CULTURAL CHANGE AND FIELD DEPENDENCE IN TWO NATIVE CANADIAN LINGUISTIC FAMILIES

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CURRICULUM STUDIORUM

Jacqueline Marie Weitz was born August 12, 1925, in Dubuque, Iowa, U.S.A. She received the Bachelor of Arts degree from Rosary College, River Forest, Illinois, in August, 1950. In June, 1953, she received the Licence ès Lettres from the University of Fribourg, Fribourg, Switzerland. Her thesis was entitled, La Portée Pédagogique de l'Oeuvre Valeryenne.

Between 1958 and 1969, Miss Weitz taught Indian children in northern British Columbia and on the Blood Reserve in southern Alberta.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Anthropological studies in recent years have provided evidence that culture and ecology influence an individual's development in specific and characteristic ways. Psychological studies have investigated manifestations of this influence on perceptual, intellectual and psychological growth as it is encountered in cross-cultural research.

The North American Indian has a characteristic way of looking at the world, thinking about it and reacting to it. There is anthropological evidence of this in the post-Columbian history of the native people.[1,2] Researchers have provided valuable insights into the way of life of numerous linguistic families, so that cultural patterns and ecological influences which contribute to shaping perception, thought and behaviour, are well defined.

Distinctive habits of perceiving, thinking and acting contribute to a composite mode of psychological functioning known as cognitive style. It is the purpose of this study to identify and describe the cognitive style of the Indian people, using Witkin's field-dependent-independent theory as the frame of reference.

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1 A.L. Kroeber, (Ed.) Anthropology Today, An Encyclopedic Inventory, Chicago, University of Chicago Press, 1953, p. xv-966.

2 Diamond Jenness, (Ed.) The American Aborigines, Their Origin and Antiquity, Toronto, University of Toronto Press, 1933, p. iv-396.

INTRODUCTION

These Asian people who traversed the Bering Strait as early as 200,000 years ago, never knew the Greek philosophers.[3] Their logic has canons of its own, which resemble oriental modes of reasoning. In any given community the Indians applied their human ingenuity for survival. This struggle produced "culture" and "intelligence", i.e. a system of responses which developed from an individual's or a group's adaptation to the environment. Berry points out that peoples define intelligence in different ways, depending on the skills they have had to develop and maintain to meet their survival needs.[4]

For four hundred years the white man and the Indian have shared the same ecology. The Indian's culture has grown out of interaction with his environment, while the white culture was imported from another time and another place. It is not surprising, then, that an Indian and a white man will define "intelligence" differently. There would be no problem if each could live alone. But this is not the case. The Indian, with his distinctive life style, is surrounded by the powerful influence of a progressive and aggressive society. In the process of acculturation, it is the Indian who

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3 Frank Boas, "Relationship Between Northwest America and Northeast Asia", in Diamond Jenness, The American Aborigines, Their Origin and Antiquity, Toronto, University of Toronto Press, 1933, p. 357-396.

4 John W. Berry, "Temne and Eskimo Perceptual Skills" International Journal of Psychology, Vol. 1, No. 3, 1966, p. 229.

must alter what he has learned in his family; especially those things which most hinder participation in the other culture. Normally, these cultural adjustments are made by enculturated adults who face the necessity of choosing between the old and the new. The children learn from them. The reverse has happened for the Indian. Acculturation is fostered in the classroom, where the child is caught in a whirlpool of cultural contradiction.

The impetus to identify the cognitive style characteristic of the North American Indian, came first from the realization that Indian parents have quite different values, goals and priorities than do teachers. These latter plan programmes and use methods aimed at stimulating and exercising the child's intelligence. But neither their concept of intelligence nor the method they employ recognizes the needs of their Indian pupils. Will Sinclair is explicit in stating the case:

> Indian children differ from non-Indian children, not because they are retarded in maturing, but because of their experiences. Theirs is a very different culture, with different mores, beliefs, ideologies and values. 5

The child's cognitive style, reflects that of his parents. If the white teacher hopes to succeed she must imitate the

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5 Will Sinclair, "The Indian Drop-out", Northian, Vol. 6, No. 2, Spring, 1969, p. 28-30.

INTRODUCTION

teaching methods used by the Indian parents and better understand the learning process of the children. Witkin suggests:

> ...knowledge about the existence of cognitive styles and their specific nature may be useful with some of the problemsencountered in the educational situation. In particular (...) for issues of evaluation, placement and teaching methods. 6

The problem, then, is to determine if there is a consistent style of cognitive functioning which is characteristic of the Indian people. This report will be concerned with only one facet of cognitive function i.e., perceptual style.

The first chapter will review what has previously been done in this area, emphasizing the evolution of cross-cultural and intra-cultural methodologies. The first formulation of a hypothesis will result from an examination of studies guided by Witkin's differentiation theory.

The theoretical foundations of the study are presented in Chapter II. These include: 1) anthropological theories, touching on cultural and ecological influences, and, 2) psychological theories, touching cognitive functioning. Resulting consequents will permit further precision in the statement of hypotheses. In Chapter III, design requirements will be discussed, with a description of the instruments, procedures and statistical analysis. The exploratory study

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6 Herman A. Witkin, "Some Implications of Research on Cognitive Style for Problems of Education", Professional School Psychology, Vol. III, Grune & Stratton, Inc., 1959, p. 198-227.

will be described in Chapter IV, after which, in Chapter V The Study itself will be reported: independent and dependent variables, instruments and statistical analysis.

Presentation and Discussion of Results will be found in Chapter VI. Following the discussion of results, the Summary and Conclusions will be presented, with Recommendations for further study. Finally, the Appendices will contain information on the Indian Population, Individual Performance Records, Samples of Field Notes and a Transcript of the Directions used in administering the tests.

CHAPTER I

REVIEW OF THE LITERATURE

METHODOLOGICAL FOUNDATIONS

Indian intelligence has been an object of curiosity for researchers since the early decades of this century. In general, studies were undertaken in order to measure Indian intelligence and to compare it with intellectual performance of white subjects. These studies were remarkable for lack of cross-cultural perspective and inadequacy of instruments and design. Gradually, concern with intellectual abilities, I.Q., M.A., achievement and aptitude as related to bloodedness, and comparisons with whites and negroes, gave way to fundamental psychological problems. This evolution will be traced from the study of intellectual ability to the definition of cognitive style. It will parallel the evolution of the concept of intelligence and the refinement of methods and procedures in cross-cultural research.

The review of the literature will be presented as follows:

1) Studies of Indian Intelligence
2) Extensions of the Concept of Intelligence
3) Definition of Cross-Cultural Objectives
4) Studies of Cognitive Abilities
5) Application of Witkin's Theory
6) Summary and General Hypothesis

1. Studies of Indian I.Q.

Research on the "mental equipment of the American Indians" was reported by Haught in 1934. The research was

directed to experimental investigation of the Indian's "reaction time, sensory acuity, handedness, color preference, community of ideas, musical talent, will-temperament, fatigue, and work curves, and intelligence."[1] The conclusions to his study are so incredible that they must be quoted:

> In terms of scores on intelligence tests (Pintner-Cunningham Primary Mental Test, National Intelligence Tests, Terman Group Test of Mental Ability) the Indian is below the whites. Naturally, the question arises: is he low in native ability or do the tests fail to measure him accurately because his environment has been different from that of the whites? The evidence that he is low in native ability and not low because he is handicapped by his environment is as follows:
>
> a) The subjects tested have been in schools from one-half to ten years. The older the subject the longer he has been in school. It is reasonable to assume that attendance at school should make his environment and past experience more like that of the whites. Consequently, his ability to take the tests should increase. But the mental growth curves in Figure 1 (not reproduced here), show that the older he becomes and the longer he attends school, the farther he falls below the normal mental age for whites...
>
> b) ... An examination of column five in Table 1 (not reproduced here) shows that the intelligence quotients of Southwestern Indians remain fairly constant from the ages of six to ten and from there on decreases.
>
> The findings of this study then, present two bits of evidence that the Indians make lower scores than the whites because they are lower in native ability.[2]

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1 B.F. Haught, "Mental Growth in the Southwestern Indian", Journal of Applied Psychology, Feb., 1934, Vol. XVIII, No. 1, p. 137-142.

2 Ibid., p. 141.

METHODOLOGICAL FOUNDATIONS

The several studies of Garth during the 20's suggested hypotheses that occupied researchers for the next decade. These references are quoted by Jamieson and Sandiford in their study of the "Mental Capacity of Southern Ontario Indians".[3] Very little was introduced by these educational researchers to broaden the dimensions of this type of study.

Telford engaged in an investigation of the relation between degree of white blood and test performance in 1932. It is difficult to take his applications seriously. In the case of the Indian, superiority of mixed-bloods over full-bloods on tests of information, and generally, in all lines of white endeavour, is due to greater educational opportunity, higher social status and contact with the white culture; since the white blood is of such poor quality. On tests of fundamental learning and motor abilities neither blood nor opportunity made a difference; mixed-bloods and full-bloods do equally well.[4]

Eells did a study for the United States Government in 1933 with the Alaskan children of the Eskimo, Aleut and

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3 Elmer Jamieson and Peter Standiford, "The Mental Capacity of Southern Ontario Indians", Journal of Educational Psychology, Nov. 1928, Vol.XIX, No. 8, p. 550.

4 C.W. Telford, "Test Performance of Full and Mixed Blood North Dakota Indians", Journal of Comparative Psychology, 1932, No. 14, p. 123-145.

Indian races. Using the original form of the New Standard Achievement Test, he found that the three native groups scored much lower than the average American child on fundamental abilities and in achievement. His recommendation for Federal education in Alaska was to the point:

> "... and indigenous curriculum should be worked out, adapted to the measured levels of ability of the children, based upon native needs, and directed toward the cultural assimilation and economic independence of the native people of the vast Territory of Alaska.[5]

Turner and Penfold did a study on the scholastic aptitude of Indian children of the Caradoc Reserve. Although they demonstrated awareness of environmental influences, this concern did not reach a significant dimension, but led only to changes in three of the items of the verbal scale of the Wechsler Intelligence Scale for Children, which "placed Canadian school children at a disadvantage with American school children". As an example: General Information, Item 17: "What is celebrated on the Fourth of July?", changed to, "What is celebrated on the 24th of May?"[6]

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5 Walter Crosby Eells, "Educational Achievement of the Native Races of Alaska", Journal of Applied Psychology, Vol. XVII, No. 4, Aug., 1933, p. 417-438; No. 6, Dec. 1933, p. 670.

6 G.H. Turner, D.J. Penfold, "The Scholastic Aptitude of the Indian Children of the Caradoc Reserve", Canadian Journal of Psychology, Vol. 6, 1, 1952, p. 31-44.

METHODOLOGICAL FOUNDATIONS

Fitzgerald and Ludeman were struck by the kind of responses which the Indian children made on the logical selection, Test 3, in the National Intelligence Scale. Selecting the two words which a "crowd" always has, Indian pupils marked "danger", "dust". This and like examples caused the investigators to observe,

> Perhaps the history, environment, and experience of the Indians have been such that "danger", "dust" (...) are to him logical elements of the crowd (...) While the evidence is not conclusive, there is some indication that the Indian considers answers to be logical and correct due to his environment and because of his experience.[7]

In 1941, M. Sparling used the relation between the Binet and Porteus scores to show that any differences in the performance of Indians were due to "themselves" and not to any difference in the standardization of the two tests, since a population of white children obtained very similar scores on the two tests. She recognized that "entirely different standards" must be used in evaluating test results from the two populations.[8]

In another study reported in 1968, MacArthur adopted a hierarchial organization of abilities as a model for inves-

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7 J.A. Fitzgerald and W.W. Ludeman, "The Intelligence of Indian Children", Journal of Comparative Psychology, 1926, Vol. 6, p. 327.

8 Margaret E. Sparling, "Intelligence of Indian Children-The relation between Binet and Porteus Scores", American Journal of Mental Deficiency, 1941, Vol. XLVI, No. 1, p. 62.

tigating the mental abilities which various peoples develop in adapting themselves to their own natural and cultural environment. An extensive battery of tests covering, or at least sampling most of the varieties of human abilities, was administered to samples of Eskimo, Indian, Metis and white boys.[9]

While rooted in a rationale which recognizes that the pattern of mental abilities will differ across cultures, the model renders interpretation inflexible. The difficulty lies in the fact that by existing criteria a pattern of v:ed abilities (verbal, numerical, educational) is the cluster to cultivate if there is to be success in the technological society. MacArthur's conclusion, echoes that of Vernon on the completion of a similar study in 1965:

> ...these results suggest a greater aptitude among Eskimos and, to a lesser extent, Indians, for technical training than for more academic types of education.[10]

Vernon's venture into cross-cultural research was carried out among the Indian boys of Alberta, Stoney Indians at Morley and Blackfoot Indians at Cluny. The Eskimo boys were from Inuvik, Tuktoyaktuk and Aklavik in the Mackenzie Delta.

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9 R. MacArthur, "Some Differential Abilities of Northern Canadian Native Youth", International Journal of Psychology, Vol.3, No.1, 1968, p.43-51.

10 Philip E. Vernon, "Educational and Intellectual Development Among Canadian Indians and Eskimo", Educational Review, Vol. 18, Part II, 1966, p.194.

METHODOLOGICAL FOUNDATIONS

The report of his work includes a detailed discussion of Indian values, historical and economic background of the people, child-rearing and schooling information. Ability tests were administered. These were fairly numerous. Among them were:

- arithmetic
- spelling
- English reading comprehension and usage
- group vocabulary
- Terman Merrill vocabulary
- information learning
- word learning
- concept formation
- abstractions
- matrices
- Gottschaldt, Embedded Figures
- Goodenough Draw-a-Man
- Draw-a-Man, Witkin scoring
- Porteus mazes
- Kohs blocks [11]

In addition a survey was made of the boys' socio-economic characteristics and interests. The resulting socio-economic index was based on:

- parental occupation
- housing and possessions
- delayed gratification
- family size and make-up
- overcrowding
- number of wage earners [12]

A cultural stimulus index was based on:

-parental education
-school standards reached by older sibs
-evidence of parental interest in school
-amount of reading at home

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11 Vernon, op. cit, Part 2, p. 187

12 Ibid, Part 1, p. 85-88

Ratings were also found for:

- delayed gratification on a chocolate test
- broken or unusual homes
- linguistic, amount of English used in the home
- irregular or delayed schooling
- planfulness or purposiveness of the home versus improvidence and irrationality
- boys' leisure time activities
- boys' occupational aspirations
- initiative on the basis of active, resourceful interests and vocational aims and self-reliance. [13]

It would seem that Vernon encountered difficulty in maintaining functional equivalence throughout these assessments. His scales and standards were similar to those he had used with English and Hebridean boys. To preserve functional equivalence is one of the pre-requisites of cross-cultural study. Thus if activities, silence for example, have different functions in different societies, the comparison of their parameters is nullified. One example of this is in Vernon's account of the test and interview procedure:

> About one-quarter of the Indians and one-eighth of the Eskimos were extremely slow and difficult to test and interview, usually through difficulties of language or general dullness, (they were mostly of Grades 1 or 2).[14]

Silence is highly regarded among Indian people, and small children, especially, are expert at this strategy of awareness.[15] Miscalculation of its function results when high

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13 Vernon, op. cit., Part 1, p. 88-91

14 Ibid., Part 1, p. 85

15 Andre Renaud, O.M.I., "Education From Within", in Living and Learning, Hall-Dennis Report, Ontario Department of Education, 1968, p. 111

priority is attached to verbalization.

The outlines of a trend are discernible across these studies of the Indian's intellectual ability. The movement is slowly away from concern with biological and racial influences as related to measurements of intelligence by I.Q. tests, to an interest in cultural and environmental influences. Their importance, i.e., cultural and environmental influences, in human development was better understood with the development of a broader theoretical concept of intelligence. A broader understanding of the role of heredity and environment in human development was also a contributing factor in this movement. The concept of behaviour as wholly hereditary gave way to the view that the heredity-environment relationship is one of interaction: the influence of each depends upon the contribution of the other.

Taking into account that this evolution of psychological concepts was a relatively rapid one, the theories which emerged are of considerable importance. Those which integrate the heredity-environment factors with those of intelligence will now be discussed.

2. Extensions of the Concept of Intelligence

Spearman's theory of a general factor of mental ability and Thurstone's stand for a number of primary abilities did not satisfy the need for a flexible theoretical model, necessary in cross-cultural intelligence studies.

METHODOLOGICAL FOUNDATIONS

Hebb's concept of the A/S ratio[16] (1940) led to a substantial revision of the notion of intelligence. From the prevalent idea of a fixed intelligence and pre-determined development, attention could be directed to the importance of perceptual experience in primary learning and its relationship to an eventual adult level of intellectual capacity.[17, 18.]

In 1954 Ferguson utilized the principle underlying the A/S ratio in his concept of learning and human ability. The power of an organism at any given time to respond to any immediate situation is a complex function, not only related to its biological propensities and previous learning, but also to the stage of life at which learning of various types take place. The implication here for cross-cultural research are immense. Ferguson states:

> ...that the more or less stable attributes of behaviour, commonly referred to as abilities, represent performance at crude limits of learning,

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16 The A/S ratio = $\frac{\text{total association cortex}}{\text{total sensory cortex}}$

In neuropsychology the notion that cell-assemblies and phase-sequences, established within the associative regions of the cerebral cortex by primary learning, (perceptual and sensory in nature), become welded through increased stimulation, use and association. The length of the primary learning period is proportional to the A/S ratio, during which environmental control is being established over associative control.

17 D.O. Hebb, The Organization of Behavior, New York, Wiley, 1949, p. 124-125.

18 J.P. Guilford, The Nature of Human Intelligence, New York, McGraw-Hill, 1967, p. 374.

> and that such limits are determined by the biological propensities of the individual and by cultural factors which prescribe what shall be learned and at what age. Therefore, questions raised about the role of cultural factors in human ability are essentially questions about the relationship between learning and human ability... The initial problem becomes one of describing the patterns of ability which are characteristic of individuals reared in different cultural environments.[19]

He repudiates as invalid those investigations on racial differences in intelligence which were rooted in a biological concept linking intelligence and race. Rather, racial differences result from specific cultural demands which give priority to the development of those abilities on which survival depends and which must reach an acceptable limit of overlearning. Practical application of this theory will recognize that there is no single criterion for performance on a given task. "Individuals in diverse cultures may bring different abilities to bear on the solution of an identical problem."[20]

Ferguson issues a caveat which should ring in the ears of every researcher in cross-cultural studies:

> Implicit in the use of (...) terms as 'restricted', 'underprivileged', and the like to refer to cultural groups is the evaluation that because many cultures

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19 G.A. Ferguson, "On Learning and Human Ability", Canadian Journal of Psychology, Vol. 8, 1954, p. 104.

20 Ibid., p. 108.

> are different from our own they are in some vague sense "not as good". Even some of our better scientific thinkers seem incapable of observing a difference between cultures without implying a value judgment.[21]

There is no question of demonstrating the existence or non-existence of inter-cultural differences in one or another specified ability. Rather every effort should be made to find the description of the patterns of ability which are characteristic of individuals from different cultural settings. This approach would necessitate finding adequate ways and means of describing these abilities. The theoretical posture of Hebb and Ferguson emerged as an important milepost in the development of cross-cultural research. Their work made possible the new directions and goals which cross-cultural studies would take. These goals and the methods for reaching them have now to be considered.

3. Definitions of Cross-Cultural Objectives

The trend in the evolution of the concept of intelligence which favours a qualitative, rather than a quantitative approach to the study of cognitive functioning of different cultural groups furnishes the basis for the venture into a viable kind of cross-cultural study. The patterns of primary

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21 G.A. Ferguson, op. cit., p. 105, footnote.

mental ability, not the abilities themselves, and their determinants emerge as the proper objects of investigation. Biesheuvel, in examining the modus operandi of researchers, advocated a common sense design which would "study the thing to be compared before undertaking comparisons".[22] In studies where cultural conditioning is a factor determining the mode of perception, thought and action, it is no longer the content of the test or the mental habits set by formal education which are of prime importance. The "manipulative habits, the symbolic reactions and possibly the entire approach to and interpretation of the perceptual world",[23] becomes the material for cross-cultural investigation.

Biesheuvel gave cross-cultural researchers their direction in 1949, not only by suggesting strategies commensurate with existing psychological knowledge, but by delineating the limits for such studies:

> Comparative studies are therefore legitimate, provided that no comparisons are made until a scientifically valid basis for making them has been established.[24]

An inter-racial-control-group design, of the kind referred to in the studied cited in Section 1, Studies of

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22 S. Biesheuvel, "Psychological Tests and Their Application to Non-European Peoples", in Cross-Cultural Studies, Selected Readings, D.R. Price-Williams, (Ed.), Baltimore, Penguin, 1969, p. 61.

23 Ibid., p. 62.

24 S. Biesheuvel, op. cit., first appearing in: G.B. Jeffrey, ed., The Yearbook of Education, Evans, 1949, pp. 90-104.

METHODOLOGICAL FOUNDATIONS

Indian Intelligence, does not provide a scientific basis for the study of intellectual ability. The mere transfer of motive, method and measure from one culture to another does not allow identification of the factors affecting test performance.

Frijda and Jahoda have recently, (1966), reviewed and evaluated the studies which were undertaken during the past twenty years. In the light of their efforts, major issues of methodological problem areas have emerged and the proposals offered by these two eminent psychologists provide sensible guidelines for research techniques, research strategies and indications of areas for further exploration.[25] They caution against carrying-over designs from one culture to another because of the number of variables and equivalence problems which complicate the research.[26]

A concise and practical three-step procedure for making cross-cultural behavioural comparisons is outlined by Berry.

> 1) Aspects of behaviour occuring in differing behaviour settings may be compared only when they can be shown to be functionally equivalent (...)

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25 N. Frijda and G. Jahoda, "On the Scope and Methods of Cross-Cultural Research", International Journal of Psychology, Vol. 1, 1966, p. 110-127.

26 Ibid., p. 123.

2) ...then a comparative descriptive framework, valid for both behaviour settings can... be generated from an internal description of behaviour within each setting.

3) Only when both these conditions are met, may one attempt to construct and apply instruments to gauge behaviour in the two settings. This attempt must also satisfy the criterion that the instruments are conceptually equivalent to individuals in the two settings.[27]

Although the conditions are not new, there is a logic and urgency in Berry's presentation which augers well for a definitive cross-cultural methodology.

In the following sections several studies will be examined in the light of these expanded concepts of intelligence and cross-cultural behavioural comparisons.

4. Studies of Cognitive Abilities

Research of the dimensions described in Section 2, Extension of the Concept of Intelligence, and in Section 3, Definitions in Cross-Cultural Objectives, has been carried out among the Eskimos by Berry, Reich and MacArthur; these will be discussed in the following pages. It will be noted immediately that for the other studies cited in this section and the following one, interest lies in their rationale and method, rather than in the sample, which differs from that of the present study.

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27 John W. Berry, "On Cross-Cultural Comparability", International Journal of Psychology, Vol. 4, No. 2, 1969, p. 122.

METHODOLOGICAL FOUNDATIONS

Research directed to understanding Indian psychology is limited.

The impressive work of Segall, Campbell and Herskovits, (1963), aimed at identifying and defining visual or perceptual patterns which correspond to, or parallel cultural differences. Their sample consisted of one thousand eight hundred seventy-eight persons, representing fourteen non-European societies and one North American sample. A single apparatus measuring perceptual or geometric illusions, and a uniform set of experimental conditions were employed. The findings substantiated "the empiristic hypothesis that the perception of space involves, to an important extent, the acquisition of habits of perceptual inference".[28] By using a single measuring tool, cultural differences were provided for and teased out. Differences in responses could be assigned to the influence of cultural and ecological factors. These factors, however, were limited in definition to encompass the properties of the visual environment. Environmental features such as rectangularity and openness of terrain, constituted the major independent variables. Jahoda specifies in his replication of the work of Segall et al., that the cultural background of Segall's subjects was not adequately defined nor taken into account and that general

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28 M.H. Segall, D.T. Campbell and M.J. Herskovits, "Cultural Differences in the Perception of Geometric Illusions", Science, Vol. 139, 1963, p. 769.

global information on culture was not sufficient for the study, while ecological features were unduly weighted.

In his own work, Jahoda[29] tested Africans from contrasting geographical and cultural backgrounds. His findings were not in conformity with the hypotheses of Segall. The complications which arose provide a fruitful source of information on the aberrations which respectable theories undergo in the course of cross-cultural research. Jahoda discusses in detail the differences in methods employed. Precise instruction is a variable to be carefully reckoned with: the effects of literacy in perceptual functioning should be controlled; visual acuity as a factor in performance of native populations presents variations which must be viewed in the context of the specific design. More cogent than method, however, is the manner in which the independent variables were handled in the two studies, giving rise to disparity in results. Jahoda views the failure of Segall to consider as separate sources of variance, 1) the carpentered environment, and 2) interpretation of two dimensional drawings, as critical in the findings. The difficulty which illiterates encounter in interpreting two dimensional representations of three-dimensional objects is

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29 G. Jahoda, "Geometric Illusion and Environment: A Study in Ghana", British Journal of Psychology, 1966, Vol. 57, p.193-199.

as much a function of culture as it is of ecological influence, though the Segall study leans to the ecological interpretation.

Bruner in Studies in Cognitive Growth,[30] reports research among other cultures. His interest in discovering how culture shapes perceptual and cognitive skills resulted in a valuable collection of observations of the "cultured" mind at work. Cultural influence was identified through equivalence judgments. By the act of rendering dissimilar things equivalent, a person reveals the categories with which he views the world. Maccoby and N. Modiano worked with Mexican children in a research directed to qualifying the perceptual strategies they used in forming equivalence categories. Reich did the same with Alaskan Eskimos and P. Greenfield replicated these studies to show relationship between culture and equivalence. Reich's study showed that developmental trends of Eskimo and white children are similar: the proportion of super-ordinate groupings increases and that of complexes decreases with with age. However, quantitative differences were found, showing that superordinate groupings are less frequent for the Eskimos than for the whites. He noted that Eskimo children do not readily change their point of view in order to resolve a contrast into a similarity.

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30 Jerome S. Bruner, Studies in Cognitive Growth, New York, Wiley, 1966, p. xviii-343.

They contrast items within an attribute dimension but do not move to a more general level or shift from one attribute to another. An example of this was the response to an array of foods. "If they both (apple and orange) had this color, they would have been the same." Reich concluded:

> One of the problems Eskimo children face in acquiring the techniques of equivalence grouping is overcoming the embeddedness of objects in a particular setting in order first to abstract one attribute and then shift to another point of view.[31]

Since equivalence judgements require the extraction of certain properties which are embedded in the cultural milieu, there is implied in all of these Bruneresque studies a field-dependent-independent factor which should be identified as a preliminary step, before interpretation of the equivalence data could be meaningful.

This identification is basic in a Witkin-type research.

5. Application of Witkin's Theory

Witkin defines cognitive style as the characteristic self-consistent way of functioning across perceptual and intellectual, i.e. cognitive activities. There are three distinct functions: 1) cognition; recognition and structuring of information, 2) thinking and problem-solving, and

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31 Lee C. Reich, A Cross-Cultural Study of Cognitive Functioning, Doctoral Dissertation, Harvard University, printed in: Bruner, Jerome S., Studies in Cognitive Growth, New York, Wiley, 1966, p. 271-283.

3) psychological functioning, e.g. controls and defenses; which are all encompassed in the identification of cognitive style. A cognitive style may be global or articulated. That is, there is a greater or lesser degree of differentiation in a sense of separate identity and body concept, and in the use of controls and defenses.[32]

Factors which contribute to development of cognitive style are socialization practices and ecological demands.

The cognitive style approach to the problem of cross-cultural investigation has gained recognition and respect through the classical work of Dawson, (1963) and Berry, (1965), as well as the explorations of Wober, (1966), MacArthur, (1967) and Okonji, (1969). In applying tests of field-dependence to a variety of indigenous groups, these studies have contributed to the assessment of the influence of culture on the performance of selected cognitive tasks. These investigators not only tested the usefulness of Witkin's cognitive style theory as a source of working hypotheses, but they also gathered data on the cultural dimension of perceptual, intellectual and psychological functioning. By controlling features of culture which bear on cognitive style, and by distinguishing the characteristic way a group of people

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32 H.A. Witkin, "A Cognitive Style Approach to Cross-Cultural Research", International Journal of Psychology, 1967, Vol. 2, No. 4, p. 232-236.

handles the testing situation, it is possible to arrive at some degree of knowledge concerning the nature of the abilities possessed by peoples of other cultures. In a technological society, ability is synonymous with intelligence, and vice versa. The definition of both is strictly circumscribed. The unique contribution of Witkin's concept of cognitive style is that it encompasses a wide range of combinations and relationships, allowing for extended interpretation, not only of ability but of intelligence. The application of Witkin's theory to cross-cultural studies allows not only for the biological, intellectual and psychological constants, characteristic of the human family, but also for individual differences resulting from the influence of ecology and culture.

