COGNITIVE STYLES OF INDIAN, METIS, INUIT AND NON-NATIVES OF NORTHERN CANADA AND ALASKA AND IMPLICATIONS FOR EDUCATION

by

Del M. Koenig

A Dissertation

Submitted to the Faculty of Graduate Studies

and Research in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

Indian and Northern Education Program

College of Education

University of Saskatchewan

Saskatoon, Saskatchewan

April, 1981

© 1981 D. M. Koenig

ABSTRACT

The present study investigated the cognitive styles of Indian, Metis, Inuit and non-native adults and adolescents of northern Canada and Alaska. The study identified three relational and two analytical cognitive styles. The styles differed significantly from each other in relation to cultural background, language facility, level of post-secondary education, sex and age of the respondents. Cultural background was found to be the most significant discriminator of those under investigation.

Procedure of the study involved the collection of verbalized responses to five open-ended questions concerning education from one hundred northern residents. A total of 528 minutes 32 seconds of tape-recorded responses was available from twenty treaty and status Indians, twenty Metis, twenty Inuit and forty non-natives. Subjects included parents, university students, high school students, teacher trainees, teachers, education administrators, native politicians and general community members. The data were submitted to content analysis procedures with items coded according to the Data Analysis of Cognitive Style (DACS) Scale which had been adapted for use in the present study from the work of E. S. Schneidman (1966). Scale item frequencies for each respondent were tabulated and submitted for statistical analyses to the SPSS program discriminant analysis. This analysis identified significantly different functions which translated into patterns of thinking or cognitive styles. In addition this analysis identified the relative importance of functions as discriminators among groups and computed predictability scores which showed the percentage of respondents who were correctly classified according to cognitive styles and demographic variables.

Findings of this study must be considered in relation to the following limitations: the size and nature of the stratified random sample; the reliability of the coders; the use of the unvalidated DACS scale; the ability of the analytical procedures to correctly discriminate among the study groups.

The study found that the groups which tended to think in relational styles were: Natives (Indian, Metis, Inuit), people with no university education or with less than one year at university; bilinguals (English and a native language); males; people under twenty years and over forty years of age. The terms Conflict-relational, Moral-relational and Inexact-relational were used to more precisely identify differing cognitive behaviors within the overall relational category. The groups which were found to exhibit analytical cognitive style behaviors included: the non-native group; those respondents with two to four years of university education; and respondents between thirty and forty years of age. Sub-categories within analytical styles were Conflict-analytical and Inexact-analytical.

When the Indian, Metis and Inuit respondents were combined into a "native" cultural group they strongly identified with the Moral-relational cognitive style (people-oriented, subjective, holistic, concerned with morals and ethics). The non-native group showed a strong negative relation-ship to this style. However, when each cultural group was analyzed separately, it was found that the Indian and Inuit subjects were somewhat more analytical (objective, linear, field-independent) than the Metis but less so than the non-natives. On the analysis of four groups, the non-natives were found to relate to both relational and analytical styles of thinking, indicating a wide range of differences within the group.

It was concluded that significant differences existed in the cognitive styles preferred by respondents of different cultural, language, education, sex and age groups in this study. Cultural background was found to be the strongest discriminator in relation to cognitive style differences. It was further concluded that according to extrapolation of findings to the theoretical model it may be possible and desirable to modify curricula content and teaching techniques to achieve a closer match between teaching styles and cognitive and learning styles of students of indigenous cultural backgrounds.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

> To belong to the human species as it is known throughout the
> world, the way of life expressed in a world view of existence must
> be transmitted to the next generation. (Roberts and Akinsanya,
> 1976, p. 1)

The human need for membership and identification with distinct

cultural and linguistic groups has determined one of the primary purposes

of education throughout history. New generations of each cultural group

must come to understand, to believe in and to live according to the world

view of the group with which they are identified. The adult generations,

in their roles as educators, are expected to shape the minds, emotions and

bodies of the young so that as they assume adult roles they in turn can

transmit the values, beliefs, technologies and philosophies required to

ensure the viable continuation of the cultural group.

Juxtaposed to the need for group identification grounded in a sense

of stability and familiarity is the need to change and adapt to new

environments and differing social requirements in order to survive. The

dilemma which challenges the educator every day is simply this: to what

extent and by what processes can education preserve and transmit the

cultural values required by the young learner, and to what extent and by

what criteria can education discard or modify those cultural components

no longer deemed to be viable?

Where an education system has been developed within a culture by

members of that specific group, checks and balances are instituted by the

elders who in their wisdom are able to respond to and lead the learners in

their choice. In the words of Chief John Snow of the Stoney Indians:

1

> Only wisdom can harness technology so that man can build a better world where people can live in pride, freedom, dignity, equality and brotherhood. My people must never lose their respect for the wisdom of the elders, wisdom which will balance all human activity. (Snow, 1977, p. 154)

However, where an education system which has been developed within and for one cultural group is imposed on a different group, the choice of what to retain and what to discard invariably produces dysfunctional results for both groups. Documentation of the impact of imposed education systems on the indigenous peoples of North America has been collected by numerous researchers (F.S.I., 1972; Hawthorne, 1967). With few exceptions, the findings have been discouraging. After several hundreds of years of "imposed" education, the people of Indian ancestry found themselves approaching the 1980s from a position of economic and political power-lessness. In many cases they had lost their language, an understanding of their cultural roots and their pride and competence as an inter-dependent cultural group. At the same time, the dominant culture which had imposed the education system on the indigenous people had come to resent the economic dependency, the inability of the Indian people to cope successfully with the social complexity of a highly industrialized world and the lack of productive skills deemed essential in a job-oriented society.

Sincere and useful efforts have been made over the past ten years in Canada and the United States to realize at least one of the general purposes of education, that of the preservation of cultural identity of the indigenous people. The focus of that movement has been largely on the production of curricular materials which are relevant to the culture and lifestyle of the child. Local schools, native education groups and government agencies have sponsored a wide-ranging variety of projects for

the production of teaching materials, each set specific to the community for which it has been designed.

It is a postulation of this study that something more than suitable teaching materials is needed to enable the child of Indian ancestry to learn both his important cultural knowledge and beliefs, and the skills and attitudes that will allow him to succeed in the modern world. If the processes by which one is taught are out-of-phase with the processes by which one thinks and learns, then the likelihood of achieving a successful teaching/learning experience is jeopardized.

The Open University in Britain not only agrees that there are differences in cognitive styles but also teaches a course in the different ways that people think and learn. One author of such a course suggests:

> . . . there is a substantial body of evidence on as sound a
> foundation as one can hope for when a research area is at the stage
> of exploratory studies, and the evidence about the differential
> effects of matched/mismatched strategies certainly merits much
> consideration. (Floyd, 1976, p. 52)

Research into teaching and learning styles (Bruner, 1956; Pask and Scott, 1972; Witkin, 1969) supports the hypothesis that people may learn in idiosyncratic ways which they have learned experientially during the formative years. The present study investigated the influence of cultural background and world view on the cognitive styles of Indian, Metis, Inuit, and non-native northerners. If cognitive styles differ then it may be suggested that a major reason for lack of success of the indigenous people within the Canadian education system may lie in the fact that teaching processes have failed to tune in to the cognitive and learning styles of native learners.

THE PROBLEM

The purpose of this study was to investigate the cognitive styles of a sample of Indian, Metis, Inuit and non-native northern residents. The study attempted to identify any significant differences in the ways of thinking among the four cultural groups. Another aspect of the research involved extrapolation from the literature on cognition and learning and from the findings of this study, to explore the suitability of style of teaching within the school system for the style of cognitive functioning of members of each group.

STATEMENT OF THE PROBLEM

This study investigated differences in the cognitive styles of a sample of one hundred Indian, Metis, Inuit and non-native Canadians and Alaskans. The stratified sample was randomly selected from a group of 314 subjects who had responded to a questionnaire concerning higher education programs and facilities available to northern students. Verbalized data from respondents were analyzed to test for hypothesized differences in cognitive styles among the sub-groups of Indians, Metis, Inuit and non-natives in the study.

In addition to exploring the influences on cognitive styles of uniqueness of cultural backgrounds, the study investigated the following more specific questions:

1. Were there significant differences between all native cultural groups together and the non-native cultural group on the criterion of cognitive style as identified in this study?

2. Were there significant differences in cognitive styles of monolingual and bilingual subjects?

3. Were there significant differences in cognitive styles of subjects with no university, or with up to six years of university education?

4. Were there significant differences in cognitive styles of male and female subjects and subjects of different age groups?

DELIMITATIONS OF THE STUDY

This study was exploratory in nature and, therefore, conclusions drawn from the findings were limited to those of a tentative nature.

1. The study was limited to a stratified sample of one hundred randomly selected protocols of young adults and adults who were resident in northern Canada and Alaska. Sixty percent of the total sample were members of the indigenous northern population (Treaty and Status Indian, twenty; Inuit, twenty; Metis, twenty). The remaining 40 percent identified themselves as members of non-native cultural groups.

2. Analysis conducted during the study focused on cognitive style as one facet of the total thinking process. However, the study did not examine specific operations such as memory and recall, shape and space orientation, conservation, classification and IQ.

3. Extrapolations concerning the likelihood that certain cognitive styles would be associated with certain learning styles were limited to those associated with the theoretical model developed in the study.

4. Data were limited to not more than ten minutes of verbal response to five open-ended questions about education in northern areas.

LIMITATIONS OF THE STUDY

The conclusions drawn from the findings in this study were limited by the following factors:

1. *Sampling*. The 100 protocols analyzed in this study coupled with the non-random nature of the original group of subjects severely limited the statistical techniques which could be applied in the analysis. The protocols were chosen from a group representative of those segments of the native and non-native northern population most closely associated with education, i.e. students, teachers, and parents, and were selected by computer as a stratified random sample. This selection process and the sample size severely limited the generalizability of conclusions to the northern populations.

2. *Data source*. Data analyzed during this study were limited to verbalized responses to five opinion questions concerning higher education available to northern students. Four of the questions related specifically to post-secondary education while the fifth question dealt with the system of northern education at the elementary and secondary levels. The study did not examine non-verbal, pictorial, written or kinesthetic data, although verbalized responses were transcribed into written form for analysis. No intelligence nor problem solving tests were administered.

3. *Analytical procedures*. The major analytical technique employed in this study was that of content analysis at the inferential level. The choice of this procedure limited the strength of the findings and conclusions to the ability of the researcher to formulate the appropriate questions, to be knowledgeable about the area of study, to be skilled in the use of the analytical instrument, to attain reliability among data coders, and to obtain appropriate methods for testing the

hypotheses.

4. *Statistical procedures*. The statistical procedures selected for the study were the one-way analysis of variance technique and step-wise discriminant analysis.

Assumptions of the Study

Basic to developing the rationale, design and procedure of the present study, the following assumptions were accepted:

1. It was possible to identify and describe some aspects of the cognitive style of a speaker from the analysis of a selection of what the speaker had said about a topic.

2. The investigative technique of content analysis had been sufficiently tested and validated in research projects of a similar nature to be considered valid for use in this study.

3. The sample used in this study was deemed to be of the quantity and quality required to draw at least tentative conclusions concerning cognitive styles characteristic of the native and non-native subjects being investigated.

4. The quantity of data collected from each interview respondent, an average of five and not more than ten minutes, was considered sufficient to identify the cognitive style of the speaker.

5. It was possible, from the findings concerning cognitive styles, to postulate some conclusions concerning the preferred learning styles of subjects in this study.

6. This study was oriented towards inter-cultural education which is founded in an inter-disciplinary approach to learning and teaching. It was considered essential, therefore, that this study be approached from

an inter-disciplinary focus, drawing knowledge from a variety of research fields without being confined to any one particular orientation.

7. It was assumed that research thus far has been unable to define clearly and precisely the total process of thinking in any culture, and cognitive style has been described as consisting of various attributes. In this study, cognitive style was assumed to be made up of a set of aspects of reasoning and cognitive strategies.

HYPOTHESES

This study tested the following null hypotheses:

Hypothesis 1. *There will be no statistically significant differences found in the cognitive styles identified as being predominantly used by each of the four sub-groups in this study: Indian, Metis, Inuit, non-native.*

Hypothesis 2. *There will be no statistically significant differences found in the cognitive style identified and associated predominantly with the total indigenous group (Indian, Metis, Inuit) as compared to the non-native group.*

Hypothesis 3. *There will be no statistically significant differences found in the cognitive style identified as being associated with monolingual or bilingual groups of protocols in the study.*

Hypothesis 4. *There will be no statistically significant differences found among cognitive styles of respondents identified with four different levels of post-secondary education.*

Hypothesis 5. *There will be no statistically significant differences found between the cognitive style identified for males and females.*

Hypothesis 6. *There will be no statistically significant differ-*

ences *found among cognitive styles identified as being associated with four different age groups of respondents.*

DEFINITIONS OF TERMS

For the purposes of the present study it was considered necessary to define a number of frequently used terms.

Cultural group in this study referred to a group comprised of Indian, Metis and Inuit people which was labelled a *native* cultural group. A group made up of Caucasians, Orientals and Negroes and others was labelled a *non-native* cultural group.

Cognitive style was used in this study to describe the organization of conscious and unconscious acts engaged in by an individual who perceived a message and then responded to it in some verbal or non-verbal fashion. Ways of thinking, thinking style and thinking processes are terms which were used inter-changeably with cognitive style in this study.

Content analysis is a research procedure used to infer meaning, intent and process from oral, written or pictorial communication. This analysis procedure was used in the present study to investigate and describe facets of cognitive style which were characteristic of respondents grouped according to five demographic variables.

Data Analysis of Cognitive Style (DACS) Scale was the analytical instrument developed to analyze the data in this study. It consisted of twenty-four categories of aspects of reasoning and twenty categories of cognitive strategies. The scale was used to conduct content analysis procedures on data from one hundred respondents.

Idio-logic[a] referred to the cognitive style defined as characteristic of
each group in the study. It consisted of the 'aspects of reasoning'
and 'cognitive strategies' found to be typical of the group according
to the DACS scale measurement and analysis.

Contra-logic[b] referred to the world view or philosophy of life of an
individual or group in this study which made possible and arose from
the idio-logic identified as characteristic of that person or group.

Psycho-logic[c] referred to the intellectual personality attributes of an
individual or group in this study which was identified with a particular
idio-logic and contra-logic.

Peda-logic[d] referred to the particular teaching-learning style which best
fit the idio-logic, contra-logic and psycho-logic of an individual or
group so as to have positive and incremental learning effects.

Analytical was used in this study to describe cognitive behaviors which
tended to be objective, linearly organized, abstract, field-independent,
structurally complex, generalized and of a factual nature.

Relational, as used in this study, referred to those cognitive behaviors
which tended to be subjective, holistic, oriented in social relation-
ships and values, specific, field-dependent, simply stated and related
to experience.

Conflict-analytical was identified in this study as a cognitive style
characterized by a tendency towards objective, analytical reasoning
and speaking behaviors. Since the behaviors were not consistently
analytical the cognitive style was categorized as *conflict*-analytical.

Note: The definitions noted a, b, c and d were taken largely from the
work of Dr. E. Schneidman (1966).

