

The Relationship between Siblings Intelligence with their Academic Achievement in Cross River State, Nigeria

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Abstract

This study investigates the relationship between siblings' intelligence with their academic achievement in Cross Rivers State. The monozygotic, dizygotic, adopted and adopted siblings were used for this study. Correlational design was used. Three hypotheses were formulated to guide the study. A total of 260 secondary school students (siblings) were selected from ten (10) schools through stratified random sampling technique. A validated questionnaire by R. B Cattell and Cattell culture fair intelligence test validated and standardized for use in Nigeria by institute of personality and achievement test (IPAT). The person product moment correlational statistics was used for data analysis. The study revealed that there is a significant relationship between students intelligence with their academic achievement in Cross River State. The results further revealed that environment and hereditary are strong determinant of siblings intelligence in secondary schools. Based on these findings, the researchers recommended that. One major finding of this study was that intelligence has a great influence on students academic achievement. It is on the part of the government to include intelligence test in the school curriculum so as to help teachers, counsellors, administrators to know the students' placement in his/her choice carrier.

Keywords: *Siblings intelligence, Academic achievement, Cross River State*

Background to the Study

Over the years researchers has focused on trying to explain the causes of intelligence; where intelligence comes from. At various points in history, particular psychological theorists have suggested that intelligence is primarily an inherited quality (that is biological and genetic forces, and inherited from one's parents) or, instead, primarily something influenced by children's environment (e.g., something influenced by school and parental teachings and by exposure to life experiences and opportunities). Both of

these views have merit, as it turns out. Currently, most researchers agree that a combination of both genetic and environmental factors contribute to the development of intelligence.

It is worthy to note that one of the basic needs of the National policy of teachers' education is the training of the mind in the understanding of the world around and the acquisition of appropriate skills, ability and competence both mental and physical to help the individual contributes to the society. This provision is centered on the need of developing siblings (students) intelligence to meet with the demands of the global child. A sibling is one of two or more individuals having one or both parents in common. A female sibling is a *sister* and a male sibling is a *brother*. In most societies throughout the world, siblings usually grow up together, facilitating the development of strong **emotional bonds** such as **love**, **hostility** or thoughtfulness. The emotional bond between siblings is often complicated and is influenced by factors such as parental treatment, **birth order**, **personality**, and personal experiences outside the family information (Colman, 2003). These can only be actualized maximally only when due attention is given to the learners' intelligence (National Policy on Education, 1998).

The word intelligence comes from the Latin verb *intelligere*, which means “to understand”. By this rationale intelligence (as understanding) is arguably different from being “Smart”. A report of Gardner, (1983) sees intelligence as an umbrella term used to describe a property of the mind that encompasses many related abilities such as capacities to reason, to plan, to solve problems, to think abstractly, to comprehend ideas, to use language, and to learn. Intelligence may include traits such as creativity, personality, character, knowledge or wisdom.

Sternberg (1985: p.45) defined intelligence as mental activity directed toward purposive adaptation to, selection and shaping of real-world environments relevant to one's life. Sternberg definition shows that intelligence is broader than a single, general ability (individual talents) his definition shows that intelligence has three different factors namely:

Analytical intelligence: This component refers to problem solving abilities.

Creative intelligence: This aspect involves the ability to deal with new situations using past experience and current skills.

Practical intelligence: This element refers to the ability to adapt to a changing environment

Intelligence and academic achievement have attracted so many research investigations. Dweck (1982) investigated that intelligence and academic achievement are interwoven; this is because if you teach a child that his intelligence can grow and increase, he will do better academically in school. Feldman, (1988), observed that the brain actually forms new connections every time you learn something new, which makes the child smarter in his/her level of understanding new concepts. In relationship to intelligence and academic achievement Steve and Asher (1980) informed that intelligence and academic achievement have a high relationship this is because teaching children that they are in charge of their own intellectual growth motivates a child to work hard and perform

academically well.

It is a very useful variable with a powerful effect on students' academic achievement this is because an intelligent person is a creative person and can meet the problems of life through his divergent thinking. A highly intelligent person (creative person) is nonetheless an intellectual leader with a great sensitivity to problems. He exhibits a high degree of self-assurance and autonomy, he is dominant and is relatively free of internal restraints and inhibitions with a considerable range of intellectual interest and shows a strong preference for complexity and challenge in the environment.

