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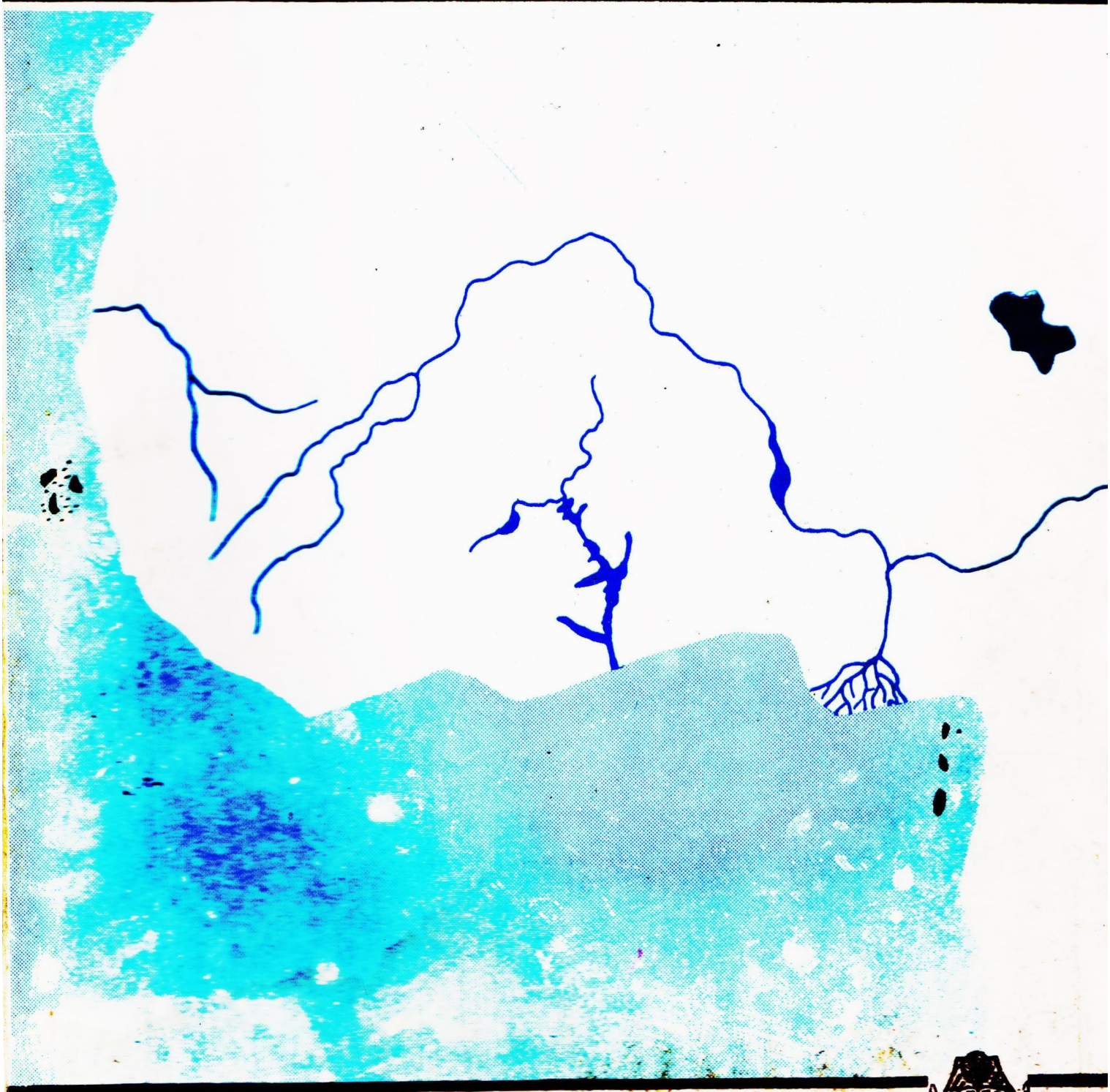

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NATURE OF ENVIRONMENT AND DEVELOPMENT OF FORM ORIENTATION

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ABSTRACT

The effect of environment on the development of form orientation was studied on two groups of children, from the age of 5 years through 11 years. The two groups, having 35 subjects each, constituted randomly selected children from rich and poor experiential background. The stimulus material, stick figure of man, was presented in 8 different orientations and the recognition threshold was determined. The results show significant differences in the recognition threshold of the two groups. Oblique orientation is last to develop. The findings are indicative of impaired development of perceptual skills among the children living in impoverished environment, however, the initial lag in perceptual development has not been found to be permanent in nature.

