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Assessment of Intelligence among School Children in Benin-City using Draw-A- Person Test (DAPT)

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Abstract

Researchers have proposed that factors such as age and gender could determine the intelligence of people. The dearth of literature on the assessment of the intelligence of school children using a standardised instrument (DAPT) in the general population and the prospect of forming a body of literature that can propose the use of DAPT for intelligence testing or to validate other intelligence tests are the basis for this study. This study focuses on measuring the intelligence of school children in Benin City, Nigeria, using Naglieri's1988 revision of the draw a person (DAPT). A cross-sectional research design was employed for the study. The study was conducted in Benin-City, Edo State, Nigeria. A convenient sampling technique was used to select one hundred and forty-one (141) participants in which females were 63(44.7%), males were 78 (55.3%), the mean age was 11.21, and the SD was 2.475. independent t-test was used to analyse the data collected. The t-test showed no significant difference between male and female intelligence quotient (t-0.016: df=139; p>0.05). Younger participants scored higher with a mean score (106.03) than the older participants (98.03). The study has implication for using the test with children that are older than 12 because it seemed to be an inaccurate measure of academic performance and ineffective in screening for intellectual ability.

Keyword: Intelligence, School Children, Assessment, Draw-A-Person Test (DAPT).

Introduction

Often, a person who is academically "bright" is described as intelligent, and a child who gets the first position in the class is judged as more intelligent than one who gets the seventh position, irrespective of the latter's strengths. Another viewpoint holds that intelligence involves a vast expanse of experience that may not be directly or wholly academic. Intelligence most often is a complex concept, and due to the varied

ways it has been conceptualised, attempts at its definition have remained varied. Galton (1869), a naturalist and mathematician in the 1880s, was the first to popularise intelligence. He was greatly influenced by the evolutionary theory proposed by Charles Darwin (1881). His belief about individual differences led him to propose that intelligence centres around exceptional sensory, perceptual and motor skills such as reaction time and sensitivity to stimuli which vary from person to person and are passed from one generation to the next (Bowler 2003). Research findings did not support his assumption that individual who are more sensitive in perceptual abilities would be more intelligent. However, his efforts led to the invention of the correlation coefficient, which still plays a useful role in statistical analysis today (Ofevwe, 2011).

Wechsler (1944) proposed that intelligence is the aggregate or global capacity of the individual to act purposefully, reason, and deal effectively with his environment. Sternberg (1985) conceptualised intelligence as the ability to adapt to one's environment throughout the life span. He postulated that intelligence is a composite of three attributes: the possession of knowledge, the ability to use information processing to reason about the world, and the ability to employ the reasoning adaptively in different environments, which is often referred to as the triarchic theory of intelligence. Eleanor and Gopaul-McNichol (1998) suggested the importance of a relativistic definition that recognised the significance of the interaction between the individual's biological nature and the cultural and

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environmental context surrounding the person. Gardner (2000) conceived intelligence as "a bio-psychological potential to process information in a certain way to solve problems or fashion products that are valued in a culture or community". He saw intelligent behaviour as related to specific kinds of functioning in the real world. While many more definitions and approaches can be cited, they generally suggest that definitions of intelligence involve learning, solving problems, and adapting.

Over the years, diverse techniques/forms of measuring intelligence have emerged. Hence, intelligence can be measured by many different kinds of tasks, is expressed in many aspects of a person's life and draw on a variety of mental processes, including memory, learning, perception, decision-making, thinking, and reasoning. Measures of intelligence used in both research and clinical practice make it possible to extend the benefit of the concept of intelligence beyond a theoretical perspective. Modern intelligence testing is traceable to Alfred Binet (1904), which was required by the educational authorities in Paris to develop a means through which slow learners could be distinguished from normal children with the hope of providing special education for the slow learners. Binet and Theodore Simon (1905) collaborated and devised the first intelligence tests ever published, which served to identify slow learners (the Binet-Simon test). This test was further revised and standardised in Stanford-Binet as an intelligence test (1916). In the revised edition, he introduced the concepts of mental age (MA) and chronological age (CA). Binet (1916) defined mental age (MA) as the average intelligence exhibited by an individual of a given age,

while chronological age (CA) refers to the actual age of the individual. He further states that if an individual's mental age is lower than his chronological age, he is considered below-average intelligence.