Theoretical Framework

For the purpose of this study two theories were reviewed in line with this study

Fluid and crystallized theory of intelligence by Cattell and Cattell (1960)

Jean Piaget's theory of cognitive development (1972).

Fluid and crystallized theory of intelligence by Cattell and Cattell (1960)

Fluid and crystallized theory of intelligence by Cattell (1960) according to him,, abilities are hierarchical. At the top of the hierarchy is g, or general ability. But below g in the hierarch are successive levels of gradually narrowing abilities ending with Spearman's specific abilities. Cattell, for example, suggested that general ability can be subdivided into two kinds of abilities, fluid and crystallized. Fluid abilities are the reasoning and problem-solving abilities measured by tests such as the matrices, series, conditions modalities analogies, classifications sub-scales.

Crystallized abilities can be said to derive from which would include vocabulary, general information and knowledge about specific field. Many people think that their intelligence seems to decline as their age goes by, research suggest that while fluid intelligence begins to decrease after adolescences, crystallized intelligence continues to increase throughout adulthood. Cattell (1987) defined fluid intelligence as the ability to perceive relationship independent of previous specific practice concerning those relationships, if is the ability to think and reason abstractly and solve problems. This ability is considered independent of learning, exercise. Examples of the use of fluid intelligence include, solving, puzzles and coming up with problem solving strategies. It is the hereditary nature of intelligence. The theory of fluid and crystallized intelligence suggests that intelligence is composed of a number of different abilities that interact and work together to produce overall individual intelligence.

According to Knox (1977), fluid intelligence peaks in adolescence and begins to decline progressively beginning around age 30 or 40, while crystallized intelligence continues to grow throughout adulthood.

Crystallized intelligence learning from past experiences and learning from the environment, in general situations that, require crystallized intelligence include, reading comprehension and vocabulary examinations. This type of intelligence is based upon facts and rooted in experience, it becomes stronger as we age and accumulate new knowledge and understanding. They constitute the global capacity to learn reason and solve problems that most people refer to as intelligence. Fluid and crystallized intelligence are

complementary in that some learning task can be mastered mainly by exercising either fluid or crystallized intelligence Schonfeld (1986), fluid and crystallized intelligence are factors of general intelligence originally identified by Raymond Cattell. Fluid intelligence (fluid reasoning) is the capacity to think logically and solve problems in novel situations, independent of acquired knowledge. It is the ability to analyze novel problems, identify patterns and relationship that underpin these problems and the extrapolation of this using logic. It is necessary for all logical problem solving especially scientific mathematical and technical problems. Crystallized intelligence is the ability to use skills, knowledge and experience. It is not equate with memory or knowledge, but it does rely on accessing information from long term memory. Fluid and crystallized intelligence are thus correlated with each other, and most IQ tests attempt to measure both varieties. For example, the Wechsler Adult intelligence scale (WAIS)

The concept of fluid and crystallized intelligence is relevant to this study in that it will help students understand the nature and role intelligence play in individuals as the individual grows his ability to this rationally, to understand complex ideas, to adapt effectively to the environment changes.

Jean Piaget's Theory of Cognitive Development (1972)

The best-known developmentally-based conception of intelligence is certainly that of the Swiss psychologist Jean Piaget (1972). Unlike most of the theorists considered here, Piaget had relatively little interest in individual differences. Intelligence develops in all children through the continually shifting balance between the assimilation of new information into existing cognitive structures and the accommodation of those structures themselves to the new information. To index the development of intelligence in this sense, Piaget devised methods that are rather different from conventional tests. To assess the understanding of "conservation." for example, (roughly, the principle that material quantity is not affected by mere changes of shape), children who have watched water being poured from a shallow to a tall beaker may be asked if there is now more water than before. (A positive answer would suggest that the child has not yet mastered the principle of conservation.) Piaget's tasks can be modified to serve as measures of individual differences; when this is done, they correlate fairly well with standard psychometric tests. Piaget, cognitive development was a progressive reorganization of mental processes as a result of biological maturation and environmental experience. Accordingly, children construct an understanding of the world around them, then experience discrepancies between what they already know and what they discover in their environment.^[1] Moreover, Piaget claimed the idea that cognitive development is at the center of human organism, and language is contingent on cognitive development. The relevant of this theory to this study is that parents can use Piaget's theory when deciding how to determine what to buy in order to support their child's growth. Teachers can also use Piaget's theory, in lesson delivery as the ability to perform mathematical operations fluently indicates a level of skill mastery and a readiness to learn more advanced mathematical problems.

