

A Causal Model for Explaining English Language Performance Using Some Psycho-Academic and School Variables at the Junior Secondary Level in Nigeria

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Eme U. Joseph, Ph.D¹ Prof. Monday T. Joshua²

Abstract-This study was designed to develop a causal model involving some psycho-academic and school variables as determinants of JS 3 students' performance in English Language in Akwa Ibom State, Nigeria. Through the construction of a nine-variable path model, significant pathways were identified that could be used to explain students' performance in English studies. The most meaningful causal models as well as direct and indirect effects of the psycho-academic and school variables on students' performances in English were to be established. Three specific objectives and hypotheses were formulated to guide the study. This ex post facto research employed stratified random sampling technique in selecting a total of 853 (407 males and 446 females) from 20 secondary schools in the State. The study made use of two research instruments for data collection, developed by the researchers. These were a 50-item English Studies Achievement Test (ESAT) and a Student Psycho-academic Information Questionnaire (SPAIQ). Data generated from these instruments were analyzed using the path analysis technique, and the findings generated a seventeen-path model which could be used to explain the effect of some of the psycho-academic and school variables on students' performance in English Language. Furthermore, school location, school proprietorship, attitude to schooling and attitude towards English Language studies had significant direct effects on performance in English Language. It was recommended that parents and teachers should consciously work on their students' attitudes to schooling and to the different school subjects as these do directly impact their performance in school.

I. INTRODUCTION

Education has been confirmed as the vehicle for the socio-economic and technological advancement of any people the world over. With this understanding, the Nigerian government has at various times enacted policies aimed at improving the educational lot of the Nigerian child. In order to achieve the broad aims of the Nigerian National Policy on Education, as stated in the Policy document (Federal Republic of Nigeria, 2004), English Language has been classified as one of the core and School system reflects substantially the vital role it plays in contemporary society. compulsory subjects in both the junior and senior secondary (high)

school curricular. The importance accorded this subject in the In a multi-lingual society like Nigeria, the need for a lingua franca cannot be over-emphasized. Thus, for easy and effective communication, both orally and written, English language has been chosen as a common medium of expression. This has also informed the government's decision to make a compulsory credit pass in this subject a prerequisite for admission into most programmes in tertiary institutions in the country.

Despite the importance attached to this subject, and the role it plays in admissions into tertiary institutions, a reasonable percentage of students in our secondary schools do not measure up to the expected score of a credit pass in their graduating examinations. An inspection of the senior secondary school certificate examinations (SSCE) results in English Language from 2001 – 2004 shows a high rate of failure in the subject. The SSCE result in English Language for 2001, 2003 and 2004 showed a failure rate of 67.43%, 52.79% and, 41.82% respectively (Source: West African Examination Council, 2004). These very poor outings have made it increasingly difficult for our students to fill their admission quota in the different colleges and universities in Nigeria. This is rather uncomplimentary when one considers the extent of investment made in the educational sub-sector by government, teachers, parents and other stakeholders.

In order to stem the tide of poor performance in this important subject, successive governments, education related agencies in both the public and private sectors have variously made relevant contributions toward the improvement of the teaching and learning of English Language. Efforts in this direction include training and retraining of teachers, improvement of learning environment by building and equipping new classrooms. Despite these concerted efforts, students' performance is still taking a downward turn. Due to the persistent nature of this problem, educational researchers and even government agencies have tried to unravel the underlying reasons for students' poor performance in this important subject. This study is one of such efforts.

In recent years, there has been an increasing awareness on the interrelated nature of various variables on humans; thus the need to investigate them collectively and not just looking at individual effects of these variables on the child's performance. This has necessitated a gradual shift away from single variable studies to studies that investigate the

About-¹Dept. of Educational Foundations, Guidance and Counselling, University of Uyo, Uyo, Nigeria

About-²Dept. of Educational Foundations, Guidance and Counselling, University of Calabar, Calabar, Nigeria.

combined effect of related variables. Hitherto, statistical tools like the student t-test, correlation analysis and chi-square etc were in common use; latter the use of analysis of variance (ANOVA) and multiple regression and path analysis came into focus.