> The opportunity to examine variations in cognitive functioning in a spectrum of naturally occurring variations in socialization may greatly enrich our understanding of the forces shaping cognitive development.[33]

wrote Witkin in assessing the cognitive style approach to cross-cultural research.

Dawson carried out a study in Sierra Leone between 1961 and 1964.[34] He hypothesized that certain aspects of

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33 Herman A. Witkin, op. cit., p. 233.

34 J.L.M. Dawson, "Cultural and Physiological influences upon spatial-perceptual processes in West Africa", Parts I and II, International Journal of Psychology, 1967, Vol. 2, p. 115-128; p. 171-185.

the Sierra Leone tribal culture and related child-rearing practices were likely to be conducive to the development of a more field-dependent perceptual style. These were: emphasis placed on conformity, group reliance, maintenance of authority, polygamy and strict discipline, lack of individual competition and the dominant role of the tribal mother. The subjects were drawn from two tribal groups with contrasting socialization and child-rearing practices. The Temne rated highly on maternal dominance and parental strictness; while the Mende adopted relatively more lenient socialization techniques and encouraged individual initiative. The selection of tests to measure field-dependence included Kohs Blocks, and an abbreviated form (six cards) of the Embedded Figures Test. The findings paralleled the American findings of Witkin, i.e., patterns of parent-child interaction and socialization practices relate to the development of a relatively more global or more articulated cognitive style. Temne males were found to be more field-dependent than the Mende males in a design which controlled for age, occupation, sex, education and intelligence.

Berry undertook to demonstrate a relationship between the cultural and ecological characteristics of a society and the perceptual skills developed by members of that society.[35]

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35 J.W. Berry, "Temne and Eskimo Perceptual Skills", International Journal of Psychology, 1966, Vol. 1, No. 3, p. 207-229.

METHODOLOGICAL FOUNDATIONS

Two contrasting groups were chosen for study: the Temne of Sierra-Leone and the Eskimo of Baffin Island. Each group contained a sub-group drawn from a traditional and transitional society. To facilitate comparison with Western society, a matched group of Scottish subjects, similarly divided, was also tested. The socialization practices and the ecological setting of the two groups provided sharp contrast. In an environment which is highly variegated in colour and texture, the Temne cultural practices place restrictions on individual initiative and emphasize harsh discipline. In an extremely severe and uniform terrain, the Eskimo culture encourages independence, creativity and responsibility. In testing his hypothesis, Berry sought to show that not only differences in visual-perceptual skills would exist between societies with differing ecological and cultural characteristics, but also that these differences would not be random in kind or degree, but might be predicted from an analysis of the ecological requirements and cultural practices of the group.

Using the Embedded Figures Test, (a selection of six items from the original twenty-four, with two exercise items), and Kohs Block Design to measure field-dependence, Berry found that the Eskimo traditional and transitional groups differed significantly from the Temne groups. Both Eskimo sub-groups performed in a strongly field-independent style, at a level comparable to educated and literate Scots. Indeed,

examination of the findings seem to confirm the view that the cultural and ecological characteristics of Eskimo life foster field-independence. Within-group comparisons show that in all three societies the transitional group proved to be more field-independent than the traditional sample. This is related to the degree of Westernization (the transitional group being more Westernized than their isolated brothers) and to education. It would appear that contact with Western life through schools, movies, T.V., magazines, radio, tends to change traditional perceptual characteristics.

The work of Wober, (1967), in Southern Nigeria is of particular interest because his rationale and his method approximate the conditions of the present study, and his findings raise certain questions touching on the validity of the Rod and Frame Test as a measure of the same skill or analytic style as is measured by the Embedded Figures Test.[36] Wober probed the possibility that African subjects brought up in a culture where proprioceptive values and skills are favoured over the visual idiom, would have better test scores where proprioceptivity was important as compared to their scores on tests dependent on visual skills alone. Proprioception is one of the sense modalities by which an individual

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36 M. Wober, "Adapting Witkin's Field-Independence Theory to Accommodate New Information from Africa", British Journal of Psychology, Vol. 58, 1967, p. 29-38.

can know his world.[37] Through stimulation of the organism itself, (the body's reaction to external conditions such as temperature, position, movement) information is furnished to the brain. The development of sense modalities, visual, aural, proprioceptive, will differ according to cultural demands placed on the child during his formative years.

The Rod and Frame Test (RFT) and the Embedded Figures Test (EFT) widely used to assess perceptual field-dependence-independence (FDI) were chosen by Wober. The original procedure of a darkened room with a luminous rod and frame viewed by the subject from a tilted chair was the task involved in the first experience. Both the subject in his chair and the square frame and the rod could be tilted independently of each other. Implicit here is the proprioceptive (body tilt) function coupled with a visual task. An abbreviated version of EFT was used with eight items from the original twenty-four. (The selection and order had been determined by pre-testing among school-children). Performance on the EFT depends largely on skill in handling visual cues. In effect his product-moment correlation between RFT and EFT was .21, supporting his argument that the two tests pose problems which must be dealt with in basically different ways.

While the findings of Dawson and Berry support the data accumulated in America, indicating that psychological

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37 M. Wober, "Sensotypes", Journal of Social Psychology, Vol. 70, 1966, p. 181-189.

differentiation (field-dependence-independence in the perceptual sphere), as determined by culture and ecology, can be measured by visual tests, Wober's results argue otherwise. That differentiation occurs in sensory fields other than the visual one would require that appropriate tests be developed for measuring other sensotypes; tests which would be associated with cultural patterns which are not yet defined or identified. Though admittedly this is a gargantuan project, it is not beyond realization. Using auditory and tactile forms to replace the visual EFT and the Block Design Test, Witkin et al. studied cognitive patterning in blind children.[38] Their findings suggest that individuals with special developmental histories, e.g. the blind, could become sensory specific in their cognitive style. If this could be postulated for individuals, a similar hypothesis could be tested with cultural groups.

Sex differences in cognitive style were consistently recorded in many of the studies done in the United States, Western Europe, Israel, Japan, Hong Kong and Africa. However, Eskimos tested by Berry showed no significant difference between male and female scores in FDI. In a replication of the work done by Berry, MacArthur (1967) administered Vernon's

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38 Herman A. Witkin, et al., "Cognitive Patterning in Congenitally Totally Blind Children", Child Development, Vol. 39, No. 3, Sept., 1968, p. 767-786.

Embedded Figures Test to male and female Western Eskimo children. Discounting disparity between the two samples in age, geographical location, (implications for ecological and socialization factors), the tool used for measuring, and the absence of reliability tests for the samples, MacArthur ventured to corroborate findings of no significant sex differences among Eskimos.[39]

In 1969, Okonji used Witkin's FDI instruments to measure the differential effects of rural and urban upbringing on the development of cognitive styles among the Ibo people of Nigeria. Interest in this work revolves around the findings which indicate that among non-Western cultures correlation between EFT and RFT as measures of FDI is not as certain nor as high as previous studies have suggested. The validity of Okonji's design is threatened, however, by instrumentation and reactive arrangements. Specifically, although the EFT was administered to the urban undergraduate group, the rural group took the Children's Embedded Figures Test (CEFT), when it was found they could not handle Witkin's EFT. Okonji discusses this as a possible reason for the non-significant correlation and issues a useful caveat:

> The non-significant correlation between the CEFT and the RFT among the Ibusa sample calls for some comments, especially as there is a significant correlation between the RFT and the EFT among the under-graduates

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39 Russell MacArthur, "Sex Differences in Field-Dependence for the Eskimo", International Journal of Psychology, Vol. 2, No. 2, 1967, p. 139-140.

> (...) Wober in his Nigerian studies (...) found an even lower correlation between the EFT and the RFT and attributed this to the kind of demand made by the tests, the EFT being a purely visual task while the RFT is a kinesthetic-visual one. In the present study, the low correlation might have arisen to some extent for the same reason. It might be, however, that if the experimenter had not utilized a simpler version of the embedded figures the correlation between the two tests would have been higher. The poor results obtained from an earlier abortive attempt to use the EFT suggests this interpretation. This does not mean that Wober's finding is not valid; it only means that we should take into account the type of test items used in a study when interpreting correlations among tests of perceptual field-dependence.[40]

Further, the Rod and Frame, (a home-made apparatus), presented several disadvantages for Okonji: i.e., 1) the luminosity of the paint on the rod and frame faded over a period of time in the dark room, 2) a black cloth hood covered the S's head, 3) rural females experienced inhibition in being alone in the dark room with Okonji, 4) varying instructions were given to the two groups. In the light of Lester's comments on methodology in administering the Rod-and-Frame Test,[41] it is useful to consider the extent of the effect of Okonji's method on his results. His hypothesis concerning urban-rural differences was confirmed by the RFT result. The EFT result failed to show significant difference between

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40 Michael O. Okonji, "The Differential Effects of Rural and Urban Upbringing on the Development of Cognitive Styles, International Journal of Psychology, 1969, Vol. 4, No. 4, p. 302.

41 Gene Lester, "The Rod-and-Frame Test: Some Comments on Methodology", Perceptual and Motor Skills, 1968, Vol. 26, No. 4, p. 1307-1314.

the two groups, though the result was in the expected direction. In a comparison of the African male undergraduates with a New York sample there was no significant difference in RFT performance, though the Nigerian rural males obtained significantly more dependent scores than the other two groups. There was no significant difference between New York females and Nigerian female undergraduates. As a kinsman of the Ibo, Okonji brought to his experiment a dimension of understanding not possible for a stranger from another culture. This is evident, for example, in his comprehension of the environmental experience which influenced the rural subject's response to the RFT. For all of the methodological weakness inherent in Okonji's work, there is a strategy of common sense, which conforms to the guidelines for intracultural and cross-cultural study laid down by Frijda and Jahoda, as well as by Biesheuvel. Wober expressed it well in appraising his own somewhat questionable methods:

> Rigid orthodoxy in keeping to printed instructions for test administration was not the guiding principle of the test administration. The two chief points were held to be: to explain the nature of the problems, and to create and sustain maximum motivation. It is believed that the subjects were thus showing their best available performances in each of the above tests.[42]

Witkin's theory of cognitive style has been shown to be applicable in cross-cultural studies. Dawson and Berry's findings would indicate that there is a field-dependent-

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42 M. Wober, op. cit., p. 34.

independent dimension of cognitive style which is comparable and measurable across culture. Wober and Okonji found limitations in their application of the theory. If, indeed, some cultural groups have perceptual habits which differ in modality because of cultural conditioning, tests which appeal to the visual mode alone would be inadequate. This situation would demand a careful assessment of the behaviour patterns of the people to be studied, with an appropriate "internal description of behaviour", as Berry points out.[43] The present study, then, using Witkin's cognitive style approach, will attempt to identify the limitations, if any, of its application.

6. Summary and General Hypothesis

The progress of cross-cultural studies has been traced from the psychologists early measuring of intelligence to his concern for describing patterns of cognitive skills. A conglomerate of ill-fitting theories and methods has been replaced by an emerging discipline, animated by a viable concept of intelligence and equipped with an efficient methodology. The contributions of Biesheuvel, Ferguson, Fridja, Jahoda and Berry to this crystallization are considerable.

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43 John W. Berry, "On Cross-Cultural Comparability", International Journal of Psychology, 1969, Vol. 4, No. 2, p. 122.

METHODOLOGICAL FOUNDATIONS

Two well-defined techniques for studies with non-Western peoples were examined: Bruner's equivalence judgments and Witkin's cognitive styles. Witkin's approach has the decided advantage of utilizing test situations which can be understood without verbal explanation, challenging the subject to action, and assessing his whole response in terms of that action.[44]

Socialization practices and environmental demands are relevant variables which contribute to a cognitive style. While the interaction between them is such that it is difficult to measure the effects of either, together they determine cultural identity, which can be identified as a factor in shaping patterns of field-dependence-independence.

Field-dependence-independence is the perceptual component of cognitive style. Cultural practices which contribute to an articulated cognitive style, (and field-independence in the perceptual sphere,) are those which foster an individual's separate identity and autonomous functioning. Cultural practices which foster a global cognitive style, (and field-dependence in the perceptual sphere), are those which place an individual in continuous reliance on others.

Sex difference in field-dependence-independence occur in many cultural groups. Conventional socialization practices which determine sex roles are generally similar to

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44 Fridja and Jahoda, op. cit., p. 122.

those which foster a global or an articulated cognitive style. There is evidence that changing societal definitions of sex roles could affect sex differences in cognitive style.

On the basis of research reports on the cultural determinants of cognitive style, a general hypothesis was formulated for this study: that the ecological demands and socialization patterns which mark the cultural heritage of native Canadians, the Indian people, are of the kind which foster an articulated cognitive style. Description of this cognitive style will be in terms of its perceptual component, field-independence.

The sub-hypotheses which flow from this hypothesis will be apparent as the theories underlying it are presented in the next chapter.

CHAPTER II

REVIEW OF THE LITERATURE

THEORETICAL FOUNDATIONS

The relationship between culture and cognitive style, or specifically, the perceptual component of cognitive style, is established by anthropological and psychological theories. These will be examined in the following sections:

1) Anthropological Theories Relating Culture and Cognitive Style

2) Psychological Theories Relating Culture and Cognitive Style

   a) Applications of Theories of Intelligence to Cross-Cultural Research

   b) Witkin's Differentiation Theory

The formulation of sub-hypotheses for this study will follow in

3) Summary and Hypotheses

1) Anthropological Theories Relating Culture and Cognitive Style

That there are differences in the cultural conditioning of perception is the fundamental construct to be examined. Evidence to buttress this position comes first from Mead:

> ...recent findings of ethnologists (...) stress that a fully acculturated member of a living culture differs in every respect and systematically from members of any other culture.[1]

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1 Margaret Mead, "Research on Primitive Children", in Carmichael, Leonard (Ed.), Child Psychology (2nd ed.), N.Y., Wiley, 1954, p. 737.

Hoijer, too, points out that cultural patterns serve to crystallize modes of perceiving and thinking and to mount them in distinctive and customary expressions.[2]

Kluckhohn tempers this cultural relativism by recalling that there are limits set to culture. "Cultural constants such as family, communication, religion, necessitate that men always and everywhere must react to the same problems that arise as part of the human condition."[3] This, essentially, is a modification of the ideas of Boas on the universality of culture traits. In 1911 he wrote:

> We may therefore base our further considerations on the theory of the similarity of mental functions in all races. Observation has shown, however, that not only emotions, intellect, and will-power of man are alike everywhere, but that much more detailed similarities in thought and action occur among the most diverse peoples.[4]

It is necessary to reconcile the cultural constant (or universal) theory with the cultural relativistic theory, in order to understand cultural conditioning of perception. The function involved, i.e., an awareness of the elements of environment through physical sensation, is a universal one,

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2 Harry Hoijer, "The Relation of Language to Culture", in Kroeber, A.L. (Ed.), Anthropology Today, Chicago University of Chicago Press, 1953, p. 554-573.

3 Clyde Kluckhohn, "Universal Categories of Culture", in Kroeber, A.L., op. cit., p. 507-523.

4 Frank Boas, Mind of Primitive Man, N.Y., MacMillan, 1911, quoted by Clyde Kluckhohn, op. cit., p. 511.

occuring in all human development. Individual differences reflect differences in the kinds of experiences provided by the respective cultures.

Cultural differences noted by anthropologists paralleled the existence of differences in perceptual processes as observed by psychologists. Segall, Campbell and Herskovits undertook to document these differences on a large scale, as has been described in Chapter I, Section 4, Studies of Cognitive Abilities, demonstrating that anthropological and psychological theories can be mutually supportive.[5]

It was Hallowell who frankly admitted:

> Although culture, ever since the classical definition of Tylor, has been assumed to be a phenomenon that rests upon a learning process, without the intensive research of psychologist it is impossible to advance beyond the simplest kind of hypotheses in our own discipline.[6]

Indeed, psychologists have developed theories of intelligence and behaviour which explain the relationship between perception and culture.

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5 M.H. Segall, D.T. Campbell and M.J. Herskovits, "Cultural Differences in the Perception of Geometric Illusions", Science, Vol. 139, 1963, p. 769-771, reprinted in D.R. Price-Williams, (Ed.) Cross Cultural Studies, Baltimore, Penguin, 1969, p. 95-101.

6 A. Irving Hallowell, "Culture, Personality, and Society", in Kroeber, A.L., Anthropology Today, p. 599.

THEORETICAL FOUNDATIONS

2) Psychological Theories Relating Culture and Cognitive Style

a) Application of Theories of Intelligence to Cross-Cultural Research

A general concept of intelligence is inoperative in cross-cultural study since intelligence is defined differently by different people.[7]

Hebb's theory of two determinants of intellectual growth, i.e. an innate potential and a stimulating environment, as factors in the A/S ratio for primary learning, dramatizes the role that early childhood experience plays in the eventual level and quality of adult cognitive and intellectual ability.[8]

Ferguson grappled with the problem of the role of cultural factors in human ability. He applied his two factor theory of learning, i.e. a transfer component and a component specific for the task, to abilities which are culturally determined:

> ...those abilities which are of importance in a particular culture, and which may be expected to correlate with performance in the important activities demanded for survival in the culture, are those which show a pronounced increment with age.[9]

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7 John W. Berry, "Temne and Eskimo Perceptual Skills", International Journal of Psychology, Vol. 1, No. 3, 1966, p. 229.

8 D.O. Hebb, Organization of Behaviour, New York, Wiley, 1949, p. xxix-335.

9 G.A. Ferguson, "On Learning and Human Abilities", Canadian Journal of Psychology, Vol. 8, 1954, p. 110.

THEORETICAL FOUNDATIONS

Cultural emphasis favours development of certain abilities, while certain others remain latent because they are less important to the immediate situation, to survival and well-being.

b) Witkin's Differentiation Theory

Modes of approaching reality or modes of perceiving the world, are known as cognitive styles. Perception deals with input information from sensory sources. The way of perceiving the world is related to the personality adjustment that the individual has worked out in the course of growing up. By identifying and describing a man's cognitive style, a key is available to the broader dimension of his psychological functioning.

The field-dependent-independent dimension of perception belongs to cognitive style, is related to the overall level of differentiation and can be measured by perceptual performance. Identifying field-dependence-independence is the primary task when the differentiation hypothesis is used in cross-cultural research, and it is at the threshold of immediate awareness, perception, that the present study is directed.

The scope of the psychological differentiation theory must be clearly envisaged before any attempt is made to focus on a single perspective, as is here proposed. Under attack

by Zigler,[10] Witkin provided a definition of the theory:

> ..."differentiation" served as a construct to conceptualize communality of behaviour in diverse areas of psychological functioning. More specifically, the "differentiation hypothesis" proposed that individuals are likely to function at a more differentiated or less differentiated level in many areas of psychological activity, making for self-consistency in behaviour. It predicted an association among such characteristics of a high level of differentiation as: an articulated way of experiencing the world, which includes experience of objects as discrete from field and fields as structured; a differentiated self, reflected particularly in an articulated body concept, and a developed sense of separate identity, based on stable internal frames of reference; and finally, the use of such relatively structured, specialized defenses as intellectualization and isolation. Some of the specific ways in which these characteristics of developed differentiation may manifest themselves in behaviour were identified as a basis for conducting our research and for interpreting results...[11]

A style in cognitive functioning, be it global or articulated, is evident at an early age. During childhood development there is, in general, progression from global to articulated, with a tendency for one or the other style to take on a dominant character.[12] The developmental process is completed by age seventeen[13] and the individual's cogni-

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10 E. Zigler, "A Measure in Search of a Theory", Contemporary Psychology, Vol. 8, No. 4, 1963, p. 133-135.

11 H.A. Witkin et al, "Witkin et al on Zigler", Contemporary Psychology, Vol. 8, No. 9, 1963, p. 363.

12 Herman A. Witkin, "Individuality in Development", The American Montessori Society Bulletin, Vol. 4, No. 2, 1966, p. 18.

13 Hanna F. Faterson and Herman A. Witkin, "Longitudinal Study of Development of the Body Concept", Developmental Psychology, Vol. 2, No. 3, 1970, p. 429-43[3].

tive style levels off to a stable and consistent mode of functioning.[14] Further changes occur between ages 60-67 and 68-74 years, the tendency being towards greater field-dependence.[15]

Developed differentiation is consonant with Ferguson's theory of a necessary-ability's "increment with age".

3) Summary and Hypotheses

Different modes of perceiving and thinking, cognitive functioning, are discernible among people who do not share the same culture. These differences are derived from the particular and specific responses which people make to the environment. These responses are determined by exigency, adequacy, acceptability and utility. The nature of the ecology in which a child grows up will shape his cognitive development, in so far as it determines the "kind of relation with the particular environment which life circumstances force upon the developing individual".[16]

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14 H.A. Witkin, D.R. Goodenough and S.A. Karp, "Stability of Cognitive Style from Childhood to Young Adulthood", Journal of Personality and Social Psychology, Vol. 7, No. 3, Nov. Part 1, 1967, p. 296.

15 Stephen A. Karp, "Field Dependence and Occupational Activity in the Aged", Perceptual and Motor Skills, Vol. 24, 1967, p. 603-609.

16 H.A. Witkin, "A Cognitive Style Approach to Cross-Cultural Research", International Journal of Psychology, 1967, Vol. 2, No. 4, p. 236.

THEORETICAL FOUNDATIONS

The main factors identified in the literature as contributing to the development of cognitive style are ecology, socialization practices and sex role. Adult members of a society have self-consistent, pervasive styles of funtioning across perceptual, intellectual and psychological activities.

The general hypothesis to guide this study is:

> That the ecological demands and socialization patterns which mark the cultural heritage of native Canadians, the Indian people, are of the kind which foster an articulated cognitive style.

Other research hypotheses formulated for the problem are:

H_1 That distinctive socialization practices and ecological features foster modifications in perceptual style between two Indian linguistic families;

H_2 That modifications in socialization patterns and environmental demands which accompany different levels of the acculturation process will result in differences in perceptual functioning at these levels;

H_3 That the description of sex roles in Indian culture is such that differences in perceptual functioning between male and female subjects will be observed;

(There is no prediction of direction for these differences resulting from the effects of cultural change or sex roles.)

H_4 That the perceptual functioning of enculturated adults will be consistently more field-independent than that of younger members.

The null hypotheses to be tested are stated as follows:

That there will be no difference in the response of two linguistic families, i.e., Algonkian and Athapaskan, on perceptual measures of a field-dependent-independent cognitive style;

That there will be no difference between traditional, transitional and urban samples on perceptual tests;

That there will be no difference on perceptual tests between male and female subjects;

That there will be no difference between the two age groups on perceptual tests.

THEORETICAL FOUNDATIONS

This study will examine the modifications, if any, to cognitive style which result from the cultural differences imposed by acculturation.

Although embodying the characteristics of experimental research, i.e., manipulation of an independent variable (cultural difference) in order to ascertain its relationship with the dependent variable (perceptual functioning), this study cannot be classified as a true experimental research. The conditions and methodology described in the following chapters present many limitations for a rigorous experimental study. This study is conducted in a natural setting, with a minimum of laboratory control. Van Dalen describes this method as causal-comparative, an "ex post facto design", where the investigator searches for likeness or difference among subjects in order to obtain information about what causes or contributes to the occurrence of a particular phenomenon.[17]

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17 D.B. Van Dalen and Wm.J. Meyer, Understanding Educational Research, McGraw-Hill, 1962, Toronto, p.220-226.

CHAPTER III

EXPERIMENTAL DESIGN

The design used to test the hypothesis of no difference in perceptual functioning is presented in this chapter. There will be five sections:

1. Samples
2. Instruments
3. Procedures for Testing
4. Statistical Analysis
5. Operational Definitions and Summary

These descriptions will be applicable to both the exploratory and research studies with two exceptions. The sample described here is that of the research study. However, further precisions will be made in Chapter V when the study is presented. In addition, the sample used in the exploratory study will be described in Chapter IV. On what concerns Procedures, only a brief comment will be made in this chapter. Those which were used in the exploratory study underwent several changes for the research study, itself. Therefore, detailed discussion of the procedures used in each will be presented in Chapter IV, The Exploratory Study, and in Chapter V, The Study.

1. Samples

Two Indian families with marked differences in language, customs, ecology and geography provided the target populations from which samples are drawn. They are identified as Algonkians of northern Ontario, and Athapaskans of

EXPERIMENTAL DESIGN

northern British Columbia and the Yukon.[1] Specifically, Crees, inhabiting the west coast of James Bay, represented the Algonkian family. The Athapaskans, who people the Interior Plateau between the Pacific Coast Range in British Columbia and the Yukon, are represented by the Tahltan, Tagish, Kaska, Sekani and Nahani tribes who live in the area traversed by the Alaska Highway.

Three cultural levels were distinguished within the two linguistic families. These were a traditional group, a transitional group and an urbanized group from each family. Indicators for these groups are given in Section 5 of this Chapter, Operational Definitions.

Enculturated adults, male and female, seventeen years and older, were considered as the best source of information regarding the impact which cultural demands and change make on the individual. The design would provide for observations across two age categories. This decision was made because of the nature of differentiation, i.e., a consistent, pervasive mode of functioning, and for the practical reason of securing enough subjects.

Two hundred and forty subjects, half from each family, were evenly divided between males and females. Among the males, half were in the 17-29 year old category and half

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1 cf. Appendix 1 and Figures 1a and 1b.

FIGURE 1a - MAP-SKETCH OF JAMES BAY

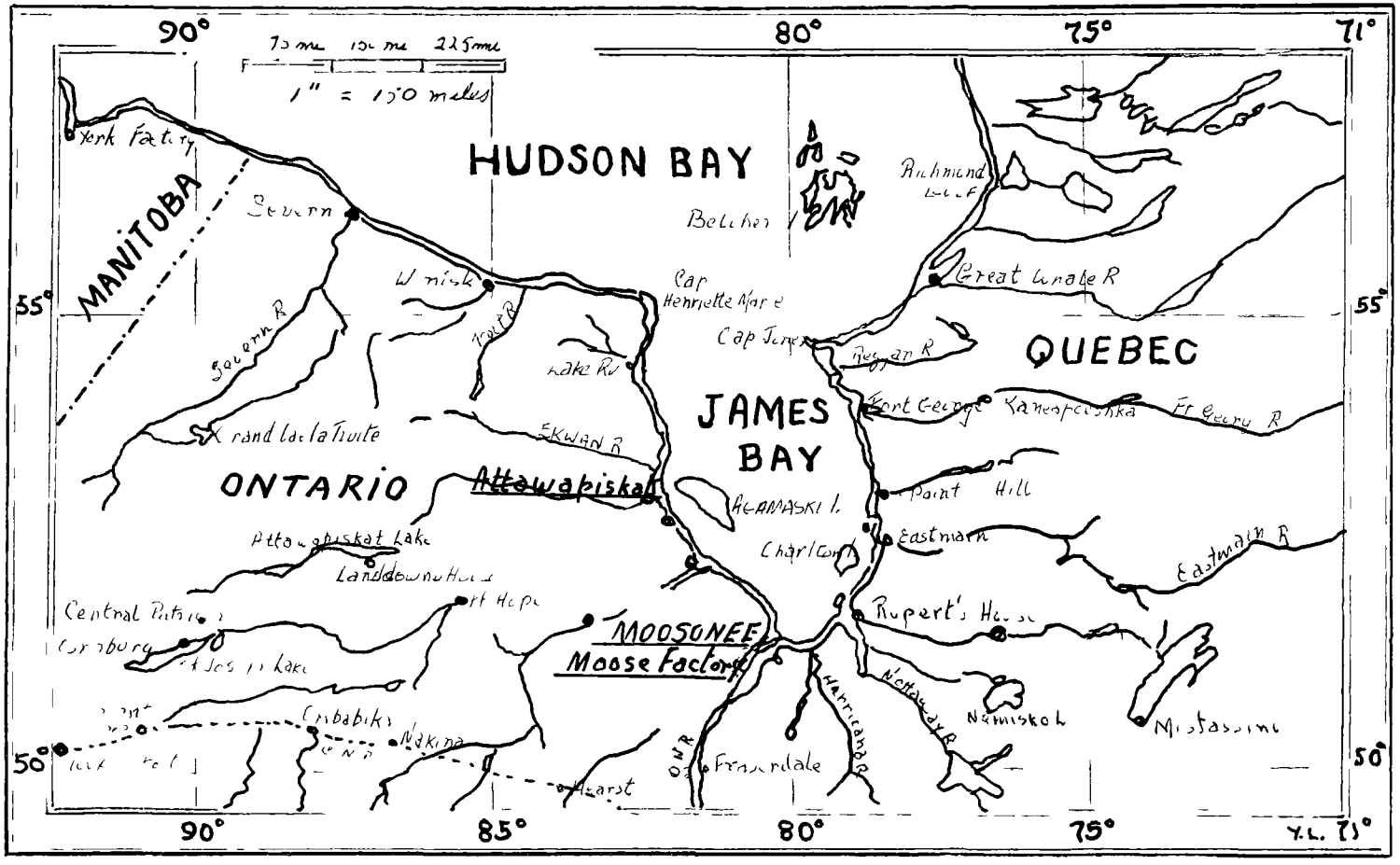

FIGURE 1b

MAP-SKETCH OF YUKON AND NORTHERN BRITISH COLUMBIA

were 30 years or older. The females were similarly divided in age groups.[2]

The subjects were contacted through the local chief. They were all paid for their time. The Cree communities, i.e. Attawapiskat, Moosonee and Moose Factory, were large enough to make it possible to have forty subjects from each, in the proportion of sex and age required. However, the Athapaskan communities were small and it was necessary to draw subjects from several communities and tribes, in order to reach the number of subjects required by the design.

