summarizing, Devi (2023) stressed that research has shown that secondary school students with a positive attribution style tend to perform better academically, have higher self-esteem, and are more resilient in the face of setbacks while students with a negative attribution style tend to have lower academic performance, lower self-esteem, and may experience more stress and anxiety, as the attribution style influences interest, motivation and most importantly study skills (habits) that influences students' academic achievement.

Academic achievement is the amount of knowledge derived from learning. According to Akunne and Anyamene (2021), academic achievement is the ability to study, remember subject contents and be able to communicate such knowledge orally or in written form, even in an examination condition. It is a multifaceted concept that reflects a student's academic success and proficiency across different dimensions of their educational journey, often measured as grades in examinations and academic degrees (Okoye and Okoli, 2025). Hence, academic achievement is the end product of an academic exposure and was ascertained in the study using students' scores in biology examinations. In education, academic achievement has become an interestingly important issue and a fundamental premium upon which all teaching and learning activities are measured using some criteria of excellence. Akunne and Anyamene, (2021b) asserted that in secondary schools, teachers measure academic achievement of students to determine the extent to which desired educational goals and objectives have been achieved, since the realization of such objectives is a milestone for any education system. Similarly, Safi (2025) opined that academic performance is widely regarded as a core indicator of both student achievement and the effectiveness of educational institutions, especially within today's increasingly competitive and globalized community. Considering this great importance placed in academic achievement and the constant quest to enhance it among secondary school students, especially in science subject like Biology, the study sought to investigate if attribution styles predict secondary school students' academic achievement in Biology, irrespective of gender.

Gender is a state of being male or female. Nwuba, Egwu and Osuafor (2022) defined it as an attribute ascribed to male and female based on biological characteristics. Hence, gender in the context of the study, simply entails a social and biological construct attributed to boys and girls

based on their physical appearance. According to Abdullahi and Bichi (2015), interest in gender related differences in academic achievement has been stimulated by concerns about the failure of students of both genders to achieve their academic potentials. Although, the literacy rate seems to be more among males than female, it is quite interesting to observe that girls are securing better ranks than boys in almost all the academic examinations, hence the need to examine gender in the present study. Fluctuations in academic achievement in Biology bother all stakeholders and academic scholars whose wards in secondary school perform poor academically. In the same vein, in spite of the considerable research attention focused on attribution styles and study habits, it appears that generally in Nigeria and in Anambra State in particular, the comprehensive/broad nature of this construct as well as its relationship with academic achievements has not been empirically established. This is further observed in the trend of academic achievement of students in external examinations, especially in science subjects, including Biology which has been fluctuating from what it used to be (WAEC, 2019 to 2023). Based on this unsatisfactory state of affairs, it becomes imperative to examine if attribution styles predict secondary school students' academic achievement in Biology, in Anambra State in particular.

Research Questions

The following research questions guided the study:

1. What is the predictive power of attribution style on secondary school students' academic achievement in Biology?
2. What is the predictive power of attribution style on secondary school students' academic achievement in Biology across gender?
3. What are the relative contributions of individual dimensions of attribution styles (internal versus external, stable versus unstable, and global versus specific) to secondary school students' academic achievement in Biology?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. Attribution style is not a significant predictor of secondary school students' academic achievement in Biology.
2. Attribution style is not a significant predictor of secondary school students' academic achievement in Biology across gender.

3. Individual dimensions of attribution styles (internal versus external, stable versus unstable, and global versus specific) are not significant predictors of secondary school students' academic achievement in Biology.

Methods

The study adopted a co-predictive survey research design. The sample comprised of 594 SS2 students drawn from the 24,102 SS2 students in the 265-government owned secondary schools in Anambra State, in the 2024/2025 academic session using multi-stage sampling procedure. Two instruments: Attribution Style Questionnaire (ASQ) adapted from Peterson, Semmel, Baeyer, Abramson, Metalsky & Seligman (1982). The 20-item ASQ, modified by the researcher to suit the context of the study, was organized under the three dimensions of attribution style; internal-external, stable-unstable, and global-specific. ASQ responses were rated on a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1) while Biology Score Proforma (BSP) is a record spreadsheet of SS2 biology students obtained from the cumulative average for their 1st, 2nd and 3rd term biology examinations for the 2024/2025 academic session. ASQ was face validated by three experts with a reliability coefficient of 0.87 established using Cronbach Alpha. Data collected with the help of four research assistants were analyzed using the Statistical Package for Social Sciences (SPSS) Version 23, and all null hypotheses tested at 0.05 alpha levels. The obtained R-values were interpreted based on a three-way range, the ranges are as follows: $r = \pm 0.30$ and below (Low relationship), ± 0.31 to below ± 0.80 (Moderate relationship) and ± 0.80 and above (High relationship). In testing the null hypotheses, reject a null hypothesis if the p-value is less than 0.05 alpha levels, if otherwise do not reject.