Path analysis is a model - building technique that uses multiple correlation and multiple regression as its statistics. To form a model, path lines are used to link one variable with another to form a network. It is this network that is referred to a path diagram or path model. The strength of these paths is determined by the values of the correlation and regression coefficients from the multiple correlation and regression analysis. This double barrel analytical method with its networking/interactive effect is more advantageous than the simple correlation analysis between single variables. Thus, the use of a comprehensive analytical tool was found to be a better option as this gives a suggestive guide to a possible causal linkage among the variables under study. This research effort, therefore, intends to proffer a possible causal model that could uncover the interactive effects of some psycho-academic and school variables on students' academic achievement with regard to their performance in English Language at the Junior Secondary School level through the use of path analytic technique.

II. STATEMENT OF THE PROBLEM

There has been a persistent poor performance of students in English Language at both the Junior and Senior Secondary School levels of education. Several studies have been conducted on the effects, relationships or influence of various factors such as personal, psycho-social, academic, teacher and even social factors on such students' performance. Various and varied results have been the outcome of these research endeavours, yet some gaps still exist in the area of the possible effect of some psycho-academic factors namely (study habits, test anxiety, attitude to schooling, attitude towards English studies and test wiseness) and school variables such as (school proprietorship, school type and school location) on the English Language performance of this same group of students at the Junior Secondary School level. This research intends to develop a causal model that will lend itself to explaining the possible interrelated effects of aforementioned psycho-academic and school variables on Junior Secondary School (JSS) 3 students' performance in English Language.

III. PURPOSE OF STUDY

The main purpose of this study was to develop a causal model involving some psycho-academic and school variables to explain Junior Secondary 3 students' performance in English Language.

In specific terms, the study was designed to:

- 1) Estimate the strengths of the causal paths of the nine variables in the 28 hypothesized path model involving some psycho-academic and school variables in explaining JSS 3 students' academic performance in English Language.

- 2) Construct the most meaningful causal model involving the nine variables (study habit, test anxiety, attitude to schooling, attitude towards English Language, test wiseness, school location, school type, school proprietorship) and JSS 3 students' performance in English Language.
- 3) Identify variables with significant direct effects on the JSS 3 students' performance in English Language.

IV. STATEMENT OF HYPOTHESES

To provide a guide for the study, the researchers formulated the following hypotheses:

1. The standardized path coefficients of the nine variables in the 28 hypothesized path model involving the psycho-academic and school variables, and JSS 3 students' academic performance in English Language are not statistically significant.
2. There is no significant, meaningful and parsimonious causal model involving the psycho-academic and school variables for JSS 3 students' academic performance in English Language.
3. There is no significant direct effect of psycho-academic and school variables on students' performance in English Language.

V. REVIEW OF RELATED LITERATURE

Studies have been conducted into the effects, relationships or influence of different (student-related, school-related, psychological or psychosocial) variables individually on students' academic achievement. In recent years, there has been an increasing awareness of the interactive nature of various variables in humans; thus the need to investigate into the composite and just not individual effects of these variables on the child's performance. This has necessitated a gradual shift away from single variable studies to studies to look into the combined effects of related variables. Lately, the shift has moved gradually towards the use of more sophisticated analytical tool like the path analysis, especially with the extensive use of the computer. Although the use of path analysis is relatively low, there has been an increasing awareness of its advantage. Here is a review of a few studies that employed path analysis to investigate into the effects of different variables on students' academic achievement.

In Australia, a study on the "prediction of academic achievement from some demographic family background and locus of control variables was conducted by Khayyer and deLacey (no date). Using path analysis as a statistical tool, the model used as grade, sex, family size socioeconomic status, mother's work, locus of control and language background as independent or exogenous variables while the dependent or endogenous variable was students' academic achievement. Results of the regression analysis indicated that all the independent variables except family size and mother's work, had significant contribution in predicting students' academic performance. A detailed inspection of the result showed that locus of control (0.214), socioeconomic status of family

(0.207), grade (0.178), sex (0.170), and language background (0.148) significantly contributed to the students' academic performance with the coefficients indicated respectively. Moreso, the R² showed that 22.6% of the variance of students' academic performance could be explained by these independent variables.