2. Instruments

The following instruments with the designated specifications were used in measuring field-dependence-independence (FDI):

1. Rod and Frame Test (Portable model designed by Dr. P.K. Oltman)
2. Embedded Figures Test. (A six item form from Witkin's Embedded Figures Test)
3. Block Design. (Subtest: Wechsler Adult Intelligence Scale, i.e., WAIS).

McCarry has provided a complete description of the portable Rod and Frame apparatus; the identical machine used for this study. He reports the standard directions and particular techniques required for conducting the test.[3]

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2 cf. Figure 2.

3 Michael W. McCarry, "Attitude Shift, Approval Need and Extent of Psychological Differentiation", Unpublished Doctoral Thesis, University of Ottawa, May 1969, p. 54-60, and Appendix 5, p. 113-119.

FIGURE 2 - RESEARCH DESIGN AND CELL VARIANCE

CELL VARIANCE - RFT. EFT. BDT. N=240 R=10

AGE	TEST	ALGONKIAN						ATHAPASKAN					
		TRADITIONAL CULTURE 1		TRANSITIONAL CULTURE 2		URBANIZED CULTURE 3		TRADITIONAL CULTURE 1		TRANSITIONAL CULTURE 2		URBANIZED CULTURE 3	
		M	F	M	F	M	F	M	F	M	F	M	F
17 to 29	RFT	25.5	43.3	66.6	86.2	61.6	127.3	59.5	66.9	11.7	67.6	5.7	108.4
	EFT	15790.	28961.	2222.	14316.	34777.	10143.	12990.	56378.	1649.	7746.	1858.	4323.
	BDT	27.	32.9	30.9	41.3	37.6	16.4	9.6	61.6	12.	15.3	1.6	19.
30 to 55	RFT	105.3	31.5	47.3	104.8	125.7	112.6	94.1	278.2	47.3	62.2	11.6	21.4
	EFT	45740.	53869.	28281.	87497.	30767.	31423.	23051.	36843.	13480.	27369.	8297.	12907.
	BDT	47.4	31.8	108.7	49.8	21.1	17.8	12.9	64.2	71.7	49.3	10.	16.8

EXPERIMENTAL DESIGN

Witkin reports the reliability of the standard Rod and Frame Test, (RFT) as .84 (men), .66 (women). Other researchers have found odd-even correlations of .92 and .89.[4] The portable RF model developed by Oltman was found to correlate with the standard RFT, .90 (males) .89 (females). Its correlation with the Embedded Figures Test (EFT) was .60 as opposed to the EFT correlation of .56 with the standard RFT.[5]

Two practice and six test items were chosen from among the twenty-four items of Witkin's Embedded Figures Test, Forms A and B. The choice was based on Wober's selection with the exception of complex figures with dark colours or three dimensional box designs.[6] In the case of dark colours, the decision was made on the basis of clarity. In many places there would not be proper lighting in the testing room. Decision to omit figures with the box design was based on Thouless' findings on racial differences in perception. These relate to interpretation of two dimensional representation of three dimensional objects. The early graphic representations of Indians are reminiscent of the absence of perspective and shadow in Oriental art. It was

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4 H.A. Witkin et al., Psychological Differentiation, New York, Wiley, 1962, p. 40.

5 Philip K. Oltman, "A Portable Rod-and-Frame Apparatus", Perceptual and Motor Skills, 1968, Vol. 26, p. 505.

6 M. Wober, "Adapting Witkin's Field Independence Theory to Accommodate New Information from Africa", British Journal of Psychology, Vol. 58, 1967, p. 33.

expected that some effect of this cultural conditioning, if present, would confound the effects of changes in cultural levels in the acculturation process. Box designs, therefore, were not included.[7] The series used is reproduced in Figure 3. Preceding presentation of the Witkin's figures, the Ss were given a demonstration of the embedding process with several figures from Karp and Konstadt's Children's Embedded Figures Test (CEFT).[8] Some of these are reproduced in Figures 4a and 4b.

Witkin reports reliabilities of .89 (men) and .89 (women). Other researchers found odd-even correlations of .90, .92, .95 and .88. Witkin remarks that these reliabilities are high enough to warrant reducing the length of the test.[9] The original test of 24 items was reduced to twelve by Jackson.[10] Wober and Berry used eight and six item forms, respectively. The reliability and validity of the items used for this study will be given in a following section.

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7 R.H. Thouless, "A Racial Difference in Perception", Journal of Social Psychology, 1933, Vol. 4, p. 333-339.

8 Stephen A. Karp and Norma L. Konstadt, Manual for Children's Embedded Figures Test, 1963, Consulting Psychologists Press, Inc., 577 College Ave., Palo Alto, Calif.

9 H.A. Witkin, op. cit, p. 40.

10 Douglas N. Jackson, "Evaluation of Group and Individual Forms of Embedded-Figures Measures of Field-Independence", Educational and Psychological Measurement, Vol. XXIV, No. 2, 1964, p. 177-192.

FIGURE 3

SIMPLE and COMPLEX FIGURES used in the EMBEDDED-FIGURES TEST

The simple figures are designated by a letter; the complex figures are designated by a letter and a number, the letter corresponding to that of the simple figure which it contains. Figures P and P-1, D and D-4,D-15 are the practice figures.

The specific colors used in each complex figure are represented by numbers as follows: 1-orange, 2-blue, 3-gray, 4-red, 5-dark green, 6-light green, 7-yellow.

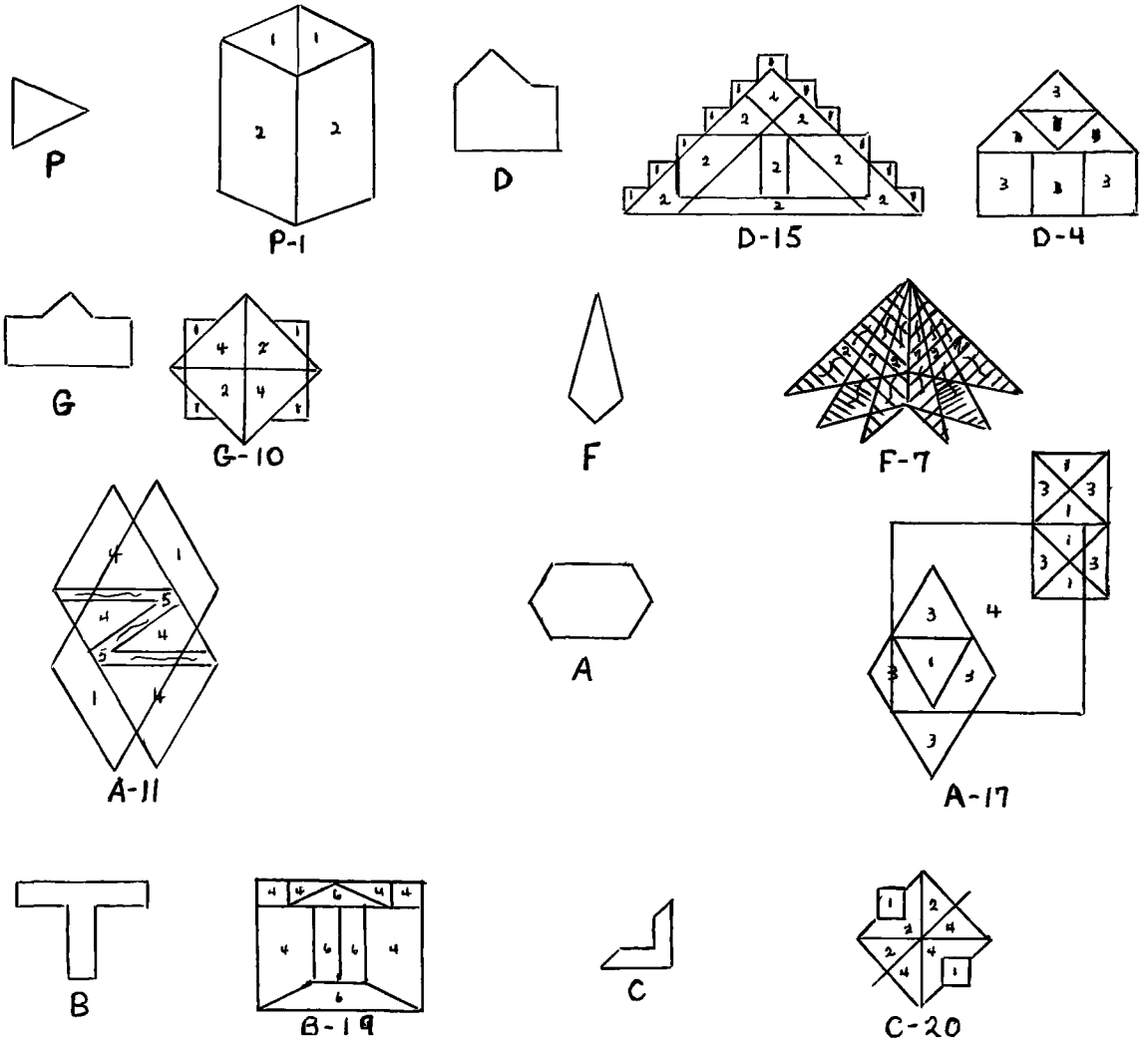


FIGURE 4a - DEMONSTRATION FIGURES FROM CHILDREN'S EMBEDDED FIGURES TEST

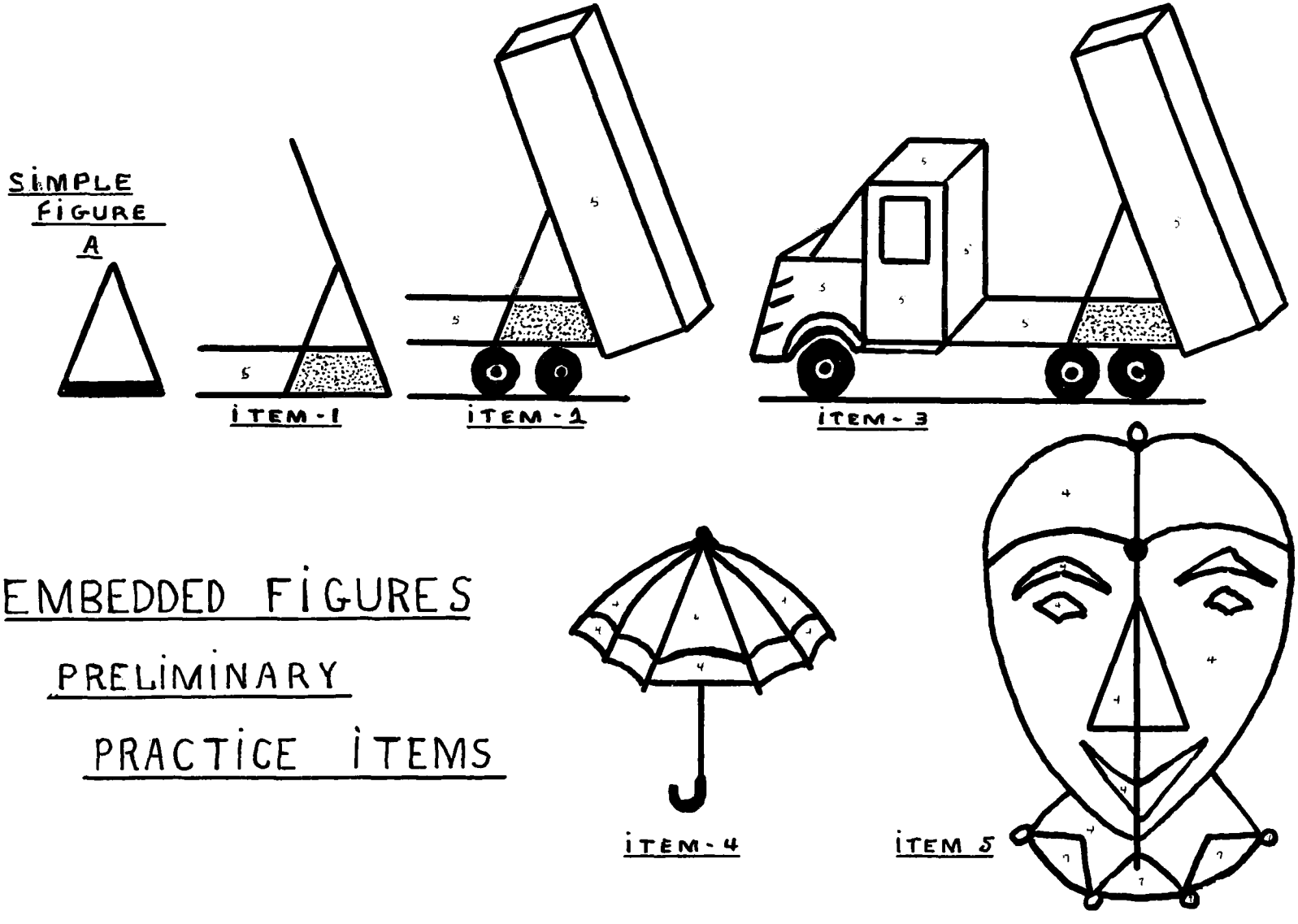
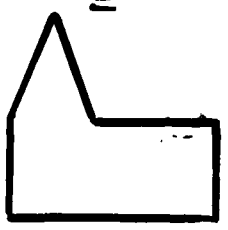
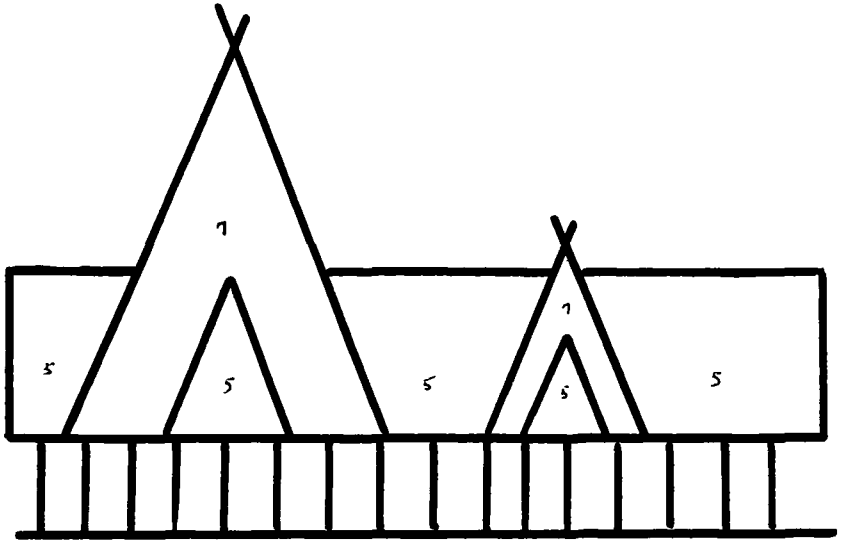


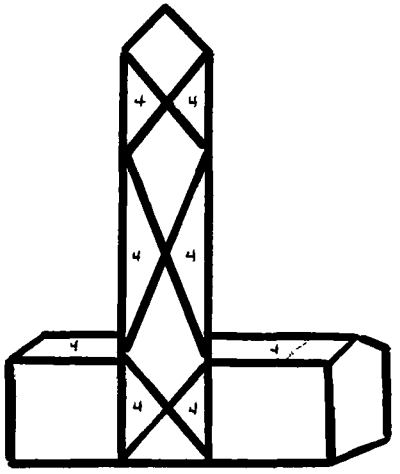
FIGURE 4b - DEMONSTRATION FIGURES FROM CEFT

SIMPLE FIGURE B





ITEM - 6

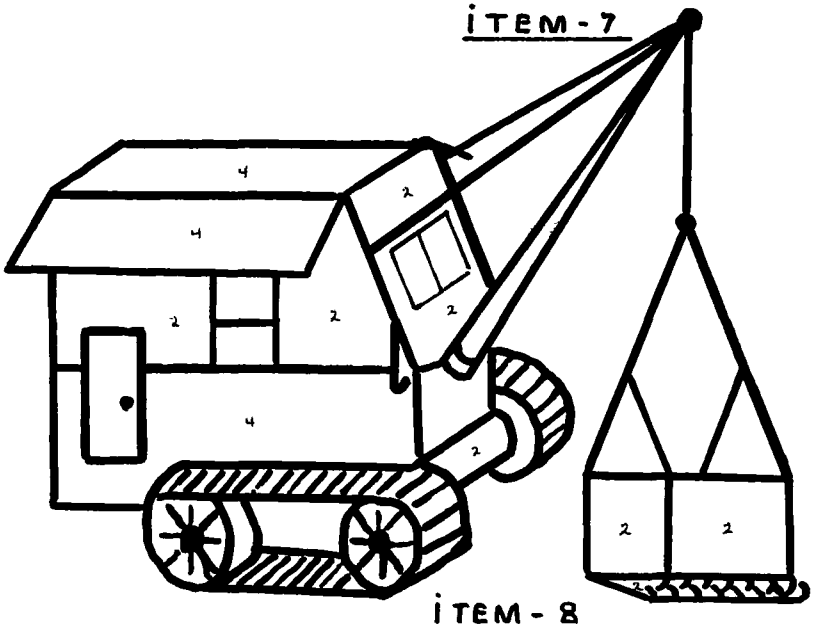


ITEM - 7

EMBEDDED FIGURES

PRELIMINARY

PRACTICE ITEMS



ITEM - 8

EXPERIMENTAL DESIGN

The Block Design Test (BDT) was chosen as a measure of analytical and structuring aspects of articulation. The RFT and EFT tap an analytic ability in perception, while the BDT requires analysis and structuring in its problem solving tasks. It has been demonstrated that performance on this test relates highly to performance on other tests of FDI.[11,12,13] This common factor is the ability to overcome embeddedness. This is a requirement for WAIS flexibility of closure measures (Block Design, Object Assembly and Picture Completion).[14] In a test battery for FDI, the BDT provides an expression for cognitive style not only on perceptual tasks, but also on intellectual tasks.[15]

Wechsler reports a reliability coefficient of .86 (age 18-19), .83 (age 25-34), .82 (age 45-59) for the Block

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11 D.R. Goodenough, and S.A. Karp, "Field Dependence and Intellectual Functioning", Journal of Abnormal and Social Psychology, 1961, Vol. 63, p. 241-246.

12 S.A. Karp, "Field Dependence and Overcoming Embeddedness", Journal of Consulting Psychology, 1963, Vol. 27, p. 294-302.

13 H.A. Witkin et al. "Cognitive Patterning in Congenitally Totally Blind Children", Child Development, Vol. 39, No. 3, Sept., 1968, p. 767-786.

14 S.A. Karp, op. cit., p. 299.

15 H.A. Witkin, Psychological Differentiation, p. 70.

Design subtest of WAIS.[16]

Guilford found intercorrelations for these three measures:[17]

	EFT	BDT
RFT	.36	.65
EFT		.86

Reliability and validity of the tests as used in this study will be presented in Chapter V.

3. Procedures for Testing

To assure that the tasks demanded by each test would be understood, arouse interest and elicit appropriate responses, procedures were devised, unique to this study. These will be presented as they were used, in Chapter IV: Exploratory Study, and in Chapter V: The Study.

4. Statistical Analysis

A fixed effects design controlled Family at two levels: Algonkian and Athapaskan; Cultural Difference at three levels: traditional, transitional and urbanized; Sex: male and female; Age: 17-29 years and 30 years and over. The main effects of these independent variables on

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16 David Wechsler, Manual for the Wechsler Adult Intelligence Scale, New York, The Psychological Corporation, 303 East 45th Street, 1955, p.12.

17 J.P. Guilford et al., "A Factor Analytic Study of Flexibility in Thinking".Report, Psychology Laboratory, 1957, No. 18, Los Angeles, U. of S.California., in H.A. Witkin, Psychological Differentiation, p. 74.

the dependent variable, (the perceptual component of cognitive style), as observed in the results of 10 replications within 24 cells on three measures, will be found by an analysis of variance procedure.

The correlation coefficients for the three measures would be used to estimate the validity of the tests for this study.

Lack of symmetry in the distribution of criterion measures and evidence of heterogeneity of variance required modifications in data processing. These departures from normality threatened the validity and usefulness of the F statistic. Reference was made to the Norton Study,[18] in order to determine the effects of skewed distributions and heterogeneity of variance on the F-distribution.

> In general, the F-distribution seems so insensitive to the form of the distribution of criterion measure that it hardly seems worthwhile to apply any statistical test to the data to detect non-normality...Unless the departure from normality is so extreme that it can easily be detected by mere inspection of the data, the departure from normality will probably have no appreciable effect on the validity of the F-test, and the probabilities read from the F-table may be used as close approximations to the true probabilities.
> ....when the heterogeneity in ...variance is "marked" but not "extreme", allowance may be made for this fact by setting a higher "apparent" level of signifi-

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18 E.F. Lindquist, Design and Analysis of Experiments in Psychology and Education, Boston, Houghton Mifflin, 1953, p.78-90.

> cance for the tests of treatment effects than would otherwise be employed. In cases of very marked heterogeneity, for example, if one wishes the risk of a Type I error not to exceed 5%, he might require the effect to be "significant" at the 2.5% level, or if he wants the risk of a Type I error not to exceed 1%, he might set the "apparent" level of significance of the test at 0.1%. The preceding is not meant to imply, of course, that allowance may always be made for heterogeneity of form or variance by "corrections" of the type suggested. On the contrary, there undoubtedly are some situations in psychological research in which the heterogeneity in either form or variance, or both, may be considerably more extreme than in any of the hypothetical situations investigated by Norton. In these situations it is not known what "corrections" should be applied to the ordinary F-test, and special procedures ...(the use of transformations) must be employed in analyzing and interpreting results. [19]

Several transformations of raw data were made in order to investigate which would put the data in the form which would most nearly satisfy the basic assumptions underlying the analysis of variance. The logarithmic transformation seemed the most efficient in normalizing the distributions and in minimizing the variance.[20] The results of the transformations and of the analysis procedures will be discussed in detail in Chapter VI, Presentation of Results.

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19 E.F. Lindquist, op. cit., p. 86

20 B.J. Winer, Statistical Principles in Experimental Design, Toronto, McGraw-Hill, 1962, p.219-222.

EXPERIMENTAL DESIGN

5. Operational Definitions

Certain terms used in this study have specific meanings imposed by the conditions of the study. The following restrictions are assigned to the terms in question:

Culture:	Life style: repertoire of responses to the exigencies of environment; linguistic, social and economic identification as Algonkian and Athapaskan.[21]
Ecology:	The totality of impositions made by geography and economy on a community of men: visual environment identified as James Bay, northern British Columbia and the Yukon.[22]
Cultural Difference:	Levels of alteration in language, socialization practices and economy within a cultural family.[23]
Traditional Group:	One living in relatively isolated areas: subsisting by traditional means, i.e., hunting, trapping, fishing; practicing traditional customs,

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21 A. Irving Hallowell, "Culture, Personality and Society", in Kroeber, A.L., Anthropology Today, Chicago, U. of Chicago Press, 1953, p. 610.

22 Clyde Kluckhohn, "Universal Categories of Culture", in Kroeber, A.L., op. cit., p. 514.

23 Ralph Beals, "Acculturation", in Kroeber, A.L., op. cit., p. 630.

EXPERIMENTAL DESIGN

relatively free of the effects of technological progress; exclusive use of the native language within the community.

Transitional Group: One living on the fringe of Western society, e.g., on a reserve; engaged in salaried employment; engaged in value conflicts but enjoying some benefits of progress, e.g., T.V., cars; orientated more towards the new than the old; in transition between Indian and Western life.

Urbanized Indian: Individuals who fulfill roles that are least like traditional ones; removed from the supportive influence of traditional customs and language in order to have a job in town: able to hold a job on a relatively permanent basis without help from the Indian family; attitude and habits which fit him for needs of an employer.

Cognitive Styles: Global or articulated modes of perceiving, thinking and acting.[24]

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24 Herman A. Witkin, "Some Implications of Research on Cognitive Style for Problems of Education", Professional School Psychology, Vol. III, 1969, p.205

EXPERIMENTAL DESIGN

Field-dependent: As measured by a battery of Witkin-type performance tests, is a mode of perception in which the overall organization of the prevailing field is dominant, and parts of the field are experienced as fused with their background: a global style.[25]

Field-independent: As measured by a battery of Witkin-type performance tests, is a mode of perception in which items are readily experienced as discrete from the field: an analytical, articulated style.[26]

Acculturation: Those cultural adjustments made by a community (or individual) in constant contact with another community (or individual) of a different culture.[27]

Enculturation: A process by which an individual learns the culture of his own people. From the accepted, organized behaviour patterns, he learns to ab-

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25 Herman A. Witkin, op. cit., p. 203

26 Ibid., p. 204

27 Ralph Beals, op. cit., p. 626-630.

> stract those which apply to situations of his daily experience. By means of this process, some modifications of old ways and some new ways of living gradually evolve.[28]

The indicators for the three cultural groups, i.e., traditional, transitional and urbanized, correspond to Hawthorn's definitions,[29] and to the description of developmental change found in the McGill Cree Project,[30,31] and to Nagler's precisions on the identification of urban Indians.[32]

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28 Harry Hoijer, "The Relation of Language to Culture", in A.L. Krober, op.cit., p. 556.

29 H.B. Hawthorn, (Ed), A Survey of the Contemporary Indians of Canada, Ottawa, Indian Affairs Branch, 1966, Part I, p. 36.

30 Norman A. Chance, Developmental Change Among the Cree Indians of Quebec, Summary Report, McGill Cree Project, Department of Regional and Economic Expansion, August, 1970, p. 4-37.

31 David Holden, Modernization Among Town and Bush Cree, McGill Cree Project, Department of Forestry and Rural Development, October, 1969, p. 1-24.

32 Mark Nagler, "Status and Identification Grouping Amongst Urban Indians", Northian, Vol. 7, No.2, 1970, p. 23-25.

EXPERIMENTAL DESIGN

Summary

The relationship between level of cultural difference and field-dependence-independence, between sex and FDI, between age and FDI for Algonkian and Athapaskan Indians, was tested by analysis of variance.

Three tests comprised the battery used to measure FDI: the Rod and Frame Test, the Embedded Figures Test and the Block Design Test.

The exploratory nature of the study imposed modifications not only on the statistical analysis but on procedures for testing and scoring as well. These will be discussed in detail in Chapter IV: Exploratory Study, and in Chapter V: The Study.

CHAPTER IV

EXPLORATORY STUDY

An exploratory study was undertaken in June, 1970, to 1) determine if the concept of a perceptual component of cognitive style was applicable to Indian perceptual behaviours, 2) establish descriptive criteria compatible with Indian cultural demands, 3) ascertain the adequacy of the instruments.

The hypothesis of no difference in cognitive style at two levels of cultural intensity, i.e., traditional and transitional, was tested.

The findings of the exploratory study will be presented in five sections:

1. Sample
2. Instruments
3. Procedures
4. Results
5. Discussion and Conclusions

Those aspects of the exploratory study which are pertinent to the research study will be fully described.