INTRODUCTION:

Human innate capacities are sharpened through learning, memory, attention, and reasoning, which take place in the context of socio-cultural background. Previous experience, according to Helmholtz (1966), is most important in perception and every perception, according to Hebb (1949), Awaritefe, ,et, al (1989) is learned. Therefore, it could be expected that the nature of environment, which provides the necessary sensory inputs, stimulation, and experiential base, would influence the development of cognitive functions. A review of literature indicates cognitive development being influenced by variables like sensory deprivation (Zubek, 1969; Jessor, 1981) and cultural background (Triandis, 1964; Jahoda, 1966; Segall et al., 1966; Ganguli & Broota 1973; Broota & Ganguli, 1975; Fleming et al., 1985; Rena, 1987). Dass (1973) concluded, on the basis of series of studies, that high caste status and high income help the development of cognitive competence. Shina & Shukla (1974) investigating the effect of deprivation on the development of skill for pictorial depth, suggested that the children deprived of stimulation and heterogeneity of experience are deficient in perceptual skills. Similarly, Davis (1968) and Tripathi & Misra (1976) also found a negative relationship between deprivation and cognitive functioning.

Present experiment has been designed to study the effect of immediate environment of the child on

the development of perception of form orientation. Environment, here, is taken as a global construct referring to multidimensional background of an individual. Impoverished environments thus, refers to background factors deficient in experiences and conditions of learning, which may include poor residential accommodation, poor physical environment at home and adjoining the home, low economic status, poor educational experience, poor recreation, lack of intellectual stimulation et c. etc. Two groups of children have been included in these ample: those having rich experiential base (labelled high economic group) and those having deficient experiential base (labelled low economic group)

METHOD

Subjects:

Two groups of 35 children each, were selected randomly from those having rich experiential base (HE) and those having deficient experiential base (LE). The children in the HE group were those whose parents were well educated, having per capita income of N10,000per month or more, studying in private schools, and living in good localities of Lagos. On the other hand, children in the LE group were those whose parents were uneducated or had primary education, per capita income was N3,500 per month or less, studying in government schools and living in slum areas in Lagos.

The age of children varied from 5 through 11 years. In each of the two groups, five children were selected from the 7 age levels.

STIMULUS MATERIAL & APPARATUS:

The stimulus material consisted of stick figure of man drawn on a white card with black ink and subtended a visual angle of 4°18′ of an arc when viewed from the tachistoscope. The form was presented in 8 different orientations achieved by rotation through 0° (vertical position), 45°, 90°, 135°, 180°, 225°, 270°, and 315°, in the frontal plane.

Thus, by rotating the figure in the clockwise direction, eight different orientations were achieved.

Two-field Harward Tachistoscope (Model T-2B-10; Ralph Gerbrands Co.) was used to present the stimulus figures. One field served as constant illuminated fixation field and the other in which these stimulus figure was exposed.

PROCEDURE:

The subject was asked to look inside, through the viewing aperture, in which an illuminated field was visible with a small back dot in the center off the field. Initially the subject was asked to look at the dot, on the illuminated background, for about one minute so that the visual system gets adapted to the level of illumination. Then a ready signal was given and the stick figure was exposed for a duration of 5 milliseconds (msec) After exposing a figure, in one of the 8 orientations, the subject was required to match the correct orientation from among the 8 randomly displayed figures on the table, in different orientations. The exposure duration was increased in equal steps till the subject recognized the correct orientation twice consecutively, the first being the threshold value. In this manner, the recognition threshold for each of the 8

orientations was determined for each of the 70 subjects. The order in which the threshold was determined for the 8 stick figures w as randomly decided for each subject. The dependent measure was the exposure duration required to correctly judge the orientation of the exposed form. The illuminance was kept constant throughout the experiment and the two fields had the same illuminance.