Statement of the problem

Academic achievement is the outcome of education, the extent to which a student, teacher and institution has achieved their educational goals. Academic achievement refers to the extent to which learners acquire the knowledge, skills and proficiencies that the instructor seeks to teach or assign it is referred here as academic intelligence, by academic

intelligence means a general students ability to express his or her personality and to enjoy rich and complex social relations which depends largely on his mastery of academic matters. With low intelligence, low academic achievement will be observed which will eventually lead to low standard of education in the society.

An understanding of students' beliefs about intelligence adds valuable information to the complex picture of factors that influences academic achievement in their course work. In education, increasing concerns about students' retention, intelligence and academic success have made researchers to pursue possible explanations and theories about these factors. As teachers scrutinize students learning behaviours in an effort to determine why those in challenging courses fail or drop out, it is important to look deeper than the actions we see in the classroom or infer from their test scores. Experience has shown that an understanding about students' intelligence may provide important insight in improving their academic achievement in school; this is because most students enter the classroom with one or two distinct conceptions of their intellectual ability. Some students feel that there is a fixed trait or an entity that they possess, and that they can do nothing to change it. Studies by Habibollah, Abdullah, Tengku and Aizan (2008) on intelligence among undergraduate students was limited to only male with fewer sample size. However, the present study seeks to address the following questions what is the relationship between siblings in general? Is intelligence a product of hereditary or environment? Answers to these questions are not readily available, seeking their answers constitute a central problem for this research study.

Purpose of the Study

The main purpose of the study was to determine the relationship between the intelligence of siblings with their academic achievement in Cross River State.

Specifically, this study intends to:

1. Examine the relationship between the intelligence of monozygotic siblings with their academic achievement?
2. Find out the relationship between the intelligence of dizygotic siblings with their academic achievement?
3. Examine the relationship between the intelligence of adopted siblings with their academic achievement?

Research Questions

The following research questions were formulated for this study:

1. What is the relationship between the intelligence of monozygotic siblings with their academic achievement?
2. What is the relationship between the intelligence of dizygotic siblings with their academic achievement?
3. What is the relationship between the intelligence of adopted siblings with their academic achievement?

Statement of Hypotheses

Three null hypotheses based on the purpose of the study were postulated and tested in the course of this investigation.

- Ho1:** There is no significant relationship between the intelligence of monozygotic siblings with their academic achievement.
- Ho2:** Dizygotic siblings' intelligence is not significantly related with academic achievement.
- Ho3:** There is no significant relationship between the intelligence of adopted siblings with their academic achievement.

Literature Reviewe

This section considers the current literature which deals with intelligence of sibling and their academic achievement in Cross River State, Nigeria.

Concepts of Intelligence

Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial, they are never entirely consistent: a given person's intellectual achievement will vary on different occasions, in different domains, as judged by different criteria. Concepts of "intelligence" are attempts to clarify and organize this complex set of phenomena. Although considerable clarity has been achieved in some areas, no such conceptualization has yet answered all the important questions and none commands universal assent. Indeed, when two dozen prominent theorists were recently asked to define intelligence, they gave two dozen somewhat different definitions (Sternberg & Detterman, 1986). Such disagreements are not cause for dismay. Scientific research rarely begins with fully agreed definitions, though it may eventually lead to them.

Hereditary and Environment in Relationship to Monozygotic and Dizygotic Siblings' Intelligence

Researchers have long overestimated the role our genes play in determining intelligence. As it has always been a difficult task to separate the relative influences of heredity and environment on human intelligence. People who have similar genetic makeup (e.g., brothers and sisters, parents and their children) typically live in similar environments as well. So when we see similarities in IQ among members of the same family, it is hard to know whether those similarities are due to the genes or to the environments that family members share. Nevertheless, a considerable body of research tells us that both heredity and environment affect intelligence.