Conflict-relational was a term used in this study to denote a cognitive

   style whereby relational reasoning and speaking behaviors were

   predominant. Inconsistency was found in the use of relational

   behaviors (some evidence of analytical behaviors). This style, there-

   fore, was labelled conflict-relational.

Moral-relational was a term used in this study to denote a cognitive style

   having a strong reasoning base in moral considerations and values. It

   tended to be field-dependent, holistic and more relational than

   analytical.

Inexact-analytical was a cognitive style identified in this study as

   having a basic orientation in analytical reasoning processes. The

   expression of conclusions in complex structure tended to obscure

   meaning.

Inexact-relational was a cognitive style identified in this study which

   was characterized by a global, people-oriented approach to situations.

   There appeared to be an uncertainty with this approach and an inexact-

   ness in the message being verbalized.

SIGNIFICANCE OF THE STUDY

The title of John Holt's book, *How Children Fail*, is indicative
of the challenge most frequently offered to educators in recent years:
Why are thousands of children in every corner of North America known as
under-achievers, slow-learners, behavior problems and drop-outs? An
impatient public and a concerned group of educators have espoused literally
hundreds of potential solutions from open classrooms to teaching machines,
from alternate schools to "back to the basics." The efforts continue to
find the key that will make education useful, interesting and within the
grasp of its students.

Those students who cannot cope and therefore do not succeed are steered into a variety of programs in "special education" where each non-achiever is diagnosed as having a particular set of problems requiring a specific type of solution.

The question under investigation in the present study suggests that for many under-achievers it is not the case of a child having learning problems but rather a situation where a learning style is in conflict with a teaching style. The resulting frustration for teacher and learner is often mis-diagnosed and an incorrect treatment prescribed, i.e., special education approaches for a child whose only "problem" is that his learning style is out of step with the teaching style which is offered.

A growing number of researchers (Bruner, 1956; Cohen, 1977; Kagan, 1965; Pask and Scott, 1971; Witkin, 1962) has suggested that the way in which people think (cognitive style) is crucial to the way in which people learn and, therefore, to the way in which people are taught. It is recognized that cognitive styles and teaching styles have areas of relatedness but are not interchangeable. This study was a first step in seeking a closer match between learning and teaching styles. It is significant for three major reasons:

1. It explores the possible existence of group differences in cognitive style.

2. It suggests ways in which teaching styles can be adapted to match more closely with cognitive and learning styles.

3. It explores cognitive styles in a cross-cultural situation (native and non-native cultural groups) within Canadian context.

It is judged to be of particular importance to study cognitive and learning styles of Indian, Metis and Inuit students in the environment

of changing conditions of the 1970s and 1980s. No other cultural group registers as high a school drop-out rate as is true of the native populations. No other cultural group is in as strong a position to design a truly different approach to education (National Indian Brotherhood, 1972).

An education program organized by Indian people for their own children has the potential to become a model in which teaching style matches learning style, at least in a group sense if not totally on an individual basis. It is the hope of this researcher that the present study will encourage further exploration of the feasibility of matching teaching and learning styles so that native children can learn the skills they require in ways that are compatible with their ways of thinking.

Chapter 2

BACKGROUND TO THE STUDY

A review of the literature supported a contention of this study
that the processes and styles by which human beings think have yet to be
explained fully in a rational, scientific manner. The question "how does
man think?" has intrigued scholars since the time of Pythagorus (500 BC)
and knowledge concerning the question has increased because of the work of
anthropologists, linguists, philosophers, psychologists, sociologists and
educators. The past century has seen the emergence of various "schools
of thought" within specific disciplines each of which has sought to explain
the processes of human thought. At times theories have conflicted with
each other but threads of common findings had begun to coalesce into a
sharing of knowledge and research approaches by the decade of the 1970s.
It was against this multi-disciplinary background of research findings that
the theoretical framework was developed for the present cross-cultural
study.

This chapter reports major chronological developments in the study
of cognitive processes within specific disciplines and the results of
inter-disciplinary research. Research support for the theoretical rationale
of the present study is reported.

RESEARCH LITERATURE

Anthropological Research into
Thought Processes

Anthropologists study the physical, mental, emotional and
spiritual aspects of human beings. To describe the totality in which

14

man was perceived to exist, anthropological writers of the late 19th and early 20th centuries came to use the word "culture." They elaborated on the term's original meaning: "a particular stage of advancement in civilization; the characteristic features of such a stage; behavior typical of a group or class" (Webster, 1967, p. 202). Anthropologically the term "culture" has come to have several hundred definitions which attempt to include the total environment within which man exists: his evolution, physical attributes, technology, values, customs, mores, language, belief system and mental functioning.

Within the sphere of anthropological studies, the search for theoretical explanations of the process of human thought has occupied a central space since the late 19th century. Herbert Spencer, E. B. Tylor and L. H. Morgan, who have been described in the literature as the founders of Western anthropological theory, maintained that human beings continued to evolve from the "primitive" to the civilized. These postulations won wide acceptance in the late 19th century since they were supported by, and congruent with, the evolutionary theories of Darwin and Huxley. Researchers hypothesized that if human beings had evolved physically, then it was logical to conclude that they also had evolved mentally. The rapidly industrializing world of Western Europe and its transplanted North American colonies were considered to epitomize a civilized culture to which all other cultural groups aspired from their more "primitive" positions along the evolutionary ladder. Members of primitive cultures were described as capable only of being able to think in concrete, childlike ways based on mysticism and superstition. Because of their higher stage of evolution, members of civilized cultures were deemed to be more capable of the reasoned scientific logic which had produced the industrial world (Cole,

Gay, Glick *et al.*, 1971).

Franz Boas (1911) offered the first serious challenge to the unproven theory that an evolutionary determinism controlled human mental processes. After extensive ethnographic investigation of North American Indian and Inuit cultural groups in which he documented evidence of behaviors indicative of complex thinking, Boas concluded that neither the theory of cultural evolution nor the equation of race and culture were valid explanations of cognitive processes. His research led him to suggest that while the capacity to think was a human universal, the mind existed within the life conditions of the individual and might have been strongly influenced by those conditions.

In addition to attacking the deterministic theories which sought to explain thought processes, Boas (1911) maintained that one could not describe thinking process only on the basis of the beliefs and customs of the cultural group. While he admitted to the existence of a strong relationship between cognitive functioning and life experiences, he challenged the assumption of a cause-effect relationship which had been suggested by French sociologist Levy-Bruhl (1910). Working from secondary sources (the writings of missionaries), Levy-Bruhl had concluded that the belief system of a cultural group was closely representative of the thinking processes of members of that group. He suggested that the belief systems of Europeans were largely intellectual and distinct from emotions, whereas, among all other cultural groups known of at that time, "the primivity [sic] of material and religious culture is sufficient evidence to prove the existence of primitive mental processes" (Cole, Gay, Glick *et al.*, 1971, p. 6). Levy-Bruhl later coined the term pre-logical to define the rules by which basic ideas were combined by primitive peoples.

The writings of Levy-Bruhl brought rapid criticism from anthropologists of his time and of the present. In a 1962 paper, Herskovitz argued that logic was not only that which was defined in Western thought.

> What the comparative study of culture, based on first-hand contact with many peoples, has taught, is that all people think in terms of certain premises that are taken for granted. Granted the premises, the logic is inescapable. (Herskovitz, 1962, p. 361)

Five years later Horton (1967) offered further arguments in refutation of Levy-Bruhl's assertion of pre-logical thinking as a valid descriptor of cognitive process among technologically undeveloped people. Horton's basic premise was that all people developed theories in an effort to understand their world. In comparative studies Horton found that there were basic similarities underlying traditional African belief systems and those within Western cultures. He contended that where differences did exist, they were strongly related to whether a belief system was "open" or "closed." He defined an "open" system as one in which there was a greater level of awareness of the existence of alternatives to the established body of beliefs. He saw Western belief systems as fitting this description while those of non-Western cultures were more "closed"; that is, more accepting of established beliefs and less aware of alternatives. Horton suggested, therefore, that Western researchers observing a "closed" belief system could be led to formulate erroneous conclusions based on misinterpreted phenomena and premises coming from within the observer's own belief system. The explanatory theories then could easily be misinterpreted.

Challenges to the theories of Levy-Bruhl and of the evolutionists had come even earlier from French anthropologist Paul Radin. His research in 1927 had led him to conclude that all human beings were capable of, and were engaged in, abstract intellectual ponderings and searchings. Summarizing his research into the thought of "primitive man," Radin

asserted that "what differentiates us from him is the written word and the technique of thinking elaborated on its basis" (Radin, 1927, p. 387). In other words, Radin saw literacy as an important component influencing cognitive style.

The structuralist point of view was espoused by Claude Lévi-Strauss (1966) as an explanation of cognitive processes among different cultural groups. He maintained that primitive people were no more mystical than modern man in their approach to reality. The difference Lévi-Strauss claimed lay between a logic constructed out of observation of concrete objects, and a logic which derived from abstract entities (Leach, 1970). The cognitive strategies an individual used and the system by which he classified objects and events may have differed among people of different cultures, but the underlying structure of thinking remained the same. Lévi-Strauss stressed the importance of language in relation to thinking processes explaining that after events and objects of the environment had been classified, they had to be represented by the symbols of language before they could be thought about. Leach (1970) elaborated on the Lévi-Strauss conclusions about language.

> Thus considered the operation of 'thinking about' consists of
> the manipulation of reduced models of ideas which started out in
> the first place as words, which symbolize 'events' and 'things'
> in the environment external to the thinker. (Leach, 1970, p. 114)

Lévi-Strauss suggested that among "primitive" people the development of totemic categories and food preparation categories may have been synonymous with modern man's invention of computer programs as models from which one could 'think about' and symbolize things in the environment. Leach (1970) attempted to sum-up what Lévi-Strauss saw as the key to understanding thought processes when he stated that all the knowledge an individual learned about the external world came to him via structured

messages received through the senses. He continued,

> But since we are aware of a single total experience—not a sound
> world plus a sight world plus a smell world—it must be because the
> coding of the various sensory signal systems can be made consistent—
> so that hearing and sight and smell all seem to be giving the same
> signal. The problem then is simply to devise a means of breaking the
> code. (Leach, 1970, pp. 93-94)

In 1959, Dorothy Lee put forward the thesis that members of differ-

ent cultural groups employed different classification systems to codify

reality. Lee theorized that,

> A member of a given society not only codifies reality through
> the use of specific language and other patterned behavior charac-
> teristic of his culture, but that he actually grasps reality only
> as it is presented to him in this code. (Lee, 1959, p. 105)

She further contended that there was an absolute reality, but specific

codes of categorizing may have enhanced or excluded certain aspects of

that reality. Lee concentrated on the study of linguistic formulation,

but also suggested that a researcher could come to understand how members

of a culture perceived reality if he were to study in detail any aspect

of that culture. One major thrust of Lee's work was concerned with the

extent to which reality was classified into lineal or non-lineal forms.

Events may have been perceived to develop lineally (along straight lines

with a beginning and an end) or non-lineally (in an holistic interaction

with the environment). The widely accepted Western postulate of lineality

may exist in different ways or indeed may not exist at all in another

culture but Lee cautioned that "we should be very careful in studying

other cultures, to avoid making the assumption that members of another

culture base their actions on the prediction of a lineal reality" (Lee,

1970, p. 120).

Anthropological theories which have attempted to explain cognitive

differences have changed dramatically since the beginning of the present

century. Evolutionary determinism suggested that human beings were capable of either "primitive" (simple) or complex thought and the evolutionary level of the culture towards being "civilized" determined the type of thinking which would be possible among group members (Levy-Bruhl, 1910). The school of cultural relations (Boas, 1914) theorized that all people were equally capable of complex thought but that the level attained within any group was related to and influenced by the culture and the requirements it imposed upon its members. More recent research (Lévi-Strauss, 1966) supported the theories of structuralism to explain cognitive differences. All people were seen by the structuralists as being equally capable of complex thought but the differences arose in the logic which had been developed as meaningful within the culture. Differing classification systems were seen to relate to differences in cognitive styles.

Language and Cognitive Style

The very act of writing a research report concerning the processes of cognitive functioning made it mandatory to examine the literature dealing with the relationship of language to cognition (without language one could not write about thinking). The relationship between language and thought has challenged researchers from every field of the social sciences, and indeed has led to new disciplines of study, such as those of psycho-linguistics and ethno-linguistics. Neither field could have developed without strong bases in linguistics, psychology and anthropology.

The discipline of linguistics was a relatively well developed field of study by 1879, but the linking of psychology and linguistics which eventually became known as psycho-linguistics took nearly a century to develop. The British empiricist school of linguistic psychology in the

early 19th century (James Mill and John Stewart Mill) contended that it was necessary to study language in order to understand thought processes. These writers espoused the proposition that simple ideas and perceptions were combined to form more complex thought, which process may have been reflected by the combination of words into the syntactical constructions that made up discourse. A somewhat later school of psychology known as the British associationists in the latter 1800s studied the idea that mental processes could be explained by the association of ideas (Markel, 1969). Research started in Germany by Wilhelm Wundt at the turn of the century focused sharply on the psychology of language—sentence construction, compound words and speech perception (Markel, 1969). Some aspects of Wundt's work had only slight impact in North America but his students expounded his ideas into what became known as "'structuralism' by which it was hoped to analyze the contents of the mind by precise and carefully controlled introspective methods" (Markel, 1969, p. 17).

Boas (1911) as an anthropologist had opted for a cross-disciplinary approach to the study of thought processes because of what he saw as the psychological processes involved in language. His influence was later over-ridden by Bloomfield (1933) who is credited with influencing linguists to steer away from studying the psychological interpretation of language and to concentrate on studying structure. This trend was largely maintained by scholars of the field of linguistics until the 1960s. Linguistic research in North America for nearly thirty years, therefore, had been focused primarily on analysis of the structural units of the linguistic code (phonemes and morphemes) rather than on the semantical implications of language as a key to personality and cognitive processes.

While Western scholars waged a campaign either for or against the

cross-discipline approach suggested by Boas, the Russian psychologist
Vygotsky published what is still considered to be one of the most important
works on the relationship of language to thought processes. Written in
Russian in 1934, Vygotsky's work was not translated into English until
1962. From his research Vygotsky concluded that language has two functions:
that of external communication with one's human fellows; and that of internal
manipulation of one's inner thoughts. He contended that the external and
internal systems used the same code and, therefore, messages could be
translated from one to the other with at least partial accuracy. In other
words, what a person said (external communication) would be at least
partially representative of the process of cognition (internal system).

After analyzing Vygotsky's findings, Greene (1975) summed up
possible relationships between language and thought.

1. Language is necessary for and precedes thought, or
2. Thought precedes language and is necessary for its
development, or
3. Language and thought have independent roots. (Greene,
1975, p. 60)

The ideas of Sapir (1921) and Whorf (1941, 1956) were related to
those of Vygotsky but were more deterministic in nature. These researchers
developed what came to be known as the theory of linguistic relativity
whereby, according to Whorf,

It was found that the background linguistic system (in other
words the grammar) of each language is not merely a reproducing
instrument for voicing ideas but rather is itself the shaper of
ideas, the program and guide for the individual's mental activity,
for his analysis of impressions, for his synthesis of his mental
stock and trade. (Whorf, 1956, p. 212)

Whorf conducted his major research among North American Indians,
particularly the Hopi. Based on his findings, he asserted that in
particular domains American Indian languages may well be superior to
European languages. Their capacity to be precise and elaborated, and

to systematically organize ideas was seen as superior.