DESIGN:

The independent variables of interest were:

1. nature of environment (Factor A), having two levels – rich environment and deficient environment;

2. age level (Factor B), having seven levels from 5 years through 11 years; and

3. form orientation (Factor C), having 8 levels. Thus, it is a 2 x 7 x 8 factor experiment with repeated measures on the last factor. All the levels of the factors were fixed.

RESULTS

Recognition threshold was determined, in milliseconds (msec), for the form in each of the 8 orientations – 0° and 180° rotations constituted the vertical positions, 90° and 270° the horizontal and 45°, 135°, 2250°, and 315° the oblique orientations. Analysis of variance was carried out in accordance with the repeated measures design (Winer, 1971; 560).

It has been observed from the results of ANOVA that factor A (nature of environment) is highly significant [F (1,56) = 33.67; $p < .001$].

The mean threshold of HE group is 5.14 msecs. This shows that children coming from the enriched environment have faster perceptual development than the children from the deficient environment. Factor B(age level) has also been found to be highly significant [F (6,56) = 30.99; $p < .001$]. This shows that recognition threshold varies with age. That is, there is negative correlation between threshold and age. The mean recognition thresholds and age. The means recognition thresholds are presented graphically as a function of age in Fig. 1.

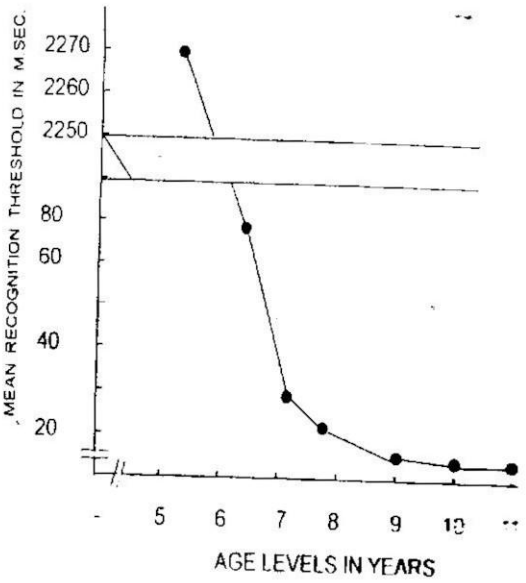

Fig 1. Mean recognition threshold as a function of age

It is observed from Fig. 1 that the threshold fall is very sharp from 5 years to years level (2259 msec to 66 msec), it drops quite fast from 6 to 7 years and after the age of 8 years the drop is slow. Duncan's multiple range test showed differences in the threshold values between 5 years level and all other levels($p < .01$), 6 years level and all other levels ($p < .05$). other comparisons showed non-significant differences.

The main effect of C (form orientation) has also been found to be significant F(7,392) = 7.36;p<.01. These mean thresholds, as a function of orientation, are presented in Fig. 2.

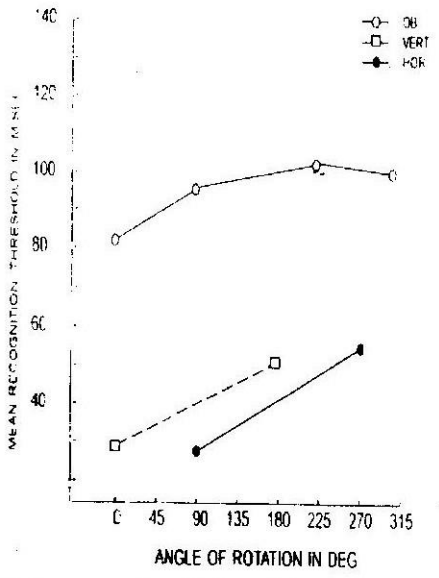

Fig 2: Mean recognition threshold of form in oblique, vertical and horizontal orientations

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Three separate curves, for oblique, vertical and horizontal orientations, have been presented in fig. 2. It is observed that the recognition threshold in respect of obliquely oriented form is highest, followed by verticals and horizontal. Duncan's multiple range test shows that the threshold values of form in oblique orientation differ significantly from those of vertical and horizontal orientations (p < .01). However, the threshold values of forms in vertical and horizontal orientations do not differ. Further, the differences within the three types of rotations are non-significant.

