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Full Length Research Paper

A study of the general perceptual ability of mainstream and high-risk students in Nigeria

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This study investigated whether or not academically high-risk students of Junior Secondary School 2 students in Rivers State of Nigeria differed from their mainstream counterparts with regard to their perceptual organisation. The *ex post facto* research design was used with a hypothesis guiding the study. Stratified random sampling was used in drawing a sample of 1,205 subjects. The survey utilized the Perceptual Organization Visual Battery Test (POVBT) for data collection. The major finding of the study was that there is a significant difference between high-risk and mainstream students in general perception as a complex psychological phenomenon. Recommendations included identifying and fitting the perceptual structure of the learner to the entire learning situation and exposing such instructional techniques to the learners in which they would benefit more.

Key words: Nigeria, perceptual ability, high-risk students, mainstream students.

INTRODUCTION

In a psychological investigation like this one, one must start from the interaction of the learner and his/her environment. This is because there is no single function of any individual that complements him or her without objects in environment (Perls et al., 1980). Here is the learner, the learning process and the learning situation. The learner is a student; he possesses sense organs through which he receives stimulation, a brain that interprets the message sent by the senses and a set of muscles, which enables him to engage in various performances.

The learner and his environment are not independent entities. Rather together they constitute a perceiving, mutually influencing total system. Without one's environment (feelings, thoughts), tendencies to action would not organize, concentrate and have direction. On the other hand, without one living as a living differentiated organization of awareness, one's environment would be, for one, non-existent. It is by the sense of contacting that an individual becomes one with his environment. Underneath the process of contacting is the formation of spontaneous attention and mounting excitement. The learner/environment field is also not just physical but social so one must consider a field in which socio-cultural and physical factors interact.

In exteroception, perception is fairly well safe-guarded for most persons in tactile (touch), olfactory (smell) and gustatory (taste) perception. There is evidence from biblical scriptures how tactile perception overruled that of auditory perception in the story of Jacob deceiving Isaac his father. "The voice is Jacob's voice but the hands (tactile) are the hands of Esau" (Genesis 27:22), then later one saw how the combination of both tactile and olfactory perception helped to precipitate the decision to unleash the blessings on Jacob, "he came near and kissed him and smelled his raiment and blessed him (Genesis 22:27). However, with more restrained senses of seeing and hearing, many people believe that what they see and hear is ordained on them unreservedly from the environment. What many people are not aware of is that seeing and hearing are efforts aimed at whatever is interesting and tending to meet a demand. Consequently, some learners may be good auditory learners while others may be visual experts. Generally in Nigeria, learners are more inclined to learn in visual and auditory perceptions than in hands-on learning experiences. In proprioception, the perception is that of an individual's line of thoughts. His surface experiences are first of all, things that exist in their own rights. Even if something is only a wish, it is something namely an event of wishing. It is therefore as real and as pervasive as a field. An individual, therefore that is not sleeping, is at every point

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in time conscious of something. When distracted, consciousness may become bleary. The processes involved (vision, instruction, fantasy etc) may not precipitate strong experiences in the form of memories, wishes, plans or actions. Yet much of what an individual is poorly conscious and nearly unconscious of can be brought into full consciousness by devoting to it the necessary boost of concentration and interest. To the effect that a gestalt can be found strong enough to precipitate an experience. What a person knows is a result of and specified by the laws of perceptual organization. His detection, discrimination, recognition, identification and judgement of what is out there constitute the process called perception. Besides, the laws of organization in perception as applicable to learning include memory. Ideas and images stored in memory are traces of perceptual events. Learning requires insight, and insight depends on perception. What is perceived (known) is used in thinking and through thinking, the person learns new things. Since learning results from man-environment interaction then without perception, learning would be impracticable (Isangedighi, 1996).