1. Sample

Two communities of Algonkians of the Ojibway cluster[1] were selected: a traditional group living in an isolated corner of the Parc Verendrye, Quebec, and a transitional

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1 G.P. Murdock, "Algonkian Social Organization", in Melford E. Spiro (Ed.), Context and Meaning in Cultural Anthropology, New York, Collier-Macmillan, 1965, p. 25.

group, inhabitants of a small reserve, three miles from Amos, Quebec.

In the traditional group, nineteen persons, aged from ten to sixty-eight, eleven males and eight females were representative of five families living in a small village, a summer encampment, on Lac Victoria. The Algonkian language is almost exclusively spoken, except among the young children who have learned French in school. Many of the traditional Indian customs are practiced, e.g., the cradle board for infants. These people depend on hunting and fishing for subsistence. The traditional Algonkian pattern of an autonomous, semi-nomadic political structure prevails, fostering self-reliance and independence in the people, while at the same time contributing to solidarity and mutual inter-dependence within the community.

In the transitional group, nineteen Algonkians, aged from eleven years to fifty-five years, eleven males and eight females, were representative of forty-five families, inhabitants of a small reserve three miles from Amos, Quebec. These people are of the same ancestry as the people of Lac Victoria. The older people speak Algonkian and either French or English. Those men speaking English are employed by surveying companies, with good pay and the opportunity to travel. Others are employed in Amos. Proximity to the town offers some of the advantages of modern society. Every family

has modern services, e.g., electricity, plumbing, T.V., cars and postal service. Departing from the traditional pattern, the political organization is structured. A chief is elected who represents the people at the various Indian association meetings and in dealings with the Department of Indian Affairs.

2. Instruments

The portable Rod and Frame apparatus, Witkin's Embedded Figures, Form A, 12 items, and the Block Design test from Wechsler Adult Intelligence Scale were used. Five subjects, aged ten, eleven and twelve years, were given Karp and Konstadt's Children's Embedded Figures Test.

3. Procedures

In both communities an effort was made to reduce suspicion and self-consciousness by going around the village to get acquainted, and by putting on a movie in the evening. By means of this publicity the people came to know about the study and were invited to take part. Subjects were accepted as they presented themselves. At Lac Victoria it was necessary to use an interpreter. In administering all tests to the Algonkians at Lac Victoria and Amos many preliminary experiences were provided.

EXPLORATORY STUDY

Specifically, for the Embedded Figures Test, the subjects were instructed in the techniques of recognition. The procedure was to show them the complex figure, then the simple, pointing out significant lines, etc. in the complex, showing one figure alone, allowing the individual to search. During the administration of the test proper, the complex figure was first shown alone for fifteen seconds, then the simple figure alone for ten seconds; it was then covered and the watch started. If the subject seemed to have forgotten the simple figure, it was shown again alone. This method and the verbal encouragements were in the spirit of the modified procedures outlined in the Embedded Figures Manual.[2] Gottschaldt examined the effect of frequent exposures to a simple figure on the ability to perceive it when embedded in a complex whole. Contrary to expectation, he found that the effect of exposure, experience and instructions on the subject's ability to extract the simple figure from a complex whole was extremely slight.[3]

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2 Herman A. Witkin, The Embedded Figures Test, Temporary Manual, Consulting Psychologists Press Inc., 577 College Ave., Palo Alto, California, p. 4.

3 K. Gottschaldt, "The Influence of Past Experience on the Perception of Figures", in M.D. Vernon (ed.), Experiments in Visual Perception, Baltimore, Penguin, 1966, p. 29-44.

EXPLORATORY STUDY

Less difficulty was encountered in presenting the Block Design Test. Some extra practice was provided by allowing the subject to reproduce many four-block patterns composed by the experimenter. When a satisfactory level of performance was reached the two exercise trials provided in the test were given and the subjects copied the design from the book. The subject was allowed to finish each design, even when the time limit was exceeded. The test was not terminated after three successive failures as directed in the manual.

The portable Rod and Frame apparatus was itself the symbol of the kind of challenge offered by the entire testing experience. The curiosity which the first sight of it aroused as it was carried through the village, assured the presence of a good crowd for the unveiling. Only the simplest demonstration was required to overcome any fear or suspicion which many must have felt. The instruction began before the subject was seated. He was invited to inspect the instrument, to roll the plastic drum, to examine the calibration on the disc, and to raise and lower the curtain. Before assuming the test position the subject saw the rod (referred to as the "stick") in the vertical position, aligned with the upright frame, and was told that this position was the one he must remember. The frame was rotated around the vertical stick to demonstrate the confounding effect this had on perception

of the stick as vertical. The stick was placed at 28°, both left and right, and rotated to 0° with corresponding changes being made for the frame. The stick was likened to a tree which grows straight, whether on level ground or on a hill. Preliminary trials were given with the subject in test position. Specific instructions were given to use the body as a reference point, once vision of the room was cut off. When the subject understood that no matter what was done to the frame, his job was to set the stick straight, the eight test trials began. The results were discussed with each person, and the men, in particular, were very proud of their accuracy in judging the upright. This had been related in the instructions to the skills of a hunter.

Lester's comments on the confounding effects of starting position and instruction on the results of the Rod and Frame test confirm that the

> S needs to be given a variety of information about the situation, which will make it clear to him that only his task remains constant throughout the experiment. The use of various angles of tilt of the frame (...) would be an appropriate approach. Rod starting position would optimally be given considerable variation during an experiment.[4]

Evidently he believed himself at odds with Witkin on this. This is not the case, for Witkin argues for the value of added practice before attempting to administer the test

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4 Gene Lester, "The Rod-And-Frame Test: Some Comments on Methodology", Perceptual and Motor Skills, Vol. 26, 1968, p. 131.

proper, when experience with or comprehension of the tasks involved is in question.[5]

4. Results

The results of the product-moment correlations and of the t tests for significance of difference between means, are found in Tables 1a and 1b. The only significant correlation is between EFT and BDT. The t tests show the Amos group performed in a significantly more field-independent manner than did the Lac Victoria group. Although there is significant difference between them, both groups give evidence of an independent mode of perceiving as can be seen in the record of individual performance reproduced in Appendix 2.

5. Discussion and Conclusions

The failure of the three tests to correlate significantly, with the exception of the EFT and BDT, was considered in the light of the findings of Wober and Okonji. For approximately comparable samples, RFT and EFT correlation was .21 in Wober's study, and RFT and CEFT correlated .205 for Okonji. Wober concluded that the two tests posed two problems which were dealt with in basically different ways,

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5 Herman A. Witkin, Personal Communication, letter dated September 14, 1970.

Table 1 a : PRODUCT-MOMENT CORRELATIONS FOR EXPLORATORY EXPERIMENT

LAC VICTORIA

		EFT	BDT
	RFT	(10) .45	(13) .06
	EFT		(9) .26
AMOS	RFT	(16) .36	(17) .35
	EFT		(15) .69+

(df) + significant at .05 level.

Table 1 b : EXPLORATORY EXPERIMENT SIGNIFICANCE OF DIFFERENCE IN MEANS

		Lac Victoria	Amos	df	t	p
RFT (degrees)	N.	19	19	36		.05
	M.	2.3	1.2		2.82+	2.03
	s.	1.4	.04			
EFT (sec.)	N.	12	17	27		
	M.	478.4	300		2.11+	2.05
	s.	239.8	198			
BDT (points)	N.	14	19	31		
	M.	34	41		2.87+	2.04
	s.	5.3	6.5			

Numbers enclosed in brackets in Table 1a are Degrees of freedom for each correlation.

i.e., proprioceptive and visual perception. Okonji concluded that the simpler CEFT was the cause of low correlation with the RFT. He suggested that the kind of test item used in a study of FDI must be considered when interpreting the correlation results.[6]

Barrett, Cabe and Thornton offered an alternative to this problem. The tests might well be measuring the same attribute, but are they related in a simple linear fashion?[7] In the light of this, the small size of the Lac Victoria-Amos sample was a determining factor in the decision to use the same three measures for the research study. A larger sample could be used in examining these alternative solutions to the problem of low test correlation.

The record of individual performance and the significance of the difference between the traditional and transitional groups, suggested that the perceptual behaviour of the Indian can be described in terms of cognitive style. To do this, however, the perceptual behaviour required by the tasks must be made meaningful for the individuals who undertake them. This imposes modifications appropriate to the experience of the individual within a cultural setting.

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6 Cf. Chapter I, REVIEW OF THE LITERATURE, METHODOLOGICAL FOUNDATIONS.

7 Gerald V. Barrett, Patrick A. Cabe, and Carl L. Thornton, "Relation Between Hidden Figures Test and Rod and Frame Test Measures of Perceptual Style", Educational and Psychological Measurements, 1968, Vol. 28, p. 551-554.

EXPLORATORY STUDY

Control of cultural difference, sex and age as variables influencing cognitive style is limited by practical considerations of random sampling and sufficient numbers. By setting the age categories at 17 to 29 years and 30 plus years, subjects of both sexes from the three levels of cultural difference would be more available than if a narrow age category was proposed.

The exploratory study, therefore, provided,
1) information on the perceptual behaviour of Indian people;
2) a basis for modification of procedures and descriptions;
3) evidence that the testing instruments were appropriate for an intra-cultural study.

In the following chapter the study of the effects of cultural difference on the perceptual style of two Indian families will be described.

CHAPTER V

THE STUDY OF CULTURAL DIFFERENCE AND FIELD-DEPENDENCE IN TWO INDIAN LINGUISTIC FAMILIES

What has been presented in Chapter III: Experimental Design, and in Chapter IV: Exploratory Study, will be supplemented here by a description of conditions specific to the study. These relate to:

1. Population
    a. Algonkian
    b. Athapaskan
2. Samples
    a. Traditional
    b. Transitional
    c. Urbanized
3. Procedures
4. Instruments
    a. Reliability
    b. Item analysis
    c. Validity
5. Statistical Analysis

Although closely identified, the Exploratory Study and the Study itself, are not identical: neither in sample, procedures, instruments nor statistical analysis. It has been necessary, therefore, to present them separately, risking some overlap in the separate discussions, while presenting the features that are specific to each one.

THE STUDY

1. Population

a. Algonkians

The Algonkian linguistic family is the largest in Canada. Within that family, the Crees are by far the most numerous. [1] The Swampy Cree, who now inhabit the coastal areas of James Bay in Northern Ontario, formerly roamed a vast forest and bog country, which they called AMISKWASI, Land of the Beaver. Environmental stresses and consequent adaptive social responses regulated, to a large extent, the Cree life style. Trapping, fishing and hunting were the main cogs in the life cycle. Great value was placed on sharing and mutual assistance, as well as on individual competence and self-reliance. Rules, authority and imposition of sanctions were contrary to the traditional loosely organized familial units. The strength of this loose-knit political structure rested on the deep respect the Crees had for individual rights. Individual ownership was a sacred privilege, scrupulously respected, as were the familial hunting and territorial rights.[2]

The importance of the child in the life cycle and the parental aspirations and expectations which centered on him, explain the unique climate in which the child is reared. Wintrob and Sindell's description of traditional enculturation captures the essence of Indian socialization from birth

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1 cf. Appendix 1

2 Jean Trudeau, O.M.I., Culture Change Among the Swampy Cree Indians of Winisk, Ontario, Unpublished doctoral dissertation, Cath. U. of America, Washington, D.C., 1966, p.24.

to age six:

> Through observing their parents and elder siblings, Cree children learn early in life the basic components of most adult roles. Much children's play is highly imitative and, thus, rehearses adult roles (...) Imitation of parental behaviour is reinforced by attention, smiling, or positive comments. (...) From four to five years of age onward boys hunt birds and have their own special hunting bag for personal supplies (...) From age four to six children do chores (...) Many tasks which children perform are done cooperatively with their siblings, parents (...) and these tasks contribute directly to the welfare of the group. Children are aware of their contributions and take pride in their growing competence (...) Sharing food as well as labour is stressed in Cree culture. Children observe this extensive sharing (...) and participate directly in it. Young children carry gifts of cooked food between the constituent families in the hunting group. A small child will receive special delicacies specifically designated for him. (...) The child learns to reciprocate such gifts (...) Self-reliance and independence are also important in traditional enculturation (...) children have few limitations placed upon their behaviour. They are free to eat whenever and as frequently as they feel hungry, bedtime is not rigidly scheduled, and except in dangerous situations (...) children are permitted to explore their natural surroundings (...) As a child gains skill in performing different kinds of tasks, adults pointedly begin to ignore overtly dependent behaviour such as crying or seeking attention and nurture the child's self-esteem through approval and encouragement of his new skills and ability to take responsibility. (...) the child learns to handle himself while alone in the bush (...) on the trapline a boy must be able to recognize and interpret the significance of animal tracks and be able to judge when it is safe to walk on the ice. Such self-reliance and the ability to function well without aid or support from other people is crucial in bush life... In traditional Cree culture, where both individual autonomy and cooperation with others are necessary, mechanisms to maintain group solidarity are highly adaptive. One such mechanism is strong social con-

> trol on the overt expression of agression. Observations show that agression is defined broadly in Cree society. It includes not only fighting but also raising one's voice (...) refusing direct requests, and directly disputing someone's statements (...) Throughout the child's socialization, fighting, quarelling and "talking back" are highly disapproved. Corporal punishment is rare.3

For this study the effects of child-rearing practices are considered of first importance in the development of a characteristic cognitive style. It is expected that modifications in socialization practices will result in modifications in child-rearing practices. This in turn should be a significant factor in observable modifications to the perceptual habits of the group.

The woman's status in Cree culture depends less on socialization practices than upon her own personality and good judgment. She has the right of full disposition of everything her husband provides, and the right to personal property, though inheritance of hunting-territorial rights is the man's. The traditional distribution of labour is not so rigid that the man will not willingly do a woman's

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3 Ronald M. Wintrob and Peter S. Sindell, Education and Identity Conflict Among Cree Youth, McGill Cree Project, Dept. of Forestry and Rural Development, Oct.,1968, p. 12-15

work, e.g., looking after the children; and she would not hesitate to undertake heavy jobs on the trapline. Married women are free to come and go as they please and are in no sense the property of their husbands.[4]

Chance observed certain behavioural patterns among the Cree which he interpreted as indicators of a particular kind of cognitive organization which is perpetuated by the cultural system. These were: repression of fear, of pain, of aggression, of hunger, lack of competition and boasting, quiet endurance in the face of deprivation, reticence in self-expression and hesitancy to interfere in the lives of others.[5] There will be occasion to recall this assessment of Chance.

The Crees call themselves NAHIYUWĀWUK, the Exact People, or Real Men, or First People. Their language is rich and well structured, and has the status among Indian languages that French has among modern languages.[6] It is a language of which the words change depending on the section of the country in which it is spoken. No native literature exists, for the Crees possessed no permanent form of writing until missionaries invented a "syllabic

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4 Regina Flannery, "The Position of Woman Among the Eastern Cree", Primitive Man, Vol. 3, No.4, Oct., 1935 p. 81-86.

5 Norman A. Chance, Developmental Change Among the Cree Indians of Quebec, McGill Cree Project, Summary Report, revised April, 1969, ARDA Project No.34002, Dept. of Forestry and Rural Development, p. 16-19

6 Le Rev.Père Alb.Lacombe,Ptre, Dictionnaire de la Langue des Cris, Montréal, C.O.Beauchemin & Valois, 1874,p.ix.

system" to give them the scriptures in an acceptable form. This system gives a symbol for each combination of each consonant with each vowel. Not all the grammatical terms used have the same meaning as in English usage. Modifications had to made in order to better describe the agglutinations to which the words of the language are subjected. These agglutinations combine words into compounds with little or no change to the form and meaning of the constituent parts. If one accepts the interrelationship of language and culture, morphological features such as agglutination, as well as syntactical patterns reflect the habitual behaviour and thought processes which fashion them.[7] One example will illustrate this for the present study. The reporting of speech in Cree observes the rule that only the Direct Method of reporting is used. Indirect narration, such as is used in English, is not used in Cree. The narrator of an incident does not say, "He said he was going to build a house.", but, "He said, I am going to build a house".[8] Le Père Lacombe gave this description of Indian languages in general, and Cree in particular:

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7 Harry Hoijer, "The Relation of Language to Culture", in Kroeber, A.L. Anthropology Today, Chicago, U. of Chicago Press, 1953, p.554-573

8 Rev.H.E. Hives, A Cree Grammar, Toronto, The Church of England in Canada, 604 Jarvis Street, 1948, p.53

> Le caractère général..consiste en ce qu'elles réunissent un grand nombre d'idées sous la forme d'un seul mot. A l'aide de racines, d'inflexions, de particules préfixes, on forme des mots qui quelquefois renferment l'idée de toute une phrase...[9]

This quality of directness in speech is recognized as one of the outstanding Indian characteristics through the many negotiations which were transacted between white men and native Canadians.

b. The Athapaskans

The Athapaskan linguistic family inhabits the interior plateau of British Columbia and the Yukon. The diversity of nature which characterizes this country explains the variety of cultural practices among the natives of north-western Canada. Experiencing the harshness of nature, Athapaskans were repeatedly displaced, undergoing with each upheaval many modifications to their adaptive responses.[10] Today any given culture of an Athapaskan tribe is a mixture of customs borrowed from neighboring tribes, a result of inter-marriage and acculturation. Athapaskans are first and foremost hunters, living on moose, caribou, etc. Those living along rivers and by lakes depended on fishing to supplement the food supply.

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9 Le Rev. Père Alb.Lacombe, op. cit., p. ix.

10 Diamond Jenness, The Indians of Canada, (3rd ed), Ottawa, National Museum of Canada, 1955, p.377-404

THE STUDY

The tribes were divided into small independent bands, each having a leader who had very little authority. While there was a bond of unity within the band, hostile acts were often committed against members of other bands. Antagonism was fostered to the extent that common identification or cooperation was impossible. In some tribes the women were subject to many restrictions and privations. However, in tribes which were dominated by the coast Tlinkit, i.e., Tahltan, Kaska and Tagish, descent followed the female line, with chieftainship passing from a man to his sister's son. This practice assured a privileged status for the woman.

Athapaskan mothers carried their babies in bags made of fur, using moss for diapers. The upright was the most usual position for the infant, as he would swing from a branch or see the world from his mother's back. Grandmothers were especially loved by children as they would take over when the mother was occupied with new arrivals. At the birth of the first child it was generally the practice for the father to drop his own name and become known as "the father of so and so". This practice gave rise to the "favourite child" cult among some tribes. In other tribes the family name was changed with each successive child. Little children were treated with great affection and indulgence. They would find a welcome in any house in the village.

THE STUDY

The children were free from many restrictions, but there were some general rules which young and old had to obey. Corporal punishment was rare, the most wide-spread method of discipline being public opinion. It was before the whole community that one had to answer for misdeeds. In many cases the child had to bear the consequences of what he had done, though parents were watchful that no bodily harm would come to him. Other threats were used, in form of bogeyman tales, which were meant to impress the vivid young imaginations. In the experience of this writer, the children, rather than being intimidated by these cautionary tales, seemed rather to delight in them, and would often tease, "Scare us!", and beg for ghost stories terrible enough to make them shriek in fright. Tahltans were fond of singing, and composed many songs for their children. From the earliest years the child was allowed to make his contribution to his family. What he did was of importance, and he soon sensed his personal worth and responsibility. These Indians had one standard of behaviour good for everyone, children and parents alike. In this atmosphere the child was never in the way, never a nuisance, never excluded. Children respected their parents and trusted them. This reflected the respect which parents showed to them; and not only the parents, but every adult. Indians recognized the potential of the child. They respected his person, his work

and his thought. They encouraged his initiative and enthusiasm. The wisdom of little children was never disdained. An Indian family was, and is today, as much influenced by the wishes of the children as it is by those of the parents.

While compromising on many things, Athapaskans would not accept bondage or loss of their freedom. [11] In the past, as today, this choice of freedom had its price. Instead of the relative security which a treaty with the Government would bring, many Athapaskans endure hardship rather than life on reserves. Many natives reluctantly accept Government aid, and hope for the day when they can pay back what they have received. In general, these people are not awed by government and would like nothing better than to be allowed to make it on their own.

The native way was to work day and night at hunting, fishing or trapping, until the job was finished. Then followed a rest, with dancing, singing, games or visiting. No one shirked his responsibilities to resume work. Neither was any virtue attached to accumulating or hoarding food and materials, (with the exception of those tribes in contact with potlatch Indians). This seeming improvidence was not a sign of indifference to life. Rather, the Indian, familiar with the vagaries of nature, recognized that life is fragile and that the future was not his to dispose of.

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11 Diamond Jenness, op. cit. , p. 149-154, 263

THE STUDY

While the Algonkian sample used in this study spoke the same language and dialect, i.e., Cree, the Athapaskan sample was far from unilingual. The dialects spoken by the people who took part in the research included:

- Tahltan-Kaska
- Sekani-Beaver-Sarsi
- Dogrib-Bear Lake-Hare
- Tlinkit [12]

Philologists are not agreed on the linguistic relationships of these groups.[13,14] Sapir in 1915 grouped the Athapaskan, Tlinkit and Haida under the name Na-Dene. Boas and Goddard disagreed, pointing out that the similarities listed by Sapir as evidence of genetic relationship may have resulted from borrowing.

Although in contact with white civilization for only thirty years, (since the construction of the Alaska Highway), the Athapaskans, in the country traversed by the Highway, have made yet another cultural adaptation to environmental pressures: many of the native dialects have been almost forgotten, replaced by English.

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12 Harry Hoijer, Linguistic Structures of Native America, New York, Viking Fund, 1946, p. 11.

13 Ibid., p. 12

14 Joseph H. Greenberg,"Historical Linguistics and Unwritten Languages", in Kroeber, A.L., op. cit., p. 283.

THE STUDY

2. Samples

The effects of cultural difference (the independent variable) on field-dependence-independence, FDI,(the dependent variable) were observed across three levels of cultural intensity. The perceptual component of cognitive style, FDI, was measured in traditional, transitional and urbanized communities. Interest here is not in racial comparison but in inter-cultural difference. A sample of 240 persons was drawn from two linguistic families, Algonkian and Athapaskan. Sex and age (intervening variables), were controlled by testing equal numbers of men and women in each sample, in two age categories, 17 to 29 years, and 30 years and over.

a. Traditional sample:

i. Algonkian

Attawapiskat, Ontario, population 500 Cree Indians, is an isolated village accessible only by bush plane or supply boat. Although there have evidently been modifications in their material culture, as noted by Honigmann,[15] these people are not orientated toward the technological society.

Very few adults over thirty speak English. All of these were educated in the residential school, which opened

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15 John J. Honigmann, "Attawapiskat--Blend of Tradition", Anthropologica, No. 6, 1958, p.57-67

in 1903, where they learned to read and write in Cree.

The people of Attawapiskat are ambitious and enterprising. Young and old worked from early morning until dark, on construction of new buildings, repairs of old ones, unloading the Hudson Bay supply boat, etc. Both men and women carried heavy loads on their shoulders for long distances; water buckets attached to wooden yolks, long pieces of lumber, boxes of groceries. Dwellings are simple frame buildings. Next to many houses are wigwam structures used for smoking meat and fish. Traditional occupations, hunting, trapping, fishing are preferred by all, but do not have the same priority as in the past.

The Chief of the village agreed to act as interpreter and to acquaint the people with the study and its purpose. Forty subjects were tested over a period of fourteen days.

Sixteen years ago Honigmann reported that a number of families had left Attawapiskat for jobs at Moosonee.[16] The population was 300 in 1955. At the time of this writer's visit the population had increased to almost 500 persons. More and more families are returning. Personal conversation with one young father revealed that he had returned because he wanted his children to grow up in the climate of his native culture.

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16 John J. Honigmann, op. cit. p. 58

THE STUDY

ii. Athapaskan

Iskut, B.C., population approximately 300 Tahltan Indians, is an isolated village in the Cassiar Mountain range. The settlement is recent, resulting from a feud among the Tahltans at Telegraph Creek. The Indians at Iskut will not call themselves Tahltan, but Bear Lakers.

The houses are of logs, well made, but barren of superfluous furniture. Wild meat is the basic food staple. Private property is scrupulously respected, making it unnecessary to lock doors. The infrequent visits of the Royal Canadian Mounted Police, stationed at Cassiar 100 miles away, are routine and friendly. At the time of the study, there was no running water, nor electricity. A government project was underway to install water pipes. All of the able-bodied men were digging trenches in order to complete the job before cold weather.

The Chief, a young man, designated a patriarch of the community to take his place in publicizing the study. Everyone could understand and speak English. The men have a reputation of being excellent hunters. Their services are sought as guides for big game expeditions. Any test of their skill is an exciting challenge, and this was how they regarded the tests.

The women are outspoken, in a manner which is abrupt and direct. Undoubtedly this is a cover-up for an initial

shyness, which they do not like to reveal to strangers. They evidently have dominant personalities. The impression was confirmed by the missionary, who said that the women are a powerful influence in the village. This, with the fact of the division among the Tahltans and the nostalgia of one old man for the dances, songs and gifts of former days, seemed to be a trace of Tlinkit influence: phratries, matrilineal descent and potlatches.

The one room kindergarten building was used for the testing. It was situated in the center of the village. It became the gathering place at night for the men who wanted to test themselves against their friends. The tests did not seem hard enough to them.

b. Transitional Sample

i. Algonkian

Moosonee, Ontario, population approximately 1200 Cree Indians, is a small harbor at the tip of James Bay, where the Hudson's Bay Company has its supply depot for remote trading posts and the Government has radar and military installations. For the Cree Indians living in a squalid settlement separated from the white establishment by a creek, Moosonee is not home. Natives from all points on the east and west coasts of James Bay come here looking for jobs and contact with the new way of life. Some Indians find steady employment with the Hudson's Bay Company or the Mission.

THE STUDY

Several have positions as aides at the Moosonee Education Centre. The majority, however, must depend on uncertain low-paying labour jobs for the Government or the railroad, or on welfare cheques. During the tourist season men operate water taxis, skillfully maneuvering 22 foot freight canoes through the tidal waters of the Moose River, between Moosonee and Moose Factory Island. The women and children line the roadway from the railroad station to the water front, displaying for sale bead-work, carving, rock and fossil specimens.

With but few exceptions, Indians here are at an economic, social, political, educational and linguistic disadvantage. The stresses which result from this require formidable adaptations. Some Indians have succeeded moderately well, but remain in a precarious position.[17] Although they have attained some economic stability the cultural conflict is not over. This conflict has sent many back to their villages on the coast.

The tests were given in the basement of the Mission, a few steps from the Indian settlement on one side and the Hudson's Bay store on the other. Contact was made through a middle-aged woman, a teacher's aide at the Moosonee Education Centre. It was necessary to supplement her efforts by excursions to the waterfront and local hang-outs. Initial

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17 Leopold Morin, O.M.I., "Moosonee Indians' Integration", Sept., 1969, R.C. Mission, Moosonee, Ont.

suspicion, timidity and disinterest were somewhat overcome through friendly conversations and by explanations of the purpose of the study.

ii.Athapaskan

Tahltan, Sekani and Kaska Indians live at Lower Post, B.C., between the Liard River on one side and the Alaska Highway on the other. The Nahani at Watson Lake, Y.T. have a small settlement on the road between the town and airport. At Cassiar, B.C., 70 miles off the Highway, a small Tahltan settlement sits on the edge of a company town.

Indians in northern B.C. and the Yukon speak and understand English, largely due to contact with construction and military personnel of the American Army when the Alaska Highway was started in 1941

The Indians at Lower Post and Watson Lake live mainly on welfare. Seasonal jobs in the bush, e.g., fire-fighting, road-clearing, provide added income, as do the few furs and hides which they get in winter. Work in the Cassiar Asbestos Mine is limited to low-level jobs which, nevertheless, afford more stability than most others.