Results

Research Question One: What is the predictive power of attribution styles on secondary school students' academic achievement in Biology?

Table 1: Prediction of Secondary School Students' Academic Achievement in Biology by Their Attribution Styles

Model	R	r^2	Adjusted r^2	Unstandardized coefficients (B)	Std. Error
Constant				65.388	
Attribution Styles	0.306 ^a	0.094	0.092	0.223	7.586

a. Predictors: (Constant), Attribution Styles (AS)

b. Dependent: Academic Achievement in Biology (AAB)

Table 1 shows a Pearson correlation coefficient value of 0.306 (indicating a low positive relationship between AS and AAB) and an R^2 (coefficient of determination) value of 0.094. The coefficient of determination (r^2) value obtained reveals that attribution styles accounted for 9.4% of the variance in students' academic achievement scores in Biology. In addition, the unstandardized coefficient B of 0.223 shows that a unit rise in attribution styles, increases students' academic achievement scores in biology by 22.3%.

Hypothesis One: Attribution style is not a significant predictor of secondary school students' academic achievement in Biology.

Table 2: Significance of Prediction of Students' Academic Achievement in Biology by Their Attribution Styles

Model	Sum of Squares	df	Mean Square	F	Sig.	Decision
1 Regression	3523.597	1	3523.597	61.223	0.000 ^b	Sig.
Residual	34071.785	592	57.554			
Total	37595.382	593				

a. Dependent Variable: Academic Achievement in Biology (AAB)

b. Predictors: (Constant), Attribution Styles (AS)

Table 2 reveals a P-value of 0.000 at F-value (df 1 and 592) of 61.223. Since the P-value is less than 0.05 level of significance, the null hypothesis is rejected, indicating that attribution styles is a significant predictor of secondary school students' academic achievement in Biology. Since attribution styles significantly predicts students' academic achievement in Biology, the regression model ($Y = a + bx$) for the prediction as obtained from Table 1, where constant is 65.388 and b value is 0.223 is: **$AAB = 65.388 + 0.223 (AS)$**

Where, **AAB** = Academic Achievement in Biology and **AS** = Attribution Styles

Research Question Two: What is the predictive power of attribution style on secondary school students' academic achievement in Biology across gender?

Table 3: Prediction of Secondary School Students' Academic Achievement in Biology by Their Attribution Styles Across Gender

Gender	Model	N	R	r ²	Adjusted r ²	Unstandardized coefficients (B)	Std. Error of the Estimate
Constant						53.028	
Male	1	241	.600 ^a	.360	.357	0.437	6.133
Constant						72.425	
Female	1	353	.131 ^a	.017	.014	0.095	8.120

a. Predictors: (Constant), Attribution Styles (AS)

b. Dependent: Academic Achievement in Biology (AAB)

Table 3 shows a Pearson correlation coefficient value of 0.60 for males (indicating a moderate positive relationship between Male AS and their AAB) and 0.131 for females (indicating a low positive relationship between Female AS and their AAB). Additionally, an R² (coefficient of determination) value of 0.360 was observed for the males, revealing that attribution styles accounted for 36% of the variance in male students' academic achievement scores in Biology while 0.017 value observed for the females, reveals that attribution styles accounted for the 1.7% of the variance in female students' academic achievement scores in Biology. Furthermore, the unstandardized coefficient *B* of 0.437 for males shows that a unit rise in attribution styles, increases male students' academic achievement scores in biology by 43.7% while 0.095 unstandardized coefficient *B* value recorded for females reveals that that a unit rise in attribution styles, increases female students' academic achievement scores in biology by 9.5%

Hypothesis Two: Attribution styles is not a significant predictor of secondary school students' academic achievement in Biology across gender.