The richness of the person's perception shapes the quality of what is learned. "No two individuals can ever perceive the same situation, event or stimulus the same way, no wonder that no two individuals can learn the same thing the same way" (Isangedighi, 1996:96). Learners learn best what makes sense to them, and what makes sense depends on their perceptions. If a child perceives what he learns as valuable or important, he easily retains it in his memory. If no value or importance is attached to what is being learnt, the thing quickly fades away from the child's memory. Perception then occurs at the frontiers between the learner and his environment primarily at the organs of sensory and motor responses and the skin surface. What one has learnt is an experience at this point and intellectually, what is learnt are the "whole configurations" that is some explanation achieved and some actions completed. The wholes of perception are not global but they are definite unified structures and are mentally sequential. When idiosyncrasies of learners or peculiarities of environment are added to such structures, they become either an "abstraction" or a "possible construction" or a "potentiality" helping a learning experience to occur now or in future (Perls et al., 1980), while the preceding gives enough evidence how confluent learning and perception are, there are studies in the literature whose findings are consistent with these affirmations. The studies were carried out by Haith and Benson (1998), Spelke (1991), Nwachukwu (1996), Mirand, Hack, Fantz, Fanaroff and Klaus (1977) who demonstrated that young infants forms visual expectation.

Observations of infants' visual preferences have found that there is a relationship between neonatal pattern vision and future cognitive development. Yet there were very few studies that related perception to memory. This is the gap that this study wants to address. To that extent, the review of literature not only provided direction to this study, but also suggested the design, methodology, instrument, sample and sampling procedure.

THEORETICAL FRAMEWORK

It is gestalt theory of perception that guided this study. What a person learns is as a result of and specified by the laws of perceptual organization. The German word "pragnanz" has been used to describe the particular perceptual configuration achieved, out of a myriad of potential configurations. Pragnanz or good form and the laws of grouping under it: assimilation, figure-ground differentiation, context, contrast, similarity, closure, constancy, grouping and good form:

1. Assimilation: Perls et al. (1980) write that learning when digested and not swallowed whole may be assimilated, that this assimilation is the aftermath of contact (except annihilation) which results in accomplished learning. According to Isangedighi (1996), assimilation is a term used in reference to the adoption techniques involved in the use of schemas. Assimilation, he asserted, has biological, social and mental characteristics. Biologically, it is about taking in and ingesting of food by the body. Mentally, assimilation connotes the inflow and reception of information, which borders on reasoning or thinking process of learning and conforming to the social milieu.
2. Figure and background: Figure is the point of interest (an object, pattern etc) with ground the setting or context. The exchange between figure and ground is dynamic, for the same ground may, with waves of interests and attention yield different figures. It could also be that a given figure, if it contains details, may itself become ground in the event that some detail of its own emerges as figure.
3. Grouping: Contrast, similarity, context, constancy, good form, because of the counteraction of two or more of these sub-themes, one is combining them in treatment, which reinforces good form or practice. Indeed, many phenomena could not exist if their opposites did not exist (Perls et al., 1980); in fact the validity of opposites depends upon appropriate context.
4. Closure: To effect closure, the Gestaltists presented incomplete objects whose achievements must be done by a kind of subjective filling-in of blank spaces.

PROBLEM

School failure and dropping out of school are serious educational and societal problems (Ianni and Orr, 1996). Through the agency of school, modern states use the opportunity of children's education to lay the foundation for better societies. Any family or community that trivializes the child's education increases the risk for

stagnation, instability and decay (Isangedighi, 1996).

High risk may be caused by both individual and environmental factors. Risks are associated not only with a low grade point average but with a chance of not completing the enrolled programme. Risk is costly to the individual, family and nation because students who leave school before receiving a certificate reduce their opportunities. By leaving school before graduating, many dropouts take with them educational deficiencies that severely curtail their economic and social well being and relevance throughout their adult lives. Dropouts are more likely to be unemployed and become streetwise involved with drugs, alcohol, crime, delinquency and gangs. The phenomenon is so pervading that to declare our children an endangered species is an understatement, the schools are simply a microcosm of the greater society which is characterized by escalating violence and by real and noxious presence of gangs. Our most cherished natural resource is being wasted.

Specifically, high levels of risk affects institutional planning for faculties, long term planning for the curriculum and an institution's survival. Large numbers of academically under-prepared students increase the average cost per student. Dropouts are more likely to end up on welfare (or any other programme that suits the political climate). All these are critical for the nation because of the fair portion of Nigeria's human and financial resources that go into the education enterprise (Onyejiaku, 1982).

PURPOSE

The purpose of this study was to determine if academically high-risk students differ from their mainstream counterparts with regard to their perceptual organization.