These Athapaskan people, with varying tribal backgrounds, have been catapulted from the Stone Age into the twentieth century within the space of 25 years, and find themselves in the process of acculturation somewhat against their will. The con-

fusion and social disintegration which is found at Lower Post and Watson Lake are due as much to a conflict of values as to poor economic opportunity. For example, the legal and penal system which was thrust on these primitive people is poorly understood and bitterly resented.[18]

This researcher had the advantage of being personal friends with many residents of these villages, having spent six years teaching at the Lower Post school. Contact was made by visits in the homes and encounters in the hotel lobby. The purpose of the study was explained and many came to find out what it was all about. It was necessary to draw subjects from three communities, since those required by the design were not available in any one group.

c. Urbanized Sample

To avoid ambiguity, the indicators for this sample will be clearly restated. The urbanized Indian will be the one fulfilling roles that are least like traditional ones. He will have moved out of his traditional environment to acquire a job in town. He will be able to continue in the job on his own, without the support of his Indian family, and will hold the job on a relatively permanent basis. More important

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18 John J. Honigmann, "Social Disintegration in Five Northern Canadain Communities", The Canadian Review of Sociology and Anthropology, Vol.2, No.4, Nov.,1965, p.199-214.

than any language or specialized skill that may be required for the job, will be his attitude and habits which fit him for the needs of his employer.[19]

i. Algonkian

Moose Factory, Ontario, Indian population approximately 1200 Crees, is an island which belongs to the Hudson's Bay Company. That the Cree Indians in the vicinity are closely identified with the Bay was shown in 1945, when the Crees were permitted by the Company to occupy a reserve area of one and a half square miles on Factory Island. Today the Indians fulfill all but administrative roles in the Bay store, in the large Government residential school and in the immense Federal hospital.

Three economic and social strata among the Indians are easily identified. At the upper end of the island are the employees of the Bay and the Government. At the other end are the Crees who still live on the reserve land and depend on seasonal jobs, hunting and welfare for a living. In the middle are the Indians married to whites. These maintain a standard of living comparable to the Hudson's Bay employees, but are usually not accepted by them nor by the reserve Indians.

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19 David E.W. Holden,"Modernization Among Town and Bush Cree", McGill Cree Project, Final Report, Annex 1, Dept. of Forestry and Rural Development, Oct.,1963, p.3

dians.

Contact was made through the administrator of the Federal school and the Indian manager of the local movie house. The majority of the subjects represent the salaried employees of the Bay, the Federal school and the Federal hospital, with the balance being the Indian partners of inter-racial marriages. The money usually offered to the subjects as recompense for their time was declined by many of these people, who expressed appreciation for the opportunity to make a personal contribution toward improvement of Indian education.

ii. Athapaskan

Whitehorse, Y.T., has an Indian population of approximately 1000. The reserve land on the fringe of the town belongs to the Nahani. Indians of several other Athapaskan tribes live in town, many of these are married to whites and work at the Indian student residences and at the hospital. Contact was made through the administrators of the student residences, of Takini Minimum Security Institute, and through social and religious organizations. The subjects selected were from among Indians living in town, employees and students at the residences, Indian partners of inter-racial marriages and volunteers from the correctional institute. The heterogeneity of the sample reflects the actual composition of the

urbanized Indian population of Whitehorse.

As was previously noted, the requirements of the design could not be met by any single tribe of common cultural and linguistic background. The decision to include the men of the correctional institute was based on the nature of the institution itself and the personal biographies of the men. The Takini Minimum Security Institute functions as the Territorial gaol, but is unlike a conventional jail. Ultra modern in architectural style and accommodation, the Institute incorporates advanced ideas for correction and rehabilitation. Educational, occupational and recreational opportunities are carefully programmed for individual needs. The volunteers who were accepted for the study were men who had left their tribal homes and were functioning in the urban milieu. Through conversation it was determined that their orientation was towards different values than those of the traditional Indian culture. Further, it was evident that they had acquired linguistic and occupational skills which altered their way of life.

In Whitehorse as in Moose Factory, many subjects participated in order to make their contribution to education. Several delined the money offered and asked that it be given to a local charitable organization working with Indians.

THE STUDY

3. Procedures

Procedures followed in the study which were not described in Chapter IV, Exploratory Study, will be discussed here.

The average amount of time for a single testing interview was forty-five minutes. Some, however, would be as short as thirty minutes or as long as two hours. This would occur when practice experience was needed to assure understanding of the task, and also when the S was allowed to complete BD items or search for EF beyond the time allotment. It would often happen that two or three Ss would come together. Explanation and demonstrations of the tasks would be given to them, and each one would take his turn while the others watched. This occurred when the S himself was reluctant to be alone, or needed to gain confidence by watching a friend successfully accomplish the task, or when the Ss were unable to return at another time, or if turned away, would lose interest. The reactive effects of this experimental arrangement could be considerable. Therefore precaution was taken to minimize any effect by requiring the observer to sit at a distance when this could be done. The observer was not permitted to see the task, EFT, BDT or RFT, in the same position as the subject saw it until he had his turn. To equalize the disadvantage of being first, each of the two or three Ss participating under these conditions had a first turn on one or the other test.

THE STUDY

Experience gained from the exploratory experiment guided several changes on the EF form and procedures. First, two practice and six test items were chosen from among the twenty-four items of Witkin's Embedded Figures Test, Forms A and B. The choice followed Wober's selection [1], with the exception of complex figures with dark colours or the three dimensional box designs. The series used is reproduced in Figure 3. [2] Preceding presentation of Witkin's figures, the Ss were given a demonstration of the embedding process with several figures from Karp and Konstadt's Children's Embedded Figures Test (CEFT). The tent and house cut-outs were used with the incomplete pictures representing stages of embedding a simple figure in a complex one. The methods used to hide the simple figure were described and further practice was given, using both the cut-outs and the stylus. The CEFT figures are well suited to this kind of demonstration. They are large reproductions of known objects with bright, bold colours and lines. Increasing degrees of difficulty make it possible to determine if the S has understood the embedding process and developed a technique for performing the task. In addition to the demonstration figure, TX1, TX2, HX, H-6,

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1 M. Wober, "Adapting Witkin's Field Independence Theory to Accommodate New Information from Africa", British Journal of Psychology, Vol. 58, 1967, p. 33.

2 The reliability and validity of these items will be presented in the following section. Figure 3, p.46.2

H-8 and H-14 were used. Some of these are found in Figures 4a, 4b.+ Following this demonstration, two practice items from Witkin's EFT were presented: P-1 and D-4. If any difficulties were encountered further assistance was given in recognizing the embedded figure, usually by juxtaposing the simple and complex figures and pointing out the technique by which it had been embedded. Item D-15 was used as practice, when necessary. During the test proper, it was the S who controlled the exposure of the simple figure each time he wanted to review it. His instruction was that he could see it as many times as he wanted for ten seconds only, and if the complex figure was covered. Some individuals in the traditional and transitional older groups were not impressed by the ten second limit, nor by covering the complex figure. Often a verbal reminder would remedy this, but when this proved ineffective it was considered better strategy to add the time in excess of ten seconds to the searching time. The order of the EF presentation was: 1. G-10, 2. F-7, 3. A-11, 4. B-19, 5. A-17, 6. C-20.

Procedure for the BDT followed the method previously outlined with these exceptions. In general, the time limit of sixty seconds for items 1, 2, 3, 4, 5, 6 was adequate for all subjects. However, neither the time limit of 120 seconds, nor practice preparation for items 7, 8, 9, 10 were satisfactory. In effect, there is no practice using nine blocks

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+ Figures 4a and 4b, p. 46.3, 46.4

allowed to the S. The transfer from four to nine blocks seemed to represent a new kind of problem for the older traditional and transitional subjects. If this difficulty arose, the test was interrupted and the S took his time to practice positioning nine blocks (with no reference to the printed design).

The RFT was scored in degrees from the upright; the EFT scored in seconds needed for extracting the embedded figure, to a maximum of 180 seconds. The time required to complete the BDT was recorded. Items 1 to 6 had a limit of 60 seconds, while items 7-12 allowed 120 seconds. Failure to complete any design within the time limit earned a score of zero. A point score, with bonus points for rapid performance on designs 7,8,9,10, was used in constructing the frequency polygon for BDT. The time score was used in the computing of the F-statistic. Individual performance records for the Study are found in Appendix 2a.

A transcript of the directions used for presenting each test in this study appears in Appendix 3. In the research study when an interpreter was used, the modified directions evidently underwent further modifications which could not be identified. In some cases it was necessary to supplement the verbal direction with appropriate mime equivalents.

A record sheet was kept for each subject. Samples of these are found in Appendix 4. Notes were made on his difficulties, method of attack, attitude and remarks. Between

sessions, field notes were compiled for use in describing the people, their way of life, and the environment.

4. Instruments

a. Reliability

The reliability of the tests when used with the native population under the conditions described was found by means of split-half correlation, with correction by the Spearman-Brown formula for estimating the reliability coefficient of the total test:

$$r_{tt} = \frac{2\, r_{hh}}{1 + r_{hh}}$$

in which:

r_{tt} = reliability of the total test estimated from the reliability of one of its halves;

r_{hh} = correlation of the halves: in this case a Pearson r.

TABLE 2

RELIABILITY OF RFT, EFT, BDT+ for this study

	RFT	EFT	BDT
r_{hh}	.71	.61	.67
r_{tt}	.82	.76	.80

+ The point score of BDT was used in this reliability study.

THE STUDY

For the RFT, the first half of the test was correlated with the last half, since trials 5,6,7,8 are repetitions of trials 1,2,3,4. Odd-even reliability was computed for both the EFT and the BDT.

The distribution of test scores for each of the three measures has been plotted in Figures 5,6,7 and 7a. The original scores for the RFT and EFT were used, with both point scores and time scores plotted for the BDT. These distributions are leptokurtic and marked by extreme skewness: evident violations of the assumptions underlying the F-test of the null hypothesis.

Cochran points out that among the factors which cause the greatest loss of power and significance sensitivity are extreme skewness and changes in error variance.[1] Discussion on page 49-50 has outlined the procedure that was followed in order to analyze and interpret the results of the tests. This was a transformation of scores to logarithmic values.

The mean scores for each of the four factors: Family, Cultural Level, Sex and Age, are given in Table 3.

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1 W.G. Cochran, "Some Consequences When the Assumptions for the Analysis of Variance are not Satisfied", Biometrics, March 1947, Vol. 3, No. 1, p. 22-38

FIGURE 5 - FREQUENCY POLYGON: RFT

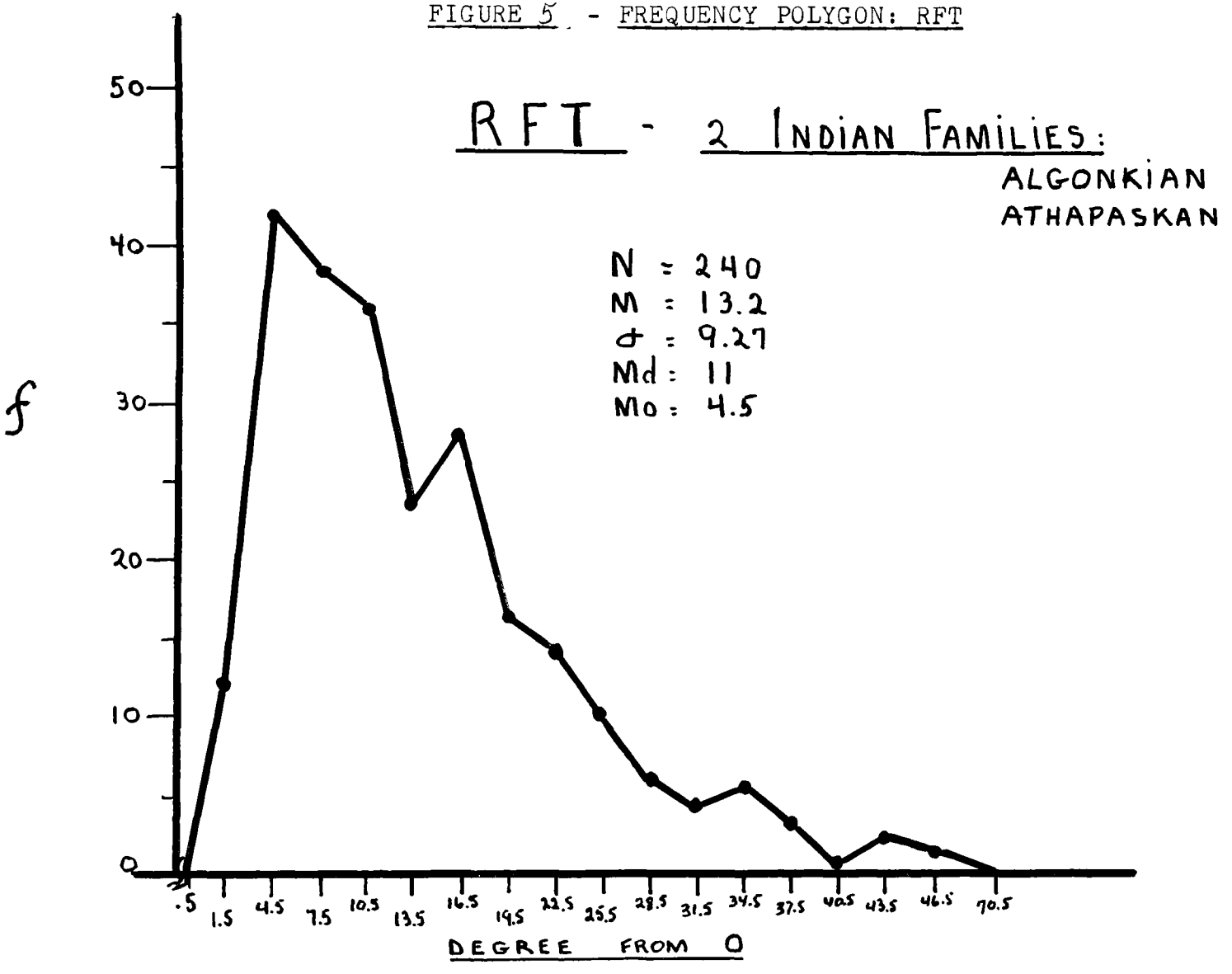

FIGURE 6 - FREQUENCY POLYGON: EFT

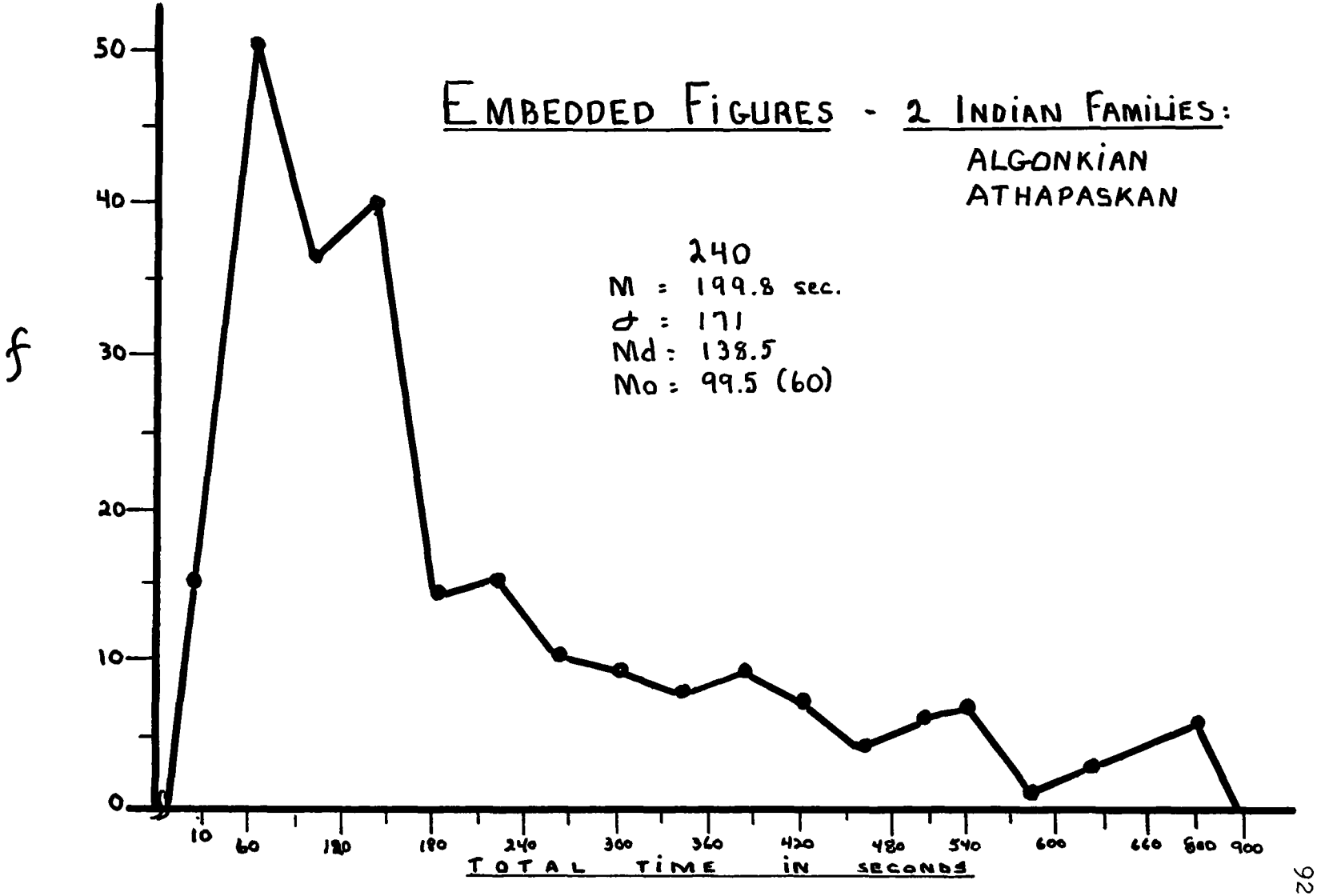

FIGURE 7 - FREQUENCY POLYGON: BDT

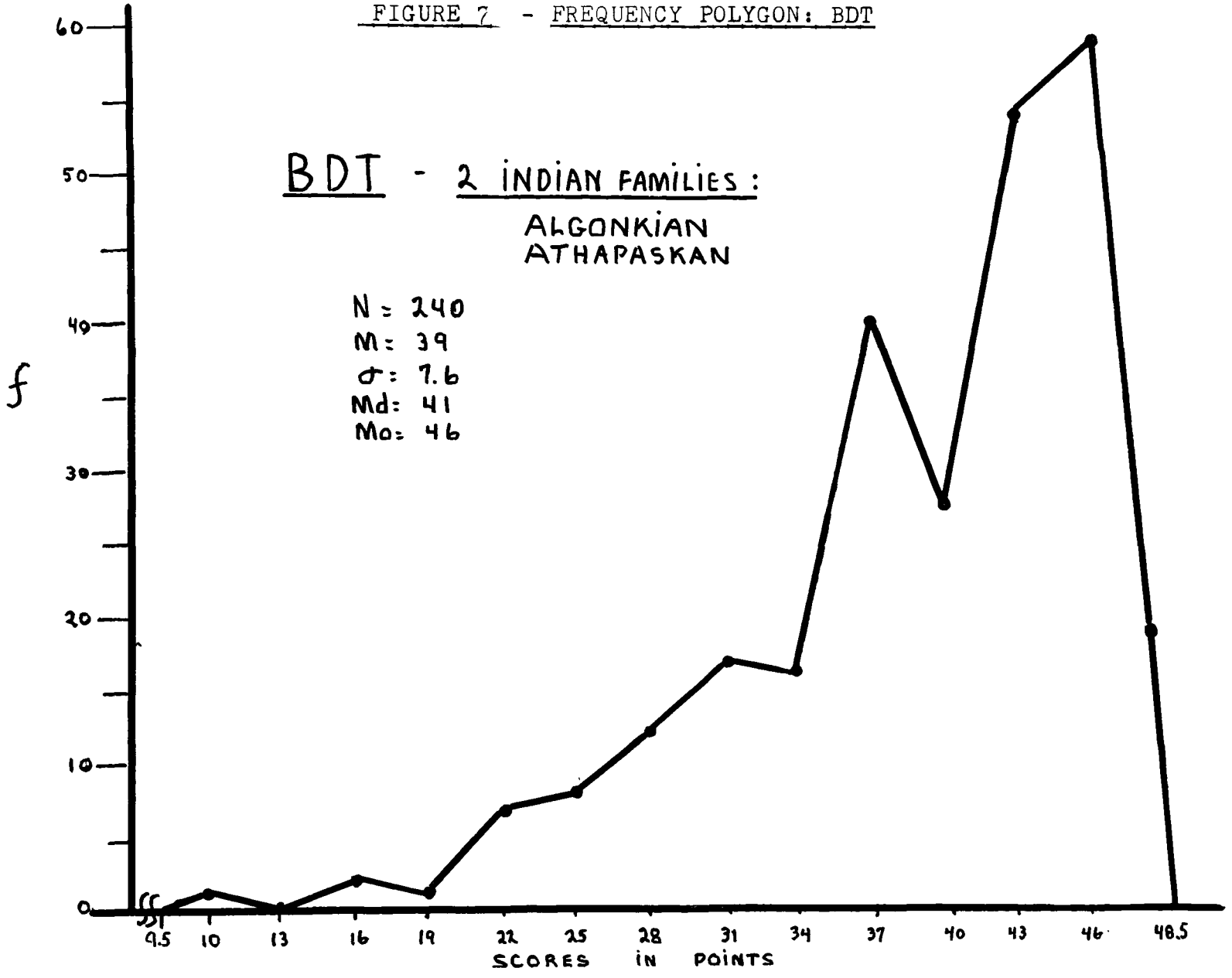

FIGURE 7a FREQUENCY POLYGON: BDT

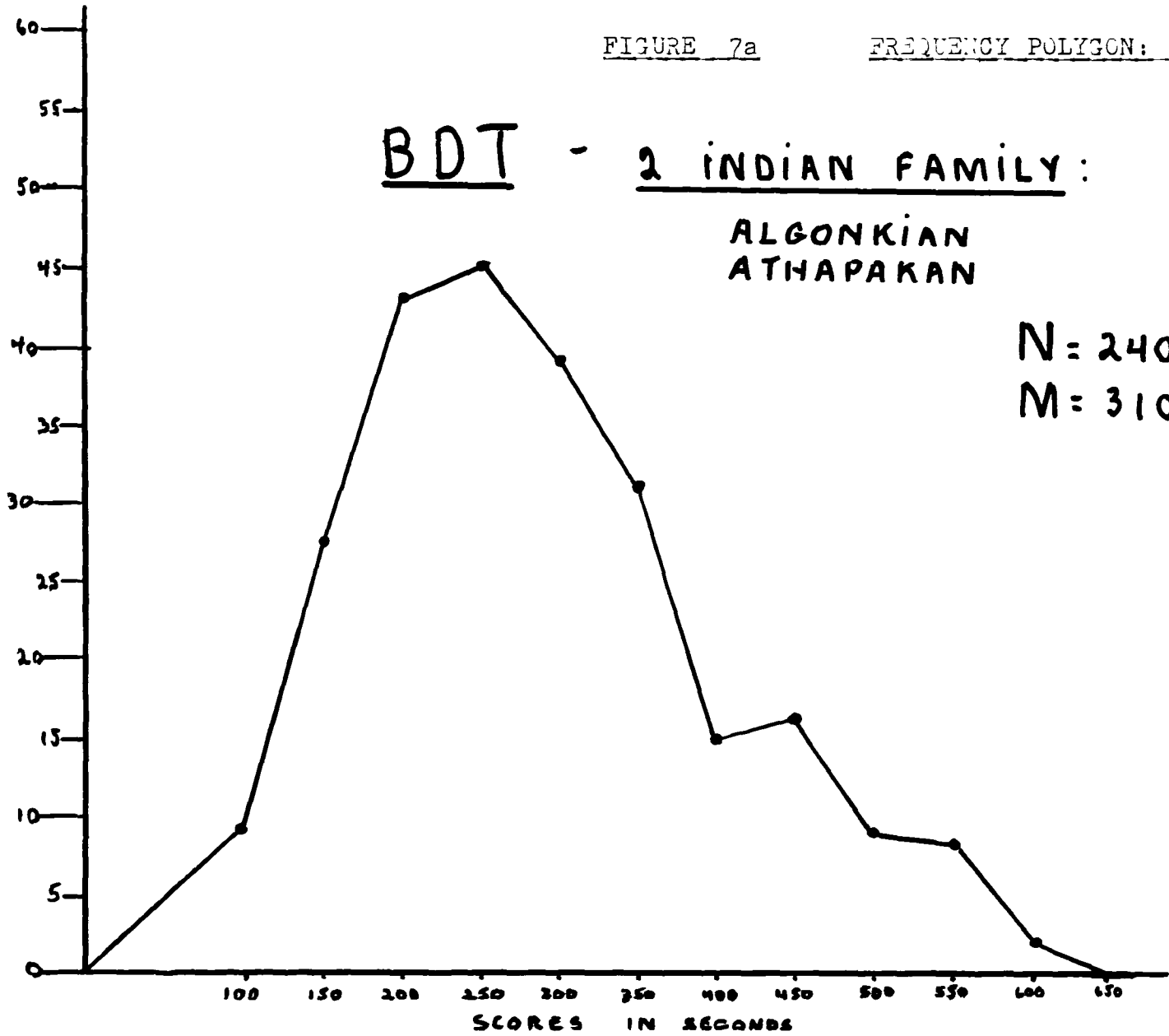

TABLE 3 : MEAN SCORES ----FOUR FACTORS

Original scores:

RFT: degrees of error: average for 8 trials

EFT: seconds: average for 6 items

BDT: points: average for 10 items

RFT, EFT ... low score towards field independent range

BDT ... high score towards field independent range

	N.	RFT	EFT	BDT
Total Sample	240	13.2	199.8	39.0 pts. 310 sec.
Family:				
Algonkian	120	14.6	237.9	36.8 pts.
Athapaskan	120	11.6	161.6	41.3
Cultural Level:				
Traditional	80	13.6	235.5	37.6
Tansitional	80	13.8	212.8	35.8
Urbanized	80	12.3	150.3	43.3
Sex:				
Male	120	10.9	177.0	39.1
Female	120	15.5	223.0	38.8
Age:				
17 years	120	13.0	155.6	32.2
30 years	120	13.4	243.8	36.9

b. Item Analysis

A closer examination of this distribution by means of an item analysis has two objectives: 1) to obtain information for evaluating the tests as measures of FDI; 2) to provide information for interpreting the findings of the study.

The proportion of the total sample scoring as field-independent can be seen in Table 4. This proportion was computed for each item on each of the three tests. Optimal cutting scores were fixed for each test.

RFT: Adevai and McGough indicate that an average error of less than 2.0° and one of more than 7.9° represent extreme scores.[2] Based on this definition of extreme field-independence as less than 2.0°, and extreme field-dependence as greater than 7.9°, a range was set to accommodate not only extremes but average positions for both dimensions on the continuum.

EFT: No indication was found in the literature of the limits for a field-independent performance. Therefore, the average time of the extreme upper and lower 27% of this sample was found. This time was then averaged with the average time of the middle 56% of the sample, to establish the range for the two dimensions on Embedded Figures performance.

BDT Again, no indications were found in the

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2 Greta Adevai and W. Edward McGough, "Retest Reliability of Rod-and-Frame Scores during Early Adulthood," Perceptual and Motor Skills, 1968, Vol.26, p.1306

literature of the range for field-independent-dependent performance. Therefore, Wechsler's point scale was used as a basis for setting limits for this study.[3] On items 1 through 6, four points are required; bonus points on items 7,8,9,10 represent the margin for raising an average above four points.

It was considered necessary to set these limits for this study, arbitrary though they may be, as it is difficult to classify categorically on the basis of the field-dependent-independent dimension of perceptual functioning.

	Field-Independent	Field-Dependent
RFT	0° to 4°	6° and more
EFT	1 sec. to 39 sec.	80 sec. and more
BDT	4 pts. and more	less than 4 pts.

The intermediate range in the RFT and EFT absorbed those persons who were close to, but still outside of either extreme limit. In this way an artificial,dichotomous scale was avoided.

Difficulty and Discrimination levels are given in Table 5. The Difficulty level is measured by the proportion of persons who performed in a field-independent way. An estimate is made by averaging the Difficulty levels of the two criterion groups, (the upper and lower 27% of the sample):

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3 David Wechsler, Wechsler Intelligence Scale for Adults, Manual, The Psychological Corporation, N.Y.,1955.

Table 4 Proportion Scoring as Field-Independent

Item	1	2	3	4	5	6	7	8	9	10
Test										
RFT										
Male	.95	.95	.95	.97	.92	.92	.95	.93		
Female	.88	.88	.90	.88	.85	.85	.85	.88		
EFT										
Male	.80	.80	.78	.75	.84	.63				
Female	.71	.69	.72	.58	.74	.79				
BDT										
Male	100	.76	.98	.99	.93	.90	.92	.90	.78	.68
Female	.98	.83	.99	.99	.95	.94	.93	.84	.72	.68

THE STUDY

$$\text{Difficulty Index} = \frac{P_u + P_l}{2}$$

in which:

P = the proportion in the upper and lower 27% of the sample scoring as field-independent.

