INTERACTION BETWEEN SELF-CONCEPT, AND MATHEMATICS, ENGLISH LANGUAGE AND GENERAL ACADEMIC ACHIEVEMENT OF SENIOR SECONDARY STUDENTS IN PORT HARCOURT

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ABSTRACT

This study explored the extent to which the self-concept of students in Port Harcourt influences to their Mathematics, English Language and General Academic Achievements. The population consisted of 6,478 senior secondary 3 (SS3) students from 13 state financed senior secondary schools in Port Harcourt. Stratified random sampling was conducted to select 3 schools (one school each from 2 mixed schools, 5 boys’ schools and six girls’ schools). The sample for study was 300 SS3 students from the 3 randomly selected schools. The instrument used for data collection was the Self-Description Questionnaire 111 (SDQ 111) developed by Marsh (1992) which contains 13 self-concept facets out of which 3 facets (Mathematics, Verbal and General Academic) were adopted for this study. The subjects were tested in Mathematics and English Language and scores obtained. The general average scores of the students on their promotion examination from SS2 to SS3 were extracted from their school records. The Multiple Regression analysis was used to 3 hypotheses formulated for this study. The results of the tests indicated that Mathematics Self-concept significantly positively predicted Mathematics Achievement, but did not predict English Language and General Academic Achievement; Verbal Self-concept significantly positively predicted English Language and General Academic Achievement, but significantly negatively predicted Mathematics Achievement; and General Academic Self-concept significantly positively predicted English Language and General Academic Achievement, but did not predict Mathematics Achievement. The main implication of the findings of this study is that self-concept and Mathematics, English Language and General Academic achievement of students are so strongly related that a change in self-concept facilitates a change in achievement. It was therefore, recommended that educational programme designers and developers, teachers, parents and students should make self-concept development of students an educational aim as important as academic achievement.

Keywords: Self-concept, Mathematics Achievement, English Language Achievement, General Academic Achievement.

INTRODUCTION

LEADERSHIP (2011) reported that the West African Examination Council, (WAEC), on 10th August, 2011, released results of the May/June 2011 West African Senior School Certificate Examination, (WASSCE) with an abysmal 30 per cent of the candidates making credits in both English and Mathematics. According to Mr. Iyi Uwadiae, Head of National Office (HNO) of the West African Examinations Council (WAEC), this was an improvement on last year’s record of 25 per cent. He stated that the results had fluctuated from 23 per cent pass in 2008; 21 per cent in 2009; 25 per cent in 2010 and 30 per cent in 2011. Education watchers contend that the results portend danger for Nigeria’s future (Leadership, 2011).
Why the poor performance of students in English Language and Mathematics despite making the two subjects compulsory in our primary and secondary schools – two subjects credits in which are a pre-requisite for admission into the University in Nigeria, and most other parts of the world. What can be done to check the deteriorating performances of students in English Language and Mathematics?

Some investigations revealed that the questions above, and even many more others, owe their answers to the complexity of self-beliefs (e.g. self-concept) that act on the students (Chapman & Tunmer, 1997; Yeung & Lee, 1999). The researches have shown close relationship between students’ self-concept and students’ academic achievement.

Self-concept means the totality of a complex, organized, and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his personal existence (Purkey & Schmidt, 1987). In particular, academic self-concept is helpful for understanding a variety of school-related issues, including educational and occupational aspirations and school achievement (Hoge & Renzulli, 1993).

Purpose of the Study

The purpose of this study is to determine whether or not (and to what extent) self-concept has any influence on students’ achievement in English Language and Mathematics. The following research question directed the study:

To what extent does students’ self-concept influence students’ English Language, Mathematics and General Academic Achievement?

Statement of Hypothesis

The study was guided by the following null hypotheses:

1. There is no significant influence on English Language Achievement by Verbal Self-concept, Mathematics Self-concept and General Academic Self-concept.
2. Mathematics Achievement is not significantly influenced by Mathematics Self-concept, Verbal-concept and General Academic Self-concept
3. There is no significant influence on General Academic Achievement by General Academic Self-concept, Verbal Self-concept and Mathematics Self-concept

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Significance of the Study

Based on the results of this study, the poor performance of Nigerian students in English Language and Mathematics could be hinged, totally or in part, on low self-concept. Thus educationists and curriculum developers shall see the need to list self-concept enhancement as a central goal of education in Nigeria.