Numerous studies have used monozygotic (identical) twins and dizygotic (fraternal) twins to get a sense of how strongly heredity affects IQ. Because monozygotic twins begin as a single fertilized egg which then separates during the process of fertilization to form two genetically equivalent human beings. In contrast, dizygotic twins are conceived as two separate fertilized eggs. They share about 50 percent of their genetic makeup, with the other 50 percent being unique to each twin. If identical twins have more similar IQ scores than fraternal twins, we can reasonably conclude that heredity influences intelligence.

Most twins are raised together by the same parent(s) and in the same home, and so they share similar environments as well as similar genes. Yet even when twins are raised separately (perhaps because they have been adopted and raised by different parents), they typically have similar IQ scores (Bouchard & McGue, 1981). In a review of many twin

studies, Bouchard and McGue (1981) found these average (median) correlations: identical twins raised in the same home .86, identical twins raised in different home .72, fraternal twins raised in the same home .68, fraternal twins raised in different home .65, adopted sibling raised in the same home .47, adopted sibling raised in different home .59. The correlation of .72 indicates that identical twins raised in the same and different environments tend to have very similar IQ scores. In fact, these twins are more similar to each other than are fraternal twins raised in the same home. However adopted siblings have different level of intelligence. This is a proof that environment also account for siblings intelligence McGue (1981). Sternberg, and Wagner (1985), observed that intelligence is a product of both genes and the environment both can explain why a child's IQ can be so different from his or her parents'. The environment makes sense. If mom doesn't eat right while she is pregnant, the baby's brain won't develop to its full potential. Kids who grow up in a more stimulating environment will have higher IQs. Equally, genetics can explain the wide range of possible IQs too because so many different genes are involved in developing and running a brain. It is possible, for example, to inherit all the higher IQ genes from each parent and leave the lower IQ ones behind. Now the child will be brighter than the parent. And of course the opposite is possible as well resulting in a child with a lower IQ than expected.

If two twins in an identical pair tend to have closer IQ's than two twins in a fraternal pair, then genes probably play a role in intelligence. Proefried (1983) noted that this is so because identical twins are definitely more likely to share the same intelligence than are adopted siblings. So genes do play a role in IQ. Case (1987) observed that when identical twins are raised apart, they have the same genes but different environments (after birth, anyway). Again, if intelligence were purely genetic you'd expect where they were brought up not to matter. His studies show the following indices about siblings' intelligence with academic achievement:

1. Identical twins-Reared together .86
2. Identical twins-Reared apart .84
3. Fraternal twins-Reared together .55
4. Fraternal twins-Reared apart .51
5. Adopted sibling- reared together .021
6. Adopted siblings- reared together .038

In both cases, the twins are less likely to have the same IQ if they are raised in separate families. The easiest explanation is that genes are not everything, the environment is important too. Twins are the easiest to understand but it works with other family members too. In particular, it helps to compare related and unrelated children raised in the same house or different environment:

Striker and Rock (1990) studies on parents and siblings intelligence found out that environment is not the whole answer. Genes do matter as siblings are more likely to share the same IQ as compared to unrelated children being raised together. And there are more examples like this. Here is the complete set: Stoddard (1984), in his study on the place of Intelligence Testing Revised came to the conclusion that about half of your IQ comes from your genes and half from your environment. To complicate things even more, IQ

isn't even a stable trait. It can change over your lifetime. One study said that IQ can change as much as 24% throughout our life! IQ is a very tricky topic. It does seem to run in families but it is more than genes. Our environment plays a key role to.

Based on studies by Rohde and Thompson (2007), identical twins' IQ scores, research shows that the heritability of intelligence is approximately .50. This heritability value suggests that about half of intelligence is more or less determined or caused by a child's genetics and biology. The other half is determined by environmental factors which include children's socioeconomic status (a measure of family wealth and social status), parent and caregiver attitudes towards education (whether they believe it is important), cultural and educational opportunities, and other similar social factors.