Whorf's conclusions gave rise to a question that continues to beg answers: Do different people actually perceive things differently or do they simply speak about them differently? Whorf maintained that speakers of languages other than English held to a different world view because of the way in which semantic relations were expressed in their languages. Structural and grammatical differences in language undoubtedly amplified the difficulty of learning 'a second language,' but as other researchers queried, could one conclude from these differences that speakers of different languages therefore operated within different cognitive processes?

Evidence against the Whorfian hypothesis of linguistic relativity has suggested that where basic perceptions were concerned, all people, in spite of speaking different languages, could and did see the world in similar ways, for it was possible to translate with reasonable accuracy from one language to another (Cole and Scribner, 1974). However, within the realms of classification and categorization, differences may have been great, i.e., kinship terms and their impact on social interaction and what was seen as acceptable behavior may have differed greatly in different language and cultural groups. When the terminology for these categories was passed on to succeeding generations through the language, the linguistic codes may have had a strong impact on the cognitive functioning of individual group members (Whorf, 1956).

Whorf's theorizing about the influence of language on perception and cognition echoed earlier speculations made by Edward Sapir with whom Whorf had studied. Sapir (1921) had written:

> . . . We see, hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation. (Sapir in Whorf, 1956)

The 1960s and 1970s saw the development of the disciplines of ethnolinguistics and psycholinguistics with methodologies built on the emphasis Sapir and Whorf had given to the semantical implications of language rather than simply on the analysis of the structural units (phonemes and morphemes). Of recent importance were studies of para-language phenomena (tone of voice, inflection, innuendo). In the opinion of Markel (1969), research has really only begun into this important key to understanding the relationship of language to thought.

> We have only the beginnings of research, cross-cultural and otherwise, devoted to demonstrating the nature and extent of the difference that language makes. (Markel, 1969, p. 293)

Markel summed up his assessment of the state of research into the implications of language for cognition by concluding that "there does not exist an experimentally precise and complete demonstration that differences of language are a major factor in differences in behavior and personality" (p. 299). However, he strongly asserted that on the basis of both theoretical and research considerations, there was little doubt that differences in language did relate to differences in culture and personality, but "there is also little or no satisfactory knowledge of the nature of the relationship" (Markel, 1969, p. 307).

From his own research, Markel defined thought as the way in which an individual dealt with information which came to him perceptually or linguistically. Responses to one bit of information may have been simple and direct, or when many bits of information were to be considered simultaneously, the response may have been more complex. In each situation thought was seen as being necessary but may have differed in its complexity. Markel explained:

> That language is one of the chief modes of thought and that speech is one of its possible outcomes . . . the automaticity

and multifariousness of linguistic responses, once these responses
have been learned makes it impossible to conceive that language
does not constantly intrude on what we have described as thought.
(Markel, 1969, p. 34)

Markel concluded that linguistic responses were learned and the
conditions for learning accounted for the meanings the individual attached
to the response. Experiences, therefore, were seen to influence both the
connotative and denotative meanings of verbal responses, but within a given
speech community there would have been mutually understood similarity to
the meanings of responses. This enabled language to fulfill its role
which was, as Markel defined it, "an arbitrary system of vocal symbols by
which human beings, as members of a social group and participants in a
given culture, interact and communicate" (Markel, 1969, p. 83).

According to Harmon (1974), the generative or Cartesian school
of linguists of the late 1800s had maintained that some underlying
universals existed in human thinking that made it possible to construct
deep structure transformations that were required to make Aristotelian
logic applicable. A century later, with the 1957 publication of Noam
Chomsky's first work, the basic framework of the structural linguistics
of Bloomfield was threatened and the Chomskian revolution was under way.
Chomsky's aim was to study the syntax or the general grammatical rules
underlying a language "to explain all of the linguistic relationships
between the sound system and the meaning of the language" (Harmon, 1974,
p. 8). He and his disciples argued that in cases where ambiguity in
meaning could not be explained by grammatical structure rules alone, the
grammar required transformational rules by which elements could be moved
around, added or deleted. He further suggested that the syntax of a
language contained two additional components: a base component and a
transformational component. The base component determined the deep

structure of the language and the transformational component the surface structure.

From the point of view of the philosophical study of the relation of language to thought processes, it is of importance to note that by the 1960s linguistic theorizing had gone full circle. According to Harmon (1974), the most spectacular conclusion about the nature of the human mind that Chomsky had derived from his work in linguistics was to vindicate the claims of the seventeenth century rationalist philosophers, Descartes, Leibniz and others, that there were innate ideas in the mind which determined to a great extent the thought processes of which the mind was capable. Cole and Scribner (1974) summarized the 1970s linguistic knowledge by stating:

> Modern linguists tend to stress the importance of structural features of language that are shared by all languages. They point out, for example, that all languages are composed of organized sequences such as sentences; all have rules for generating acceptable sentences; all have expandable lexicons. These assertions combine to form a point of view that de-emphasizes cognitive differences among different linguistic (cultural) groups. (Cole and Scribner, 1974, p. 27)

Cole and Scribner (1974) concluded, however, that because languages are cultural in nature, the researcher's ability to describe the language structure in isolation from the cultural and psychological environment of a group or individual still could not by itself describe the process of cognition. The growth during the 1970s of such cross-disciplinary fields of study as ethnolinguistics and psycholinguistics lent support to the conclusion that researchers have begun to share expertise and findings in efforts to solve the puzzle of how human beings think. The argument about whether it is only structural or only semantical would appear to have given way to a position which admits the importance of both as components of language which exist and must be examined simultaneously.

Philosophy and Thinking Processes

The idea that language exists in relation to thought goes back in Western philosophical writings at least to the time of Plato who suggested in his Dialogue Cratylus that some linguistic expressions appeared to relate more naturally than others to their meanings in either a phonetical or an etymological way. Writing in the Sophist, Plato noted that language was an expression of the mind's conversation with itself and as such may have been either true or false (Alexander, 1967). Alexander stated that Aristotle too spoke of linguistic analyses and claimed to have discovered basic categories in language within which the mind worked. However, he regarded various forms of expression in different languages as nothing more than conventional differences which did not in themselves exert any great influence on the process of thinking.

The puzzle of language and its relation to thought has been investigated by every generation of scholars since the time of the Greek philosophers (Alexander, 1967), but it was not until the 20th century that language came under rigorous research scrutiny. Sir Francis Bacon (1561-1625) was concerned that too "common" a way of speaking might lead a man away from true understanding. The misuse of language was a concern expressed by John Locke (1632-1704) who wondered "how we can protect ourselves against these misuses" (Alexander, 1967, p. 5).

It was in the 19th and early 20th centuries that the interest of philosophers focused most earnestly on the study of language. Pioneer researchers of this period included Charles S. Pierce (1839-1914) who analyzed varieties of signs and symbols, and Ernst Cassirer (1874-1945) who studied man's ability to symbolize, with language being the primary human symbol (Alexander, 1967).

Since the beginning of the present century, several schools of philosophical thought have dealt with language and its place in relation to thought and knowledge. The theory expounded by the logical positivists, including Russell (1872-1969) and Whitehead (1861-1947), suggested that an ideal logical language could be developed that would lead to a more precise knowledge than was possible through ordinary language. The Oxford school group of philosophers studied ordinary language for the insights it offered into the way in which man understood reality. A third direction which became known as continental philosophy theorized that language gave man a way to directly express concrete experience. As the Existentialists came to interpret it, language was a creative force which could lead man into a sense of being (Alexander, 1967).

Alexander (1967) himself studied language from two major foci: the epistemic factors of perception, structure, sense and experience; and the semantic factors of man's symbol system. In his definition of language, Alexander included the spoken word as well as sign language and written forms. He classified symbol systems such as music as metaphorical extensions of language. Alexander (1967) classified languages as analytic (made up of freely separated "unbound" units) or as synthetic or poly-synthetic (made up of tightly "bound" units). He used Chinese as an example of an analytic language where its components could stand alone or in other combinations without changing meaning. The Algonkian language was described as polysynthetic in that its parts were tightly bound together and could not be separated without changing meaning. Alexander placed English and other European languages somewhere between these two examples, for although its words were separate units, a change in their ordering usually involved a change in meaning.

Conceptual thought depended on an "awareness and analysis of rela-
tionships" (Alexander, 1967, p. 48) and was expressed through a developed
system of symbols—a language:

> Certainly the language we learn as a mother tongue gives us the
> patterns that we are accustomed to use whenever we express our
> thoughts; and these patterns undoubtedly tend to focus and channel
> the thoughts themselves along the lines already established in the
> language. (Alexander, 1967, p. 48)

Language provided a set of words and phrases, and a structure or
syntax in which to organize expression of thoughts. In other words, it
was the vehicle through which thoughts could be expressed. Western logic
as it had developed had come to mean the analysis and testing of patterns
of reasoning. Reasoning involves an awareness of structures and the ability
to draw out and state the implications in the patterns, according to
Alexander.

Among philosophers as among others, the argument and search con-
tinues for the key to describing the process of thinking and, with it, the
process of learning. As in anthropology and linguistics, the importance
of language has loomed large but exactly how or where it fits into the
equation has remained in dispute. Much of value has been written about
cognitive processes by the scholars who "think about thinking." Reasoning,
logic, symbols, and expression of thought have been known to relate but
the nature of the relationship has not been defined.

Psychological Theories of Cognition

Study of cognitive processes and their relation to personality and
other psychological aspects of the human being have occupied the attention
of those psychologists belonging to the groups known as the Associationists,
later the Structuralists and, later still, the Functionalists (Markel,
1969). The associationist's school was concerned with an explanation of

mental processes by association of ideas. The structuralists, on the other hand, hoped "to analyze the content of the mind by precise and carefully controlled introspective methods" (Markel, 1969, p. 17). In reaction to the structuralism theories, functionalism emphasized the dynamic relationships between behavior and mental processes and was the basis for the school of behaviorism which went most deeply into the study of cognitive functioning.

The behaviorists tended to steer away from the study of language and of the mind *per se* because of the difficulty of observing and measuring the phenomena in an experimental situation. Such men as Hull (1934), Skinner (1938) and Watson (1919) aimed at finding objective ways of measuring the content and processes of the mind. Skinner introduced the concept of operant behavior and instrumental learning whereby behavior was reinforced by conditioning. The mind was seen to be an empty Black Box with input (stimulus) and output (response) mechanisms. The school of Skinnerian psychology theorized that it was essential only to observe, measure, describe and then modify overt behavior of an individual in order to change and encourage further development of that person's cognitive skills on selected dimensions. The behavior was the important component and the only one on which teaching could focus. Changes in cognitive style would result from changes in behavior, according to this theory (Greene, 1975).

Behaviorist researchers constantly found their theories confounded by the intrusion of unmeasurable internal acts, and by the 1970s the state of behaviorist theory was described by Greene (1975):

> All that is left of the original insistence on sticking to observable data is that any predictions based on the hypothesized internal mechanisms must themselves be testable against observable Ss and Rs—including people's verbal reports. (Greene, 1975, p. 29)

The importance of imagination as fundamental to the thinking process was suggested by Langer (1951) as a challenge to behaviorist theory when she described the mind as living simultaneously in the world of the imagination through religion, art and science and also in the practical world of perception and action. Langer's conclusion about the importance of imagination was echoed by educational philosopher Marc Belth (1977) who said of the thinking process:

> That process, being in essence creative, derives primarily from those human powers we call imagination: the capacity to analogize, to create imagery of worlds yet to be fashioned. (Belth, 1977, p. xii)

He defined the thinking process itself as:

> The act of following out, and examining at the same time, a path, pattern, mapping, form or formula until what has been called for in that map, path, pattern, form, or formula has been concluded and the whole of it has been considered for its inner and outer consistencies and its warrantable circumstances. (Belth, 1977, p. xvii)

He went on to explain that in the act of thinking, the human mind followed a process entailed in a model, analogy or metaphor that had been developed to fit events within experience. To some extent this was similar to a physical act, but thought did not necessarily produce observable behavior as was the case with a physical act. Sometimes behavioral action was unnecessary as when the learned forms satisfied the situation and sometimes action was impossible when the solution had not been reached. It was, according to Belth, only when we built the forms as the act went on that we were thinking.

Belth (1977) also discussed the difficulty faced by those who would "teach people how to think." He suggested that many impediments exist: sociological, biological and psychological. He pleaded for a different approach to teaching people how to think. If thinking was to

be creative, imaginative and reflective, how could it at the same time be logical, analytical and fitted into grammatical outlines where pieces must fit together in a totally structured way?

Belth saw thinking as the process of analogizing which in itself could be examined, tested, checked, modified, improved and learned. Thought was communicated in the form of concepts which had been systematically organized and given material form as written symbols or spoken words. Drawings, paintings, music, dance, gesture and facial expressions also expressed thought. Because these things communicated thought, Belth maintained that it was possible to study the processes of thinking by observing the model, the structure and the function of the analogy as it was communicated. He asserted:

> It is, in part, the examination of the logical structure of the sentences spoken or written, and the testing of the relationships between symbols and matter symbolized. (Belth, 1977, p. 25)

In common with research in anthropology and linguistics as discussed in this chapter, psychological research in recent years has tended towards a cross-discipline approach to the study of thought processes, particularly where culture was seen as an important variable. Psychologists have found that the experimental approach without consideration of the language and culture of the subjects under study added little new knowledge to defining the thinking process of people of diverse backgrounds. Such researchers as Bruner, Berry, Cole, Hudson, Piaget, Vygotsky, Witkin and others have focused their work on the individual within the cultural and psychological environment and have found complex interconnections among all facets of the thinking person.

Cognitive Style in Sociological Perspective

Sociology has described cognition as inclusive of perception,

learning, thinking and belief. Perception has been seen as being influenced by at least four external and internal factors: (1) neurological state, (2) psychological need, (3) incentive, and (4) environment. According to Lewin's (1956) field theory, an individual perceived and interpreted events in light of these four factors, and so they indirectly influenced the conclusions he made. This orientation towards the study of complex phenomena has evolved far from the controversial stance of French sociologist Levy-Bruhl during the early years of the century. He accepted the 'social collectivity' as the major determiner of the characteristics and behavior of the individual and postulated that the key to mental functioning rested in a set of general beliefs of the culture to which the individual belonged. Reaction to Levy-Bruhl's work was discussed in an earlier section of this chapter. Although his theories have been refuted, research may in fact owe Levy-Bruhl a debt of gratitude for having spurred others to study the important sociological aspects of the process of thinking.