Review of Related Literature

This study is based on the Perceptual Psychology tradition. Perceptual psychologists postulate that all persons create their own reality through their perceptions of what they believe to be real. And that a person’s behaviour is contingent on how an individual perceives and interprets his/her experiences (Combs and Gonzales, 1994). Thus from the perspective of the perceptual psychology, it is clear that to understand an individual's behaviour, we need to know how that individual perceives and interprets his/her experiences. In other words, to appreciate students’ academic performance, we need to understand how students perceive and interpret school and school subjects.

Carl Rogers was one of the earliest proponents of the self-concept theory (Hattie, 1992). In Rogers’ view, the self is the central ingredient in human personality and personal adjustment. Rogers described the self as a social product, developing out of interpersonal relationships and striving for consistency. He emphasized that there is a basic human need for positive regard both from others and from oneself, and that every person there has a tendency towards self-actualization.

Self-concept is the cognitive or thinking aspect of self and generally means the totality of a complex, organized, and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his or her personal existence (Purkey & Schmidt, 1987). Self-concept can also means the general idea we have of ourselves. The idea of self-concept includes attitudes, feelings and knowledge about ability, skills, and social acceptance capability of the self. According to Gross (1992), self-concept is simply a collection of personal attitudes towards oneself.

Psychologists have paid a lot of attention to factors related to the formation and development of self-concept (Gross, 1992). It is suggested that if self-concept is positive and normal, the individual will possess normal mental health. Adversely, if self-concept is negative and abnormal, the individual may behave abnormally in his or her environment. According to Gross (1992), the consensus appears to be that self-concept is largely acquired. This point is very pertinent for students and for those who are involved in their upbringing, particularly their parents and teachers. The implication is that students’ self-concept can be changed over time.

Marsh (1992) showed that the relationship of self-concept to school achievement was very specific. According to Marsh, general self-concept and non-academic aspects of self-concept are not related to academic work, but general academic achievement measures were found to relate positively to general academic self-concepts and are highly related to success in that content area.

Many students are not confident about their mathematical ability to solve problems. A poor attitude towards the discipline is thought to plague learners at every level of schooling. According to Wong (1992), mathematics achievement is closely related to self-concept and attitude towards mathematics. As in the case of the general self-esteem, more mathematically confident
students have significantly higher scores on mathematics computations. Osang (1990), in his study, tested the relationship between students’ performance in mathematics and self-concept. He found that students’ performance in mathematics depended on their mathematics self-concept. That is, their achievement in mathematics depended on what they thought of or believed about themselves, with reference to mathematics as a subject.

In a study conducted by Byrne (1984), he founded that relationship between students’ self-concept in Mathematics and their Mathematics Achievement is logically and inevitably connected. Byrne reported that achievement in Mathematics is highly related to what an individual thinks of Mathematics. That is, ones Mathematics self-concept will influence ones achievement in Mathematics. Also students’ self-perceptions of mathematics ability influence their mathematics achievement, and that their attitude towards mathematics during high school has positive effects on their choosing careers in science and mathematics.

Hunt (1997) in a study of personality, reading ability and response to classroom lesson found a high significant positive relationship between verbal self-concept and achievement in English language. Skaalvik and Rankin (1992) examined over 400 6th-grade Norwegian students in achievement and self-concept (math and verbal). They found math and verbal self-concept were strongly correlated and there were no significant negative correlations between achievement in one area and self-concept in the one another. However, in a major survey of over 14,000 high school students in over 1,000 schools, Marsh (1990a) found that math and verbal self-concepts were uncorrelated despite a substantial correlation between math and English test scores.

**METHODOLOGY**

The research design was the Correlation Research Design. The population of the study consisted of 6,478 SS3 students of the 13 state government financed post primary schools in Port Harcourt. Only the state schools were chosen (as against unity schools and private schools) to make for homogeneity: that is, to ensure the use of subjects that have similar characteristics.

The sample for this study consisted of three hundred (300) SS3 students that were chosen from 3 randomly selected schools from 13 senior secondary schools in Port Harcourt. The study employed the stratified random sampling technique, each school type (single boys, single girls and mixed schools) was considered a stratum and a senior secondary school selected at random. The hypotheses were tested using the Multiple Regression.

**RESULTS**

**Hypothesis One:** There is no significant influence on English Language Achievement by Verbal Self-concept, Mathematics Self-concept and General Academic Self-concept.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Table 1, reports Multiple Regression (R) of 0.469; Multiple Regression Squared (R²) of 0.220; Adjusted R² of 0.207; Standard Error of Estimate of 13.58511; and an R² Change of 0.220 which implies that all the predictors account for 22% of the variance in English Language Score and this is statistically significant (p < 0.05). Table 2 shows that the Multiple Regression has an F ratio of 16.578 that is statistically significant (p < 0.05). Table 3 reports the Standardized Coefficients (Beta) of Mathematics Score = -0.075 (Not significant, p > 0.05); Mathematics Self-concept = 0.039 (Not significant, p > 0.05); Verbal Self-concept = 0.194 (Significant, p < 0.05); General Academic Score = -0.070 (Not significant, p > 0.05) and General Academic Self-concept = 0.142 (Significant, p < 0.05).