Hereditary and Environment in Relationship to Adopted sibling's Intelligence

Another way to compare the effects of heredity and environment is to correlate adopted children Intelligent Quotient scores with their academic achievement. Adopted children tend to be similar to their biological parents in genetic makeup but dissimilar in their adopted parents. Their environment, of course, more closely matches that of their adopted parents. Researchers have found that adopted children's IQ scores are more highly correlated with their adopted parent especially parents' IQs than with their adoptive parents' IQs. In other words, in a group of people who place their infants up for adoption, those with the highest IQs tend to have offspring who, despite being raised by other people, also have the highest IQs. Furthermore, the IQ correlations between adopted children and their biological parents become stronger, and those between the children and their adoptive parents become weaker, as the children grow older, especially during late adolescence (Corley, & DeFries, 1997; Plomin & Petrill, 1997). Adopted siblings intelligence is not influenced by hereditary (gens) but rather a product of parental position. For example, inadequate diet can disrupt brain development, reduced access to health service, poor parenting, and insufficient stimulation and emotional support can impair intellectual growth of adopted siblings.

Children from wealthier homes scored higher on IQ than did children from poor homes. While genetics provide a person with the capacity to learn, general good health and a stimulating environment are also necessary to build a person's intelligence. In addition, a solid education provides factual knowledge, increases vocabulary and provides the opportunity to practice analytical and computation skills. Studies of identical twins show that their IQ scores will be even closer if they are raised in the same household, with the same parents, health care and education. Collins, Maccoby, Steinberg, Hetherington and Bornstein, (2000) For example, adopted children adoption studies do not allow researchers to examine the ways in which heredity and environment might interact in their effects on measured intelligence. Any interactive effects are often added to the "heredity" This is not to say that children are not predestined to have an intelligence level similar to that of their biological parents. In fact, most children with high intelligence are conceived by parents of average intelligence rather than by parents with high IQ scores (Plomin & Petrill, 1997).

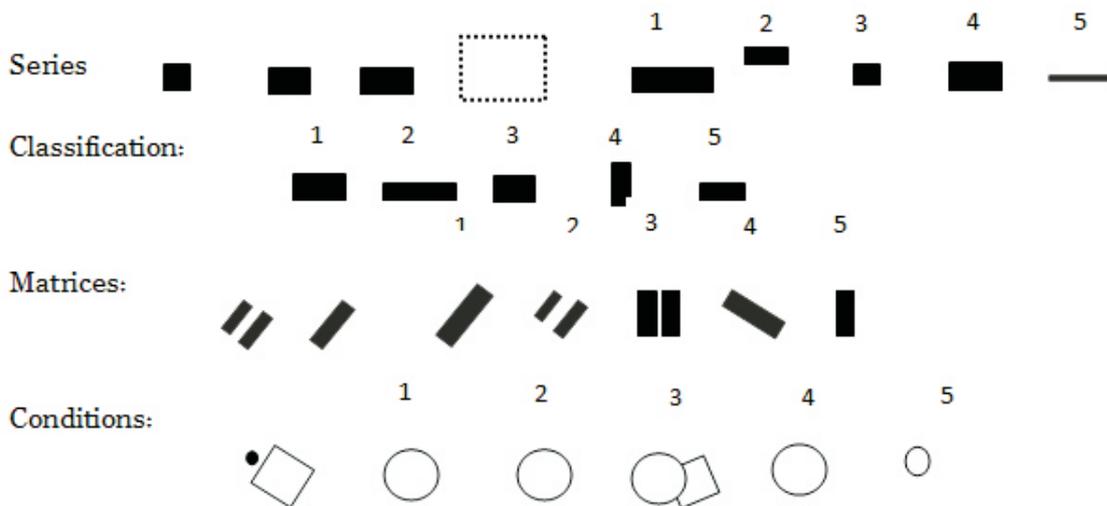
Research Methodology

Instrument for the Study

The R. B Cattell and Cattell culture fair test of intelligence published in (1949 & 1960) by Institute of Personality and Achievement Test (IPAT, 2002) in the United States was the main instrument used for this study. The test consists of three series (scale 1, 2 and 3). Scale one was designed for use with children of 4-8 years old and mentally retarded adults. Scale two is for children aged 8-11years and all normal adults. Scale three is for use with people who are of very high intelligence. Consequently, the scale two of the culture fair intelligence test is used for this investigation, this scale has four subsets namely; series, classification, matrices and conditions. The first subscale (series) required the examinee to select from among choices provided, the answer which best continues an incomplete progressive series presented. The second subset (classifications) presents the test with five figures of which he must select the one that is different from the other four. The matrices subtest requires an examinee to correctly complete a design or matrix presented at the left of each row from one of the option in the row. The condition subset also known as topology requires the testee to select from five options provided, the one which best duplicates conditions contained in the far left box of each row. An example of items in each of the subtests is given in figure 1 below:

Sample of the Culture fair Intelligence Test

Sample items in the Culture Fair Intelligence Test developed by R. B. Cattell and Cattell standardized for use in Nigeria by Institute of personality and achievement test (IPAT) (for use in in nigeria by Dr. P. J. Kpolovie).