In an essay on the sociology of knowledge, Merton (1957) set out a paradigm of knowledge based on sociological research. The paradigm emphasized the complexity, interrelatedness and interactiveness which are part of the acquisition of knowledge within a framework of social, environmental, psychological and cultural factors. In reference to knowledge acquisition in other cultures, Merton did not go beyond suggesting that the entire question was extremely complex and that the sociologists were beginning to question the suitability of their own research methods of the past. He concluded that:

> The sociology of knowledge is fast outgrowing a prior tendency to confuse provisional hypotheses with impeachable dogma; the plentitude of speculative insights which marked its early stages are now being subjected to increasingly rigorous tests. (Merton, 1957, p. 488)

The social psychology view of cognition as discussed by Sargent and Williamson (1966) argued that the way people communicated with the outside world was a major determinant of social behavior. Knowledge of the world came through perceptions which were strongly influenced by the language and thought structure of the particular culture to which a person belonged. Lewin (1935) had suggested that any situation, particularly a social one, was psychologically perceived as being different by each different individual. Sargent and Williamson went further and suggested that although things within a given situation had objective properties, this alone never fully determined an observer's perception. There was always an element of subjectivity related to personal experiences, language and cultural learning. Almost unconsciously, each person "sees the world as he wishes" and deals with it in a style that fits his frame of reference (Sargent and Williamson, 1966). When it came to learning new information, skills or attitudes, the way the world was perceived was of crucial importance. Perceptual style was seen as a part of cognition, learning and style of response, all of which were affected by the past and present social world of the individual.

Sociologists have studied cognitive processes in relation to physical, psychological and environmental factors. This was not the case for Levy-Bruhl (1910), one of the earliest of the sociologists to discuss cognitive functioning, but sociological research has evolved towards a greater understanding of the fact that cognition occurs within a complex environment. Perception, experience and communication have come to be seen by sociologists as important variables in relation to cognitive processes.

Emergence of Interdisciplinary Study of Cognition

As knowledge of cultural components expanded, it was inevitable that researchers would begin to postulate and describe the existence of relationships among kinship patterns, social organization, languages and cognitive functioning. Research over the past century has expanded knowledge of human thought far beyond the early idea of evolutionary determinism. Within the disciplines of anthropology, linguistics, psychology, philosophy and sociology theory has grown from adherence to biological and genetic theories as determinants of thought processes; to stringently controlled cause and effect experiments; to current practices of combining methodologies and theories to examine all facets of the complex phenomena. Information has been accumulated which explains, at least partially, such components of cognition as memory, classification systems, creativity, and approaches to perception.

In the search for answers to elusive questions numerous theoretical schools of thought prevailed during the late 19th and early 20th centuries. However, as knowledge accumulated and as measuring instruments and research techniques came under more stringent scrutiny, the need became more evident to approach the study of thought processes from a cross-disciplinary orientation.

Within the last decade the social scientists who have studied facets of human behavior across cultures have come to be known as cross-cultural researchers. This group has urged a sharing of knowledge and techniques across disciplines (Berry, 1974; Brislin, 1975; Price-Williams, 1974; and others). Research of the 1970s had gone far towards a cross-discipline approach to the study of human thought. Cole and Scribner (1974) suggested that even more integration of theory and practice is required.

It implies that the truly challenging questions about human thought and its development will only yield to enquiry when investigators bring to bear on them all the tools that the separate sciences have developed for studying man-in-his-culture. (Cole and Scribner, 1974, p. 200)

The present study investigated cognitive style from a cross-disciplinary approach drawing its rationale and methodology from a composite of sources.

Cognitive Style and Culture

Numerous studies have examined facets of cognition in a cross-cultural setting (Piaget, 1923; Bruner, 1966; Berry, 1976; Witkin, 1977). For many years cross-cultural researchers dealt with quantitative questions, i.e., what factors in the culture accounted for the fact that children of non-Western cultural groups appeared to follow Piaget's developmental sequence more slowly than was to be expected of the "normal" child. Such works were largely responsible for the "deficit theories" which in turn produced a plethora of compensatory programs for the culturally disadvantaged. Bruner (1971) and Cole, Gay, Glick *et al.* (1971) argued strongly that teachers in particular must be freed of the assumption that differences equate with deficits.

Prior to studying cognition in cross-cultural perspectives, research over the years has been mainly devoted to observing and describing those behaviors thought to be indicators of thinking processes among people of the Western world. Francis Bacon (1561-1626) is considered the first "modern" philosopher of the Western world who "advocated an 'inductive' method of enquiry to be undertaken by observing and analyzing the observed data, then inferring hypotheses and verifying the hypotheses through further observation" (Nakamura, 1975, p. 480). By so doing, Bacon contended, the essential could be separated from the non-essential and the

underlying form or structure of the phenomena could be more easily observed.

Before the time of Bacon, the development of science promoted by mathematics and logic exerted a strong influence on patterns of thinking in the Western world. Euclidean mathematics inspired Western philosophers until Kant and, to some extent, to the present (Nakamura, 1975). Descartes (1596-1650) shares Bacon's reputation as the "father of modern philosophy." He wanted to develop a system of true propositions wherein nothing was pre-supposed which was not self-evident and indubitable. He supported intuition and deduction as the best routes to knowledge and accepted as truth only those things which he recognized as true. However, in an effort to discard those things which he doubted as true, Descartes rejected much of which society had previously accepted—i.e., perceptions reached through the senses. He admitted that not all truth could be arrived at by rational means alone but also could be derived from what had been experienced.

John Locke (1632-1704), considered the first of the British empiricists, claimed that all the ideas which men thought really originated in sense experience or were a reflection of sense experience. He contended that complex ideas were constructed in the mind from simple ideas which had objective references. Another empiricist, Bishop George Berkeley (1685-1753), stated that all significant words stood for ideas which may have come from without as sensations or from within as thoughts (Alexander, 1967).

From the findings of more recent research, it was useful to look briefly at one description of the cognitive style seen as typical of Western society. Gladwin (1964) characterized general aspects of the cognitive process in Western society by the statement:

> In our culture we value (and measure crudely with intelligence
> tests) relational or abstract thinking, in which bodies of knowledge

are integrated and related to each other through unifying symbolic constructs. (p. 111)

Western cultures were seen to look for a unifying concept that encompassed all the relevant facts almost at the same time, thereby developing an overall principle or game-plan from which a solution could be deduced. The overall plan was designed to take in all essential details. Once the plan had been decided upon, it was implemented one piece at a time "with little reference to the goal synthesized within it" (cf., Miller, Galanter and Pribram, 1960). The thinking preceded the action. When unexpected phenomena occurred, the problem solver was required to change the plan in order to cope with something not originally planned for. The Western thinker could at any point in the problem solving process give a logical explanation of what he was doing. Gladwin assessed this attribute in Western culture as:

This ability to conceptualize and verbalize a plan is, often implicitly, assumed to be an essential attribute of "intelligent" behavior as we understand it in our culture. (Gladwin, 1964, p. 117)

Gladwin maintained that the Western culture person was likely to employ deductive reasoning strategies of problem solving as he moved from principles to details. Once the plan had been set and the necessary resources were made available, the carrying through of the actions could at times become almost mechanical.

Cross-cultural research has been based on two somewhat differing assumptions, the first asserting that in the area of intellectual skills all people essentially were similar but the skills were realized in different ways depending on cultural settings. A second assumption stated that no one cultural setting was superior to any other and, therefore, differences could not be equated with deficiencies.

Nakamura pointed out in a comparative study of ways of thinking

in India, China, Tibet and Japan compared to the Western world that,

> Western thought, from its first arrival in these lands, was
> theoretically rather well understood among the educated classes
> as part of their general education. And yet it did not govern
> completely the practical and concrete behavior of many of these
> people. (Nakamura, 1964, p. 1)

Ways of thinking were defined by Nakamura as "any individual's thinking in which the characteristic features of the thinking habits of the culture to which he belongs are revealed" (Nakamura, 1964, p. 5) and therefore different cultures may produce different ways of thinking. He used the phrase "system of thought" to refer to a coherent, well-organized system of beliefs and philosophy.

> In studying the ways of thinking of a people, we find one of the
> first clues in their language. Language is basic to the cultural
> life of a people; so basic that when a special language system comes
> into being, we may say that a people has come into being. (Nakamura,
> 1964, p. 5)

> Forms of linguistic expression become, in the inner consciousness
> of people, norms of psychologically ordering in a fixed pattern and
> carrying to conclusion the operations of thought. (Nakamura, 1964,
> p. 6)

The grammar and syntax of a language were indicators of the cognitive style of a people and may have aided and encouraged a particular style of thinking. Nakamura asserted that examining the system of logic, which meant skill in the use of words, was one of the best ways of studying the ways of thinking of a people. Differences in patterns of logic then became important indicators of differences in thinking as revealed in the structure of a language. Nakamura made the point that in most cultural groups those who have understood and applied the system of logic were the intellectual class. He went on to say, "In spite of the fact that the masses use language constantly every day, their use of logical forms of expression is almost non-existent" (p. 9). Therefore, although a study of the logic of a people was useful, it could not be said that the logic truly

regulated the ways of thinking of the majority of the members of that group.

Much more indicative of thinking style were the characteristic sayings, songs, mythology, proverbs and folklore and current expressions. Myths, religious scriptures, the art and music, and literature of Westerners were said to be "postulational" or logical in that they learned to understand things systematically and by orderly planning (Nakamura, 1964).

Differences in thinking in various nations were explained by numerous factors:

> Being left to live among a numerically greater and stronger people, a minority group naturally becomes accustomed to the new social and cultural environment and finally takes on the same traits and ways of thinking as the dominant majority. (Nakamura, 1964, p. 33)

It has been suggested that physical causes such as climate, weather, geology, soil and topography influenced the ways in which a people thought, but the idea failed to stand up as the decisive fact when historical development of nations was analyzed. Likewise, explanations which suggested that economic condition or materialistic condition determined thinking style failed to account for differences in cultural groups when those variables were controlled (Cole and Scribner, 1974).

Nakamura maintained that among cultural groups there were characteristic differences in ways of thinking and at the same time there was a certain logical and human connection among the differences. He summed up his speculations about ways of thinking by the hypothesis: "There is no such thing as a single fundamental principle which determines the characteristic ways of thinking of a people" (Nakamura, 1964, p. 37).

Research into facets of cognition where cultural background has been considered an important variable has developed only over the past twenty-five years. Cross-cultural researchers have strongly encouraged

a multi-disciplinary approach to the study of cognition. The nature of their findings has emphasized the necessity to study cognition within its cultural, social and environmental contexts before valid conclusions could be made.

Indigenous People in Cognition Research

Indigenous people in Canada and elsewhere have been the subjects of studies of cognitive skills more frequently than they have for any other aspect of human functioning according to Berry (1972). However, the research has focused primarily on perceptual and intellectual development and educational potential along the lines of the way in which these variables are defined and measured in Western society. Within a large number of studies, Inuit children were found to score relatively high on perceptual skills involving performance. Several similar studies among Indian and Metis children have also produced high scores on perceptual skills suggesting the existence of a "northern" cognitive style (Berry, 1972).

Numerous Piagetian and other cognitive tests have been administered over recent years to Inuit and Indian children. In most cases results indicated that native children perceived objects in their environment with great accuracy and as discrete individual entities. This capability invariably was interpreted to mean that although these children were able to perform intellectual tasks, they did so at a lower rate than the norms indicated (MacArthur, 1969).

Researchers soon realized that a person's observed intellectual ability depended on his opportunities to acquire intelligent behavior; on the amount of stimulating experience available to him in his environment; and on his reaction to the situation of being tested (Schubert, 1972).

Problems of testing procedure and interpretation were compounded by the fact that what was regarded as intelligent may have differed markedly from culture to culture (Schubert, 1972, p. 8). Emphasis in cross-cultural research into cognitive abilities shifted into a search to develop "culture-free," then "culture-fair," then "culture-reduced" and finally "culturally-appropriate" tests of intelligence (Cole, Gay, Glick *et al.*, 1971).

Difficulties of using knowledge gained about cognition in other cultures when "culturally-appropriate" instruments were used became evident when those findings were to be put into practise in teaching within established school systems. Cole, Gay and Glick (1971) found that Kpelle children measured higher than Western-culture children on intelligence tasks when tested with instruments and approaches appropriate to their culture. The fact remained, however, that the school system was based on Western theory of what constituted intelligence and how children learned, and in that setting the Kpelle children experienced difficulty. Kleinfeld (1970), MacArthur (1973), Michelson (1969) and others have found that Indian and Inuit tended to outscore non-native children on intellectual tasks which de-emphasized verbal abilities. However, within schools where the abilities to participate verbally were highly rewarded (Phillips, 1972), the non-verbal skills did not translate into school success.

The literature search revealed relatively few studies which investigated possible differences in cognitive styles. Witkin's (1962) extensive work in the area of field-dependence, field-independence with cultural groups in Africa revealed significant differences in the orientation of people of different cultural groups to problem solving situations. Weitz (1971) found in replicating Witkin's tests with Indian groups in

British Columbia that the more "traditional" the subject, the more likely

that person was to operate from a field-dependent orientation. Cohen, in

1969, found significant support for the hypothesis of the existence of

relational and analytical cognitive styles among children of different

economic and social backgrounds. In a 1974 study, Ramirez III and Castaneda

were able to identify significant cognitive style differences between

Spanish-American and Anglo-American children. In Canada recent studies

among the Ojibway people of Manitoulin Island (King, 1975; Mohatt, 1979)

found strong evidence that bilingual Ojibway children operated according

to a learning style which was outside of the norm of the non-native or

integrated classroom.

Cognitive Functioning and Education

Bruner (1971) defined the process by which a child gained

knowledge as:

> The child first learns the rudiments of achieving his intentions
> and reaching his goals. Enroute he acquires and stores information
> relevant to his purposes. In time there is a puzzling process by
> which such purposely organized knowledge is converted into a more
> generalized form so that it can be used for many ends. It then
> becomes "knowledge" in the most general sense—transcending func-
> tional fixedness and egocentric limitations. (Bruner, 1971, p. xii)

Within a complex society, no one individual can know all the

knowledge and skills which exist. With this realization, schools have

developed into systems where the learners are taught selective information

out of context rather than attempting to learn everything experientially.

According to Bruner, this may be the greatest difference between the way

of learning in the school setting and that utilized in more traditional

indigenous cultures. Learning in schools becomes an act in itself,

remote from the on-going action. The learner must follow the abstraction

of oral or written speech and the rewards for learning are remote and

distant. Research studies (Cole, Gay, Glick *et al.*, 1971) have found that children who learned in this situation developed different methods of perception, abstraction, time perspective, and cognitive style from those children who were "unschooled" in the formal institution.

Working from his theory that the principal task of the intellect was to construct models, Bruner (1971) suggested that a curriculum must contain a series of knowledge and skills which the learner must have mastered before he proceeded. Rewards for the learner were in feelings of satisfaction with increased competence. This idea presumed that one was a learner within a culture whose teachings could be transmitted to someone at any age.

The French psychologist Jean Piaget, more than any other recent scholar, has influenced the approach to teaching cognitive processes in Western education. It took nearly a half century for Piaget's findings of 1923 about children's learning to make their impact on North American classrooms but during the decades of the 60s and 70s Piagetian theory had finally "arrived" and in recent years has been taught to teachers who in turn have implemented it with varying degrees of seriousness in classrooms of all types (Farnham-Diggory, 1972; Heckinger, 1966).