RESEARCH QUESTION AND HYPOTHESIS

Parents, teachers, schools and even governments awakened by the serious nature of risks have either singularly or collectively come together with various remedies to no avail. What might be responsible for this negative trend and how can it be managed? While there are studies speculating about the causes of high-risk and underachievement of students in literature, there are just a few involved with their perceptions. This study is therefore an effort to authenticate empirically the proposition that general perceptual ability could be relevant in explaining high-risk in the students. Research question (RQ): Do academically high-risk students differ from mainstream students in their general perceptual ability?

Hypothesis

There is no significant difference between academically high-risk and mainstream students in their general perceptual ability.

ASSUMPTIONS OF THE STUDY

The following assumptions were made:

1. In the school system, some students are academically high-risk while some are in the mainstream in terms of academic performance.
2. Academically high-risk and mainstream students in the school system can be identified.
3. General perceptual ability is measurable and it differs from one student to another.

METHODOLOGY

Sample

The sample was drawn from the population of Junior Secondary School 2 students in Rivers State, Nigeria. The population is made up of thirteen thousand, two hundred and fifteen boys (13,215) and thirteen thousand, eight hundred and eighty eight (13,888) girls with a total size of twenty seven thousand, one hundred and three (27,103) students (Rivers State Government, 2000). Their age range lay between twelve (12) and fifteen (15) years. Actual sample size was one thousand, two hundred and five (1, 205) students, stratification of the study population based on territories.

Research instrument

The high-risk students were identified by the status of their report cards. The subjects that passed were assigned into the mainstream group, which are the majority. The subjects that had outright failure or were given conditional promotion constituted the high-risk group, they were in the minority. As there was no ready-made instrument for measuring perceptual organization in subjects, a well-validated self made instrument captioned Perceptual Organization Visual Battery Test (POVBT) was developed. This is a battery of three tests because the problem of high-risk spans through academic, behaviour, physical and other areas as no one test could satisfactorily measure it. Besides, perceptual organisation also spans through psychological, developmental and cognitive batteries to be able to assess it (perceptual organisation) adequately. Hence the adapted tests were (a) Bender Perceptual Motor Gestalt Test, "The Bender" McCullough (1992); (b) Marianne Frostig Development Test of Visual Perceptual, "The Frostig" McCullough (1992), (c) An adapted form of Sigel's Cognitive Style Test (SCST) (1997), Onyejiaku (1982), these are all paper and pencil tests.

RESULTS

It was hypothesized that there is no significant difference between academically high risk and mainstream students in their general perceptual ability. The t-test has been adopted to analyse the data because the scores of the

Table 1. Results of t-test analysis, high risk students and their mainstream counterparts compared in general perceptual ability.

Group	N	Max	Mean	SD	$t^{critical}$	$t^{calculated}$	Remark
Mainstream	742	46	34.19	2.26			
					1.96	3.08*	Ho rejected $p < 0.05$
High risk students	462	46	34.19	2.73			

*Significant beyond the 0.05 level.

dependent variable are continuous, its distribution normal and the population variances of the two groups are equivalent. The two sample t-test is a comparison of means to determine whether the observed difference of 34.19 for mainstream students and 34.64 for high-risk students is statistically significant (real) or that it is due to sampling error. A real or statistically significant difference of 0.45 indicates a difference in the mean of the population (27,103) from which the samples (742 + 462 = 1204) were drawn. However, it must be noted that in this case, the difference was not a result of sampling error which might indicate that the 0.45 difference in mean was a result of chance factors associated with the sampling technique.

This is the result of the study comparing the mainstream (742) and high-risk (462) subjects without pairing them. The sampled 0.45 between 34.64 and 34.19 is comparable to the null hypothesis assumption of no difference between the means. The null hypothesis is that practically, sampling has taken place in the same population of dependent variable scores twice, and gotten two sample means from the same population. That is why t-test is employed in research for comparison between two variables. This implies that the null hypothesis is $\mu_1 - \mu_2 = 0$, where μ_1 and μ_2 are the 34.64 and 34.19 (population means) for their general perceptual ability scores of the mainstream and high-risk groups. In order to test the null hypothesis, the calculated value of t is compared against the critical value of t for the appropriate degrees of freedom. A level of significance is set at 0.05 which specifies the region of acceptance or rejection.