An acceptable Difficulty Index centers around .50 to .60, at which point its discriminating function is maximized.

An Index of Discrimination is given for each item, estimated by the formula:

$$\text{Discrimination Index} = P_u - P_l$$

in which:

P = proportion in the upper and lower 27% of the sample scoring as field-independent.

The higher the positive value of the Discrimination Index the more power it has to differentiate between sub-groups. Although indices between .20 and .40 are acceptable, items with higher indices contribute much more to evaluating the suitability of an item as a tool for identifying the ability being tested.

In Table 5 the standard deviation for each item is reported. An item-total correlation is also given. Correction has been made in this correlation for part-whole overlap, in order to remove the spurious effects of self-correlation.[2] This correction was made by:

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2 J. P. Guilford, "The Correlation of an Item with a Composite of the Remaining Items in a Test", Educational and Psychological Measurement, Vol.13, No.1, 1953, p.87-93.

$$r_{ir} = \frac{r_{it}\,\sigma_t - \sigma_i}{\sqrt{\sigma_i^2 + \sigma_t^2 - 2r_{it}\,\sigma_i\,\sigma_t}}$$

in which:

r_{ir} = correlation of item with remainder of total score after removal of the item;

r_{it} = correlation obtained between item and total score with item included: Pearson r;

σ_i = standard deviation of the item;

σ_t = standard deviation of the total score.

The expected item-total correlation is approximately

$$1 / \sqrt{n}$$

where n is the number of items. When the number is small, as is the case in this study, inflation of an uncorrected r would overestimate the true relationship.[3]

The same corrected coefficients can serve as indicators of the validity of the items.

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3 J. P. Guilford, Psychometric Methods, (2nd ed.), New York, McGraw-Hill, 1954, p. 439.

Table 5 - Item Analysis

Indices of Discrimination and Difficulty

Item - Total Correlation

	Discrim. Index		Difficulty Index		SD	$r_{item-tot.}$
	M	F	M	F		
RFT						
1	.13	.28	.94	.86	1.88	.42
2	.16	.35	.92	.83	1.69	.44
3	.18	.25	.91	.88	1.62	.43
4	.10	.44	.95	.78	1.88	.54
5	.28	.35	.86	.50	2.20	.54
6	.22	.44	.89	.78	2.00	.53
7	.18	.35	.91	.83	1.7	.36
8	.25	.35	.88	.83	1.8	.52
EFT						
1	.46	.56	.73	.68	38.8	.46
2	.60	.72	.70	.64	42.7	.63
3	.63	.68	.69	.66	48.7	.56
4	.85	.75	.58	.63	60.8	.51
5	.50	.43	.75	.75	27.4	.43
6	.35	.37	.83	.82	30.6	.41
BDT						
1	.0	.09	1.00	.96	.22	.17
2	.66	.34	.67	.83	.80	.39
3	.07	.03	.97	.99	.45	.28
4	.04	.03	.98	.99	.36	.18
5	.22	.06	.89	.97	.91	.27
6	.35	.12	.83	.94	1.1	.32
7	.28	.22	.86	.89	1.5	.61
8	.53	.53	.74	.74	2.0	.60
9	.57	.87	.72	.57	2.3	.59
10	.84	.72	.58	.64	2.4	.55

c. Validity of the Tests

Inter-correlation of the tests was found. The Pearson product moment correlation coefficients are presented in Table 6a. Two correlations are significant at the $P \geq .05$.

How can the validity of the tests for this study be evaluated on the basis of these low coefficients? Guilford maintains that whenever a significant correlation is established, this is the important fact: of more consequence than the size of the coefficient, itself. The low correlation coefficient may be accounted for by "the inextricable interplay of variables that we cannot measure in isolation".[6]

The Rod and Frame test correlates significantly with the Embedded Figures test. These two tests are recognized as good measures of field-dependence-independence. Witkin reports a correlation between the EFT and the RFT of .36 to .64 for men, and of .21 to .51 for women. Guilford points out that these two tests correlate with many other variables, giving the impression of being factorially complex.[7] It could be suggested then, that each test, i.e., RFT and EFT, is measuring a distinct aspect of FDI.

Correlation between EFT and BDT is low, but significant. Perceptual speed and visualization could be isolated as

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6 J.P. Guilford, Fundamental Statistics in Psychology and Education, Toronto, McGraw-Hill, 1965, p. 105

7 J.P. Guilford, The Nature of Human Intelligence, Toronto, McGraw-Hill, 1967, p.179-180

TABLE 6: COEFFICIENTS OF Correlation and t ratios

a) Pearson r computed on raw scores:

	EFT	BDT(time)	BDT(point)
RFT	.204+	.089	- .105
EFT		.147	- .558+

b) Pearson r computed on lagrithmic transformations:

	EFT	BDT(time)
RFT	.218+	.109
EFT		.216+

c) t values d.f. = 238

P> = .05

r = .138

t = 1.97

	EFT	BDT(time)
RFT	3.44+	1.78
EFT		3.41+

FIGURE 8

SCATTERGRAMS

GRAPHIC REPRESENTATION OF TEST CORRELATIONS

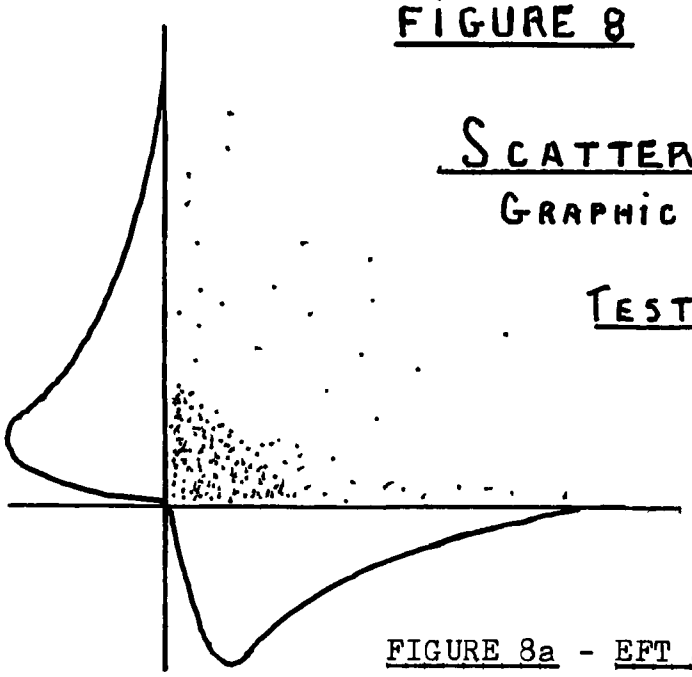

FIGURE 8a - EFT and RFT

EFT Score in total seconds	0	5	10	15	20	25	30	35	40		60
800		1		1				1			
700			1								
650		1			1						
600	1			2							
550	2	1									
500		2	2	2		1					
450	1	1				1	1		1		
400			3	1	1			1			1
350		4	5	1	2						
300	2		1	2	1	2					
250	2	8	2	4							
200	1	3	5	3	1	3			1		
150	3	4	5	6	1		1				
100	10	11	11	6	9	2	2	2	1		
50	10	18	7	6	6	2	3				
0	8	12	11	6	1	1					

RFT - Score in total degrees of error from vertical

FIGURE 8 b SCATTERGRAMS

RFT

Scores in total degrees of error from the vertical

BDT Scores in total points	0	5	10	15	20	25	30	35	40	45	≈	60
48	8	6	3	1		1						
45	8	15	12	6	8	3	2					
42	5	13	8	7	6	1	1	1				
39	4	4	6	7	2	4	2		1			1
36	5	9	6	8	2	2	1	1				
33	2	3	3	3	2	2			1			
30	1	5	5	2	1		1					
27	2	2	2	3	1		1					
24	2	1	1	2	1			1				
21	1	2	3			1						
18			1									
15				1	1							
12												
9		1										
≈												
0												

FIGURE 8 c

EFT - Scores in total seconds

BDT Scores in total points	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	≈	800
48	7	7	4			1											
45	14	15	20	7	2	1	1	1									
42	7	13	10	3	2	2	1	3	2			1					
39	1	7	5	1	4	3	2		1	1	1				1		
36	1	4	13	3	4	2	2	1	1	1	1		1				
33	1	1	2	2	3	1		1	2	1	1	1					
30		2	5	2		2	2	1	1		1		1				
27	1		1	2	1	1		1	1	1	2		1				
24			2	1	1					1			1				2
21							1	1	1	1	1		1				1
18								1									
15			1					1									
12													1				
9																	
≈																	
0																	

FIGURE 9 ~ SCATTERGRAMS

Log Values ~ Test Correlations

N = 240

RFT

E.F.T	.3	.5	.7	.9	1.1	1.3	1.5	1.7
2.8				3	1	1	1	
2.6		4	2	5	6	5	5	1
2.4	3	1	4	9	11	6		
2.2		3	3	3	11	5	2	
2.0	3	3	3	13	10	14	1	
1.8	1	6	3	10	5	3	1	
1.6	4	3	4	5	-	7	1	
1.4		3	2	5	3			
1.2				2				
1.0	1							

RFT

BDT	.3	.5	.7	.9	1.1	1.3	1.5	1.7
2.7		3	3	5	4	1		
2.6	2		4	7	9	6	3	
2.5	2	6	3	13	12	12	3	1
2.4	2	7	10	15	13	14	2	
2.3	3	8	6	12	7	7	2	
2.2	1	4	6	4	5	2	1	
2.1	1	1		1	1	1		
2.0			1	3	1	1		

EFT

BDT	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8
2.7				1	3	6		3	3	
2.6			1	2	3	4	5	10	6	1
2.5			2	6	9	11	7	10	6	
2.4		1	2	10	7	20	12	3	5	2
2.3	1	1	4	6	6	14	5	2	4	1
2.2			1	5	3	3	2	5	3	2
2.1				4	2			1		
2.0		1	1				1		1	

the common factors in these two measures. It is further suggested that the ability to synthesize, as well as to analyze, provides the basis for a field-independent performance on the Block Design Test.

The element of proprioceptivity which has been ascribed to Rod and Frame performance by Wober,[8] might be a factor measured by the RFT but not by either the EFT or BDT. Reference is made to the intercorrelations for the same three measures which was reported by Guilford.[9] The coefficients of correlation for this study are much lower. But it will be remembered:

> Always, the coefficient of correlation is purely relative to the circumstances under which it was obtained and should be interpreted in the light of those circumstances, very rarely, certainly, in any absolute sense.[10]

Logarithmic transformations were made of the original scores. The time score was used for the BDT in place of the point score. These new values were used in plotting scattergrams and in computing product-moment correlations. As can be see in Figure 9 and in Table 6b, the transformation had a corrective effect on the distribution (cf. Scattergrams), but did not contribute to the product-moment correlation.

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8 M. Wober, "Adapting Witkin's Field-Independence Theory to Accommodate New Information from Africa", British Journal of Psychology, Vol.58, 1967, p.29-38

9 cf. page 40

10 J.P. Guilford, Fundamental Statistics in Psychology and Education, p. 105

THE STUDY

5. Statistical Analysis

The statistical procedures used in this study have already been described in the discussion of the Experimental Design (cf. p. 48-50). However, it will be useful to recall these before presenting their results.

The effects of Family, Cultural Difference, Sex and Age on the perceptual component of cognitive style was studied by means of an analysis of variance procedure. Due to extreme skewness observed in the three distributions (a clustering of scores in the upper, or FI, end of the range with relatively few low, or FD, scores), and to a marked within-cell variance, certain modifications were made in order to normalize the distribution and reduce the variance.[11] A logarithmic transformation of raw scores was used. The results of this on the distributions can be studied in Figure 10, where frequency distributions are plotted. There is a decided swing toward normality, in contrast to the distributions of raw scores, as seen in the frequency polygons on p. 91, 92, 93 , 93.2.

The effect on variance of a log transformation can be estimated by its effect on the range. In many cases the range

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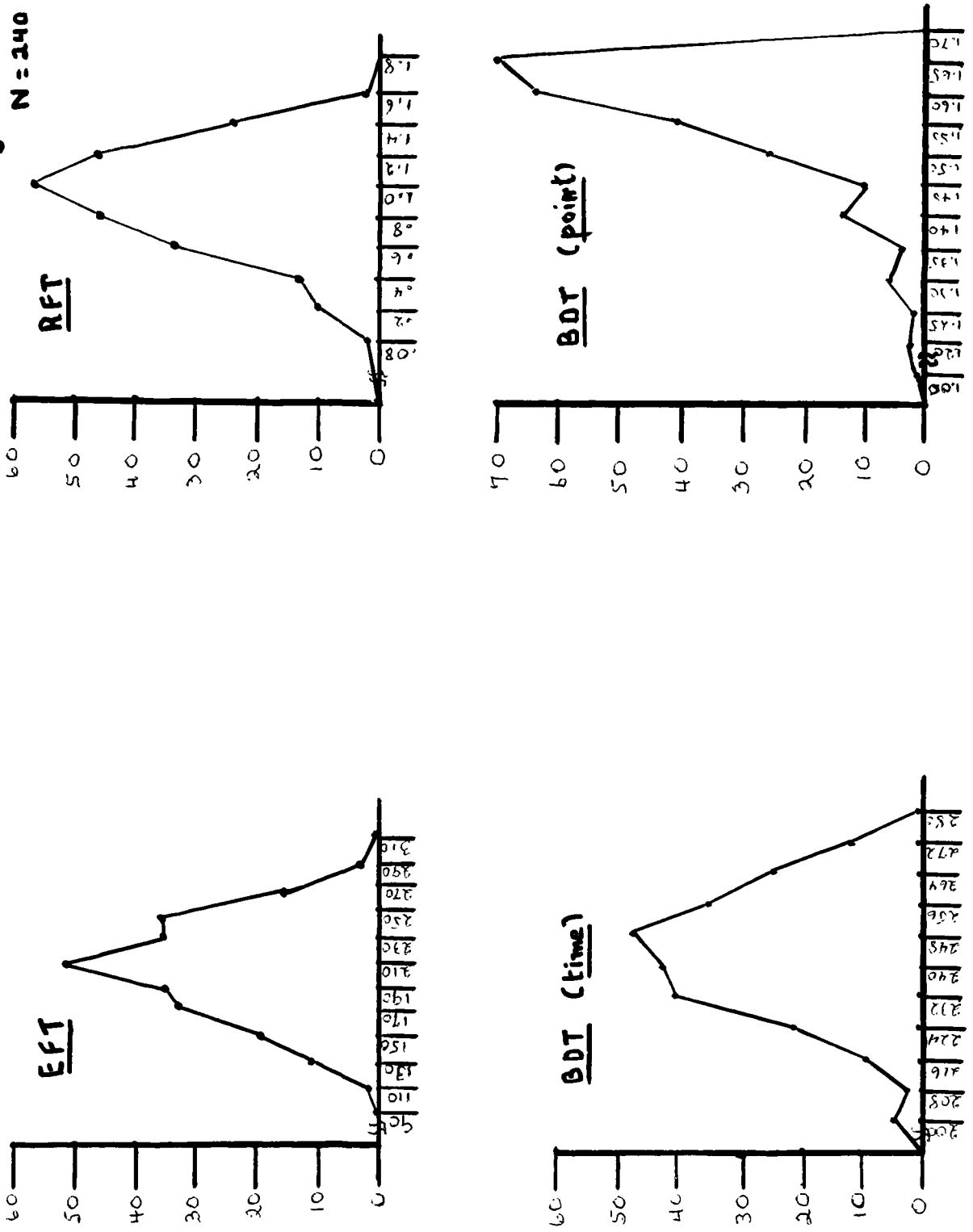
11 M.S. Bartlett and D.G. Kendall, "The Statistical Analysis of Variance Heterogeneity and the Logarithmic Transformation," Journal of the Royal Statistical Society, Vol.7, 1946,p.123-138

FIGURE 10 ~ Frequency Distributions - Log Values N = 240



tends to be proportional to the variance. The transformation which makes the range uniform will also tend to make the variance more uniform.[12]

Cell variance of original scores as shown on page 44.2, are shown here with the variance of the log values. The effect of the log transformation on the variance is a pronounced reduction in the spread between the greatest and the least variance.

		VARIANCE	
Test	Cell	Raw score	log score
RFT	16	278.2	.092
	21	5.7	.034
EFT	8	87479	.199
	17	1649	.051
BDT	6	50486	.060
	21	5313	.018

With evidence that this log transformation corrected the heterogeneity of variance and the skewness of the distribution, the decision was made to use an analysis of variance procedure to study the effects of the four factors on the field-dependent-independent dimension of the cognitive style of the Indian people.

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12 B.J. Winer, Statistical Principles in Experimental Design, Toronto, McGraw-Hill, 1962, p.222

CHAPTER VI

PRESENTATION AND DISCUSSION OF RESULTS

Information furnished by the three measures will be presented within the context of the problem proposed by this study.

1. Restatement of the Problem
2. Adequacy of the Instruments
3. Identification of Cognitive Style
4. Analysis of Variance
   a. Main effects:
      i. Family
      ii. Cultural Difference
      iii. Sex
      iv. Age
   b. Interactions

Tables and figures already presented will be referred to again in order to integrate the information gathered at each stage of the study.

1. Restatement of the problem

The questions to be answered by the findings of this study are:

1. Can the Indian's perceptual style be described in terms of Witkin's theory of cognitive style?
2. Is there a difference in perceptual style between two linguistic families?
3. Is there a difference in perceptual style among Indians at three levels of cultural difference?
4. Is there a difference between males and females on measurements of perceptual style?
5. Does perceptual style change with age?

RESULTS

2. Adequacy of the Instruments

Three tests were used to measure the perceptual component of cognitive style: i.e., Rod and Frame test, Embedded Figures test and the Block Design test

As seen in Table 5, p. 99, the Discrimination power of the tests ranged from low for RFT, to good for the EFT, with items 3,9,10, of BDT showing high discrimination value.

Difficulty Indices for EFT are in the range of the desirable .50 to .60 maximum difficulty level. With the exception of trial-item 5 of the RFT, which was passed by exactly 50% of the females, other RFT trials have high Difficulty Indices. Items 2,8,9, and 10 of the BDT had indices closest to the maximum difficulty level.

The internal consistency of the RFT and the EFT, shown in the item-total correlation of Table 5 is good. In the BDT, items 7,8,9, and 10 correlate with the total test, but performance on the first six items does not correlate with performance on the total test.

3. Identification of Cognitive Style

There is evidence in the results that scoring was predominantly in the field-independent range. Table 4, page 96, shows the proportion of the sample scoring in the field-independent range on each item of the three measures. These proportions are high for the RFT and the BDT, and only slightly lower for the EFT.

RESULTS

Table 3, Mean Scores, and Appendix 2a, Record of Individual Performance, give indication that the performance of Indian people on these tests tends towards the independent range of the field-dependent-independent continuum.

For each of the 8 items of the RFT, the average of the total sample was 1.6° of error. (cf. Table 3). A time of 33 seconds was the average for each of the six Embedded Figures. For each of the 10 items of the Block Design test there was an average of 31 seconds.

Data compiled by Okonji to compare his sample of Nigerian subjects with New York undergraduates show the following means for those groups:[1]

	RFT	EFT
Nigerian subjects	8° of error	91 sec.
New York subjects	7° of error	58 sec.

From results for 102 Brooklyn college students tested by Witkin on twenty-four items of the Embedded Figures test, the mean solution time required by those students for the same 6 items used in this present study was 25 seconds.[2] These figures are cited as a point of interest. No comparative study is intended, since these groups are not comparable.

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1 Michael O. Okonji, "The Differential Effects of Rural and Urban Upbringing on the Development of Cognitive Style", International Journal of Psychology, 1969, Vol.4, No.4. p. 301.

2 H.A. Witkin, "Individual Differences in Ease of Perception of Embedded Figures", Journal of Personality, 1950, Vol. 19, p.8-10

RESULTS

4. Analysis of Variance

Table 7 gives the results of the univariate analysis of variance on the log values of the Rod and Frame test, the Embedded Figures test and the Block Design test.

a. Main Effects

i) Family

> That distinctive socialization practices and ecological features foster modifications in perceptual style between two Indian linguistic families.

The analysis of variance shows a significant effect of Family for performance on the Rod and Frame test and on the Embedded Figures test. These findings are compatible with what is known of the customs and life style of these people, and with the relationship which has been established between culture and cognitive style. Athapaskans have been described as extremely heterogeneous, adapting to the pressures of many cultural influences, while retaining their individuality. Algonkian tradition, by contrast, is very ancient, very durable and very stable.[3]

Some socialization practices which contribute to an articulated cognitive style are common to both as part of the Indian tradition. Among these are child-rearing practices which encourage separate identity, self-reliance and autonomous

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3 Diamond Jenness, The Indians of Canada,(3rd ed.), Ottawa, National Museum of Canada, 1955,p.377

TABLE 7 : ANALYSIS OF VARIANCE on log Transformations

SOURCE	d.f.	$F_{.95}$	RFT F.stat.	EFT F.stat.	BDT F.stat.
Family	1,216	3.84	9.42+	8.56+	1.47
Culture	2,216	2.99	.29	7.68+	1.93
Sex	1,216	3.84	19.35+	7.43+	3.69
Age	1,216	3.84	.20	15.44+	15.60+
F x C	2,216	2.99	9.20+	,75	6.93+
F x S	1,216	3.84	3.67	5.57+	1.61
F x A	1,216	3.84	.08	.03	.09
C x S	2,216	2.99	.49	1.06	.08
C x A	2,216	2.99	.82	2.43	.84
S x A	1,216	3.84	.26	6.23+	.56
F x C x S	2,216	2.99	.21	.07	1.18
F x C x A	2,216	2.99	.26	.41	.72
F x S x A	1,216	3.84	.48	.64	.12
C x S x A	2,216	3.84	.18	2.10	1.29
F x C x S x A	2,216	3.84	.83	.15	.04

+ significant at .05

functioning.[4] However, expressions of impulse, i.e. use of defenses and controls, is not dealt with in the same way by both families. In general, specialized defenses and controls for channeling impulse and expression are characteristic of greater differentiation, while defences such as repression and denial represent less differentiated ways of functioning.[5] The description of the two families (cf. Chapter V) confirms that Athapaskans tend to aggressive and specialized expressions of impulse, while the Algonkians, as noted by Chance, value highly repression and denial as social controls.[6]

The null hypothesis of no difference between the two families is rejected on the basis of the significant F values for the RFT and the EFT.

No significant difference was found between the two families on the Block Design test. Therefore, the null hypothesis is not rejected for the BDT.

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4 Herman A Witkin, "A Cognitive-Style Approach to Cross-Cultural Research", International Journal of Psychology, 1967, Vol. 2, No. 4, p. 235-236.

5 Ibid., p. 235

6 Norman A. Chance, Developmental Change Among the Cree Indians of Quebec, McGill Cree Project, 1969, p. 16-19.

RESULTS

ii) Main effects of Cultural Difference

> That modifications in socialization patterns and environmental demands which accompany different levels of the acculturation process will result in differences in perceptual functioning at these levels.

The effect of cultural difference is found on the Embedded Figures test but not on the other two measures.

The three levels of cultural difference: traditional, transitional and urbanized, were examined further by means of the Tukey post hoc procedure.[7] One significant difference in means was located with $q = 3.31$ for d.f. = 3,216 at the $P \geq .05$ level in the table for the studentized range statistic.

The mean for the traditional group was significantly different from that of the urbanized group with a value of 3.60. The other contrasts, i.e., traditional and transitional, transitional and urbanized were not significant, with values of .29 and 3.30 respectively.

Based on these results the significance of cultural difference is found in the performance of the traditional and urbanized groups on the Embedded Figures test. The influence of economic and social opportunity, education, and the benefit of facilities such as T.V., sports and recreational

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7 Virginia Keith, Design and Analysis in Experimentation, Faculty of Education, University of Ottawa, Ottawa, Canada, 1969, p. 203.

advantage, might account for the success of the urbanized group with the Embedded Figures test. It was noticeable throughout the sessions that the urbanized Indian employed more versatile strategies in attacking these tasks. He seemed better able to assess the problem and plan his attack before committing himself. He was generally more aware of the time factor and extended himself in order to beat the clock. These modifications of behaviour among urbanized native people were also noted by Berry, Okonji and Bruner, and were attributed to the influence of formal education and contact with a technological, competitive society. Berry attributed the significant difference between his groups to these influences.[8] Likewise Okonji found significant difference between his rural and urban samples, with their differing backgrounds of experience and of educational opportunity.[9] Studies made under Bruner's direction established a rural-urban difference which was accounted for by the school experience. Both formal schooling and experiences in an industrialized society, as contrasted to those

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8 John W. Berry, "Temne and Eskimo Perceptual Skills", International Journal of Psychology, 1966, Vol.1, No.3,p.225

9 Michael O. Okonji, "The Differential Effects of Rural and Urban Upbringing on the Development of Cognitive Styles", International Journal of Psychology, 1969, Vol.4, No.4, p.299, 303.

of primitive societies, foster habits of perceptual analysis which depend more on an abstract than a concrete approach to reality.[10]

While there was no control for the effect of education in this study, note was made of an individual's educational history. The traditional Algonkian had an average of 3 years in school, the urbanized Algonkian had 6 years. Among the Athapaskans, the traditional group had an average of 3 years in school, while the urbanized group had 9 years. The advantage of more developed analytical and structuring abilities did not extend to performance on the RFT, as was noted by Okonji. He considered the RFT as a more stable and purer measure of field-dependence-independence than the EFT. It was on the RFT that he found the significant differences between his rural and urban samples.[11]

There was no significant difference found between the traditional and transitional groups. This might be accounted for by the nature of cognitive style, itself, i.e., a consistent and pervasive mode of functioning.[12] Many of the adults tested in the transitional group had been raised in traditional Indian families. Those childhood experiences

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10 Jerome S. Bruner, Studies in Cognitive Growth, N.Y., John Wiley, 1966, p. 268-269, p. 314-318.

11 Michael O. Okonji, op. cit., p. 303.

12 Herman A Witkin, op. cit., p. 234

which foster an articulated cognitive style are not easily erased, even by cultural change. For example, one middle-aged Nahani from Watson Lake (transitional) performed perfectly on the RFT, with not half a degree deviation from the vertical. The transitional Indian is closer to the traditional culture than he is to the social practices of the white society.

Significant difference was found between the traditional and urban samples on the EFT. There was no difference found between any groups on the RFT and BDT.

iii) The Main effect of Sex

> That the description of sex roles in Indian culture is such that differences in perceptual functioning between male and female subjects will be observed.

The F values for the Rod and Frame test and for the Embedded Figures test, 19.35 and 7.43, respectively, at $P \leq .05$, show that on these two measures there was a significant effect of Sex. The Block Design test had an F value slightly lower than the significance level: $3.69 < F - 3.34$.

These findings differ somewhat from the findings of other researchers on sex difference among North American native people. Berry and MacArthur found no differenc among their Eskimo samples.[13,14] Berry pointed out that this departure from the findings of difference due to sex, among

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13 John W. Berry, op. cit., p. 225

14 Russel MacArthur, "Sex Differences in Field-Dependence for the Eskimo: Replication of Berry's Findings", International Journal of Psychology ,1967, p. 139.

among other cultures, is probably due to the socialization practices of the Eskimo. These are of the type which, contrary to Western practices, do not foster more independence in boys than girls during the child-rearing period.[15] From what is known of Indian practices in this respect it would seem that the same social factors would operate in the development of a cognitive style equally field-independent in both men and women.

However, this is not supported by the present findings. Customs of the Athapaskan tribes in regard to the woman's role vary somewhat from the Algonkian custom as well as from each other. In some tribes the woman's life was one of privation and hardship. Among others, e.g., Tahltan, Tagish and Kaska (the tribes which were influenced by the coast Tlinkit) matrilineal descent was recognized, thus giving the woman political and social importance.[16] The effect of sex among Athapaskans could be accounted for (whether in favour of the male or female) by these social practices.

The actual social conditions which prevail in Indian communities are such that traditional roles are in conflict with present economic needs. Employment opportunities in modern society often appeal more to women than to men. Consequently, the responsibility of providing money for the

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15 John W. Berry, op. cit. , p. 225

16 Diamond Jenness, op. cit., p. 377-404, 265-237

commodities which can only be had in stores, falls to the woman. In a psychological context, a woman is more flexible and able to adapt, to endure and sustain.[17] In terms of intellectual functioning there is evidence that in problem solving, males are superior where there must be changes in direction or method.[18] In the cultural confrontation through which each individual man and woman of Indian ancestry passes, these accepted concepts of psychological and intellectual functioning must undergo alteration. In view of the divergence of research findings on the effect of sex on perceptual performance of native people, it is suggested that more investigation is needed.