In that same study, sex, socioeconomic status, grade, language background and locus of control had significant direct effects on determination of students' academic performance, while family size and mother's work had indirect effects on students' academic performance. It was observed that significant correlations with other independent variables, for instance, family size and mother's work, had indirect effects on students' academic performance due to their significant correlation with socioeconomic status; also mother's work was found to be significantly associated with language background.

An abstract from another study conducted by Chadha (2005) on causal antecedents of self-concept, locus of control and academic achievement, a path analysis recursive model was proposed to determine to what extent the personality variables account for the relationship between the background variables and academic achievement and the extent to which the relationships between the personality variables and academic achievement are accounted for by the background variables. Based on the data gathered from 307 12th grade students through the use of paper and pencil tests, personality

measures and collation of information from school files to measure background and personality variables, and students' achievement, results of the path analysis carried out on the data indicated that creativity, sex and quality of family relationships accounted for 12.8% and 19.2% of the variance for self-concept and locus of control respectively, while creativity, sex, quality of family relationships, self concept and locus of control accounted for 57.8% of the variance for academic achievement.

A study by Sherry and Jessey (2005) employed path analysis to investigate into the relationship between instructional technology and student achievement. The independent variables were motivation, meta-cognition, learning processes, and students' achievement was the dependent variable. Results from the analysis showed that motivation on learning process significantly predicted performance of students. The researchers also observed a high and significant relationship ($r = 0.75$) between inquiry learning (a type of learning process) = 0.75 and metacognition between and application of skills (a type of learning process).

It is worthy to note that from the various studies reviewed, there was an interplay of the different independent variables on the dependent variables, therefore the lopsided result from a case of a single variable effect was altered by the effects of the other variables

VI. METHODOLOGY

This research design adopted in this study was a causal comparative (also known as *ex post facto*) design. On the basis of this design, the researchers constructed and tested a

28-hypothetical path model for JSS 3 students' performance in English Language. The population for this study was made up of all the JSS 3 students from both public and private secondary schools in Akwa Ibom State of Nigeria in the year of study. There were a total of 438 secondary schools in the State by then, made up of 240 public and 198 private schools. A total of 20 schools were sampled out, on the basis of the public/private stratification, comprising 13 public schools and 7 privately owned schools, sampled by balloting for each of the groups. From the thirteen (13) public schools, eight (8) were from urban community while the remaining five (5) were in rural areas. From the seven (7) privately owned schools, four (4) were from urban areas while three (3) were located in the rural areas of the State. From each of these 20 schools, 50 students were randomly sampled to make up a study sample of 1000 respondents. Out of the 1000 students, complete and correct data were obtained from 853 students of which, 407 were males and 446 were females, representing a percentage of 47.7% and 52.3% respectively.

The instruments employed by the researchers to gather relevant information for this study were A 50-item English Studies Achievement Test (ESAT) and the Students' Psycho-academic Information Questionnaire (SPAIQ). The ESAT was developed in accordance with the JSS 3 syllabus. Considering the cognitive level of the students, items included in the instrument were based only on knowledge, comprehension and application levels of Blooms taxonomy of educational objectives. The content areas tested on were comprehension, antonyms, structure, synonyms, spellings and register; and the SPAIQ was the researchers-developed instrument where Part A was to elicit respondents' demographic information, while Part B consisted of 10 items for each of the five psycho-academic variables of study habit, test anxiety, attitude to schooling, attitude towards English Language and test wise-ness. For each sub set, the respondents expressed their level of agreement or otherwise to each statement based on a 4-point Likert type scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

To ascertain the face validity of the instruments, the items on the questionnaire were vetted and reviewed by Measurement and Evaluation experts, while secondary school teachers currently teaching English studies vetted the achievement tests items. The instruments were pre-tested using 100 JS3 students in four secondary schools within the study area. To make the final fifty item on ESAT, items with negative discrimination indices were discarded, while those with low discrimination indices between 0.2 and 0.45 were restructured. The English studies achievement test had a reliability coefficient of 0.92. The reliability of the Students' Psycho-Academic Information Questionnaire was calculated on the basis of the subsets in the instrument using the Cronbach alpha statistical procedure. The reliability coefficient for each subset is shown in Table 1.