As presented in Table 1, the result of the data analysis shows that the calculated t-value (3.08) is higher than the critical t-value of 1.96. This implies that the null hypothesis that there is no significant difference between high-risk and mainstream students in their general perceptual ability is rejected. The alternate hypothesis of there being a significant difference stands in spite of their difference in mean scores in favour of high-risk students. The mainstream students still have a significantly higher general perceptual ability.

DISCUSSION

Mainstream students have a significantly higher perceptual ability, in spite of their being a difference in mean scores in favour of high-risk students. The result also implied that main stream students tend more than high-risk students to be successful in specific areas of perception. A theory to interpret in the light of one's results is the gestalt theory of perception. It is very evident that gestalt organizational law of grouping determined the structure of perceptions. What a person learns is as a result of and specified by the laws of perceptual organization. It also determined the structure of what is laid down in memory. With respect to visual memory, individuals vary from those who have "none", to those who have an eidetic (photographic) memory. Eidetic memory is "infantile", everyone had it as a child, this is consistent with studies by Haith and Benson (1998), Spelke (1991), Nwachukwu (1996), Mirand, Hack, Fantz, Fanaroff and Klaus (1977) who demonstrated that young infants forms visual expectations. They found that by 4 months of age, even though infants do not yet have the ability to talk about objects, move around objects, manipulate objects or even see objects with high resolution, they can recognise where a moving object is when it has left their visual field and make inferences about where it should be when it comes into sight again. Observations of infants' visual preferences have found that there is a relationship between neonatal pattern vision (ability to distinguish between patterns) and future cognitive development. In their study, ratings on a neonatal visual pattern test predicted children's IQ scores at age 3 or 4 better than neonatal ratings on neurological tests (Mirand et al., 1977). However, very few individuals preserve the eidetic memory ability to review experiences in such vividness, with figure and ground easily shifting. Besides, the conventional demands of our education that we abstract only useful objects and verbal knowledge from experiences which are full of life so suppress the eidetic power that most of us experience it only in dreaming. Hence, the significant difference between mainstream and high-risk students.

The differential performance of mainstream and high risk students on the criterion can also be explained in terms of the subjects' early experience, learning, motivation and emotion, because all these factors can either singly or collectively define what and how subjects perceive. A basis for distinction between perceiving and sensing is the notion that perceiving is subject to the influence of learning while sensing is not. It might be said that the sensations generated by a particular stimulus will be essentially the same from one time to the other while

the resulting precepts may vary considerably depending on what has been learned between one occasion and the next. This explanation is consistent with Isangedighi (1996), Cigales, Field, Lundy, Cuandra and Hart (1997) who found in their study that contact with child, communicating with him/her and providing a rich environment seem to foster a variety of physical, sensory and cognitive gains. The opposite case that is the inability to sight the world and perceive it correctly could distort the balance that is so necessary for succeeding. This is the reason why Santrock (1999) has maintained that if infants did not develop perceptual constancy, each time they saw an object at a different level of brightness, they would perceive it as a different object.

Conclusion

Some of the findings of the study are as follows: mainstream students have a significantly higher general perceptual ability, in spite of there being a difference in mean scores in favour of high-risk students. Mainstream students tend more than high-risk students to be successful in specific areas of perception like differentiation, constancy and grouping. Based on these findings, the following conclusions were drawn:

1. Mainstream students are excellent in general perception as a complex psychological phenomenon.
2. The high-risk students were themselves found excellent in general perception as a complex or compound ability.
3. Mainstream students tend to be more capable than high-risk students in specific areas of perception like differentiation, constancy and grouping.

RECOMMENDATIONS

Based on the finding of the study and subsequent conclusions, the following recommendations have been made:

1. For effective teaching and learning, the mode of learners' perceptual style or his mode of understanding seems to be basic. Students should be exposed to instructional technique in which they will benefit more. This recommendation is worthy of attention of all educational psychologists and counsellors, educators and administrators.

2. Knowledge of students' mode of perceptual categorization by the teacher could serve as a basis for prescribing learning activities that match the at-risk students' perceptual or cognitive structure, thereby increasing the probability of successful accomplishment of a learning task by the students at-risk.

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