Conversely, if the mental age is higher than the chronological age, he is considered above average intelligence. The difficulty arose in comparing the mental ages of children of different chronological ages. For instance, it is not easy to ascertain if a child with a mental age of 10 years and a chronological age of 8 years is brighter than a child with a mental age of 11 and a chronological age of 9. These discrepancies lead to the development of the concept of intelligence quotient (IQ). The IQ is a numerical value derived from intelligence tests; it is obtained by dividing the mental age (MA) by the chronological age (CA) and multiplying the product by 100.

Mous, Schoemaker, Blanken, and Polderman (2016) have proposed that factors such as age and gender could determine the intelligence of people (Von, 2013; Christian, & Taryn, 2011; Habibollah, Rohani, Tengku, Jamaluddin, 2009; Stephen, 1991; Datta, 1967) have also proposed that factors such as educational level, environment and level of exposure rather than age and gender, could determine the intelligence of people. El-Shafie, El Lahony, Latif, and Khalil (2019), studied 1000 healthy primary school children aged from 6 to 12 years old in Tanta District El-Gharbia Governorate. The study objective was to screen primary school children's intelligence using the draw-a-person test (DAPT). All students were subjected to DAPT; their parents were asked to fulfil a questionnaire that included full name, date of birth, parent's job,

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degree of parents education and family income. Five hundred one were girls, and 499 were boys; the mean age was 9.02 ± 1.41 (6–12) years. Significant correlations were found between intelligence quotient levels, socioeconomic standard, school achievement, BMI, residence and sex. The study concluded that the DAPT is a useful developmental screening tool that paediatricians can use to measure intellectual maturity.

Cooper (2018) carried out a study on the perception of intelligence at Arizona University; the result shows that men perceive themselves as more intelligent in the college biology classroom than women whose grades demonstrate they are just as accomplished. The study shows that gender greatly impacts students' perceptions of their intelligence, particularly when comparing themselves to others.

Studies have shown that boys and girls score about the same in math in elementary school. However, girls seem to fall behind only later in life so that by the time they are in the senior year in high school, the boys score higher on the Scholastic Aptitude Test. Research continues to study these findings (difference in the performance of male and female) and wonder if results like this are due to gender differences, parental influences, environmental influences, social pressures, personal beliefs and values, schooling, or a combination given the broad nature of the concept of intelligence (Benbow, Lubinski, Shea, & Eftekhari-Sanjani 2000; Leahey 2001).

DAPT usefulness was reported by several researchers like Ozer (2010); he claims that there are two primary contexts where the human figure drawings can be put to

use are; prediction of children intellectual development and evaluating the child's emotions. Also, Nagleria, McNeish, and Bardo (1991) argue that this test can screen children to identify aspects like emotional and behavioural problems. Lastly, in an educational setting, this test can be used as a portion of the regular psychoeducational assessment. All the drawings are assumed to have different meaning about the examinee and the person being drawn (Yong, 2015). Many psychologists and researchers rely on drawing tests because they believe that the drawings represent the child expression of thoughts and because it works to their advantage since the child perceives the act of drawing as fun.

The present study assessed the intelligence of school children in Benin, Edo State, Nigeria. Notably, a draw-a-person test (DAPT) will be used to determine if age and gender would influence intelligence or not. This study is significant for the following reasons; the instrument used in the assessment is DAPT; a nonverbal, non-threatening approach to evaluate intelligence intended to eliminate possible sources of bias by reducing variables like primary language, verbal skills, communication disabilities, and sensitivity to working under pressure. Other IQ related studies in Nigeria focused on assessing intelligence quotient (IQ) scores in sub-Saharan African children with intellectual disability (Bakare, Ubochi, Okoroikpa, Aguocha, Ebigbo, 2009); nutritional status and IQ of primary school children (Ijerotimi, &Ijadunola, 2007); and comparison of IQ of atopic and non-atopic children (Daramola, Ayoola, &Ogunbiyi, 2010), largely relying on the ICD – 10 diagnostic criteria for mental

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retardation and self-administered questionnaires. Given the scarcity of literature on intelligence assessment among a general population using a standardised instrument (DAP) in a non-psychiatric setting, this study will serve as a research base that will enhance and advance research in this area in Nigeria. It will also assist Nigerian researchers in understanding the utility of DAPT to test intelligence.