Table 4: Significance of Prediction of Students' Academic Achievement in Biology by Their Attribution Styles Across Gender

Gender	Model		Sum of Squares	df	Mean Square	F	Sig.	Decision
Male	1	Regression	5053.556	1	5053.556	134.337	.000 ^b	Sig.
		Residual	8990.834	239	37.619			
		Total	14044.390	240				
Female	1	Regression	403.804	1	403.804	6.124	.104 ^b	Sig.
		Residual	23145.630	351	65.942			
		Total	23549.433	352				

a. Dependent Variable: Academic_Achievement

b. Predictors: (Constant), Attribution_Styles

Table 4 reveals that at an F-value (df 1 and 239) of 134.337, a P-value of 0.000 is obtained for males. Since the P-value is less than 0.05 level of significance, the null hypothesis is rejected, indicating that male secondary school students' attribution styles is a significant predictor of their academic achievement in Biology. On the contrary, for the females, at an F-value (df 1 and 351) of 6.124, a P-value of 0.104 is obtained. Since the P-value is greater than 0.05 level of significance, the null hypothesis is not rejected, indicating that female secondary school students' attribution styles is a not a significant predictor of their academic achievement in Biology.

Research Question Three: What are the relative contributions of individual dimensions of attribution styles (internal versus external, stable versus unstable, and global versus specific) to secondary school students' academic achievement in Biology?

Table 5: Contributions of the Individual Dimensions of Attribution Styles to Secondary School Students' Academic Achievement in Biology

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	65.865	1.714		38.420	.000
Internal_vs_External	.086	.099	.046	.865	.387
Stable_vs_Unstable	.257	.108	.144	2.376	.018
Global_vs_Specific	.335	.120	.158	2.799	.005

a. Dependent Variable: Academic Achievement in Biology

Table 5 shows the unstandardized B coefficients values that indicate the predictive value (relative contributions) of each dimension of attribution styles to students' academic achievement scores in Biology. The table reveals that a unit rise in internal versus external dimension increases academic achievement score in Biology by 8.6%, an increment in the dimension of stable versus unstable increases it by 25.7% while an increment in Global versus specific, increases students' achievement in Biology by 33.5%. Based on the table, the order of contributions of the dimensions of attribution styles to students' academic achievement in Biology from highest to lowest is; Global versus specific (33.5%), followed by stable versus unstable (25.7%), and lastly, internal versus external (8.6%).

Hypothesis Three: Individual dimensions of attribution styles (internal versus external, stable versus unstable, and global versus specific) are not significant predictors of secondary school students' academic achievement in Biology.

Table 6: Significance of Prediction of Students' Academic Achievement Scores in Biology by Individual Dimensions of Attribution Styles

Model	Sum of Squares	Df	Mean Square	F	Sig.	Decision
1 Regression	3643.755	3	1214.585	21.107	.000 ^b	Sig.
Residual	33951.627	590	57.545			
Total	37595.382	593				

a. Dependent Variable: Academic Achievement in Biology (AAB)

b. Predictors: (Constant), Global_vs_Specific, Internal_vs_External, Stable_vs_Unstable

Table 6 reveals that all the individual dimensions of attribution styles when combined significantly predict students' academic achievement scores in biology, since the P-value (0.00) obtained is less than 0.05 alpha levels, at an F-value (df = 3 and 590) of 21.107. However, further analysis of data contained in table 5 reveals that, individually, only dimensions of stable versus unstable (0.018) and global versus specific (0.005) are significant predictors of students' academic achievement in biology, since they possess p-values below the 0.05 level of significance while internal versus external (0.387), on its own, is not a significant predictor of students' academic achievement in biology since its P-value is greater than the 0.05 alpha levels,. However, since all the dimensions of AS when combined significantly predicted students' academic achievement score in biology, the equation for the regression model ($Y = a + bx_1 + cx_2 + dx_3$) derived from table 7 can be written as: **AAB = 65.865+ 0.086 (INT vs EXT) + 0.257 (STA vs UNSTA.) + 0.335 (GLO vs SPE.)**Where; **AAB** = Academic Achievement in Biology, **INT vs EXT** = Internal versus External, **STA vs UNSTA** = Stable versus Unstable, and **GLO vs SPE** = Global versus Specific.