TABLE 1
Results of reliability analyses of research instruments

Variables	No. of items	Mean	SD	Cronbach alpha
Test Anxiety	10	17.15	5.03	0.72
Test Wiseness	10	29.92	2.74	0.59
Study Habits	10	33.46	0.68	0.87
Attitude to Schooling	10	32.61	5.08	0.91
Attitude towards English	10	31.60	4.67	0.77

The researchers with the assistance of English Language teachers in the sampled schools administered the instruments. These teachers were enlisted by the researchers as research assistants for the proper and speedy collection and collation of the relevant data from the respondents. Each instrument was administered within a day in each school. So, data collection in each school lasted for two days. For the demographic data the following are the scoring pattern;

Sex:

Male = 1
Female = 2

School Location:

Urban = 1
Rural = 2

School type:

Boys = 1
Girls = 2
Mixed = 3

School Proprietorship:

Government owned = 1
Privately owned = 2

For the English Language achievement test, correctly answered items had a score of 1 while incorrectly answered items were scored 0. For the path analytic aspect of the data processing, the variables used in the study were labeled as shown:

X1 = School location

For the English Language achievement test, correctly answered items had a score of 1 while incorrectly answered items were scored 0.

For the path analytic aspect of the data processing, the variables used in the study were labeled as shown:

X₁ = School location
X₂ = School type
X₃ = School proprietorship
X₄ = Study habit
X₅ = Test anxiety
X₆ = Attitude to Schooling

X₇ = Attitude towards English studies
X₈ = Test wiseness
X₉ = Performance in English studies

The students involved in the study were assigned numbers from 1 – 853. This was to aid in the proper tracking of individual scores for the different variables

VII. PRESENTATION OF RESULTS

This study involved a total of 853 respondents out of which 407 representing 47.7% were males and 446 representing 52.3% were females. The demographic information on school location indicates that 409 (47.9%) of the respondents where in urban schools while 444 (52.1%) of the subjects were from schools located in the rural areas. Only 60 (7%) boys came from all- boys' school while 121 girls representing 14.2% of the whole sample were girls from all-girls' schools. The remaining 672 (78.8%) of the respondents were drawn from mixed schools. On school proprietorship, 505 (59.2%) were drawn from public schools while 348 (40.8%) of the respondents came from privately owned schools. The psycho-academic variables in the study had mean scores ranging from 17.95 to 32.72 and standard deviations ranging between 3.54 and 5.05. The mean score for the English studies achievement test was 44.10 with and standard deviation of 17.26.

Hypothesis 1

The standardized path coefficients of the nine variables in the hypothesized path model involving the psycho-academic and school variables, and JS 3 students' academic performance are not statistically significant.

To test this hypothesis, path analysis method of data processing was employed to determine the path coefficient of each of the hypothesized paths in the model. The outcome of the analysis is presented in Table 2.

TABLE 2
Paths, their coefficients and effects on students' English Language performance

Paths	Path Cof.	Nature of Path	Remarks
P41	-0.023	—	NS
P42	-0.027	—	NS
P43	0.163	Indirect	S
P51	0.128	Indirect	S
P52	-0.012	—	NS
P53	-0.066	—	NS
P61	-0.048	—	NS
P62	0.036	—	NS
P63	0.078	Indirect	S
P64	0.288	Indirect	S
P65	-0.249	Indirect	S
P71	-0.058	Indirect	S
P72	0.055	—	NS
P73	0.111	Indirect	S
P76	0.517	Indirect	S
P81	0.102	—	NS
P82	0.026	—	NS
P83	0.039	—	NS
P84	0.168	Indirect	S
P85	-0.041	—	NS
P91	-0.154	Direct	S
P92	0.001	—	NS
P93	0.515	Direct	S
P94	0.039	—	NS
P95	0.015	—	NS
P96	0.124	Direct	S
P97	0.131	Direct	S
P98	0.035	—	NS

Table 2 shows the different path coefficients for the causal model on students' English Language performance. The beta weights of the hypothesized paths ranged from 0.001 for P92 to 0.517 for P76. On testing the significance of the path coefficients in the hypothesized recursive model, out of twenty-eight (28) paths hypothesized, thirteen (13) paths were retained because their beta weights were statistically significant. On the basis of this analysis, it implies that the hypothesized model through which the predictor variables determined students' performance in English studies is not statistically significant for all the 28 paths. Therefore the

null hypothesis is rejected for 13 out of the 28 possible pathways.