So much of what Piaget concluded about the development of cognitive abilities seemed to fit the observed behavior of children, that educators seized on his theories as a rationale for curriculum development and teaching strategies. Piaget maintained that cognitive skills developed in stages which in the "normal" child meshed closely with chronological age. Teaching strategies and content could be developed to enhance skill development if they matched the stages of the child's level of skill mastery that could be expected at different ages. Piaget (1928) strongly suggested

that the stages of development which he had identified were common to all children, but that cultural and environmental factors could cause an acceleration of growth in some skill areas and a retardation in others. He stated, however, that implications of his theories for children of other cultures required further study and experimentation.

Research studies into the applicability of Piagetian stages of development across cultures have totalled in the hundreds, but the vast majority were based on the assumption that the stages were universal and something within the cultural background, or the home environment, was responsible for a slowing down or speeding up of the process. As noted earlier, this type of conclusion supported the "deficit theories" which, while not blaming the child *per se*, implied that something within the culture handicapped the child in his cognitive development (Bowd, 1977).

Researchers such as Cohen, Gagné, Ramirez III and Castaneda, Schneidman, Witkin and others have argued that it is necessary first to determine the cognitive and learning styles of the individual and then try to match a teaching style to the learning style in order to modify and enhance aspects of the cognitive process. A growing group of researchers and a lesser number of educational institutions, i.e., The Open University, have been sharing a concern for the match-mismatch factor of learning and teaching style. Far more prevalent however in schools of North America has been the belief that Western education is the system which best can teach children to think. Lloyd's assessment of the current situation seemed appropriate to the day-to-day activities of most classrooms.

> Cultural differences are expected to vanish as soon as science
> is taught in schools, as television becomes universal and as literacy
> replaces illiteracy. The knowledge and rational thought processes

of Western man are expected to become universal and any barriers
to the diffusion of Western knowledge are expected to be questions
of time and attitude rather than basic differences in perception,
thinking and learning. (Lloyd, 1972, p. 1)

SUMMARY AND HYPOTHESES FORMULATION

The theoretical framework and hypotheses of the present study were

developed from a synthesis of research findings and current priorities

concerning cognition and cognitive style.

Researchers have been unable to agree on a concise definition

of either thinking process or cognitive style, but it has come to be

generally accepted that thinking includes ways of ordering or classifying,

the formulation of concepts, the approach to problem solving, the

decision-making process, and strategies of reasoning. Any number of

these processes may operate simultaneously to produce a verbal or non-

verbal response to a stimulus or situation (Belth, 1971; Bruner, 1973).

It was in light of this understanding of cognitive style and multi-

disciplinary research into cognition that certain theoretical premises

were accepted as valid to hypotheses of this study. The premises were

(1) that a group of variables which are "aspects of reasoning" together

with a set of "cognitive strategies" create an idio-logic or cognitive

style, (2) that a cognitive style is an intellectual characteristic of

each human being and that styles may differ between individuals and among

cultural groups, (3) that it is possible through analyses of a body of

verbalized data to infer some characteristics of the cognitive style of

an individual and of a group, (4) that the cognitive and learning styles

of students are closely related and are crucial components of the educa-

tional process, and (5) that learning will be accelerated if learning and

teaching styles match between learner and teacher.

The premise concerning the acceptance of "aspects of reasoning" and "cognitive strategies" as components of cognitive style was based directly on the work of Schneidman (1966) who in turn had been influenced by the writings of Nakamura (1964). In comprehensive studies of the ways of thinking among the peoples of India, China, Japan and Tibet, Nakamura had identified and described strong relationships among the belief system, values, language, customs, physical environment, world view and cognitive styles characteristic of the culture to which an individual belonged. The way that an individual operated at the cognitive level of functioning was found to be strongly influenced by all of these variables. Nakamura concluded that finally there was no single determinant of the ways in which a people think but there were certain characteristic differences in cognitive styles that related strongly to the variables constituting the cultural background of the group. The present study considered cultural background to be an important variable in the hypothesized differences in cognitive style among groups of adults. Ramirez III and Castaneda (1975), Weitz (1971) and Witkin (1977) also identified cultural background as an important variable in relation to field-dependent orientations to problem solving.

Schneidman (1966) conducted extensive research into the cognitive styles of suicidal and non-suicidal personality types in California over many years and was able to describe basic cognitive attributes of the process by which people arrived at certain verbalized statements. He concluded that all mentational processes occurred in order that a person could "concludify," that is, arrive at a conclusion about a problem, a situation or an emotional stimulus. According to Schneidman's theorizing, the impact of the content of the verbalized conclusion may have been

strongly influenced by the cognitive strategies underpinning the premises that lead to the conclusion. The conclusion would be expressed either verbally or non-verbally but the premises could be explicit or implied.

> Schneidman assumes that everyone is prone to Aristotelian logical errors and that these "errors" (along with one's cognitive maneuvers, which also are part of one's ideologies) should be considered as indicators of underlying personal and cultural assumptions about the nature of the world and of the nature of meaning. (Millburn in Schneidman, 1966, p. 2)

These strategies Schneidman labelled as an individual's Idio-logic, and the beliefs and assumptions underlying them constituted a Contra-logic. Both of the foregoing logics reflected certain psychological traits which were an individual's Psycho-logic. Further, Schneidman asserted with some evidence, "that one may communicate with, teach, or influence another more effectively if the communicator employs a style which is consonant with the other's style of thought, i.e., with his peda-logic" (Schneidman, 1966, p. 3). Earlier researchers (Bruner, 1966; Pask and Scott, 1972; Witkin, 1977) had found strong evidence of differences in cognitive style. Their findings were used to develop the conceptual framework of this study. Methodologies of these researchers were based on the use of intellectual test tasks. This approach was deemed to be inappropriate to the present study.

Ample support was found in the research for the premise "that ways of thinking (cognitive styles) differ between individuals and among cultural groups." Boaz (1911), Bruner (1971), Cole and Scribner (1974), Lee (1959), Lévi-Strauss (1966), Nakamura (1964) and others studied the relationship between cultural background and the ways in which people think. Evidence supported the contention that differences exist in the cognitive styles of different cultural groups. Against this background of research, the major hypothesis of the present study stated that signifi-cant differences would be found in the cognitive styles characteristic

of different cultural groups in the sample.

The third premise of the present study was that some aspects of the cognitive style of an individual could be inferred from an analysis of a body of verbalized data. To some extent recent psycho-linguistic research supported such a premise. Cole and Scribner (1974), Markel (1969), Vygotsky (1962) and Whorf (1956) all found a strong but puzzling relationship between language and patterns of cognition. Chomsky suggested, in contrast to Whorf's theory of language determining thought, that innate ideas rather than language determined cognition. However, the argument is far from ended and further research is needed to explain the relationship. Validation studies for the use of the content analysis technique at the latent level (Carney, 1972) found strong evidence that it was both sensitive and discriminating enough to be used in such an investigation.

It was a premise of this study that cognitive and learning styles of students are crucial components in the educational process. Support for this stance was found in the research of only the past twenty years. Prior to that time the possibility of such differences was overshadowed by theories of developmental learning and teaching. A study by Rosalie Cohen (1976) identified significant differences between the "analytical" cognitive style characteristic of students who succeeded in the school system, and the "relational" style that was typical of the low achievers in school. Her study described the relational style thinkers as those who came from the subculture of the low income and shared-function family groups. A number of the characteristics which Cohen identified as being associated with the high relational thinkers has been used in the literature to describe the cultures of the indigenous peoples of North America, i.e., critical group functions being "widely shared among all members of

the group"; distribution of rewards being "widespread and equal"; a sense of individual identity being "only as attached to group identity" (Chance, 1960; Hallowell, 1955; Honigman, 1965). Because some parallels were seen to exist between Cohen's findings and the questions under investigation in the present study, her work was deemed to be relevant to the theoretical framework.

Another area of research which related closely to the present study was that of Witkin *et al.* (1962). His work concentrated on investigating the field-dependent, field-independent components of cognitive style and the implications of the existence of such characteristics for facilitating the attempts to match teaching and learning styles. In a number of such studies, Witkin found the existence of important correlations among how people learned, how teachers taught, interaction among students and teachers, and the ways in which students made vocational choices. Weitz (1971) tested Witkin's instruments (the field-dependence, field-independence continuum) among Indian people of British Columbia. She found that high field-dependent subjects in her study were likely to have grown up in strongly traditional Indian homes. The more acculturated the family was into the non-Indian culture, the more field-independent the subjects were likely to be. Because of the importance to inter-cultural education of the field-dependent, field-independent dimension of cognitive style, it was considered important to include this descriptor in the present study.

The final premise of this study stated that "learning will be accelerated if teaching and learning styles match between teacher and learner." Cohen's (1976) and Witkin's (1977) work dealt extensively with this proposition and at The Open University in Great Britain classes have

been offered which teach students awareness of different cognitive and learning styles (Floyd, 1976).

The secondary hypotheses of the present study stated that there would be significant differences in cognitive styles of groups within the sample on the basis of linguistic facility, whether respondents had attended university, age groups, and sex groups. Research reports invariably have noted the relationship between cultural background and cognitive style to be a multi-faceted variable. While it has been widely accepted that these variables exert an influence on cognitive style, research has yet to reach a consensus as to the direction and impact of each factor.

The hypotheses for this study developed from the background research across disciplines into the general area of thought processes. More specifically, recent research into cognitive style differences across cultures tended to support the underlying premises of this study.

The remainder of this report describes the procedure of the study; the study sample and data collection, the analyses which were performed; the findings and conclusions which were drawn. Implications for cross-cultural education of the findings of this study are discussed.

Chapter 3

PROCEDURE OF THE STUDY

This chapter describes the method and procedure followed in conducting the present study. Details outline the development of the DACS scale which became the major analytical tool of the study. Descriptors are provided for the study sample. The chapter includes discussion of the organization and procedure, the content analysis, the reliability and validity tests, and the statistical analyses which were used in the study.

DEVELOPMENT OF THE DACS SCALE

The Data Analysis of Cognitive Style scale which was developed to analyze data in the present study consisted of forty variables of a continuous nature and four which were discrete variables. The theoretical rationale and format of the instrument was based primarily on Schneidman's 1966 model described in *The Logics of Communication: A Manual for Analysis.* Initially the researcher hoped to replicate Schneidman's use of the instrument and had obtained permission to do so (Appendix A). However, detailed study of the Schneidman instrument indicated that it had been designed primarily to investigate differences in cognitive style, world view, and personality of the potentially suicidal and non-suicidal person. The instrument suggested positive intervention approaches that could be used to change those aspects of cognitive style that appeared to be dysfunctional. An assumption of the Schneidman scale (developed and used with middle class North Americans) was that any deviation from Aristotelian logic was a logical error. Everyone makes these errors which Schneidman considered to be "indicators of underlying personal and cultural

assumptions about the nature of the world and of the nature of meaning"
(Schneidman, 1966, p. 2).

The present study was concerned primarily with identifying the
impact of cultural and personal influences on cognitive style rather than
with knowing whether subjects tended towards the suicidal or non-suicidal
personality. The instrument had been used to study the Kennedy-Nixon
television debates and other bodies of verbalized data and had gained
acceptance as a valid indicator of cognitive style in research studies
other than those concerned with suicide. Following consultation with
four researchers and intercultural educators, it was decided to make some
modifications to the instrument for use in the present study but to retain
the format and the majority of the measurement categories.

The original Schneidman instrument (Appendix B) contained twenty-
eight items categorized as being Aspects of Reasoning and forty behaviors
labelled Cognitive Strategies. The final form of the DACS scale for the
present study consisted of twenty-four items considered to be Aspects of
Reasoning and twenty Cognitive Strategies (Figure 1).

The first version of the DACS scale as it was constructed was field
tested on ten protocols which were a part of the original data but which
were not analyzed in the study itself. The field test was conducted by
the researcher, a bilingual professor of languages, and a graduate student
who had just completed a research project utilizing the content analysis
technique.

Each of the three researchers independently coded the same three
protocols and then met to discuss the procedure. Initial agreement among
the coders was low and revisions were made in the DACS scale. Three more
protocols were then coded independently and results were compared. After

revisions, a third round of coding and final revisions, it was agreed

that the DACS scale was useful but only after coders had been trained in

its use. The scale required coding of all important units (words, phrases,

clauses, sentences, paragraphs) and coders were required to "read between

the lines" in order to infer meaning and intent. These two requirements

made data coding impossible until the instrument was carefully explained

and coders were given guided practice.

The forty-four variables which eventually evolved contained items

adapted from Schneidman's (1966) work, from Witkin's (1962) findings on

the field-dependent, field-independent component, and from Cohen's (1969)

study of analytic and relational styles of cognition among students of

differing cultural, economic and school achievement backgrounds. Figure 1

shows the DACS variables and the source of each. Of the forty-four

variables, thirty-three were taken from Schneidman's instrument either in

direct or modified form; nine variables were constructed by the researcher

based on Cohen's studies of analytic and relational styles of cognition;

and two discrete items were derived from Witkin's work on field-dependence

and field-independence. In most cases, the language used in the Schneidman

adapted variables was changed to increase the facility of the coders in

applying the instrument to the data.