There is substantial evidence that gender difference does not determine intelligence (Akinwale 2019: Akinwale 2017). Datta (1967) research on the Draw-a-person test as a measure of intelligence in preschool children from deficient income families showed that ethnic group and sex did not affect either the IQ equivalent scores or the congruent validities of the figure-drawing test in a representative sample of 956 children enrolled in full-year head start programs. Habibollah, Rohani, Tengku and Jamaluddin, (2009) work on intelligence, academic achievement and gender differences; they study aimed at examining if a relationship exists between intelligence and academic achievement and if the relationship differs between males and female using 153 Iranian undergraduates (male=105 and female =48). The result showed that some aspects of intelligence were not related to academic achievement for males and females. Von (2013) focused his study on whether intelligence, gender, and assessment method affect the accuracy of self-estimated intelligence. The distortion effects of individual differences in intelligence (IQ), gender, and proximal (concerning test performance) and distal (regarding IQ score distributions) assessments of Self-Estimated Intelligence (SEI) were tested in a sample of 200

British adults. This result showed that SEI means did not differ significantly across gender.

The Draw-a-person test (DAPT) is a cognitive test used to evaluate children and adolescents for various purposes. Developed originally by Florence Goodenough(1926), this test was first known as the Goodenough Draw-a-Man test. It is detailed in her book titled Measurement of Intelligence by Drawings. Dale Harris (1963) later revised and extended the test, known as the Goodenough-Harris Drawings Test. The revision and extension are detailed in his book, 'Children's Drawings as Measures of Intellectual Maturity' 1963.

It is also interesting to note that a Psychologist Julian Jaynes (1976), in his book 'The Origin of Consciousness in the Breakdown of the Bicameral Mind', wrote that the test is "routinely administered as an indicator of schizophrenia," and that while not all schizophrenic patients have trouble drawing a person when they do, it is obvious evidence of a disorder. Specific signs could include a patient's neglect to include "obvious anatomical parts like hands and eyes," with "blurred and unconnected lines," ambiguous sexuality and general distortion. There has been no validation of this test as indicative of schizophrenia. Chapman and Chapman (1969) in a classic study of illusory correlation, showed that the scoring manual, for example, large eyes indicative of paranoia, could be generated from the naïve beliefs of undergraduates.

Naglieri(1988) revised the draw-a-person test. This test can be used with two different scoring systems for different purposes based on children's drawings of

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human figures. One measures nonverbal intelligence while the other screen for emotional or behavioural disorders. The focus of this study is on measuring nonverbal intelligence. During the testing session, which can be completed in 15 minutes, the child is asked to draw three figures-a men, a woman, and him and herself. To evaluate intelligence, the test administrator uses the Draw-a-person: QSS (Quantitative Scoring System). This system analyses fourteen different aspects of the drawings, such as specific body parts and clothing, for various criteria, including presence or absence, detail, and proportion. In all, there are 64 scoring items for each drawing. A separate standard score is recorded for each drawing and a total score for all three. The use of a nonverbal, non-threatening task to evaluate intelligence is intended to eliminate a possible source of bias by reducing variables like primary language, verbal skills, communication disabilities, and sensitivity to working under pressure, as stated earlier. The test's purpose is to assist professionals in inferring children's cognitive developmental levels with little or no influence of other factors such as language barriers or special needs.

METHOD

Sample

One hundred and forty-one school children, Male 78 (55.3%), female 63 (44.7%), were recruited for the study with a mean age of 11.21 years (SD = 2.48) and a range of 5-17 years (with 56% in primary school and 44% in secondary school). They were

recruited at one of the holiday catechism class venues in Etsako Central local government, Edo State

Sampling method

The method of recruitment for the study was convenient sampling, and this is because randomisation was not possible because of the number of participants available for the study.

Instrument

Draw-A-Person Test (DAPT) drawings by Naglieri, 1988 was used for the study. It is an instrument for ages 5-17, meant to measure intellectual ability through human figure drawing. Participants were instructed to draw a man, a woman and themselves on each of the response sheet. The drawing must be done without the use of an eraser. It has records form with a quantitative scoring system that contains examinee information and a score summary, and a manual that includes the raw scores, standard scores, percentile ranks, and age equivalents.

Procedure

Permission was sought and obtained from the Chaplain of the Parish, and the researchers were introduced to the participants. The reason for the research was explained to the participants and the purpose of the study; the students were allowed to indicate their willingness to participate in the study. All those who signify

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interest to partake in the study were recruited for the study. Participants were provided with three plain sheets (response sheet) and a pencil each; they were instructed on the information to provide on the sheets (name, age, date of birth), the time limit required and the number of drawings to make. Participants completed the test within the specified time, and all the sheets given out were collected for scoring.