Discussion

The study revealed that attribution styles positively and significantly predicted students' academic achievement in Biology. This positive and significant contribution can be likened to the attributes of locus of control (ability to state the reason why a behaviour has occurred), stability (ability to determine if the reason is temporary or permanent), controllability (ability to believe that the reason can be changed), emotion, motivation, social, and cognition associated with attribution styles. A students' attribution styles usually shape not just how a student feels about their result, but also what he/she does once after seeing it. It determines their persistence after failure, drives efforts and goal orientation, affects learning habits, shapes emotional responses and influences help-seeking behaviour. Supporting the premise, Devi (2023) noted that a positive

attribution style, characterized by internal, controllable, and unstable attributions, is associated with better academic performance, higher self-esteem, and greater resilience in the face of setbacks. That is, secondary school students with a positive attribution style tend to perform better academically, have higher self-esteem, and are more resilient in the face of setbacks. The findings lend credence to the findings of Ngunu et al. (2019), Ilo, Nwankwo, and Unachukwu (2020), Hojjati (2022) and Okoli and Ezenwata (2024) who revealed in their respective studies that attribution styles positively and significantly contributed to students' academic achievement.

On gender, the study revealed that although attribution styles positively contributed to male and female students' academic achievement in Biology, the contribution proved only statistically significant for the males. This finding, of significant contribution for the males, could be attributed to the nature of Biology curriculum that involves more reading and studying than calculations. This specific nature of Biology has in most scenarios made teachers often stereotype the subject as a female subject, and as a result male students often find it difficult to sit down to read the subject to comprehend it. This stereotyped observation, as seen in schools, explains that while boys perceive the subject as a female subject, it influences their stability, controllability and locus of control towards the subject, making their attribution style a significant contributor to their academic achievement in the subject, unlike for the girls who love the subject. The findings accede to the findings of Yusuf and Afolabi (2018), Ilo, Nwankwo, and Unachukwu (2020), and Adeyemi and Bello (2022) who reported in their respective studies that attribution styles significantly influenced students' academic achievement, irrespective of gender. On the contrary, the study of Okoli and Ezenwata (2024) reported that the moderating influence of gender on relationship between students' attribution styles and their academic achievement was not significant.

Finally, the study revealed that individually, all the dimensions of attribution styles positively contributed to students' academic achievement in Biology. However, only stable versus unstable and global versus specific were the only significant contributors to secondary school students' academic achievement in Biology. These significant prediction of stable versus unstable and global versus specific dimensions of attribution styles could be seen when a person attributes the cause of an event to unchangeable (stable) or changeable (unstable) factors or to uncontrollable events caused by present in a variety of situations (global), as opposed to more circumscribed causes (specific). These reasons for pass or failure as observed by a student greatly influences

his/her self-esteem, locus of control, interest, motivation and engagement that influences academic achievement. The findings of the study concur with the findings of Houston (2016) who reported in his study that attribution style significantly predicts students' academic performance, with internal, stable, and global attributions for positive events being associated with higher academic achievement.

Conclusion

The study investigated the contribution of attribution styles to secondary school students' academic achievement in Biology in Anambra State, Nigeria. Specifically, it sought to determine the predictive power of attribution styles, as well as each predictor variable individual dimensions, on students' academic achievement in Biology, moderating the influence of gender. Based on the findings, the study concluded that attribution styles is significant predictor of secondary school students' academic achievement in Biology. On the moderating influence of gender, the study revealed that while attribution styles significantly predicted male students' academic achievement in Biology, the reverse is reported for the females.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Biology teachers should encourage students to develop positive attribution styles and study habits by helping them associate academic success with effort, determination, and effective study practices.
2. Educational administrators should provide seminars and workshops for teachers on strategies for promoting positive attribution styles among students.
3. Government and school authorities should strengthen guidance and counselling units in schools to help students overcome negative academic pressure, fostering positive attribution styles that enhance academic achievement.
4. Curriculum planners should incorporate learner-support programs into secondary school education to promote better academic achievement in science subjects.

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