The researcher with the aid of two research assistance administered the test to the subjects in groups of 30 to 40. The time allocation for each subset was strictly adhered to with the aid of a stop watch in all the groups to ensure that more or fewer persons were not allowed to cheat on any subtests.

Validity of the Instrument

The culture fair intelligence test (CFIT) has construct validity through subtotal correlational evidence. The test also has satisfactory construct validity via developmental changes evidence as mean (x) score of various from ages increase systematically significant from age 9-15 after which it flattens out in perfect agreement with fluid and crystallized theory of intelligence. The CFIT can best be measured with the Hausa, Igbo Yoruba and Efik examinee irrespective of their cultural background (Kpolovie 2010).

Reliability of the Instrument

The reliability of the culture fair intelligence test (CFIT) was determined through equivalent or parallel form reliability. This is the correlation between two sets of scores obtained from the administration of two alternative or parallel tests at a time to examine. The two forms of the CFIT equally measure a particular trait by having equal length, difficulty and other discriminating indices. Same items formation similar ordering of items and the same instructions. (Form A and form B) of the culture fair intelligence test are constructed to meet these requirements. Thus, the correlation coefficient between two sets of scores obtained from form A and B by a group of examinees in Nigeria will depict the reliability of the CFIT in Nigeria, the culture fair intelligence test has equivalent forms reliability of 0.91 (Kpolovie, 1999).

Administration of the Instrument

The instrument was administered on a direct delivery method (D D M) face to face by the researcher and with the help of two other researcher assistants special instruction as contained in the culture fair intelligence test manual, pg7 was given to the respondents to guide them in answering the test items effectively. The instrument was collected back from the respondents having exhausted the allotted time.

Scoring of the Instrument

The culture fair intelligence test developed by R.B Cattell and Cattell has 2 forms (form A and form B), each of which is composed of four subtests (series, classification matrices and conditions). Each of the two forms has 46 items to be answered in 12 minutes. That is, the complete test has 92 items to be answered in 25 minutes.

Method of Data Analysis

The data gathered for this study were subject to both descriptive and inferential statistics. The mean (X), standard deviation (SD) and Person Product Moment Correlation (r) was used to analyze the data.

Result and Discussion

Data obtained from the study as well as the analysis. The analysis and presentation followed the sequence of the research questions and hypothesis.

Hypothesis 1: There is no significant relationship between the intelligence of monozygotic siblings with their academic achievement.

Table 1
Summary of Pearson's r using monozygotic siblings with their Academic achievement

		IQ SCORES	ACA PERF.
IQ Scores	Pearson Correlation	1	.876**
	Sig. (2-tailed)		.000
	N	80	80
Aca. Perf.	Pearson Correlation	.876**	1
	Sig. (2-tailed)	.000	
	N	80	80

**** Correlation is significant at the 0.05 level (2-tailed).**

It can be discerned from table one that the correlation between IQ and academic achievement of monozygotic siblings is 0.876. with a significant (2- tailed) value of .000 at 0.05 chosen alpha the sig value of 0.00 was found to be less than the alpha level of 0.05 the null hypothesis that states “There is no significant relationship in the intelligence of monozygotic siblings with their academic achievement” is rejected. The significant of the r value or the rejection of this null hypothesis reveals that there is indeed a statistical significant relationship in the intelligence of monozygotic siblings with their academic achievement.

Hypothesis 2: There is no significant relationship between students' intelligence and the intelligence of dizygotic siblings is not significantly related with their academic achievement.

Table 2
Summary of Pearson's r using Dizygotic siblings with their Academic achievement

		IQ SCORES	ACA PERF.
IQ Scores	Pearson Correlation	1	.756**
	Sig. (2-tailed)		.001
	N	80	80
Aca. Per.	Pearson Correlation	.759**	1
	Sig. (2-tailed)	.001	
	N	80	80

**** Correlation is significant at the 0.05 level (2-tailed) P<0.05).**

This table has shown that the correlation between IQ and academic achievement of dizygotic siblings is 0.759. with a significant (2-tailed) value of .001 at 0.05 chosen alpha the sig value of 0.01 was found to be lesser than the chosen alpha level of 0.05. This result indicates that the null hypothesis is rejected. Thereby the alternate hypothesis is retained.