The null hypothesis concerning the perceptual behaviour of men and women is rejected for the RFT and for the EFT. However, no significant difference was found between the sexes on the BDT.

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17 Anne Anastasi, Differential Psychology, (3rd ed.), MacMillan, N.Y., 1958, p. 470-490

18 C.K. Adcock, Fundamentals of Psychology, Penquin, Baltimore, 1964, p. 229-231

19 J.P. Guilford, The Nature of Human Intelligence, Toronto, McGraw, 1967, p. 406

RESULTS

iv) The Main Effects of Age

> That the perceptual functioning of enculturated adults will be consistently more field-independent than that of younger members.

The effect of Age is indicated on the Embedded Figures test and on the Block Design test, with F values of 15.44 and 15.60, respectively; well beyond the significance level set at $P \geq .05$.

The initial postulate that field-dependence-independence would be more readily observed among the older members of the Indian community, was upheld by the findings.

By examining the individual performance record [20], it can be seen that among the Athapaskans in general, subjects over thirty, male and female, were more field-independent than were their younger counterparts. These findings are somewhat different than those of Berry for his Eskimo sample. On Kohs Blocks his subjects from both traditional and urban communities reached a peak between age 16 and 30 years, after which there was a gradual descent. On EFT the age trend showed a plateau between ages 16 and 40 years, after which there was a sharp decline. In general he accounted for this by the stronger effects of westernization on the younger as compared to the older members.[21]

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20 cf. Appendix 2 a

21 John W. Berry, op. cit. p. 226-227

RESULTS

It is suggested here that in all three communities represented in this study, i.e., traditional, transitional and urbanized, the older members, between ages 30 and 60 years, are all products of the kind of training in their childhood which was marked by traditional Indian practices, and hence, was conducive to a greater FI cognitive style. For the younger subjects of this study, it is suggested that their parents, although raised in the traditional manner themselves, have modified the traditional Indian child-rearing practices in regard to their own children. In addition, the experience of these young people from their early years in a residential school, away from the influence of their parents, might also be considered as a factor in the development of their cognitive style.

A diminuation in measurable field-independence was noted among a f e w subjects of the fifty to sixty year age group. This trend is supported by the findings of Karp, among others, that dedifferentiation occurs in older people. However, he found that this was less marked among those who remained active as compared to those who were retired.[22] There is indication that this relationship obtains for the older Indians of this study.

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22 Stephen A. Karp, "Field Dependence and Occupational Activity in the Aged", Perceptual and Motor Skills, 1967, Vol.24, p. 607-608

RESULTS

b. Interactions

There were four significant first-order interactions:

Family and Culture	RFT	BDT
Family and Sex	EFT	
Sex and Age	EFT	

The direction of these interactions has been plotted on page 124, Figure 11.

It was noted in the present study that many urban individuals had difficulty coping with the simplicity of the RFT. The success of the traditional Indian might be due to the necessity he has of dealing directly and immediately with fundamental problems of existence; problems which often do not require complicated solutions nor long term planning. He has frequent practice in accuracy, on which the success of his hunting depends. The Indian in town has little occasion to test his marksmanship.

In considering the sources of interaction, the possibility that the RFT contains a proprioceptive componet, as maintained by Wober, must not be overlooked. [23] While the portable RFT allows the subject to remain upright, thus reducing the demands of body adjustment which the tilted chair experience requires, the subject was specifically directed in this study to make use of his body for judging the verticality of the rod. It is compatible with what is known of

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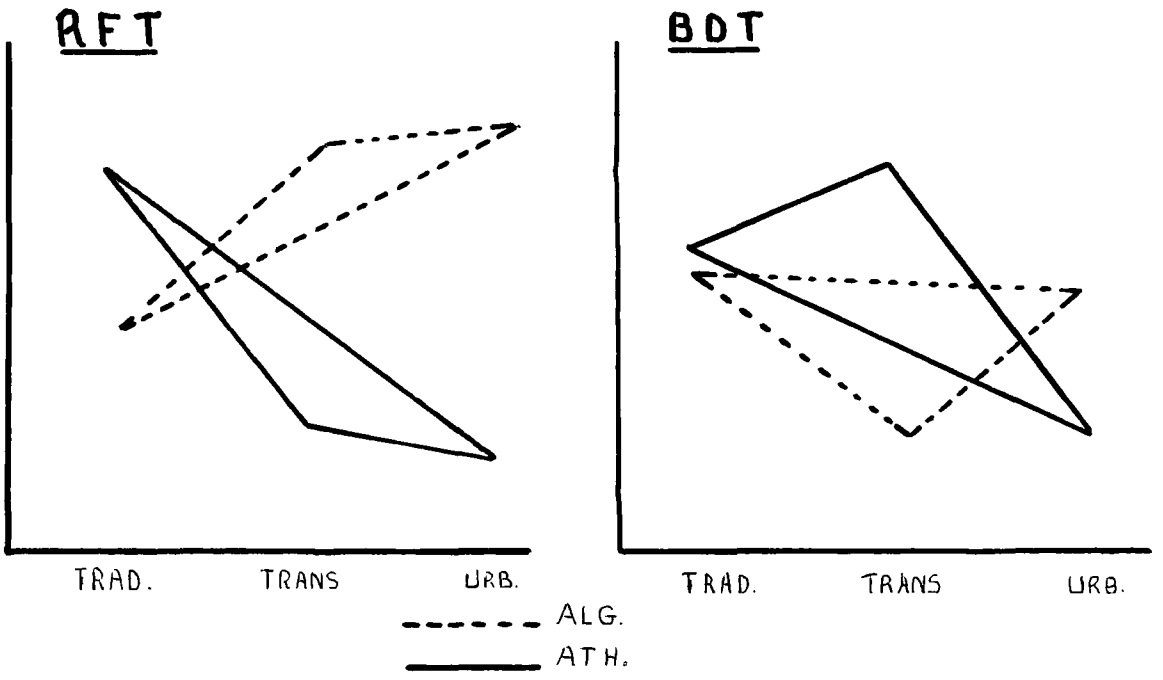
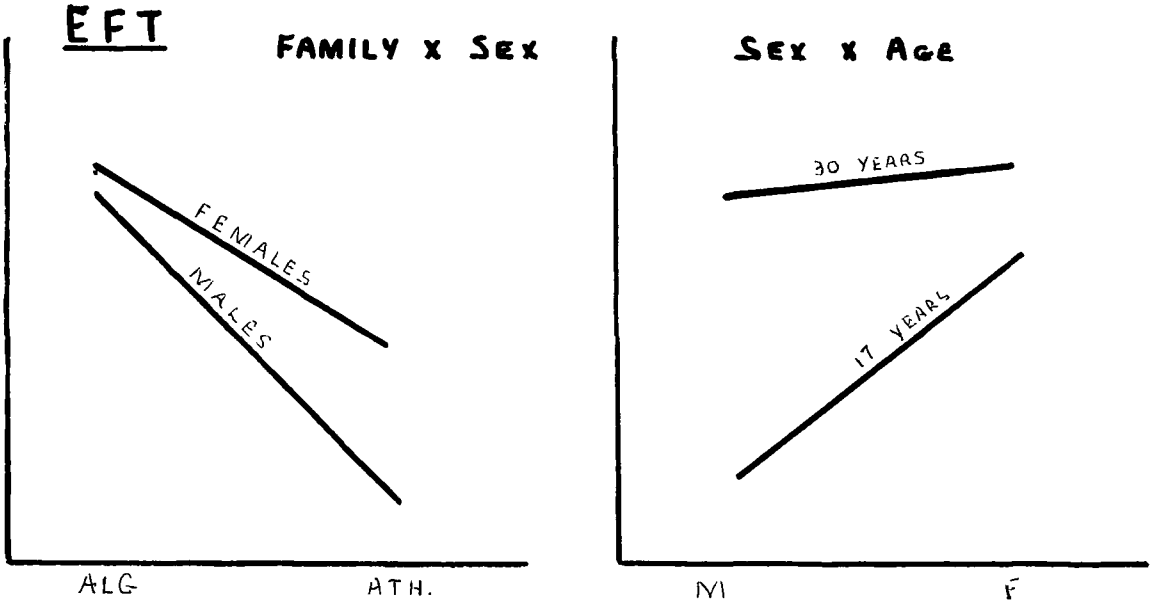
23 M. Wober, "Adapting Witkin's Field-independence Theory to Accommodate New Information from Africa", British Journal of Psychology, 1967, Vol.58, p. 37-38

FIGURE 11 INTERACTION EFFECTS

FAMILY X CULTURE





the traditional life style of the Indian to suggest that the individual in the traditional setting has a more developed body concept and more awareness of himself in relation to the environment than does his urban brother.

Further attention can be given to the climate of conflict and confusion which predominates in the transitional communities from which the samples were drawn. Though not long nor far removed from his traditional home, the Indian at Moosonee or Lower Post is confronted with pressures to adapt his behaviour to standards and roles which he has not chosen, which he poorly understands and which he often resents. In the face of this, there is a break-down of those traditional practices which foster separate identity and autonomous functioning.[24]

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24 John J. Honigmann, "Social Disintegration in Five Northern Canadian Communities", The Canadian Review of Sociology and Anthropology, Nov., 1965, Vol.2, No.4, p. 199-214

SUMMARY AND CONCLUSIONS

The findings of this study will be summarized as they relate, 1) to the hypotheses, and 2) to the instruments. The conclusions which can be drawn from this study will be presented, followed by their implications for education. Finally, recommendations on the basis of these conclusions will be made.

1. Hypotheses

The purpose of the study was to examine the modifications, if any, to the cognitive style of Indian people, which result from the cultural changes imposed by acculturation.

On the basis of evidence from the literature which shows a relationship between cultural determinants and cognitive style, a general hypothesis was formulated for this study: i.e., that the ecological demands and social patterns which mark the cultural heritage of native Canadians, the Indian people, are of the kind which foster an articulated cognitive style. Sub-hypotheses deduced from this, and also substantiated by the literature are: that modifications in socialization patterns and environmental demands which accompany different levels of the acculturation process, would results in modifications in cognitive style; and, that the description of sex roles in Indian culture is such that differences in cognitive style would be observed between males and females; that the perceptual functioning of encultur-

SUMMARY

ated adults would be consistently more field-independent than that of younger members.

This study of the cognitive style of the Indian people was limited to observing the perceptual component of cognitive style, i.e., field-dependence-independence (FDI). The tests used to measure FDI were the Rod and Frame test, (RFT), the Embedded Figures test, (EFT), and the Block Design test (BDT). Statistical tests used to analyze the data were a univariate analysis of variance, a Pearson r product-moment correlation, and a Tukey post hoc test.

Two cultural families, Algonkians and Athapaskans, presenting certain contrasts in customs and environment, constituted the target population. The sample drawn from this population included an equal number of males and females, i.e., 120 each, a total of 240 subjects. In each family three communities were designated as representative of three levels of cultural difference, i.e., traditional, transitional and urbanized. Members of the communities were grouped at two age levels for the purpose of observing the cognitive style of enculturated adults and of studying the stability of cognitive style.

The results of the findings show that the perceptual behaviour of Indian people is functionally equivalent to that of other peoples. It was possible to measure this behaviour in terms of Witkin's description of the field-

SUMMARY

dependent-independent dimension of perceptual functioning. The Indian people have a predominently field-independent style of funtioning in the perceptual sphere.

A significant difference in the performance of the two Families was found on the Rod and Frame Test and the Embeded Figures test. It was suggested that this difference was due largely to the differing manner in which the two families make use of defense and control in regulating social behaviour.

A significant effect of cultural difference was observed between traditional and urbanized samples on the Embedded Figures test. This effect was accounted for by the kinds of demands which the two communities make on the members. No effect of cultural difference on any of the tests was observed for the traditional and transitional groups.

Significant difference was found between males and females on the Rod and Frame and Block Design tests. No satisfactory explanation was offerend for this departure from the pattern of no sex difference in native subjects which was established by the findings of Berry and MacArthur. Indeed, traditional Indian socialization practices foster independence in both sexes. It can only be suggested that the social and economic demands of Western society in conflict with traditional Indian patterns are met in different ways by the individual male and female. This is an area where further research is needed.

SUMMARY

Expected stability in cognitive style was found among these communities of northern Algonkians and northern Athapaskans. The source of difference between the age groups was not immediately evident. On the RFT the older members were slightly more field-independent than the younger ones. Among the transitional samples the younger members had better scores on the EFT and the BDT.

2. Instruments

The traditional and urbanized Indians demonstrated that one tool for measuring FDI may not be suitable for every group. Many traditional Indians scoring as FI on the RFT had lower scores on the EFT and/or the BDT. Conversely, many urban Indians scored less well on the RFT while scoring field-independently on the EFT and/or the BDT. This can be accounted for by the kinds of demands which are made by the socio-economic climate in which the individual lives, reflected in the kinds of tasks imposed by the RFT, EFT and BDT.

The distribution of scores for each of the measures was marked by similar characteristics. Specifically, the distributions were skewed with clustering of scores in the field-independent area.

Heterogeneity of variance was found to characterize the sample. This was most marked for both families on the BDT and for the Athapaskan sample on all measures. In view of these violations of the assumptions underlying the use of the F-test, steps were taken to correct skewness in the distributions and to reduce the extreme within-cell variance. A loga-

SUMMARY

rithmic transformation was made on the raw scores of the three tests. The resulting distributions were considered suitable for an F test of significance.

Reactive effects of experimental procedures, e.g., instruction and practice, cannot be overlooked as threats to the external and internal validity of the study.

Consideration must be given to the possibility that the tests did not provide enough ceiling, or were not sensitive enough to discriminate among the field-independent performers.

The results of the research would indicate that the three tests were appropriate, if not adequate, instruments for use with a native population. They were selected as conforming to the requirements of conceptual equivalence,[1] with task demands which could be readily understood by the subjects in terms of action-demonstration and action-responses.[2]

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1 John W. Berry, "On Cross-Cultural Comparability", International Journal of Psychology, Vol. 4, No. 2, 1969, p.124.

2 N. Frijda and G. Jahoda, "On the Scope and Methods of Cross-Cultural Research", International Journal of Psychology, Vol. 1, 1966, p.121.

CONCLUSIONS

Studies of Indian cognitive style have the benefit today of a broader definition of human intelligence and human psychology. Witkin's theory of differentiation, encompassing as it does perceptual, intellectual and psychological functioning, has proven to be flexible and adaptable to the requirements of diverse cultures. Adapting it to a definition of the psychology of the Canadian Indian is a task which is not without pitfalls, however.

One example of this might be the effect of history on tests results. For too long the Indian has been an object of study. Neither his opinion, nor his reaction to the experimental situation was solicited. Seldom was he informed of the results, and rarely did he benefit by them. The Indian, then, is suspicious of intruders bearing notebooks and testing-tools. By nature and necessity he is self-contained and self-sufficient, neither asking nor expecting understanding and approval from strangers. Because he reveals so little of himself and his true feelings the scope of his abilities and potential is unknown. Studies, such as this one, are undertaken with the assumption that the ability to be examined is normally distributed among the Indians, as it is

assumed to be for other people. The assumption that anything measurable or quantifiable is distributed normally in a population has deep roots in experimental measurement. With only the evidence of this study it may be temerarious to suggest that the field-dependent-independent attribute of perception is not normally distributed among the Indian people. However, it is within reason to assume that the exact distribution is unknown. The concept of normality has been useful in a complex technological milieu; it need not be so among people who are unsophisticated and have an essentially ordered and predictable existence. It would be an error to allow Procrustean standards of normality to obscure the significance of the Indian's response to a challenge of his skill and ability.

This necessarily makes generalization of the findings of a study limited. As in this case, they are applicable to the samples only, since the population parameters are not known. Indeed, this need not be a disadvantage, but rather, should be considered as extremely useful: providing a bridgehead for this unknown population against hasty or ambiguous definitions.

In considering the distribution of scores resulting from this study, it might be asked if many more subjects would have scored as field-dependent if only standard directions had been given. The rationale which guided the procedure of

familiarizing the subjects with the task was based on the principles of methodology outlined by Fridja, Jahoda, Witkin, and Berry. Participation in the testing situation should not be a delimiting one. Rather, it should be an extending experience which maximizes the opportunity, scope and individuality of responses. What is reflected in these test scores should be a measure, however imperfect, of a characteristic style of functioning in the perceptual sphere.

Okonji was disturbed by the low degree of variance in RFT scores among his Ibusa sample. Among the reasons he advanced were failure of subjects to understand the task and the possibility that uniform socio-cultural conditions promoted the development of field-dependence, minimizing individual differences.[3] The extreme variance found in samples of this study could be accounted for by the preparation procedure. Another explanation should also be considered: that of the personal involvement of the subjects. Curiosity and interest were followed by determination and perseverance in accepting and completing the task. The test was regarded as a challenge, and there was evident pride in accomplishment. This is characteristic of the Indian personality. He is not interested in competing with others to establish his superior-

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3 Michael O. Okonji, "The Differential Effects of Rural and Urban Upbringing on the Development of Cognitive Styles", International Journal of Psychology, 1969, Vol. 4, No. 4, p. 302-303.

ity. He is more comfortable in attaining an inner conviction of achievement which is the result of the satisfaction and fulfillment that competence gives.

Conclusions touching the non-linear relationship between the tests would suggest, with Wober, that the tests evoke different kinds of responses from people of different cultural settings.[4] The inverse ease and difficulty which the traditional and urban groups experienced on the measures would indicate this. The difference is described by Bruner as the difference between abstraction and concreteness.[5] This difference is fostered by the two ways of life, and was evident in the way each group handled the two kinds of problems. The RFT involved a simple direct assessment of physical relationship requiring a developed perceptual subtlety. The BDT required conceptualization, which removed the problem from the concrete, and manipulated it by means of analysis and synthesis.

The difference in the manner of handling the two problems is related directly to the kind of training the child receives for the kind of life he will live. In a traditional community the child is taught to keep his eyes open

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4 M. Wober, "Adapting Witkin's Field Independence Theory to Accommodate New Information from Africa", British Journal of Psychology, 1967, Vol. 58, p. 37.

5 Jerome S. Bruner, et al. Studies in Cognitive Growth, New York, John Wiley, 1966, p. 315.

CONCLUSIONS

all the time in order to learn more, as Renaud[6] points out. In a modern urban setting he is placed in school, removed from direct contact with concrete reality. He must learn to deal with it through ideas, and to conceptualize relationships which he has not personally experienced.

This leads back, then, to the original impetus which prompted this study: the realization that Indian parents have quite different values, goals and priorities than do teachers; that the programmes and methods used in the schools to exercise and stimulate intelligence are not compatible with the Indian's definition of intelligence, nor with his cultural and environmental needs.

IMPLICATIONS FOR EDUCATION

A few of the adults who participated in this study were educated, the majority were not. But all shared a common concern for improving educational programmes for their children. For centuries every Indian adult was an educator. Renaud describes this and underlines the fact that to this day, older people still teach the young directly and personally. The Indian community is a silent one, and oral lang-

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6 André Renaud, O.M.I., "Education from Within", Ontario Conference on Indian Affairs, Nov., 1965, in "Living and Learning", Hall-Dennis Report of the Provincial Committee on Aims and Objectives of Education in the Schools of Ontario, Ontario Department of Education, 1968, p. 111.

CONCLUSIONS

uage is a secondary tool for transmitting knowledge.[7]

In an educational system which places heavy emphasis on verbal competence, to the relative disregard of other kinds of abilities, the Indian child is at a disadvantage. The resulting reticence of the child and his seeming passivity create an impression of dullness which is, indeed, contrary to his cognitive abilities and to his personality. Anyone who has taught Indian children knows how deceptive is their outward conformity in the classroom. They have powerful insulating techniques which they use when bored or disinterested in the curriculum. The experience of this study in observing and evaluating the Indian's performance in handling the tasks, confirmed the conviction that the present educational programmes are not tapping the potential ability of which the Indian child is capable.

If any change is to be effected, more than lip service must be paid to the fact that different modes of thought can lead to the same results. Tyler has said:

> ...in a world as complex as ours, a wide variety of special abilities can be utilized. Schools capitalize only on verbal ability, neglecting other talents, leaving them unidentified and untrained.

He stresses the need for identification and measurement of

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7 André Renaud, O.M.I., op. cit., p. 111-112.

abilities which indicate talents that can be developed by education.[8]

If this study contributes anything of importance to the cause of Indian education, it is the identification of the Indian's cognitive style as a field-independent mode of perceptual functioning. Recognizing the relationship between socialization practices and cognitive style, it follows that the Indian adult imparts this style to his children by the manner in which he trains them. Knowing that from his early years an Indian child has received training which makes him aware of himself and his needs, which develops his self-reliance and his responsibility, the teacher can then provide opportunity in the classroom to strengthen this independence instead of stifling it.

A field-independent child should be less conforming and more self-directed in his classroom behaviour.[9] The school's emphasis on obedience and discipline, on time-regulated activities, represents a drastic change for the Indian child. From a world where his life was intrinsically bound up with that of his parents and other adults, the child

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8 Ralph Tyler, "Can Intelligence Tests be Used to Predict Educability", in, Kenneth Eells et al., Intelligence and Cultural Differences, Chicago, University of Chicago Press, 1951.

9 Herman A. Witkin, "Individuality in Development", The American Montessori Society Bulletin, 1966, Vol. 4, No. 2, p. 22.

CONCLUSIONS

finds himself confined in a small space for several hours daily with a teacher who appears to him forbidding, with his many questions and demands, and his exercise of authority. At home the child learned from the attitude of his parents toward him: their indulgence and patience, their acceptance of him; his interaction with them. In school, the teacher-pupil relationship fosters dependence, and teaching becomes a process of shaping behaviour; a process as disagreeable to the Indian parent as it is to the child.

RECOMMENDATIONS

Research is needed to develop appropriate educational goals and teaching methods which would capitalize on the talents of Indian children. In the area of curriculum and method, action-programmes could be directed to problem-solving in a wide range of familiar and unfamiliar situations. Flexible time and spatial structures should allow the child to concentrate without interruption on tasks which interest and challenge him. In the area of teacher-child relationship, effort could be directed to creating a climate of acceptance, patience and non-aggression, of interaction between child and teacher.

The most valuable resource people for this kind of research are the Indian parents. Consultation with them would ensure the continuity of development from the early years of home training through the years of learning in school.

RECOMMENDATIONS

Much is yet to be done in developing techniques appropriate for identifying and describing the repertoire of abilities, skills and responses which the Indian has developed in response to his environment. Young Indian university students should be encouraged to undertake research in some of the areas indicated, thus adding a dimension of comprehension which is impossible from a person of another culture.

Studies of skills and abilities as determined by sex roles are needed for a better understanding of the basic elements of Indian psychology.

Adequate processing procedures are needed to handle the data gathered in these studies.

Finally, the possibilities of utilizing Witkin's theory of cognitive style in developing "cognitive maps" which reflect patterns of cognitive characteristics in the perceptual, intellectual and psychological spheres, should be explored in relation to Indian education. A frame of reference is needed, broader and more flexible than intellectual functioning alone, i.e., Intelligence Quotients, to accommodate the wide range of individual differences and abilities which are encountered among Indian people.

BIBLIOGRAPHY

Berry, John W., "On Cross-Cultural Comparability", International Journal of Psychology, 1969, Vol. 4, No. 2, p. 119-128.

Procedures, guide-lines, and conditions are proposed which would make cross-cultural comparisons more valid, and would provide a standard for evaluating the proliferation of recent research in this area. Three indispensable conditions are signalled: functional equivalence, comparative descriptive framework and conceptual equivalence. Berry recognizes that complete understanding and definition of an unfamiliar system is extremely difficult for an outsider. He suggests an approach which would allow tentative application of existing descriptive categories, e.g. field-dependence-independence, with proper modifications. This could result in discarding some honoured universal definitions in favour of new ones which would be more adequate and applicable to fundamental human behaviour.

Precautionary measures were adopted to bring the present research into line with this plan for improving the caliber of cross-cultural study.

Bruner, Jerome S., et al., Studies in Cognitive Growth, N.Y., Wiley, 1966, p. xviii-343.

The research described was undertaken in order to study the development of cognitive processes in children. The approach is pragmatic, directed to assessing the child's strategies for problem solving and the nature of his equivalence judgments, among other areas of interest. Bruner clearly states his conviction of the importance of the shaping influences which a culture has on thought. He further states that cognitive growth is inconceivable without participation in a culture and its linguistic community. Parallel studies of conceptual behaviour were carried on among the Eskimos of Alaska, the Wolofs of Senegal, the Indians of Mexico and white children of Massachusetts. Accounts of the testing situation, procedures, responses, results, provide an engrossing insight into the child's mind, accompanied by astute observations on the significance of the relationships which emerge.

Of great value for this study were Bruner's precisions on the possible reason for the difference in performance of rural-urban children. This difference was ascribed to the demands which each society places on its members. A technical society requires abilities of abstraction, whereas traditional societies demand concrete, direct attention and awareness of the environment.

BIBLIOGRAPHY

Jenness, Diamond (Ed.), The American Aborigines, Their Origins and Antiquity, Toronto, University of Toronto Press, 1933, p. iv-396.

This collection of papers by scholars, each a specialist in his field, deals with fundamental evidence of how long the Indians inhabited North and South America; how and by what routes they reached this hemisphere, and to what race or races they are most akin. Scientific evidence is given to show that for unnumbered millenia before Columbus, the Indians occupied the whole of two continents from the Arctic to Tierra del Fuego. Their development is traced from the primitive state to flourishing civilizations comparable to those in Mesopotamia and Egypt two thousand years before Christ.

The papers of Hooton, Wissler and Boas on "Racial Types in America and Their Relations to Old World Types", "Ethnological Diversity in America and Its Significance", and "Relationships Between North-West America and North-East Asia", respectively, were of great importance to this study. Their emphasis on a primary principle of cultural change as related to environment and geography gives anthropological support to the application of Witkin's theory of differentiation in cross-cultural studies.

_____. The Indians of Canada, 3rd ed., Ottawa, National Museum of Canada, 1955, p. xii-452.

As a history and description of the Canadian Indian since 1603, this work is indispensable for anyone engaged in a study of native Canadians. Jenness adopts a classification of Indians based on cultural areas, which themselves are determined by the physiography of the country. In describing the characteristics of these cultural divisions, differences in languages, economic, political, social and religious practices are related to their development in a particular climate.

As a source of information on the customs of the Algonkian and Athapaskan families, this work has been invaluable. It is the basis for the description of the population of this study, and gives support to many of the observations and conclusions which followed. Other references might be considered supplementary to this definitive history of the Indians of Canada by an eminent scholar and humanist.

_____. La Trame Indienne de l'Histoire du Canada, Ottawa, Imprimateur de sa Très excellente Majesté le roi, 1937, p. 49.

In this look at the Indian in Canadian history, Jenness examines the many theories which attempt to explain differences in intelligence, civilization and progress among

BIBLIOGRAPHY

peoples of different races. He suggests that the apparent lag in progress which marks the history of the North American Indian is largely due to the geographical features of the country. This would seem to be an oversimplification.

The work was useful for the historical information it gives, especially in the description of the many migrations which occured through the years. It became possible to place the Algonkian and Athapaskan families in historical perspective.

Kroeber, A.L., (Ed.), Anthropology Today, Chicago, University of Chicago Press, 1953, p. xv-966.

The fifty inventory papers of this volume present an overview of the methods employed and results obtained from inquiry in the many areas of anthropological research. Among these papers are several which supplied the anthropological foundation for this study.

Kroeber, Kluckhohn, Levi-Strauss, Hallowell, Hoijer, Beals and Mead, each deals with a particular segment of culture. The underlying principle which can be traced throughout is that of culture as a principle, or focal point, for coordinating most of the observable phenomena related to man. Since this study was directed towards establishing a relationship between cultural change and one of those phenomena, perceptual functioning, it was important to have a properly balanced concept of the integral reality of society, culture and personality, as Hallowell puts it.

Price-Williams, D.R., (Ed.), Cross-Cultural Studies: Selected Readings, Baltimore, Penguin, 1969, p. 383.

Articles which are relevant to psychological theory and method in cross-cultural research are collected in this volume. The presentation of material is aimed at showing the growth of a body of knowledge in the field. Easy reference to valuable studies is made possible by this inexpensive paper-back edition.