The format, use and interpretation of the instrument were based on

Schneidman's approach to the analysis of the logics of communication. This

study was conducted according to Schneidman's four categories of analysis:

Idio-logic, Contra-logic, Psycho-logic and Peda-logic (Figure 2). An

individual's Idio-logic was described by Schneidman as:

> Idio-logic involves the individual's style of thinking referring
> to all those things that might be said . . . by that person about
> the syllogistic structure, the idiosyncracies of either induction or

Figure 1

Data Analysis of Cognitive Style (DACS) Scale,
Source and Construction of 44 Variables

Scale Variables	Source and Construction
ASPECTS OF REASONING	
A. Relevance	
1. Fact premise	– Schneidman I A – modified
2. Value premise	– Schneidman I A – modified
3. Fear of consequences	– Schneidman I C
4. Appeal for sympathy	– Schneidman I E
5. Appeal to beliefs	– Schneidman I F
6. Authority support	– Schneidman I G
7. Assumed cause – effect	– Schneidman I H
8. Derogation	– Schneidman I K
B. Meaning	
1. Stimulus centered objective	– Cohen, 1976
2. Self-centered, subjective	– Cohen, 1976
3. Global, concrete	– Cohen, 1976
4. Parts specific, linear	– Cohen, 1976
5. Equivocation (double meaning)	– Schneidman II A
6. Amphiboly (unusual grammar)	– Schneidman II B
7. Opposites, contrasts	– Schneidman II C 1.
8. Non-comparable opposites	– Schneidman II C 2.
9. Indirect -- "I think that..."	– Cohen, 1976

Figure 1 (continued)

Scale Variables	Source and Construction
C. Languages and Structure	
1. Problem solving	– Cohen, 1976
2. Role descriptors	– Cohen, 1976
3. Contradictory statements	– Schneidman I,V B
4. Complex sentences	– Cohen, 1976
5. Simple direct sentences	– Cohen, 1976
D. Field Articulation	
1. Field independent (analytical)	– Witkin, 1977
2. Field dependent (relational)	– Witkin, 1977
COGNITIVE STRATEGIES	
I. Types of Statements	
A. Absolute Statements	
100. Intensify	– Schneidman I A 100
101. Contend without support	– Schneidman I A 101
102. Reject without support	– Schneidman I A 102
103. Generalize	– Schneidman I A 104
B. Qualified Statements	
150. De-emphasize	– Schneidman I B 150
151. Accept conditionally	– Schneidman I B 151
152. Close line of thought	– Schneidman I B 152
153. Become specific	– Schneidman I B 153

Figure 1 (continued)

Scale Variables	Source and Construction
II. **Flow of Ideas**	
A. <u>Initiating New Ideas</u>	
200. Note difference between ideas	– Schneidman II A 202
201. End idea and begin again	– Schneidman II A 204
202. Switch to unrelated ideas	– Schneidman II A 209
203. Move from idea to audience	– Schneidman II A 207
B. <u>Continuing Discussion of Ideas</u>	
250. Enlarge or elaborate	– Schneidman II B 250
251. Analogies, metaphors, images	– Schneidman II B 251
252. Summarize	– Schneidman II B 252
253. Paraphrase, rephrase, repeat	– Schneidman II B 254
254. Agree generally; disagree in part	– Schneidman II B 262
255. Focus on few points	– Schneidman II B 264
256. Deduce and voice conclusion	– Schneidman II B 265
257. Verbalize link between ideas	– Schneidman II B 266

Figure 2

Data Analysis Cognitive Style (DACS) Theoretical Model

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.	**RELEVANCE**			
A.1	Premise based on factual knowledge. (Factual statements lead to and support a conclusion.)	One believes that factual information relates causally to the conclusion, and gives it validity Facts are essential.	Such a person would tend to be detached, objective, consistent, predictable, organized, definite, reality-oriented.	Such a person will react positively to an organized presentation of factual information supported by facts and figures data.
A.2	Premise based on value orientation. (Conclusion derives from value statements which give sufficient support.)	One believes that values, judgements, beliefs give sufficient support to conclusions. Facts are used only to illustrate value statements.	Such a person would tend to be conforming, affective, subjective, receptive, spontaneous, social, easily defeated.	Such a person will react positively to personal warmth, firm direction; a social approach to teaching, flexibility, short term goals.
A.3	Premise appealing to fear of losing stated consequences. (Conclusion is grounded in a suggestion of negative consequences or it is rejected.)	One believes that what is true is what men want to believe is true, and what they want to reject is false. Life is believed to be fraught with unknown dangers from which others must be protected.	Such a person would tend to be aggressive, goal-oriented, impulsive, emotional, subjective, moralistic. He over-simplifies project standards and will bully to win.	Such a person will react positively to being convinced that something bad could also happen to him if he rejects a conclusion. He responds to his own devices.
A.4	Conclusion appealing to sympathy for persons involved. (Conclusion aims for acceptance by seeking pity from the listener on moral and ethical grounds.)	One believes that truth must always be conditioned by moral considerations, not only by objective considerations. Something cannot be true while also being morally or ethically false, nor totally false while being morally satisfying.	Such a person would tend to be in search of approval, concerned with standards of right and wrong, philosophic, contemplative.	Such a person will react positively to hearing the moral implications of a situation discussed, especially if it seems that they will be consistent with his standards.
A.5	Conclusion appealing to assumed beliefs and attitudes of listener. (Support is sought by subjective statements on the affective level which have little connection to the content of the message.)	One believes that the truth of a conclusion must be judged in relation to beliefs and attitudes of society. Objectivity is secondary to concurrence of the views of speaker and listener.	Such a person would tend to be insecure, conservative, needing approval, receptive, retiring, seeking support of others.	This person will react positively to material presented with a "feeling tone"—i.e., folk metaphors, slogans, idioms. His favorites can be identified by studying his conversation.
A.6	Conclusion supported by an authority. (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)	One believes that a statement is largely true because of the rank, status or "expert" label of the person making it; men in authority are authorities.	Such a person would tend to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person will react positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.

Figure 2 (continued)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.7	Assumed cause-effect relationship. (Premises are made that imply a cause-effect relationship between events having no obvious connection.)	One believes that every event is causally related to every other event but a cause can exist without the effect occurring; man's action can in no way assure a hoped for effect.	Such a person tends to be dependent, indecisive, both for-and-against, caught in an uncontrollable situation.	This person will react positively if the means are made to seem more important than the far-off hoped-for end goal. His general pessimism and feeling of helplessness must be overcome.
A.8	Conclusion and/or premise is derogatory of persons or institutions. (Statements appeal to emotions of listener, especially negative attitudes of persons or groups involved in the argument.)	One believes that whether one accepts a conclusion depends on the listener's feelings towards the agency or person involved in the argument. Subjective and objective characteristics cannot be separated.	Such a person tends to be hostile, aggressive, dogmatic, opinionated and rigid, and would project his own standards on others.	This person will react positively if the teacher first understands his attitudes. The world is "good" or "bad" so build on, or totally isolate, your material from his attitudes.
B.	**MEANING**			
B.1	Stimulus-centered, objective and analytical premise and conclusion. (The meaning is found in abstract parts of a statement stated in objective, analytic terms.)	One believes that a situation is best understood by systematically analyzing its components. Anything can be done by an orderly approach to the stimulus and process. Natural laws operate.	Such a person tends to be objective, concerned with each part of a totality, listens carefully for solutions, is ambitious, independent, and confident of control over environment.	This person reacts positively to well-organized material that challenges an analytical problem-solving approach. Objective material is favored and skill mastery motivates.
B.2	Self-centered, subjective, and relational premise and conclusion. (Components of a situation have meaning in relation to total context and a personal orientation to it.)	One believes that a situation has meaning only in relation to its personal context. Every situation is part of and related to everything else and its components have little meaning in themselves.	Such a person tends to be subjective, concerned with global characteristics, is passive, not in control, and concerned with social relationships and self.	This person reacts positively to affective presentation of material in a holistic and relational manner. The teacher is first a person and must relate well on the emotional level to motivate learners.
B.3	Concern with global and concrete characteristics. (Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.

Figure 2 (continued)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
B.4 Parts-specific, linear orientation to a situation. (Components of a situation explain its meaning. They relate linearly in organized, causal fashion.) (Related to B.1)	One believes that the components of a situation give it meaning. Things occur in linear fashion from a beginning to an end that follows a scientific law or rule. Goals are important.	Such a person tends to be ambitious, achievement oriented, conscious of "wasting time," sees himself in control and able to solve problems, is confident, competitive and objective.	This person reacts positively to material presented in linear organization; must be challenged to solve problems, achieve external rewards and master objective information.
B.5 Equivocation (Meaning is unclear because words may have two meanings, or may be ambiguous. Interpretation is left to the listener.)	One believes that a word has only one meaning; the context has no influence on meaning and everyone understands the same meanings of the word.	Such a person tends to be rigid, dogmatic, denies that differences exist and is reluctant to change his behavior in different situations.	This person will only react positively if the intended meanings of words are clearly explained. Presentation must be precise and unambiguous for this learner will put his own interpretation on the words.
B.6 Amphiboly (Meaning is unclear because of awkward grammatical structure. The speaker may be unclear about what he is saying. Second language speakers may fall into this category for lack of language facility.)	One believes that words are not of primary importance. Something can be said in many ways; it is up to the listener to understand. Knowledge and truth are not relative to the speaker or to society.	Such a person tends to be rigid, dogmatic, authoritarian, expects to be understood and blames those who do not. Trusts his own judgements and is slow to change ideas.	This person will react positively only if presentations are simple, straightforward and not dependent on discussion and feedback. Once he thinks he understands he stops listening. He thinks what he says is perfectly clear.
B.7 Complete opposition (Meaning is clarified and strengthened by using contrasts and opposites. Statement is well organized.)	One believes that a position is stronger by explaining what it is not; a thing is defined by what is excluded.	Such a person tends to be methodical, philosophical, painstaking, impatient, theoretical and overreactive (if a thing is changed, it is destroyed).	This person will learn material presented in his mode of contrasts. In explaining a thing, exploration can be made of what it is not as well as what it is.
B.8 Incomplete opposition (Meaning is confused by phrases used to illustrate opposites which are not comparable. The statement becomes non-cohesive.)	One believes that everything is opposed to everything else. All positions are incompatible, all beliefs are opposed. Attitudes and beliefs are opposed to reality, feelings to fact, present to past and future.	Such a person tends to be dichotomous, either-or, fears compromise, would work alone, would not relate well to others, would be pessimistic and expect the worst of everything.	This person will learn material that seems to give some credence to his beliefs. Gradually he may be convinced that things are not always in opposition to each other.

Figure 2 (continued)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
B.9 Indirect Context (Premise is an indirect statement leading to a direct conclusion. Premise is relativized to himself to gain acceptance.)	One believes that relative statements are logically equivalent to direct statements. All things are relative; there is no objective truth independent of human belief, conjecture, or bias.	Such a person tends to be relativistic, insecure, defensive. He fears commitment, distrusts his perceptions, feels alienated and holds his own opinions in low regard.	This person will learn material presented as being relative to points of view, attitudes, beliefs. Things presented as absolutes may arouse defensiveness.
C. LANGUAGE AND STRUCTURE			
C.1 Problem solving orientation (Discourse is structured in a problem solving scientific approach. It is analytical and objective.)	One believes most situations are problems that can be logically solved with the right approach. Each problem can be solved without great concern for the context.	Such a person tends to be objective, analytical, action-oriented, concerned with goals and achievement. He is impersonal, stimulus centered, theoretical and impatient with people.	This person will learn material presented in problem format where solution brings reward. A gradual approach may interest him in the creative arts, and the affective domain.
C.2 Concern with role descriptors (Vocabulary focuses on impersonal role descriptors rather than on individual, subjective description.)	One believes that an individual's role is the over-riding consideration. If everyone lives up to role expectations, problems will be solved, i.e., a teacher is a source of information, not an individual.	Such a person tends to speak objectively of others in terms of their role performance rather than their behavior as emotional individuals. He tends to be distant, impersonal and critical of those who fail to measure up to expectations.	This person will learn when context is formally presented by a teacher who "acts like a teacher." Expectations for himself and the teacher are known because of their roles, and personal relationships must remain at this level.
C.3 Contradiction (Contradictory premises are made with the speaker unaware that one statement makes the other impossible.)	One believes that contradictory conditions are possible at the same time. A thing and its opposite can exist at the same time. All things are seen as being possible.	Such a person has a difficult time choosing an alternative or making a decision. He wants to be "for" and "against" something at the same time. He is more comfortable with theoretical discussion than with problem solving.	This person needs the security of a directed approach so he is not forced to choose alternatives. He needs time to "think things over slowly" before being pressed for a decision.
C.4 Complex sentence structure (Discourse is grammatically complex, organized and planned in patterns of complete structures.)	One believes that meanings become more clear when speech is carefully planned and grammatically complex. A complex situation is illustrated by a complicated verbal code.	Such a person is concerned with explicit meanings; with analyzing each facet of a situation and with careful planning or verbalization that can then be delivered in a clear, cool, deliberate style. He may modify speech to suit the listener.	This person enjoys carefully organized and planned discussion in a learning situation. He needs time to plan discourse and will want to look at each facet of a problem before voicing a possible solution.

Figure 2 (continued)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
C.5 Simple, direct sentence structure (Sentences are short, direct and grammatical; structure is not complex.)	One believes that meaning is dependent on time, place, authority and other social interactions. What is said is a personal reaction, not an explanation of specifics. One therefore states a simple, affective response.	Such a person sees concrete specifics but does not generalize. He reacts to things on a personal level and sense meaning is embedded in the situation; he hesitates to explain and solve situations.	This person may be uncomfortable if asked to discuss, explain and generalize in analytical style. New concepts are best approached from a concrete, personalized viewpoint.

D.   **FIELD ARTICULATION**

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
D.1 Field-independent style (Attributes of a stimulus can be abstracted from the total field for their meaning.)	One believes that specific items or attributes of a situation are more or less separate from the total field. The parts are seen as having meaning in themselves and if studied according to certain principles will lead to solutions.	This person tends to be interested in the abstract and theoretical and in applying general rules and principles to problem solving. He will take critical elements out of the total context and restructure these items in a different context to arrive at a solution.	Such a person will learn if material is organized and structured, and demands analysis and abstraction. He will respond well to requests to "intellectualize" about problems and less well to assignments of an affective, personal orientation.
D.2 Field-dependent style (A situation can only be perceived within its total context of people and events.)	One believes that nothing exists in isolation from its total context, and its parts cannot be separated from the whole. Each situation is uniquely concrete and personal and principles do not really apply.	This person tends to perceive things holistically. Events are relative to the social environment. Interpersonal relationships are a major consideration in making decisions. Problems are seen as being beyond control of an individual.	Such a person will react positively to context in the affective domain, and to a warm personal atmosphere in the classroom. The teacher is first an individual. Objective, analytical learning will not be well received.

deduction, the forms of the explicit or implied premises, and the gaps in reasoning or unwarranted conclusions. (Gerbner *et al.*, 1969, p. 263)

The category labelled Contra-logic was described as a person's "private epistomological and metaphysical view of the universe" (Gerbner *et al.*, 1969, p. 272). In other words, Contra-logic is that set of personal and cultural assumptions about the world which permits him to justify his particular Idio-logic. Going further, the particular set of beliefs (Contra-logic) interrelates with certain psychological traits or attributes of an individual with that particular Contra-logic and Idio-logic. The category of Psycho-logic answers the question: What kind of person would he have to be (in relation to his mentational and psychological traits) in order for him to have the world view he has (Contra-logic) as manifested in his cognitive style (Idio-logic)?

Schneidman's approach suggested a practical application of the analysis and the interpretation of Idio-logic into the inferential categories of Contra-logic and Psycho-logic. He proposed the development of a Peda-logic whereby attempts are made to fit teaching and communicating style to the cognitive style, world view and personality of the learner.

In the usual learning situation, there are at least two major aspects present: the substantive (what is being taught), and the process (the way in which the "what" is presented—the teacher's way or the textbook's way). Most of us adjust to the way of the text or the teacher, but our grasp of content would be even greater if the content were presented our way, in a textbook custom-made to reflect our styles of cognizing. (Gerbner *et al.*, 1969, p. 275)

The present study, unlike those of Schneidman, was concerned primarily with groups rather than individuals. It was assumed that members of specific cultural groups would give evidence of some commonalities in cognitive style because of the influence of culture and language on the Contra-logic and Psycho-logic of group members. The Schneidman

model of analysis with modifications therefore was deemed appropriate for use in the study. Figure 2 contains detailed descriptions of the Idio-logic, Contra-logic, Psycho-logic and Peda-logic as it was developed and used in the study of cognitive styles of members of different cultural groups.

Only the Idio-logic attributes of the four-step model were observable. The theoretical meaning of each variable of the DACS scale added a dimension to the Idio-logic to make a composite of cognitive style.

Aspects of Reasoning were those mentational strategies which related to a person's method of induction and deduction. Included were eight categories of verbalization behaviors assumed by the speaker to be relevant to the discourse. Expression of facts, values, beliefs, fears, became premises to the concludifying statement.