On the whole, the three (3) tables show that there is a significant interaction between the predictors and Achievement in English Language, and that Verbal Self-concept and General Academic Self-concept positively significantly predict English Language Achievement. However, Mathematics Self-concept was found to not significantly predict English Language Achievement.

Hypothesis Two: Mathematics Achievement is not significantly influenced by Mathematics Self-concept, Verbal-concept and General Academic Self-concept
Table 4: Model Summary (2) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R Square Change</td>
</tr>
<tr>
<td>1</td>
<td>.784⁺</td>
<td>.615</td>
<td>.609</td>
<td>8.62996</td>
<td>.615</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Genconcept, Verbconcept, Mathconcept, GenAvscore, Engscore

Table 5: ANOVA (2) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>34998.230</td>
<td>5</td>
<td>6999.646</td>
<td>93.985</td>
<td>.000⁺</td>
</tr>
<tr>
<td>Residual</td>
<td>21896.020</td>
<td>294</td>
<td>74.476</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>56894.250</td>
<td>299</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Genconcept, Verbconcept, Mathconcept, GenAvscore, Engscore
b. Dependent Variable: Mathscore

table 6: Coefficients (2) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-1.036</td>
<td>2.980</td>
<td>-.348</td>
<td>.728</td>
</tr>
<tr>
<td></td>
<td>Mathconcept</td>
<td>1.014</td>
<td>.047</td>
<td>.783</td>
<td>21.372</td>
</tr>
<tr>
<td></td>
<td>Engscore</td>
<td>-.033</td>
<td>.037</td>
<td>-.037</td>
<td>-.905</td>
</tr>
<tr>
<td></td>
<td>Verbconcept</td>
<td>-.070</td>
<td>.021</td>
<td>-.126</td>
<td>-3.345</td>
</tr>
<tr>
<td></td>
<td>GenAvscore</td>
<td>.017</td>
<td>.038</td>
<td>.018</td>
<td>.446</td>
</tr>
<tr>
<td></td>
<td>Genconcept</td>
<td>-.006</td>
<td>.083</td>
<td>-.003</td>
<td>-.069</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Mathscore

Table 4 shows Multiple Regression (R) of 0.784; Multiple Regression Squared (R²) of 0.615; Adjusted R² of 0.609; Standard Error of Estimate of 8.62996; and an R² Change of 0.615 which implies that all the predictors account for 61.5% of the variance in Mathematics Score and this is statistically significant (p < 0.05). Table 5 shows that the Multiple Regression has an F ratio of 93.985 that is statistically significant (p < 0.05). Table 6 reports the Standardized Coefficients (Beta) of English Language Score = - 0.037 (Not significant, p > 0.05); Mathematics Self-concept = 0.783 (Significant, p < 0.05); Mathematics Self-concept = 0.783 (Significant, p < 0.05); Verbal Self-concept = - 0.126 (Significant, p < 0.05); General Academic Score = 0.018 (Not significant, p > 0.05) and General Academic Self-concept = - 0.003 (Not significant, p > 0.05).

Tables 4-6 show significant interaction between the predictors and Achievement in Mathematics. They further show that only Mathematics Self-concept can positively significantly predict Mathematics Achievement. The tables also show that while Verbal Self-concept negatively
significantly predicts Mathematics Achievement, General Academic Self-concept does not predict Mathematics Achievement.

**Hypothesis Three**: There is no significant influence on General Academic Achievement by General Academic Self-concept, Verbal Self-concept and Mathematics Self-concept.

Table 7: Model Summary (3) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.424a</td>
<td>.180</td>
<td>.166</td>
<td>13.18490</td>
<td>.180</td>
<td>12.896</td>
<td>5</td>
<td>294</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Genconcept, Mathscore, Verbconcept, Engscore, Mathconcept

Table 8: ANOVA (3) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>11208.983</td>
<td>5</td>
<td>2241.797</td>
<td>12.896</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>51109.404</td>
<td>294</td>
<td>173.842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62318.387</td>
<td>299</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Genconcept, Mathscore, Verbconcept, Engscore, Mathconcept
b. Dependent Variable: GenAvscore

c. Total includes the interaction between all variables.