The works of Frijda, Jahoda, Biesheuvel, Dawson and Wober are among those which are reported and which were referred to many times in the present study. Valuable historical overviews are provided as preface to each section. The titles of these sections suggest the wide range of interests which constitute the merit of this volume; for example, Theory and Method, Tests, Field-Dependence, Conservation, Freudian Hypotheses.

BIBLIOGRAPHY

Wiseman, Stephen, (Ed.), Intelligence and Ability: Selected Readings, Baltimore, Penguin, 1967, p. 368.

An historical approach is adopted by the editor, tracing the development of the theory of intelligence over a period of one-hundred years from Galton to J. McV. Hunt. The British and American schools of thought are represented. Linking passages between each section furnished background information, which aids in evaluating and interpreting the many contributions. In the final section, the results of the extensive research on intelligence and of the inquiry into the cognitive field are drawn together, showing the possibility of integrating the two major sectors of psychological theory, i.e., learning theory and man's abilities and aptitudes.

The works which were most valuable to the present study were those of Hebb, 1949, and Ferguson, 1954. Apart from fixing them in historical perspective, the volume of Wiseman allows for easy comparison of their contributions to the development of an expanded theory of intelligence. The dimension which they added to the theory of intelligence was recognition of the importance of early-childhood experience in the development of adult intellectual capacity. The relationship between cognitive functioning and cultural conditioning was implied by Hebb and clearly established by Ferguson.

Witkin, H.A., "A Cognitive-Style Approach to Cross-Cultural Research", International Journal of Psychology, 1967, Vol. 2, No. 4, p. 233-250.

The application of the differentiation theory to the study of people possessing cognitive abilities which are unfamiliar to Western psychology is expertly outlined by Witkin. He gives concise definitions of terms, as well as examining the factors which foster differentiation as they are applicable to other cultural groups. The studies which have been undertaken in this area are reviewed, with suggestions for future research.

As a blueprint for the present study Witkin's article was invaluable. Undoubtedly, many adjustment are necessary in applying the method and theory to an unfamiliar, indigenous population. These are discussed honestly and illustrated by reference to the difficulties encountered by researchers in the field.

BIBLIOGRAPHY

_____. R.B. Dyk, H.F. Faterson, D.R. Goodenough, S.A. Karp, Psychological Differentiation, New York, Wiley, 1962, p. x-418.

This is a second major report (the first: Personality Through Perception, 1954) of research covering twenty years. Within a revised and elaborated conceptual scheme, the "differentiation hypothesis", the volume continues the earlier work on field-dependence-independence by reviewing numerous studies from within and outside the laboratory, extending the range of relationships among perceptual, cognitive and personality functions which distinguish more and less differentiated people. Longitudinal evidence of consistency in differentiation among individuals over time, and the origins of greater and lesser differentiation in early development, particularly in the mother-child relationship, are well documented.

The importance of Witkin's methods, findings and theoretical position for the present study can be summarized by three words: simplicity, flexibility and unity. Its simplicity and flexibility make it a powerful tool for use with a native population by eliminating or reducing many of the difficulties encountered in cross-cultural research, e.g. communication and conceptual equivalence of material. Its unity makes possible the integration of the critical components of man's behaviour, i.e. perceptual, intellectual and psychological functioning; permitting a humanistic interpretation of man.

APPENDICES

Appendix

APPENDIX 1

LINGUISTIC AND CULTURAL AFFILIATIONS OF CANADIAN INDIAN BANDS

Department of Indian Affairs and Northern Development
Ottawa, 1970

Linguistic Group	No.	Language or Dialect		POPULATION
ALGONKIAN	12	Abenakis	627	Totals:
		Algonkin	3,827	
		Blackfoot	8,030	
		Cree	70,403	
		Delaware	610	
		Malecite	1,744	
		Micmac	9,342	
		Montagnais	5,765	
		Naskapi	320	
		Ojibway	50,431	
		Ottawa	1,632	
		Potawatomi	863	153,594
ATHAPASKAN	14	Beaver	789	
		Carrier	4,549	
		Chilcotin	1,401	
		Chipewyan	5,098	
		Dogrib	1,202	
		Hare	715	
		Kutchin	1,129	
		Loucheux	1,205	
		Nahani	1,112	
		Sarcee	467	
		Sekani	450	
		Slave	3,334	
		Tahltan	712	
		Yellowknife	504	22,657
Haida	1	Haida	1,367	1,367
Iroquoian	2	Iroquois-Huron		22,304
Kootenayan	1	Kootenayan	446	446
Salishan	12			20,989
Siouan	2			6,212
Tlingit	1	Tagish	491	491
Tsimshian	3			7,730
Wakashan	4			8,217
			GRAND TOTAL+	244,113

+ Grand Total based on Indian Registery Records

APPENDIX 2 + EXPLORATORY EXPERIMENT : INDIVIDUAL RECORD

Individual scores on Field-Dependence Tests:

RFT..... mean degrees on 8 trials:
low degrees = Field Independence

EFT..... total seconds on 12 trials:
low time = Field Independence

Block Design.. total points on 10 trials: max= 48 points
high points = Field Independence

LAC VICTORIA

Subjects Age - Sex	RFT	EFT	BLOCK	CEFT pts./25
+ 10 M	3.1		29	25
+ 12 M	1.3		47	25
+ 12 M	2.8		21	23
+ 13 F	2.8	400	28	
+ 14 M	2.3	763	34	
+ 14 M	0.8	252	--	
+ 15 M	1.5	177	42	Block
+ 15 F	1.2	456	24	/WAIS scaled
+ 17 F	4.6	634	33	11
+ 19 F	1.6	326	32	10
+ 21 P	2.5	590	--	
/ 23 M	4.4	369	39	12
/ 35 M	1.3	---	40	13
/ 38 F	0.4	109	38	12
/ 39 M	5.6	861	40	13
/ 40 M	0.4	804	26	8
/ 50 M	o.8	---	--	
/ 50 F	3.6	---	--	
/ 68 F	3.1	---	--	
	N=19	N=14	N=12	N=3

+ Indicates schooling of 4 or more years
/ Indicates no schooling

APPENDIX 2 + EXPLORATORY EXPERIMENT : INDIVIDUAL RECORD

AMOS

Subjects Age - Sex	RFT	EFT	BLOCK	CEFT pts./25
+ 11 F	1.5		24	24
+ 12 F	0.6	175	47	
+ 12 M	1.0		36	19
+ 12 F	1.0	152	47	
+ 13 F	1.1	193	43	
+ 15 F	3.2	80	42	
+ 16 M	0.5	161	47	Block
+ 16 M	0.8	127	48	/WAIS Scaled
+ 17 M	0.5	161	46	15
+ 19 M	2.0	422	31	
+ 23 F	1.7	291	44	14
/ 29 M	2.1	632	33	10
/ 35 M	2.3	662	41	13
/ 44 F	2.3	495	32	11
/ 44 M	0.3	173	48	18
/ 46 M	0.2	441	38	14
/ 51 F	0.6	193	45	16
/ 54 M	0.9	633	37	13
/ 55 M	0.4	120	37	14
	N = 19	N=17	N=19	N=2

+ Indicates schooling of 4 or more years

/ Indicates no schooling

Appendix 2 a

RESEARCH STUDY Individual Performance Records

Cultural level	Location	Sex	Age	Tests RFT	EFT	BDT
				degrees	sec. sec.	Pt.
ALGONKIAN Traditional	ATTAWAPISKAT, Ont.	M	16	4.0	88 133	40
			16	2.5	108 219	32
			17	9.0	365 390	30
			17	14.0	418 177	34
			22	10.5	242 264	33
			24	8.5	59 151	47
			27	15.5	133 289	38
			29	19.0	161 383	42
			29	7.5	146 345	36
			29	11.0	54 163	40
			32	9.0	363 363	23
			37	3.0	156 286	28
			37	2.0	144 317	26
			40	23.0	109 409	35
			40	9.0	322 549	43
			43	22.0	661 305	32
			44	6.5	85 4.4	31
			50	7.5	657 195	22
			61	14.0	377 189	18
			70	34.0	465 346	28
		F	16	20.5	411 424	36
			17	15.5	157 230	34
			18	4.0	136 179	33
			21	4.5	570 389	35
			21	6.5	116 263	23
			22	15.5	41 152	46
			24	23.0	373 275	33
			25	8.5	80 393	43
			26	16.5	319 439	30
			27	14.5	221 404	41
			32	8.5	158 589	40
			36	5.5	121 295	32
			40	3.5	629 205	23
			41	10.5	97 319	41
			45	5.5	273 177	23
			49	10.0	709 495	40
			50	19.5	608 536	37
			53	16.5	272 362	36
			51	4.5	134 287	45
			56	16.0	286 505	34

APPENDIX 2 a

INDIVIDUAL PERFORMANCE RECORDS

Cultural Level	Location	Sex	Age	Tests RFT	EFT	BDT
				degrees	sec.	sec.	Pt.
ATHAPASKAN Traditional	ISKUT LAKE, B.C.	M	18	17.5	36	240	45
			19	4.0	30	172	48
			19	24.0	55	302	46
			21	21.0	52	291	45
			21	2.0	44	273	46
			22	6.5	79	115	48
			22	16.5	55	322	44
			23	18.5	244	398	37
			23	10.0	379	257	46
			29	7.0	104	249	44
			31	10.5	135	409	46
			37	9.5	170	276	45
			39	2.0	14	243	41
			40	6.5	46	279	37
			47	2.0	75	283	47
			48	11.0	167	458	42
			53	20.0	149	296	41
			56	6.5	366	552	42
			58	20.5	68	380	44
			65	33.0	499	441	36
		F	16	13.0	54	254	46
			16	30.0	78	331	45
			17	5.0	101	309	38
			19	17.0	140	311	37
			20	11.5	46	279	45
			21	19.0	215	367	42
			23	6.5	268	465	32
			24	9.0	835	252	22
			25	16.5	278	185	41
			28	26.5	57	182	48
			30	31.5	72	347	32
			33	16.5	128	234	48
			39	6.0	88	303	44
			41	14.0	354	480	42
			45	9.0	498	406	40
			46	60.0	405	364	40
			48	21.5	129	462	43
			55	15.5	529	307	29
			46	27.0	495	284	22
			67	43.0	489	462	33

Appendix 2 a

INDIVIDUAL PERFORMANCE RECORDS

Cultural level	Location	Sex	Age	Tests RFT	EFT	BDT
				degrees	sec.	sec. Pt.
ALGONKIAN Transitional	MOOSONEE Ont.	M	16	15.5	27	115 29
			16	17.5	73	280 42
			16	55.5	51	325 41
			16	8.5	86	369 43
			17	8.0	113	304 38
			17	31.0	109	238 43
			17	11.0	79	362 35
			18	15.0	157	263 32
			20	3.0	168	252 47
			26	19.5	153	351 37
			32	7.5	279	484 36
			35	18.0	284	462 41
			44	6.0	116	562 38
			46	1.5	255	366 38
			46	15.5	168	219 26
			48	20.0	609	305 26
			51	23.5	355	136 16
			56	13.0	545	189 22
			59	8.0	557	107 10
			62	13.5	370	186 22
		F	16	23.5	89	246 44
			17	38.0	408	246 28
			17	14.5	185	277 32
			18	5.5	121	211 32
			18	20.5	166	108 27
			18	11.0	409	171 22
			19	10.5	148	384 36
			23	9.5	66	100 36
			25	13.5	236	276 38
			19	15.5	213	433 38
			32	26.5	145	376 36
			33	24.5	44	325 43
			36	20.0	57	276 45
			40	10.0	502	314 30
			44	19.0	392	485 36
			45	16.5	841	193 24
			46	14.5	140	272 30
			49	38.5	137	279 36
			50	36.0	803	226 24
			55	7.5	257	232 32

APPENDIX 2 a

INDIVIDUAL PERFORMANCE RECORDS

Cultural Level	Location	Sex	Age	Tests RFT	EFT	BDT	
				Degrees	sec.	sec.	Pt.
ATHAPASKAN Transitional	LOWER POST, B.C.	M.	16	5.0	55	245	47
	WATSON LAKE, Y.T.		17	8.5	37	374	44
	CASSIAR, B.C.		18	11.5	30	357	45
			18	10.5	141	257	47
			20	3.5	73	245	46
			20	7.0	144	253	47
			21	2.0	55	401	44
			22	3.0	59	236	48
			23	10.5	100	271	36
			29	5.5	51	460	43
			30	16.5	126	161	16
			30	21.0	67	469	42
			33	11.0	235	178	28
			34	0.0	291	439	41
			34	2.5	349	241	22
			35	4.0	109	236	31
			37	13.0	185	473	38
			40	4.0	104	573	36
			40	3.5	135	513	38
			50	11.0	411	235	30
		F.	18	14.5	126	304	48
			18	3.0	197	376	37
			19	14.5	285	334	42
			19	18.0	199	316	46
			22	7.5	79	510	42
			22	21.0	319	332	45
			24	4.5	128	322	44
			24	12.0	268	325	44
			24	5.5	136	190	48
			25	29.0	321	415	37
			30	15.5	144	504	42
			30	11.0	120	342	26
			30	26.5	324	347	32
			30	25.5	41	257	35
			31	5.0	227	300	24
			31	7.0	524	569	34
			36	16.0	82	520	43
			37	10.5	303	402	38
			37	3.5	452	556	24
			38	10.5	91	568	38

APPENDIX 2 a

INDIVIDUAL PERFORMANCE RECORDS

Cultural Level	Location	Sex	Age	Tests RFT	EFT	BDT	
				degrees	sec.	sec.	Pt.
ALGONKIAN Urbanized	Moose Factory Ont.	M	17	11.0	153	235	47
			17	10.0	110	253	39
			19	21.0	117	255	44
			21	15.0	48	227	45
			21	6.5	548	385	36
			23	30.5	117	251	39
			24	21.5	142	409	41
			24	16.5	83	222	40
			24	4.0	34	211	48
			27	15.5	519	306	27
			30	25.0	535	242	39
			31	5.5	49	212	46
			33	16.5	99	385	39
			36	28.0	223	363	44
			40	8.0	250	213	47
			44	2.0	130	204	48
			45	14.0	111	607	40
			50	15.5	446	462	34
			55	3.5	93	264	37
			66	35.5	441	489	42
		F	16	19.5	52	257	46
			16	22.0	135	207	47
			17	24.0	137	244	47
			21	9.0	79	253	46
			23	9.5	232	216	34
			27	7.0	190	210	47
			29	28.5	97	387	44
			29	24.5	232	288	46
			29	11.0	396	341	44
			29	43.5	223	195	41
			33	4.0	552	350	44
			35	21.0	137	279	47
			36	7.5	163	239	33
			36	33.0	62	344	41
			37	28.5	149	379	44
			37	7.0	44	369	43
			45	6.0	27	463	42
			46	13.0	426	360	44
			48	12.0	25	296	46
			55	27.0	211	332	37

APPENDIX 2 a

INDIVIDUAL PERFORMANCE RECORDS

Cultural Level	Location	Sex	Age	Tests RFT	EFT	BDT
				Degrees	sec.	sec.	Pt.
ATHAPASKAN Urbanized	WHITEHORSE Y.T.	M	16	6.5	50	193	47
			17	5.0	53	229	46
			17	9.5	31	247	46
			17	7.5	25	125	48
			17	8.0	75	251	47
			18	3.0	58	389	44
			20	3.0	84	271	47
			28	7.5	155	316	45
			29	7.0	49	183	48
			29	10.0	137	233	46
			30	3.5	38	206	47
			30	2.5	41	130	48
			31	7.5	25	221	46
			33	3.0	47	148	48
			34	4.5	84	169	48
			34	13.0	76	403	46
			34	4.0	86	209	48
			37	4.5	143	384	42
			58	4.5	311	308	41
			59	10.0	209	450	40
		F	17	12.5	29	214	48
			17	5.0	28	310	44
			19	5.0	98	195	48
			21	12.0	105	247	45
			21	26.0	202	363	35
			23	6.0	214	273	46
			23	16.0	116	331	44
			24	34.0	159	303	45
			25	22.0	117	375	37
			26	2.5	49	199	46
			30	16.0	333	335	39
			30	7.0	295	198	48
			30	11.0	76	220	48
			30	14.0	182	355	44
			32	5.0	82	302	43
			35	18.0	40	233	47
			42	4.0	225	279	39
			46	8.0	57	543	36
			50	9.5	30	267	45
			56	8.5	42	275	43

APPENDIX 3

TRANSCRIPT OF TEST DIRECTIONS

Rod and Frame Test

"Sit down, please, and put your chin on the pad. Keep your hands on your knees. Now, if you will sit back and look into the barrel you'll see that the box and stick are straight. I'll move the box. Is the stick still straight? I'll move it again. Is the stick straight now? Now I will move the stick. Do you see when it is not straight. Now, I am going to move the box and stick in many different ways. All you have to do is tell when the stick is straight, up and down. You will have to keep your head in the box so you won't see the room or the walls. All you will know is how your body feels as it is straight.

Now, we will have one or two practice tries (Frame at 28° - rod at 28°, in both left and right positions if needed). Now, we will begin the trials. I will close the curtain while I move the stick and box. Now, take a look. Tell me when the stick is straight again. Don't take your head out now and to help you remember, I'll put this band around your head. If you move you will pull the whole machine with you. You'll have eight tries."

(When no interpreter was available an ordinary stick was used to relate to the body as the standard for the vertical. Different positions of the rod were shown in relation to different positions of the frame. Then, when the frame was

APPENDIX 3

at 28^{o} and the rod was eased into the upright position, the subject was told "O.K.". When the task was understood, the subject then viewed the rod and frame from the forward cloistered position, and called "O.K." when he judged the rod to be vertical).

Embedded Figures Test

"I will give you a little practice first to help you get the idea of what it is about. (Using the CEFT shapes and pictures). Look at this shape (the triangle-tent). Can you see how it is hidden - see the different colours and lines cutting it in half. Do you see how this line is part of two different shapes? (Triangle-tent series follow). Now we will look at another shape (house) something like a house. Can you see it in these pictures (house series). You can see how it is hidden, by colours, by being part of another picture, by using lines from other pictures to make the house. Now I will show you something a little harder. Look at this shape and this picture (EF, PX). This simple shape is hidden in this coloured picture. Just the same size, the same shape and in the same position. (The explanation is accompanied by tracing with the stylus, by the researcher and then by the subject). Now try this one (D-4). This little house is hidden here, but there are many more lines to hide it from you. Now, you are ready for the real test. None of

these are as hard as the practice pictures. Look at this coloured picture (Item G-10). Now look at this simple picture. (The simple shape is placed on top of the complex figure). Now when you look carefully, and are ready, turn the simple one over and look for it in the coloured picture. If you forget it you can turn it back again. But do not look at both together. I will stop the watch for ten seconds when you are looking at the simple figure and I will start it when you start to search again in the coloured picture." (The only deviation from this format consisted of allowing the older people to keep both pictures exposed together if after a reminder had been given they did not cover the simple figure after having viewed it. When this happened no bonus time was allowed for viewing: therefore the total time includes viewing time, which in the standard procedure is not counted).

Block Design Test

"This test will make you think about a picture and figure out a way to take it apart and put it together again. Before we see the picture I want you to practice using the blocks. You see the colours on each side, some half red and white, some all white, some all red. Copy these pictures that I make, (figures are formed by changing some colours). Now I will make one and I will time you when you copy it. You see here a picture of what you just did. The pictures

are harder to follow than the ones I did for you, because you can't tell just where each block belongs, but you can help yourself by looking at the corners and seeing where just one colour belongs. Like this. Now I will show you picture number 2. Look at it as long as you want. Think about how the blocks go. I will start the time only when you start working with the blocks."

NAME Michael Moskush AGE 37

DESCENT Cree CULTURAL LEVEL 1

LOCATION Attawapiskat NATIVE LANGUAGE Cree

OTHER LANGUAGES no RESERVE-durée

SCHOOL- How long?- no gr. comp. Where

Life off reserve no where how long

WORK preference self-employed?

Beadwork or handicraft

Intensity of influence of customs, traditions, language, religion

Other notes:

ROD AND FRAME (°from 0)		EMBEDDED FIGURES (seconds)	BLOCK DESIGN (seconds - points)	
1.	0 0.0	1. 29	1. 17	4
2.	0 0.0	2. 27	2. ②16	2
3.	L 1 1.0	3. 16	3. 16	4
4.	0 0.0	4. 31	4. 15	4
5.	0 0.0	5. 13	5. 14	4
6.	0 0.0	6. 28	~~6. 79~~	~~0~~
7.	L.5 0.5		7. 119	4
8.	L.5 0.5		~~8. 201~~	~~0~~
			9. 120	4
			~~10. 360~~	~~0~~
Tot.	2.0	Tot. 144.	Tot. 28	
Mean	.25	mean 24	Scale 9	
S.D.		S.D.	S.D.	
z.		z.	z.	

had several correct only to make changes at the end.

Date Sept 4

22122 174

2.00
2.00
160

RESEARCH RECORDS: 3 Individual Psychological Experiences

NAME Russel Magun AGE 130+1 34

DESCENT Cree CULTURAL LEVEL 2

LOCATION Hills NZ NATIVE LANGUAGE Cree

OTHER LANGUAGES English RESERVE-durée

SCHOOL- How long?- no gr. comp. Where

Life off reserve no where Frances Lake how long

WORK preference self-employed?

Beadwork or handicraft

Intensity of influence of customs, traditions, language, religion

Other notes:

ROD AND FRAME (°from 0)		EMBEDDED FIGURES (seconds)		BLOCK DESIGN (seconds - points)	
1.	0 0.0	1.	12	1. 6	4
2.	0 0.0	2.	70	2. 12	4
3.	0 0.0	3.	14	3. 15	4
4.	0 0.0	4.	180	4. 20	4
5.	0 0.0	5.	4	5. 22	4
6.	0 0.0	6.	11	6. 67	4
7.	0 0.0			7. 52	4
8.	0 0.0			8. 51	5
				9. 95	4
				10. 98	4
Tot.	0.	Tot.	291	Tot. 41	
Mean	0.	mean	48.5	Scale 12	
S.D.		S.D.		S.D.	
z.		z.		z.	

points for EF

Miss Jacquie Waite

C.C.I.-9

Date

21222/53 2.00

RESEARCH RECORDS: 3 Individual Psychological Experiences 161

NAME Isabelle Tusga AGE 39

DESCENT Casca CULTURAL LEVEL 1

LOCATION Upper Liard NATIVE LANGUAGE Casca

OTHER LANGUAGES English RESERVE-durée

No SCHOOL- How long?- -no gr. comp. Where

Life off reserve where Upper Liard how long

WORK preference self-employed?

Beadwork or handicraft yes

Intensity of influence of customs, traditions, language, religion

Other notes:

ROD AND FRAME (° from 0)

1.	0	0.0
2.	1.5	1.5
3.	0	0.0
4.	0	0.0
5.	2	2.0
6.	0.5	0.5
7.	1	1.0
8.	1	1.0
Tot.		6.0
Mean		.75
S.D.		
z.		

best in this age group here

EMBEDDED FIGURES (seconds)

1.	3
2.	2
3.	5
4.	30
5.	44
6.	4
Tot.	88.
mean	14.6
S.D.	
z.	

very good attack on samples no hesitation - extremely sharp

BLOCK DESIGN (seconds - points)

	seconds	points
1.	3	4
2.	10	4
3.	7	4
4.	6	4
5.	12	4
6.	8	4
7.	32	5
8.	69	5
9.	96	4
10.	60	6
Tot.	44	
Scale	14	
S.D.		
z.		

per direct. needed - sees clearly the pattern on side block & uses excellent judgement in positioning

Date Oct 29

13 11290

RESEARCH RECORDS: 3 Individual Psychological Experiences 1.00

162

NAME ~~Daniel Katoquapit~~ AGE 27

DESCENT Attawapiscat CULTURAL LEVEL 3

LOCATION Moosonee NATIVE LANGUAGE Cree

OTHER LANGUAGES English RESERVE-durée 2 years

W SCHOOL- How long?- 1-2 gr. comp. ______ Where Fort Albany

Life off reserve ______ where ______ how long ______

WORK ______ preference ______ self-employed? Bay –

Beadwork or handicraft ______

Intensity of influence of customs, traditions, language, religion

Other notes: saw both

ROD AND FRAME (° from 0)		EMBEDDED FIGURES (seconds)	BLOCK DESIGN (seconds - points)	
1. R 5	0.5	1. 69 sec.	1. 10 sec.	4
2. R 2.5	2.5	2. 120 sec.	2. ~~2~~ ~~60~~ 60	2
3. L 4.5	4.5	3. 27 sec.	3. 10 sec.	4
4. L 1	1.0	4. 180	4. 16 sec.	4
5. R 2	2.0	5. 11 sec.	5. ~~[illegible]~~	0
6. R 1	1.0	6. 112 sec	6. 15 sec	4
7. L 2.5	2.5		7. ~~120+~~	0 fin
8. L 1.5	1.5		8. 120	4
			9. 75 sec	5
			10. ~~[illegible]~~	0

ROD AND FRAME	EMBEDDED FIGURES	BLOCK DESIGN
Tot. 15.5	Tot. 519	Tot. ~~[illegible]~~ 27
Mean 1.9	mean 86.5	Scale 8
S.D. ______	S.D. ______	S.D.
z. ______	z. ______	z. ______

Miss Jacque

Date Aug 31

APPENDIX 5

ABSTRACT

CULTURAL CHANGE AND FIELD DEPENDENCE IN TWO NATIVE CANADIAN LINGUISTIC FAMILIES[1]

The purpose of the study was to examine the modifications, if any, to cognitive style which result from the cultural changes imposed by acculturation. This study of cognitive style of the Indian people was limited to observing the perceptual component of cognitive style, i.e., field-dependence-independence.

The differentiation theory of Witkin, which establishes relationship between socialization practices and a global or articulated cognitive style, was used to 1) identify the variables relevant to the development of cognitive style, 2) select appropriate methods and instruments for the study, and, 3) interpret the findings.

Linguistic family, levels of cultural change, sex and age were identified as factors which for practical reasons could be controlled. Two-hundred and forty subjects were equally divided by family, i.e., 120 Algonkians and 120 Athapaskans. Equal numbers of males and females in two age groups, 17-29 years and 30-60 years were tested. Within each family three levels of cultural change were identified,

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1 Jacqueline Marie Weitz, doctoral thesis, presented to the Faculty of Education, University of Ottawa, Ottawa, Ontario, March, 1971, p. x- 186

ABSTRACT

i.e., traditional, transitional and urbanized.

An analysis of variance procedure was used with a battery of perceptual tests suitable for measuring the field-dependent-independent dimension of cognitive style: i.e., the portable Rod and Frame test, Witkin's Embedded Figures test and the Block Design test from Wechsler's Adult Intelligence Scale.

The findings of the study can be summarized as follows:

- There is indication that the perceptual style of these northern Algonkians and Athapaskans has characteristics of field-independence. This is related to cultural practices which emphasize respect for individual rights, self-reliance and individual responsibility from earliest childhood to adult participation in family and tribal affairs.
- Effects of cultural difference were found between traditional and urbanized groups on the Embedded Figures test. No difference was found between any of the groups on the Rod and Frame test and on the Block Design test. This can be interpreted as indication of the pervasive quality of cognitive style. The tasks required by the RFT, i.e., concrete and direct solutions, and those required by the BDT, i.e., abstract analysis-structuring strategies, reflect the demands made by two conflicting

ABSTRACT

cultural environments, ie., a primitive society and a technological society.

- Significant difference was found between the performance of males and females on the RFT and on the EFT. The direction of this difference is not readily described since the socialization practices of the Algonkians and Athapaskans place different emphasis on the sex roles.
- A significant effect of Age was found on the EFT and BDT. This was accounted for by a gradual modification in traditional child-rearing practices, even in isolated communities, which tends to foster less field-independence in younger members.
- Marked skewness in the distribution of test scores and heterogeneity of variance were found in the sample. These threats to loss of power and efficiency of an F-test of significance were corrected by logarithmic transformations of test scores.
- The exploratory nature of the Study imposed restraints and caution in the interpretation of data. It is suggested that this is an unknown population and that hasty and ambiguous definitions, explanations or conclusions are inappropriate.

This identification and description of the characteristic cognitive style of Indian people and the factors

ABSTRACT

which influence it should be of value to educators. There is grave concern that the school experience has a disrupting effect on the Indian child. By recognizing the quality of the training he receives in the family, efforts can be made to preserve continuity in his learning experience.