Ethics of research was adhered to considering the age of the children. The children verbally gave their consents, while those that are older were able to thumbprint on the consents forms, the parents approved participation for the minors. The time limit was designed for the instrument; however, the children spent between 10 to 30 minutes on it.

Design/Statistics

A cross-sectional design was used to collect data for the study, and independent t-test was used for data analysis.

RESULTS

TABLE 1: Showing frequency of Gender & IQ Categories

VARIABLE	FREQUENCY	PERCENTAGE
Male	78	55.3
Female	63	44.7
Total	141	100

IQ CATEGORY		
Very Superior	11	7.8
Superior	23	16.3
High Average	24	17.0
Average	49	34.8
Low Average	12	8.5
Borderline	6	8.5
Deficient	16	11.3
Total	141	100

Table 1 shows that 78 (55.3%) of the participants are male while 63 (44.7%) of the participants are females. Also, the IQ categories show that 11 (7.8) is very superior, 23 (16.3) is superior, 24 (17.0) is a high average, 49 (34.8) is average, 12 (8.5) is low average, 6 (4.3) is borderline, i6 (11.3) is deficient.

TABLE 2- Summary table of independent t-test comparing male and female on IQ.

SOURCE	GENDER	N	MEAN	df	T	P
IQ	Male	78	102.54	139	.016	>0.05
	Female	63	102.48			

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Table 2 shows no significant difference between male and female on I.Q (t=0.016; df=139; p>0.05). This shows that male and female were not different from each other on IQ.

TABLE 3- Summary table of independent t-test comparing age groups on IQ

SOURCE	AGE	N	MEAN	df	T	P
IQ	5-11	79	106.03	139	2.089	<0.05
	12-17	62	98.03			

Table 3 shows a significant difference between participants in the age group of 5-11 and those in the age group of 12-17 (t=2.089; df=139; p=<0.05). This significant difference can be seen in the means; 5-11 (106.03) and 12-17 (98.03). This shows that participants in the age group of 5-1 scored higher than participants in the age group 12-17.

Discussions

The current study aimed to fill the gap created by lack of evidence-based standardised instruments to assess intelligence or validate other intelligent tests in Nigeria. This we set out to achieve by measuring the intelligence of school children in Benin-city using DAPT as an assessment instrument to determine if age and gender will influence performance. The result showed no significant difference between male and female on DAPT IQ. This shows that gender did not influence IQ performance on DAPT, which is in line with previous research (e.g., Datta, 1967:

Habibollah et al., 2009: Von Stumm 2013). This implies that gender affected neither the IQ equivalent scores nor the congruent validities of the figure-drawing test; however, in this present study, it cannot be ascertained whether scores or performance on DAP have any direct relationship with academic achievement for both males and females but can be speculated. The result is also in agreement with the study of El-Shafie et al. (2019), which also reported that there was no correlation between IQ levels and children's sex.

Interestingly, it appears that age influenced intelligence quotient performance on DAPT as revealed by the result which indicated that younger participants in the age group of 5-11 scored higher than older participants in the age group of 12-17, which can be explained as the reason for age restriction (age 5-17) by the test developer. Scout (1981) affirmed Goodenough-Harriss's drawing test scores and Naglieri (1988) regarding the DAPT, human figure drawings differentiate performance only between age groups of 5 to 11 years. Age significantly correlated with DAP scores only for children 11 years or younger, suggesting that a ceiling effect may have occurred (Scout, 1981).

RECOMMENDATIONS

The following were recommended from the study: Although the findings revealed that younger children scored higher than older children using DAPT as a measure of intelligence, this does not indicate that older children are less intelligent, given that

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intellectual functioning encompasses paper and pencil tests or that this is the only instrument with which intelligence can be measured. Therefore, these findings provide a platform for advancing research using DAPT as an instrument for testing intelligence. Research should also explore the opportunity to compare IQ score using both DAPT and other objective instruments to ascertain general intellectual performance and mental functioning.

LIMITATIONS

Some limitations to the present study are acknowledged. Since the study was meant to represent school children in Benin, the sample size of several primary and secondary schools in one particular area might not indicate the larger population of school children in Benin. Also, schools were on vacation at the time of collecting data for this study contributed to the reduced number of participants used for the study and the inability to compare their DAPT scores with their academic performance.

Therefore, it is recommended that future researchers attempt to make the samples more representative and inclusive. Also, the participant DAPT score compares with their academic performance.

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