Table 9: Coefficients (3) of Interaction between Self-concept and English Language, Mathematics and General Academic Achievement of Students

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>17.424</td>
<td>4.439</td>
<td></td>
<td>3.925</td>
<td>.000</td>
</tr>
<tr>
<td>Mathscore</td>
<td>.040</td>
<td>.089</td>
<td>.038</td>
<td>.446</td>
<td>.656</td>
</tr>
<tr>
<td>Mathconcept</td>
<td>-.010</td>
<td>.116</td>
<td>-.008</td>
<td>-.090</td>
<td>.928</td>
</tr>
<tr>
<td>Engscore</td>
<td>-.070</td>
<td>.056</td>
<td>-.074</td>
<td>-1.242</td>
<td>.215</td>
</tr>
<tr>
<td>Verbconcept</td>
<td>.065</td>
<td>.032</td>
<td>.112</td>
<td>2.012</td>
<td>.045</td>
</tr>
<tr>
<td>Genconcept</td>
<td>.838</td>
<td>.117</td>
<td>.420</td>
<td>7.159</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: GenAvscore

Table 7, reports Multiple Regression (R) of 0.424; Multiple Regression Squared (R²) of 0.180; Adjusted R² of 0.166; Standard Error of Estimate of 13.18490; and an R² Change of 0.180 which implies that all the predictors account for 18% of the variance in General Academic Score and this is statistically significant (p < 0.05). Table 8 shows that the Multiple Regression has an F ratio of 12.896 that is statistically significant (p < 0.05). Table 9 reports the Standardized Coefficients (Beta) of Mathematics Score = 0.038 (Not significant, p > 0.05); Mathematics Self-concept = -0.008 (Not significant, p > 0.05); Verbal Self-concept = 0.112 (Significant, p < 0.05); English Language Score = -0.074 (Not significant, p > 0.05) and General Academic Self-concept = 0.420 (Significant, p < 0.05).
Finally, tables 7-8 show that there is a significant interaction between the predictors and General Academic Achievement, and that Verbal Self-concept and General Academic Self-concept positively significantly predict General Academic Achievement. However, Mathematics Self-concept was found to not significantly predict General Academic Achievement.

CONCLUSION

This study investigated the extent to which self-concept influence English Language, Mathematics and General Academic Achievement of students. Verbal Self-concept and General Academic Self-concept were found to positively significantly predict English Language Achievement and General Academic Achievement. The study further found that while Mathematics Self-concept positively significantly predict Mathematics Achievement, Verbal Self-concept negatively significantly predict Mathematics Achievement and General Academic Self-concept does not predict Mathematics Achievement.

According to Bandura (1997), self-concept beliefs influence the choices people make and the courses of action they pursue. Individuals tend to engage in tasks about which they feel competent and confident and avoid those which they do not. Self-concept also helps determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations. The higher the self-concept, the greater the effort, persistence, and resilience an individual puts on tasks. As a consequence, self-concept exercises a powerful influence on the level of accomplishment that individuals ultimately realize. No wonder this study found that students with high Mathematics Self-concept and Verbal Self-concept scored highly in tests on Mathematics and English Language respectively.

It was further found that Verbal Self-concept is very closely related to General Academic Self-concept. This suggests that the development of Verbal Self-concept enhances the development of General Academic Self-concept and vice versa. On the other hand, Mathematics Self-concept was found to negatively relate to Verbal Self-concept. Thus the development of Mathematics Self-concept and Verbal Self-concept should be pursued distinctly and variously if the poor performance of Nigerian students in English Language and Mathematics is to be eradicated.

Recommendations

Given the significance of self-concept in academic achievement of students, the enhancement of self-concept outcomes should be of major concern to educators, program developers, teachers, parents and counselors. In other words, self-concept development should be made a central focus of educational policies in Nigeria.

The influence of students’ self-beliefs on their achievement does not end with their schooling. Consequently, the aim of education must transcend the development of academic competence. Schools have the added responsibility of preparing self-assured and fully-functioning individuals capable of pursuing their hopes and their ambitions.

Counseling services should be provided in schools so that students having problems in academic subjects can be attended to through the combined efforts of the school and the home. Students should be discouraged from forming stereotyped attitudes towards certain subjects,
because of their sexes. This will boost positive competition between males and females, and enhance academic achievement and excellence.

Self-concept theory is a relatively new area in the Nigerian educational scene. Thus, more researches on this field should be conducted to delve more into the self-concept patterns and how they affect academic achievement, vocational choices and problem-solving abilities. These studies should be done to test the various facets of self-concept in different populations. This is very important because the findings of the present study point to positive self-concept development as a panacea to students’ poor performance in English Language and Mathematics.

REFERENCES