A second category of reasoning strategies included nine actions concerned with the meaning which the speaker tried to convey, the approach taken to the discussion and the clarity of the intended meaning. What initially appeared to be a straightforward statement may have been re-inforced by the use of opposites and contrasts or may have become ambiguous if equivocation, amphiboly or the indirect approach were used.

The use of language and structure formed a third category that was indicative of the speaker's reasoning strategies and cognitive style. The field articulation aspect of reasoning suggested a general orientation to discussing a problem or situation: was the approach one of ordered analysis, synthesis and concluding statement, or was it a holistic view of a situation in relation to other events, experiences and persons?

Part two of the scale contained twenty items labelled cognitive strategies. These strategies gave an indication of how an individual

Figure 3

Data Analysis of Cognitive Style (DACS)
Idio-logic Attributes

Part One

ASPECTS OF REASONING

Category

A. Relevance

1. Fact premise
2. Value premise
3. Fear of consequences
4. Appeal for sympathy
5. Appeal to beliefs
6. Authority support
7. Assumed cause—effect
8. Derogation

B. Meaning

1. Stimulus centered, objective
2. Self-centered, subjective
3. Global, concrete
4. Parts specific, linear
5. Equivocation (double meaning)
6. Amphiboly (unusual grammar)
7. Opposites, contrasts
8. Non-comparable opposites
9. Indirect: "I think that ..."

C. Languages and Structure

1. Problem solving
2. Role descriptors
3. Contradictory statements
4. Complex sentences
5. Simple direct sentences
6. Word usage

D. Field Articulation

1. Field-independent (objective)
2. Field-dependent (subjective)

I. Types of Statements

A. Absolute statements

100. Intensify
101. Contend without support
102. Reject without support
103. Become general

B. Qualified statements

150. De-emphasize
151. Accept conditionally
152. Close line of thought
153. Become specific

II. Flow of Ideas

A. Initiating new ideas

200. Note difference between ideas
201. End idea and begin again
202. Switch to unrelated ideas
203. Move from idea to audience

B. Continuing discussion of ideas

250. Enlarge or elaborate
251. Analogies, metaphors, images
252. Summarize
253. Paraphrase, rephrase, repeat
254. Agree generally; disagree in part
255. Focus on few points
256. Deduce and voice conclusion
257. Verbalize link between ideas

verbalized the development of an idea, an argument, a solution or an
opinion. Included were types of statements used (absolute and qualified)
and the way in which the ideas flowed—both the initiation of new ideas and
continuing discussion of ideas already identified. Simply stated, the two
parts of the DACS scale attempted to measure (1) what it is that a person
does in the process of reasoning, and (2) how one does whatever is being
done.

THE SAMPLE

The study sample consisted of protocols collected from one hundred
adults and young adults who identified themselves as residents of northern
Canada and Alaska. Of the total group (Table 1), 40 percent were non-
native northerners (parents, educators and students). The remaining 60
percent of protocols were collected from twenty Treaty and Status Indians,
twenty Metis and twenty Inuit people (parents, political leaders, students
and teachers). Further demography according to cultural group is given in
Appendix H.

Table 1

Cultural Group of Study Participants

Cultural Group	Participants	Percent
Indian (Treaty and Status)	20	20.0
Metis	20	20.0
Inuit	20	20.0
Non-native	40	40.0
TOTAL	100	100.0

Occupations represented by the adults in the sample included government and education officials, teachers and principals, counsellors, elected officials of native organizations, laborers, hunters and trappers, community workers, missionaries and businessmen.

Ability of the study participants to speak one or more languages is shown in Table 2. Original interviews for the study were conducted in English. Therefore it was known that all participants were able to speak and understand English. In addition, eighty-two of the one hundred subjects were able to speak and understand one or more native languages. The languages represented by the bilingual group included Cree, Slavey, Ojibway, Algonkian, Montagnais, Chipewyan, Dogrib, Loucheux and Inuktitut.

Table 2

Language Facility of Participants

Designation	Number	Percent
Monolingual (English)	18	18.0
Bilingual (English, French, native languages)	82	82.0
TOTAL	100	100.0

Demographic data collected for each respondent gave information concerning educational background. As Table 3 shows, forty-two of the respondents had no university training while twenty-six subjects had attended university for between four and six years. This would indicate that more than one-quarter of all participants in the study were qualified to hold one, and possibly two, university degrees. Of the one hundred cases, eight had attended university for part of one year and twenty-four

indicated having spent between one and three years in university studies.
In addition, a large number of non-university attenders had spent time in
post-secondary study in a technical, trade or vocational school.

Table 3

Educational Background in University
Level Studies for Participants

Length of Study at University	Number of Participants	Percent
No attendance	42	42.0
Less than 1 year	8	8.0
1 to 3 years	24	24.0
4 to 6 years	26	26.0
TOTAL	100	100.0

The sex distribution of the study sample of one hundred respond-
ents, as shown in Table 4, was 62 percent male and 38 percent female. The
random selection process by which participants had been selected from the
original pool of 314 interviewees had held cultural background as a
criterion and therefore the group was not evenly divided on the basis of
sex.

The age distribution of study participants is depicted in Table 5.
According to the figures, more than one-half (57.0 percent) of the proto-
cols analyzed in the study were from participants who were thirty years or
younger. Seventeen percent of the sample were between thirty-one and forty
years of age and 22 percent were forty-one years of age or older. For 5
percent of the study, age was not stated.

Table 4

Sex of Study Participants

Sex	Participants	Percent
Male	62	62.0
Female	38	38.0
TOTAL	100	100.0

Table 5

Age of Study Participants

Age Group	Participants	Percent
19 or younger	26	26.0
20-30	30	30.0
31-40	17	17.0
41 or older	22	22.0
Unknown	5	5.0
TOTAL	100	100.0

ORGANIZATION AND PROCEDURE

Data collected for analyses in the present study came from one hundred protocols of oral communication collected by tape recorded interviews with northern adults of native and non-native background. Each of the one hundred respondents was asked five open-ended opinion questions (Appendix D) concerning various phases of education in northern areas of

Canada and Alaska. A decision was made to monitor a maximum of two minutes of data from each interviewee in response to each of the five questions. This meant that a maximum of ten minutes of data would be available for analysis for each of the one hundred respondents. Appendix E shows the questions asked of and responded to by each respondent and the length of response in each case. Figures show that the total amounts of data varied among groups according to the following figures: Indians, 112 min.; Metis, 91 min. 40 sec.; Inuit, 108 min. 47 sec.; non-native, 216 min. 5 sec. for a total of 528 min. 32 sec. Variation in the amount of data available from different protocols was considered as not crucial to the study since a minimum of 1 min. 45 sec. of response time was available from each respondent. Responses for each protocol were typed in double space format on 8½" by 11" sheets for coding purposes.

CONTENT ANALYSIS

Initial analyses of the data involved conducting a content analysis of a written version of opinions and ideas for each of the one hundred protocols. The content analysis procedure was selected as most appropriate to the nature of the data available and to the hypotheses being tested.

Content analysis requires abundant data to be effective (Carney, 1972). The 528 min, 32 sec of data in the present study were minimal to satisfy this criterion. The type of source material available was considered particularly well suited to the content analysis procedure.

> Another type of source material which calls for the use of content analysis is the language of a writer or group. No matter whether it is structure or thought patterns which have to be investigated, this material turns out to involve complicated analysis. (Carney, 1972, p. 64)

A further reason for choosing to use content analysis techniques

was concerned with the development of a complex theoretical model. Content analysis permits the management of complex theoretical problems and provides for the possibility of testing a series of subjective questions in an objective way.

This study attempted to describe cognitive style by using the procedure of content analysis at the inferential level. Support for such procedure was stated by Fox (1969) in a discussion of the study of words at the latent level.

> An investigation of this kind necessitates the ability to plan a series of analyses in overall terms, to distinguish between levels of analysis, and to relate the whole to a theoretical background. Content analysis provides the infra-structure without which it is not possible to evolve a research design that will enable reaching the final set of conclusions in this process. (Fox, 1969, p. 647)

In this study analysis focused on words, phrases, sentences and, in the case of two pairs of discrete variables (C4, C5, D1, D2), coders were required to assess the entire protocol. Because of the free flowing nature of the discourse it was found impossible to designate any one unit as being most appropriate for analysis. Additionally it was considered appropriate to follow the patterns used by Schneidman on whose work the study was based, and who had investigated all units of the data which contributed to meaning, words, phrases, clauses, sentences, paragraphs.

Data from the tape-recorded interviews were listened to with head-sets for optimum clarity and were typed in as accurately as possible a verbatim version of the speaker's statement. Each response was timed with a stopwatch and ended either when the speaker stopped talking or at the end of two minutes, whichever occurred first.

Coders who had been trained in the use of the instrument then proceeded to code the one hundred protocols. Each coder worked independently but periodically a randomly selected protocol was coded separately

by two people and compared as an additional reliability check. It was found that it required an average of 30 minutes to code each protocol and if errors were made, they were in the direction of omission. It was found to be extremely difficult for coders to unerringly check every important unit. Frequently it required three to four readings of a passage to note all important words, phrases, sentences, kind of structure, paragraphs, implied intent and mood of the passage. Since no one type of unit alone was selected for coding, the maintenance of a high level of reliability required time and concentration from each coder.

Following the coding of each protocol, a count was made for the number of times each variable occurred. This information was tabulated onto data coding sheets and key punched onto computer cards by Sask. Comp. key punch operators. The data then were in usable form for the conduct of statistical analyses. Raw scores are shown in Appendix G.

Reliability

Reliability tests for both the coding system and the coders had been conducted prior to the content analysis. To perform the test, five protocols were randomly selected from the data base. Three coders who had been trained in the use of the instrument each independently coded the first one hundred units of data. A formula suggested by Fox (1969) was used to test the percentage of agreement among coders:

$$\text{percent agreement} = 100 \times \frac{\text{number of units coded identically}}{\text{total number of units coded}}$$

Since the formula was designed to test the reliability of two coders, the three involved in this test were paired in various combinations to test their inter-reliability on the five protocols. Reliability scores were computed as 92 percent, 93 percent, 80 percent, 94 percent and 92 percent

for a mean reliability score of 90 percent. These figures were supported by Fox (1969) that at least 90 percent agreement should be reached for one or two-digit codes. The coding system and coders were accepted as sufficiently reliable for the purposes of this study.

Validity

A search of the literature revealed little reliability or validity evidence concerning the Schneidman instrument which formed the basis of this study. This caused difficulty in attempting to validate the DACS instrument and interpretation of the logics of communication against other studies reported in the literature. Dr. Schneidman's work has been acclaimed in social sciences research for having pointed the way to a new approach to the study of cognition, personality and the importance of style in the communication process (Gerbner *et al.*, 1969; Kagan and Lesser, 1961). However, since inference and interpretation formed a major role in his determination of results and conclusions, a dearth of hard data existed and this researcher was unable to locate statistical verification for his work.

This study went further into unverified exploratory work and adapted the Schneidman model for use in an inter-cultural study. Schneidman's research had been conducted only within the Euro-American middle class culture.

The strongest claim for external validity of the analytical model and findings of the present study may lie in the realization of how closely the results fit with what multi-disciplinary research has suggested about cognition within native and non-native cultural groups in North America (Whorf, 1956; Lévi-Strauss, 1962; Lee, 1959; Berry, 1976; MacArthur, 1969). Educational and psychological studies have identified facets of cognition

of the average learner within the majority North American culture. These

patterns have formed a philosophical base which school curricula and

teaching approaches have been designed to support (Bruner, 1973; Piaget,

1923; Dewey, 1963; Farnham-Diggory, 1972; Heckinger, 1966). Anthro-

pological studies by such researchers as Boas (1914), Herskovits (1967),

Hallowell (1955) and Hall (1976) have described numerous facets of culture

and personality, and have speculated about the cognitive strategies of

Indian cultural groups. As later chapters of this study point out,

findings from this investigation tended to confirm at least some of those

statements.

Within the study itself, the researcher made efforts through

consultation to validate the procedures, the content of the DACS instrument

and the interpretation of results. Lengthy discussions were held with

researchers familiar with content analysis techniques, with experts in the

study of the philosophy and practices of education, with teachers in native

and non-native classrooms and with educators in cross-cultural work. The

researcher consulted with Indian and Metis people about the validity of

the instrument, the procedure and the findings. Coders were specifically

selected so that the Indian cultural group was represented. During coder

training an Indian person was involved to alert the non-native coders to

particular nuances of speech that might otherwise have been overlooked.

Statistical Analysis

Data assembled through content analysis of each protocol were

analyzed with the statistical procedure of discriminant analysis to test

the hypotheses posed in this study.

Certain assumptions were made concerning the data and the pro-

cedures that were employed. It was assumed that coded data were at the

level of measurement that made it possible to use the parametric procedures of analysis of variance, and discriminant analysis. The one-way analysis was performed only as an exploratory technique to test for significant differences between variously defined groups and individual variables from the DACS scale. When it was found that sex, cultural group and university training were related to significantly different means on items in the scale, the data were considered for further analyses. The sex variable reached the .05 level of significance for six items; university training made a significant difference for eight items and culture was significant for ten items.

The results of the analysis of variance procedures was considered to be sufficient reason to carry out more detailed analyses. Since the analysis of variance procedure is limited to item analysis, it was not the appropriate procedure to identify patterns of cognitive style. It therefore was decided to employ the discriminant analysis technique which "begins with the desire to statistically distinguish between two or more groups of cases" (SPSS, 2nd ed., 1975). The 'groups of cases' under study were primarily the cultural groups (Indian, Metis, Inuit, non-native) and secondarily the groups defined by age, language facility, sex, educational background at the post-secondary level.

The discriminant analysis performed several functions in addition to defining whether or not the groups differed significantly on various dimensions in relation to cognitive style. It also grouped variables from the DACS scale into distinguishable patterns of cognitive style. It predicted the membership of the groups and identified those cases which did not appear "to fit" according to the particular variable under study.

A detailed description of the analyses and findings is presented in the following chapter.

Summary

Chapter Three described the procedures followed in developing the Data Analysis of Cognitive Style (DACS) scale, the instrument used to conduct content analysis of data in the study. Components of the scale were described as were the logics of the theoretical model. Description of the study sample of 100 respondents revealed that the 20 Treaty and Status Indians, 20 Metis, 20 Inuit and 40 non-natives representing northern residents were closely involved in the education system as students or educators, parents or concerned adults. Eighty-two percent of the total group were bilingual and 42 percent had not attended university.

Other demographic variables showed that sex distribution in the group was 62 percent male and 38 percent female. Fifty-seven percent of respondents were thirty years of age or younger while 22 percent were over the age of 40 years.

The content analysis technique was supported in the literature as appropriate to and valid for the study. An overall reliability score of 90 percent was found in testing the content analysis data coding. Chapter Three concluded with a brief description of the rationale for using the statistical procedure of discriminant analysis.

Chapter 4

DATA ANALYSIS, FINDINGS AND DISCUSSION

This chapter describes the data base of the study, the statistical analyses performed on the data, and the findings from each procedure. Findings are reported in relation to each of the six hypotheses and results are discussed and interpreted according to the theoretical model designed for this study (see Figure 2, Chapter 3).