Hypothesis2

There is no significant, meaningful and parsimonious causal model involving the psycho-academic and school variables for JSS 3 students' academic performance in English Language. The data gathered from the respondents were analyzed to obtain the original correlation coefficients of the variables in the study. Also, the path coefficient for each hypothesized pathway in the recursive model was determined.

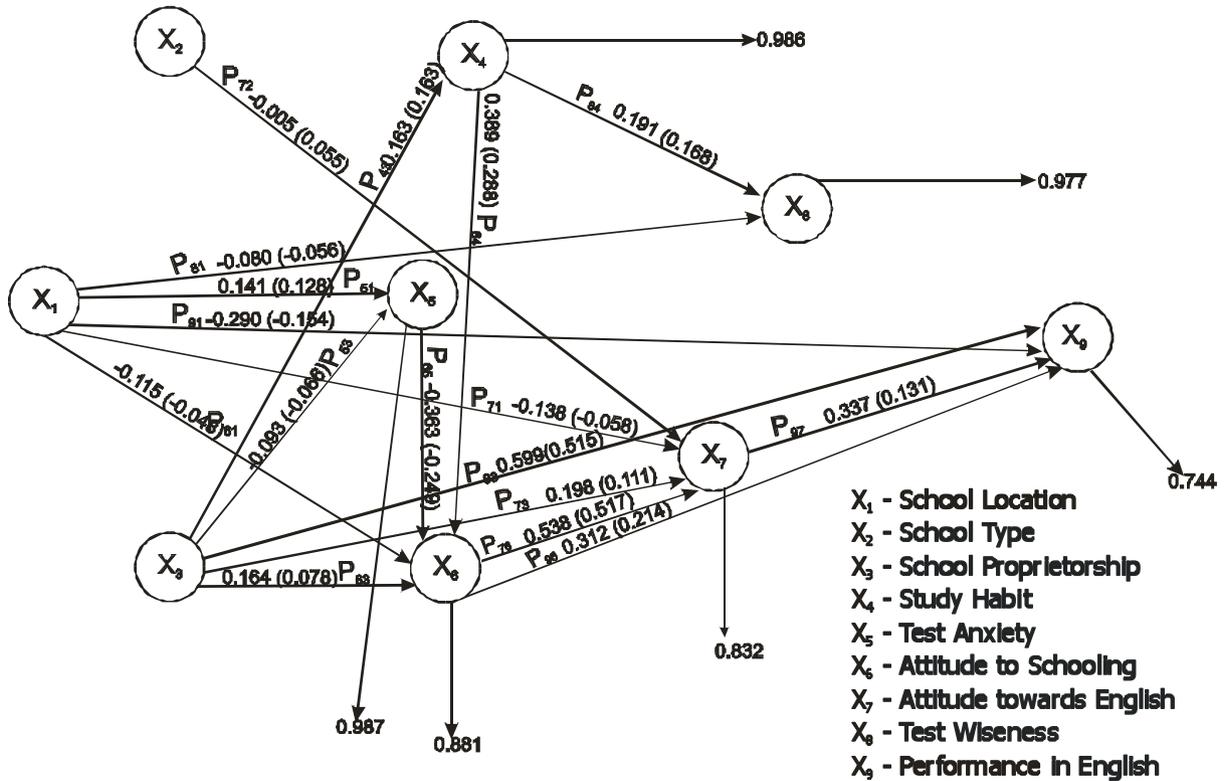


Fig. 1: A parsimonious causal model of eight variables on students’ performance in English Language.