AXB interaction (environment x age) is also significant [F (6,56) = 30.91; p<.01]. The AXB interaction profile is presented in Fig. 3.

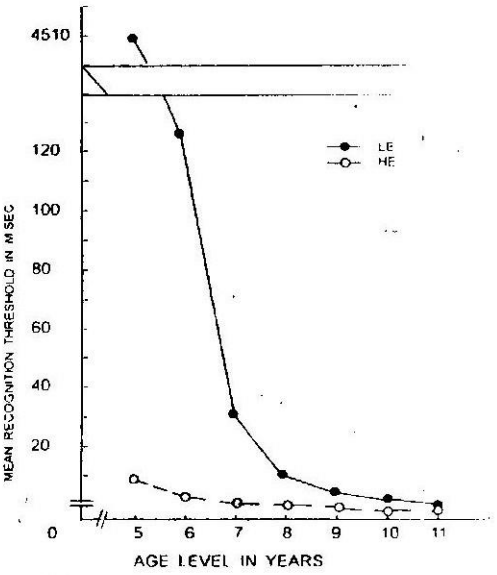

Fig. 3: A x B interaction profile

It is observed from Fig. 3 that the pattern of the two curves, in the two groups, differ widely. The threshold values in respect of the HE group remain constant (within the chance fluctuations) with age, whereas, that of the LE group the values drop sharply from 5 to 6 years level and the drop continues. However, at the age of 11 years the two curves merge, showing that by the age of 11 years the two groups have the same recognition threshold. The differences between the threshold values of the two groups shows that the perceptual learning among the LR groups is retarded in comparisons to the HE group. However, the make-up is complete by the age of 9 years of so.

All other interactions (A x C, B x C, & A x B x C) are also significant (p< .01). These interactions are significant as the threshold values of the 5, 6, & 7 year levels in the LE group are

exceptionally high in comparison to the HE group.

DISCUSSION

The results of the experiment indicate that the experiential base of a child influences the development of perceptual skills. It has been found that the rate of perceptual development, in the children reared in rich environment, is faster in comparison to the children reared in deficient environment. Nature of environment provides the necessary sensory inputs, stimulation, and experience for the development of perceptual skills. According to Hunt (1961), the environmental settings in which a child is born has as great an influence as the genetic factor. Burner (1959) has also emphasized the role of environmental factors. Child reared in deficient environment lack perceptual stimulation, in general. They do not get enough learning opportunities. According to Gibson (1969) "Impoverishment of stimulation in early life may result in lack of perceptual curiosity, and an ability to sift our distinctive features from irrelevant stimulation". The high threshold values of the LE group shows that the children were unable to locate distinguishing features and single them out form the multidimensional display, and their selective pick-up of information was deficient. For this reason, greater number of exposures and its duration were required by the LE subjects to recognize the form in different orientations.

Forgays & Forgays (1952) found that the at reared in free environment performed better than cage-reared rats. They concluded that superior performance was due to early perceptual experience gained from the wider sensory environment.

However, the retardation of perceptual skills in the LE group is not permanent in nature. It has been observed that the differences in the two groups start converging from the age of 8 years and by 11 years the threshold values merge. Younger children in the age group of 5 to 7 years do not get opportunity to interact with the environment away from their home and immediate environment. Thus, their perceptual experiences are limited and deficient. As they grow up their area of locomotion in the environment increases and they get wider and richer experience away from their homes, which results in the pick-up in the perceptual learning.

It has also been observed that maximum effect on recognition threshold is observed when the figure is rotated in oblique axis (45°, 135°, 225°, & 315°). This shows that vertical and horizontals orientation develops first, through experience, and oblique orientation develops later. Moreover, the nature of the stimulus material was such that its recognition in vertical and horizontal axis was easier and more natural for the child than in the oblique axis.

Thus, it may be concluded that the form orientation is a developmental phenomenon and develops faster if the experiential base is rich and conversely gets retarded under impoverished stimulation. However, the lag observed among the children from the impoverished environment is not permanent in nature.

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