Hypothesis 3: The intelligence of adopted siblings is not significantly related with their academic achievement.

Table 3
Summary of Pearson's r using adopted siblings with their Academic achievement

		IQ SCORES	ACA PERF.
IQ SCORES	Pearson Correlation	1	.021
	Sig. (2-tailed)		.070
	N	80	80
ACA. PERF.	Pearson Correlation	.021	1
	Sig. (2-tailed)	.070	
	N	80	80

Correlation is not significant at the 0.05 level (2-tailed)

Table three above indicates that the Pearson correlation between Intelligence and academic achievement of adopted siblings is 0.021. with a significant (2-tailed) value of .070 at 0.05 chosen alpha the sig value was found to be far more greater than the chosen alpha level of 0.05. The stated hypothesis is retained. This result indicates that there is no significant relationship in the intelligence of adopted siblings.

Discussions of Result

The most important finding of this study is that when sibling's intelligence was measured with the culture fare intelligence test, the result sows that there existed a significant relationship between monozygotic and dizygotic sibling intelligence this implies that intelligence is strictly a product of hereditary and environment. This findings is in consonance to that of Rohde and Thompson (2007), who carried out their studies on identical twins' IQ scores, and their result shows that the heritability of intelligence is approximately .50. This heritability value suggests that about half of intelligence is more or less determined or caused by a child's genetics and biology. The other half is determined by environmental factors which include children's socioeconomic status (a measure of family wealth and social status), parent and caregiver attitudes towards education (whether they believe it is important), cultural and educational opportunities, and other similar social factors.

This could be one reason previous study yielded a significant relationship between intelligence and students performance. Findings from this study of Proefried (1983), also agrees to the present study so because identical twins are definitely more likely to share the same intelligence than are adopted siblings. So genes do play a role in IQ.

The second findings of this study reveal that there was indeed no significant relationship between adopted student intelligence with their academic performance. Plomin and Petrill (1997) observed that children are not predestined to have an intelligence level similar to that of their biological or adopted parents. In fact, most children with high intelligence are conceived by parents of average intelligence rather than by parents with high IQ scores. This findings is also in agreement with that of Corley, & DeFries, 1997;

Plomin & Petrill, (1997) their study discovers that IQ correlations between adopted children and their biological parents become stronger, and those between the children and their adoptive parents become weaker, as the children grow older, especially during late adolescence.

Conclusion

Debate is ongoing over how much of a person's intelligence comes from genes passed down to them from their parents, but estimates put hereditary on a par with the environment a person is raised in. This is the "nature versus nurture" debate. Still, it is clear that heredity plays a strong role in determining a person's intelligence. While genetics provide a person with the capacity to learn, general good health and a stimulating environment are also necessary to build a person's intelligence. In addition, a solid education provides factual knowledge, increases vocabulary and provides the opportunity to practice analytical and computation skills. Studies of identical twins show that their IQ scores will be even closer if they are raised in the same household, with the same parents, health care and education.

Recommendations

1. For research purpose, the raw score should be first converted to deviation IQs or normalized standard score IQs, using the norms table of this investigation before other comparison. That is the raw scores which are still affected by differences in age should not be used as the subjects in the research. This is because it might not be matched age wise. For instance when correlating intelligence with academic achievement as in the case of this research work, it must be the CFIT IQs that should be used and certainly not the raw scores. The raw scores should be converted to Z-score $(x-x)$ then converted to t-score $(10z+50)$ because of the differences in schools grading system.
2. Since intelligence is related to academic achievement the government should encourage indigenous test expert to validate and standardize other test other than the CFIT and the Wide Rang Intelligence Test (WRIT) which are the intelligence that has the quality qualities for use in Nigeria; with affordable prices and accessible for other researchers who may wish to embark on intelligence of students.
3. One major finding of this study was that intelligence has a great influence on students academic achievement. It is on the part of the government to include intelligence test in the school curriculum so as to help teachers, counsellors, administrators to know the students' placement in his/her choice carrier.

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