Of the 28 hypothesized paths, thirteen (13) paths were retained because their beta weights were statistically significant, while additional four pathways were retained for their meaningfulness. Pedhazur (1982) proposed that paths whose beta weights are up to 0.05 and above could be considered strong enough to be retained in a meaningful model even if they are not statistically significant. Therefore, on the basis of meaningfulness, the following paths; P53, P61, P72 and P81, although not statistically significant, were not deleted. In all, 17 pathways were retained from the original 28 in the hypothesized model. Fig. 1 shows the parsimonious causal model, with the 17 surviving paths for students’ performance on English Language. On a closer inspection of Fig. 1, the numbers found on each pathway represent the original correlation coefficients, while the numbers in bracket

represent the beta weight of each pathway. The directions of the causal paths of the variables in the model are the pathways which are significant and meaningful, as well as have a link with the dependent (criterion) variable.

Hypothesis 3

There is no significant direct effect of psycho-academic and school variables on students’ performance in English Language.

To test this hypothesis, the data analysis results of Table 2 (earlier presented) and Table 3 were used.

Table 3
Variables with direct effects on students' English Language performance

VARIABLE	Beta Weight	Remarks
School location	-0.154	S*
School type	-0.001	NS
School proprietorship	0.515	S
Study habit	0.039	NS
Test anxiety	0.015	NS
Attitude to schooling	0.124	S
Attitude toward English studies	0.131	S
Test wiseness	0.035	NS

* *S* means Significant, and *NS* means Not Significant

Table 2 shows the nature of the effect of each path on the criterion variable. Out of the 28 pathways outlined on Table 2, nine pathways (P43, P51, P63, P64, P65, P71, P73, P76, and P84) were found to have indirect but significant effects on the dependent variable, while the other four paths (P91, P93, P96, and P97) were found to have direct and significant effects. Table 3 shows that four out of the eight direct paths (criterion /independent) variables had significant direct effects on students' English Language performance. These variables are: school location, school proprietorship, attitude to schooling and attitude towards English Language. It is worthy to note that school proprietorship has the most direct causal effect on students' academic performance in English Language. On the basis of this therefore, the null hypothesis of no significant direct effect of school and psycho-academic variables on students' performance in English Language was rejected for school location, school proprietorship, attitude to schooling and attitude towards English Language, while the null hypothesis was retained for school type, study habit, test anxiety and test wise-ness.

VIII. DISCUSSION OF FINDINGS

Statistically, the magnitude of the beta weights is considered to be directly proportional to the strength or the degree of effect of the independent variable on the dependent variable. From Tables 2 and 3, it could be seen that four variables (school location, school proprietorship, attitude to schooling and attitude to English Language) had direct significant causal effects on students' performance in English studies with school proprietorship (X3) having the most causal effect with a beta weight of 0.515. This result goes in concert with previous research works by Figlio and Store (1997) and Kim and Placier (2004). Furthermore, school proprietorship still had some significant but indirect

effect on performance due to its significant correlation with test anxiety and attitude towards English Language.

The variable with the next highest direct causal effect on students' performance in English Language was school location with a beta weight of 0.154. Apart from its direct causal effect on students' performance on English Language, school location also pulled over its strong correlation effects on test anxiety and attitude towards the subject to have a combined indirect effect on students' academic performance in English Language.

Attitude towards English Language as the third variable on the continuum was directly followed by attitude to schooling. The attitude variables also harnessed the cumulative/inter-related effects of study habits and test anxiety to pull over a significant indirect effect along with their direct effects on students' performance in English Language. The significant effects of these attitude variables reaffirm the importance of attitude in the child's academic pursuit as confirmed by previous works of Maduabum (1993) and Thompson (2001).

IX. CONCLUSION

The findings of this study have indicated that a meaningful causal model with 17 pathways involving the nine variables can be used to explain students' performance in English Language. Four variables (school location, school proprietorship and attitude to schooling and attitude towards English Language) had direct significant causal effects on students' performance in the subject under study.

X. RECOMMENDATIONS

Based on the findings of this study, the researchers recommend that government, teachers, parents and all stakeholders in the educational sector should:

1. Put the necessary mechanism in place to improve the teaching/learning conditions in public and rural

schools to enable students in these schools compete favourably with their counterparts in private schools.

2. Consciously and deliberately work on their students' attitudes towards schooling and the different school subjects as these do directly impact their performance in the school subjects.

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