RESEARCH DATA

The data analyzed in this study consisted of the tape-recorded responses of one hundred interviewees to five open-ended questions concerning education in northern regions of Canada and Alaska (Appendix D). The one hundred respondents included: forty non-native northern residents, twenty Treaty and Status Indians, twenty Metis, and twenty Inuit adults and teenagers. The group represented parents, university students, high school students, teachers, teacher trainees, principals, superintendents, educational counsellors, adult educators, school drop-outs and native political leaders. The five questions which were asked of each respondent are shown in Appendix D.

All interviews conducted for this study were carried out by a Saskatchewan-born, non-status Indian male who was a fluent speaker of Cree and English. Interviews were held in northern communities from Ontario to Alaska. Among interview sites were North Bay and Moosonee, Ontario; Winnipeg and Brandon, Manitoba; Saskatoon, Prince Albert and Lac La Ronge, Saskatchewan; Slave Lake, Alberta; Vancouver and Prince George, British Columbia; Inuvik, Yellowknife, Fort Smith and Hay River, Northwest

Territories; Whitehorse, Yukon; and Fairbanks and Anchorage, Alaska.

The majority of inverviews were conducted in schools and offices. Some parents were interviewed in their homes. A majority of the sample were short term residents in the place of interview. They had come in connection with education but considered other northern or southern communities to be their homes.

Study participants were encouraged to respond openly to each question and it was found that while some respondents spoke at considerable length, others gave only brief comments. In an effort to establish uniformity in the amount of data available for each respondent, the decision was taken to analyze not more than the first two minutes of verbalized response to each question for a possible maximum of ten minutes of data per protocol. This provided for a possible maximum of 1000 minutes or 16.6 hours of data for analysis. Appendix E shows the actual amount of verbalization from each interviewee. The twenty members of the Indian group spoke for 112 min. 48 sec. for a mean response time of 5.6 minutes. Members of the Metis group spoke for 91 min. 40 sec. ($\overline{X}$ = 4.5 minutes); the Inuit group for 108 min. 24 sec. ($\overline{X}$ = 5.4 minutes); and the non-native group for 214 min. 05 sec. ($\overline{X}$= 5.4 min.). Because the interviewer attempted to create an informal discussion atmosphere during the interviews, in some cases not all five of the questions were asked. Although interviewees made other comments it had been decided to analyze responses to only the five specific questions. Therefore, the amount of data available for some protocols was less than optimal and may have influenced the results.

The data were transcribed and typed in triple-spaced format on 8½ × 11 pages and coded by the content analysis technique according to the

Data Analysis of Cognitive Style (DACS) Scale. Appendix F shows a sample protocol as each was coded according to the instrument categories. Numbers and/or letters fitting DACS scale variables were inserted as they were judged by coders to apply to words, phrases, sentences or paragraphs of the transcribed interviews.

Raw DACS scores were computed for each respondent (Appendix G). Tabulations showed the total of coded items and mean item scores for each group to be: Indian, 4,586 ($\overline{X}$ = 229.3); Metis, 4,413 ($\overline{X}$ = 220.7); Inuit 3,675 ($\overline{X}$ = 183.8); and non-native, 8,478 ($\overline{X}$ = 212.0). It was of interest to note that the Indian group which proportionately scored the highest mean score for the amount of talking also scored the highest mean number of DACS scale items. The Metis group whose members spoke the most briefly scored the second highest mean number of coded items. In contrast the Inuit group, with a mean response time of 5.4 minutes (equal to the non-natives) scores significantly fewer items on the DACS scale than any other group.

Examination of the four highest scored variables for each group showed that only variable B9 (Indirect, I think ...) statements and A2 (Value premises) were common high scores for all groups. The A1 variable (Fact premises) was not a high score item for either the Metis or the non-native groups, although it was among high scores for both the Indian and the Inuit groups. Only the Indian group scored high on variable 250 (Analogies and elaboration). This group's high scores did not include variable B2 (Self-centered, subjective) which was a high scoring item for the Metis, Inuit and non-native groups. A high scoring variable which was common to both Metis and non-native groups was 100 (Intensify). This variable identified a cognitive strategy by which statements are strongly expressed.

Individual scores for each protocol on items of the DACS scale were keypunched onto data cards. Data cards were submitted to the computerized SPSS discriminant analysis program for testing the hypotheses of the study (Klecka, 1975).

DISCRIMINANT ANALYSES

To determine the degree to which Indian, Metis, Inuit and non-native groups in the study could be distinguished statistically from each other on the dimension of cognitive style, discriminant analyses were performed. Analyses were performed for (1) four cultural groups (Indian, Metis, Inuit, non-native), (2) two cultural groups (native, non-native), (3) language facility (monolingual or bilingual), (4) educational background at post-secondary level, (5) sex, and (6) age.

The stepwise discriminant analysis using the Mahalonobis criteria was selected as appropriate (Klecka, 1975). This procedure selects independent variables for entry on the basis of their power to discriminate among the groups under study. At each step the "next best" discriminator is selected, given the variables already selected. The Mahalonobis method maximizes the distance between the two closest groups. Variables previously selected may be rejected at a later step if the information they contain becomes available in some combination of other variables. A rejected variable may be re-entered at a later time, again depending on the combination of variables in the equation. The procedure will not accept variables from the original data which contribute little or no discriminating power. Thus, a reduced set of variables can be obtained which probably is equally as descriptive and more succinct than the original list.

To compare findings from two related but different discriminant techniques the first step of the direct method analysis was also performed (SPSS, 1975). This procedure in which all variables are entered simultaneously indicates the discriminating power of each with no priorization nor any combination of variables that fit best together. This method serves to identify those items which contribute only minimally to the power to distinguish among groups. Such variables tend to be discarded by the direct method procedure and do not re-enter the equation.

Procedures performed as part of the stepwise analysis produced function scores and group means in this study and predicted the best group classification of protocols according to the independent variables under investigation. It served to exclude those variables which contributed only minor amounts of discriminatory power.

The remaining sections of this chapter describe the results obtained from each analysis.

Indian, Metis, Inuit and Non-native Cultural Groups

Hypothesis 1. *There will be no statistically significant differences found in the cognitive styles identified as being predominantly used by each of the four sub-groups in this study: Indian, Metis, Inuit, non-native.*

The direct method discriminant analysis (Table 6) shows that all variables from the DACS scale contributed to discrimination among four cultural groups on dimensions of cognitive style. However, the discriminating power ranged from high absolute scores of -.745 (A1) and +.740 (A5) on function one, to lows of +.009 (B3) and +.016 (C3) on function three. Thirteen variables were discarded by the stepwise procedure which was later

Table 6

Direct Method Standardized Discriminant Function
Coefficients for Four Cultural Groups

Variables	Function One	Function Two	Function Three
A1	-.745	.453	.028
A2	-.173	.341	-.068
A3*	.263	-.119	-.179
A4	.483	.357	-.173
A5	.740	-.076	.074
A6	.110	-.456	-.125
A7	-.351	.145	.733
A8*	-.079	.101	-.021
B1	-.166	-.312	.174
B2	-.330	.279	-.437
B3	-.267	.436	.009
B4	.698	.233	.229
B5	-.599	.075	.095
B6	-.504	-.006	-.490
B7	-.459	-.319	-.435
B8	.380	.096	.279
B9	-.049	-.008	.342
C1	-.681	.190	-.156
C2*	.060	.068	-.222
C3	-.468	.104	-.016
C4	.032	.165	.491
D1	-.718	-.238	-.082
100	.232	-.602	-.077
101	.484	.292	.738
102	-.441	-.187	-.298
103*	-.299	-.029	.042
150*	.331	.024	.442
151*	-.161	-.171	.139
152	.045	.259	.289
153	.736	-.313	-.235
200*	.144	-.155	.153
201*	.294	.061	-.103
202	-.067	-.514	.557
203*	-.156	.165	.117
250	.260	.095	.664
251*	-.070	.058	.335
252	-.431	.204	.296
253*	-.102	.097	.049
254*	-.166	.106	-.193
255	.320	-.259	.020
256*	-.095	-.216	-.295
257	-.168	-.431	-.229

* Indicates non-significant variables removed by stepwise procedure.

performed. The direct method (Table 7) found that function one was significant and provided the greatest disciminatory power (eigenvalue 2.147). Function two was a significant discriminator but the third function failed to reach significance at the .05 level. Eigenvalue of function three was 1.056, indicating only slight discriminatory power for the variables included.

Table 7

Relationships of Canonical Discriminant Functions Defined
by Direct Method Discriminant Analysis

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig
1	2.147	43.86	.826	.057	126	<.0001
2	1.692	34.57	.793	.181	82	.0006
3	1.056	21.57	.717	.486	40	.0599

The stepwise discriminant analysis entered twenty-nine significant variables into the equation (Table 8). The small Wilke's lambda (.076) and significant change in minimum D squared on 35 of 39 steps indicated a high level of discrimination among the four cultural groups. Of the thirty-nine steps in which significant changes were noted, the differences occurred in twenty cases between the non-native group and one or other of the three native groups. In other words, the non-native group (one of four) was found to differ significantly 50 percent of the time from the other three groups.

Table 9 shows that in comparison to the direct method of analysis, the stepwise method accounted for slightly less of the total variance.

Table 8

Summary of Stepwise Discriminant Analysis of
Variables for Four Cultural Groups

Step	Variables Entered	Removed	Wilke's Lambda	Change in Minimum D Squared	Significance	Between Groups
1	B1		.838	.077	.3811	1 - 3
2	C4		.761	.295	.2374	1 - 3
3	A4		.576	.748	.0251	1 - 5
4	252		.536	1.079	.0107	1 - 5
5	152		.457	1.648	.0017*	1 - 5
6	A7		.433	1.896	.0014*	1 - 5
7	100		.402	2.357	.0050*	1 - 4
8	101		.365	2.746	.0001**	1 - 5
9	A1		.306	3.289	.0000**	3 - 5
10	202		.281	3.702	.0006**	3 - 5
11	D1		.243	4.182	.0005**	1 - 4
12	B2		.227	4.537	.0004**	1 - 4
13	250		.214	4.936	.0004**	3 - 4
14	B7		.198	5.303	.0004**	3 - 4
15	C1		.190	5.598	.0004**	3 - 4
16	102		.183	5.870	.0004**	3 - 4
17	B9		.174	6.100	.0000**	1 - 5
18		102	.180	5.843	.0000**	1 - 5

Table 8 (continued)

Step	Variables Entered	Removed	Wilke's Lambda	Change in Minimum D Squared	Significance	Between Groups
19	B3		.170	6.164	.0005**	3 - 4
20	B5		.159	6.540	.0000**	1 - 5
21		252	.163	6.267	.0004**	1 - 4
22		B1	.169	6.020	.0000**	1 - 5
23	A6		.162	6.253	.0004**	1 - 4
24	B6		.156	6.445	.0000**	1 - 5
25	B8		.147	6.751	.0000**	1 - 5
26	102		.140	6.997	.0000**	1 - 5
27	257		.134	7.320	.0000**	1 - 5
28	252		.127	7.694	.0007**	1 - 4
29	B1		.122	7.918	.0000**	1 - 5
30	A5		.116	7.981	.0000**	1 - 5
31		256	.121	7.559	.0000**	1 - 5
32		257	.125	7.244	.0000**	1 - 5
33	153		.112	7.458	.0000**	1 - 5
34	252		.107	7.713	.0001**	1 - 5
35	B4		.096	7.858	.0001**	1 - 5
36	257		.091	8.150	.0028*	1 - 4
37	C3		.085	8.158	.0044*	1 - 4
38	255		.080	8.2436	.0062*	1 - 4
39	A2		.076	8.247	.0094*	1 - 4

Wilke's Lambda: .076   Significance: **p < .001; *p < .01

Wilke's lambda increased from .057 in the direct method to .076 in the stepwise method and the canonical correlation (Table 9) fell by the step-wise analysis from .826 to .801 on function one. However, this decrease in discriminatory power was outweighed by the reduction of thirteen variables in the overall equation. Tables 9 and 10 depict the relative importance of the three functions. The eigenvalue (.840) of function three indicated its minor discriminating power.

Table 9

Relationships of Canonical Discriminant Functions Defined by
Stepwise Discriminant Analysis

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig.
1	1.795	42.96	.801	.076	87	<.0001
2	1.543	36.93	.779	.214	56	<.0001
3	0.840	20.11	.676	.543	27	.0042

The six variables contributing greatest discrimination to function one (Table 10) were: B4 at -.737 (Parts specific, linear); B7 at +.703 (Opposites and contrasts); D1 at +.690 (Field independent); A4 at -.678 (Appeal for sympathy); B5 at +.625 (Equivocation); and A1 at +.588 (Fact premises). It was of interest to note that the six variables which con-tributed most to the uniqueness of function one were all from Part I of the DACS scale (Aspects of reasoning).

Interpretation of the discriminant functions (Tatsuoka, 1970) suggested that a person scoring high on function one operated from a

Table 10

Stepwise Method Canonical Discriminant Function
Coefficients for Four Cultural Groups

Variables	Function One Coefficients	Function Two Coefficients	Function Three Coefficients
A1	.588	-.584	.038
A2	.201	-.407	-.136
A4	-.678	-.229	.171
A5	-.524	.239	-.001
A6	-.053	.455	.028
A7	.221	-.120	-.587
B1	.224	.394	-.148
B2	.156	-.357	.382
B3	.134	-.388	-.009
B4	-.737	-.104	-.025
B5	.625	-.177	-.138
B6	.433	-.160	.433
B7	.703	.219	.395
B8	-.280	-.016	-.331
B9	.003	.090	-.405
C1	.434	-.224	.248
C3	.470	-.217	-.012
C4	-.070	-.129	-.547
D1	.690	.110	.040
100	-.215	.650	.946
101	-.539	-.195	-.639
102	.427	.094	.243
152	-.090	-.297	-.223
153	-.378	.424	.108
202	.108	.488	-.516
250	-.279	-.065	-.703
252	.276	-.183	-.246
255	-.316	.248	-.058
257	.293	.310	.054
EIGENVALUES	1.795	1.543	0.840

complex process of reasoning but used few verbalized strategies as a part
of that process. Such a person appeared to think of problems and situations
as they existed independently of the surrounding events. This person based
premises in facts (or what were seen as facts). Opposites and contrasts
were used for clarity but there was some equivocation (double meaning).
Speech was not in lineal, organized fashion and there was no effort to win
over the audience by appealing for sympathy on moral or ethical grounds.
This person was described in this study as using a cognitive style cate-
gorized as Conflict-analytical.

The six highest absolute scores on function two were variables:
100 at +.650 (Intensify); A1 at -.584 (Fact premises); 202 at +.488
(Switch to unrelated ideas); A6 at +.455 (Authority support); 153 at +.424
(Become specific); A2 at -.407 (Value premises). In contrast with function
one, three of the six most important cognitive variables were from the
cognitive strategies portion of the DACS scale indicating a strong concern
for the way in which things were said.

A person scoring high on this function tended to speak strongly,
to switch to unrelated ideas, to refer to authority figures (experts) and
to make specific rather than general comments. Such a person did not base
statements on value premises nor on facts. The cognitive style of such a
thinker in this study was said to be Conflict-relational.

Although function three was not a strong discriminator (Table 9),
its makeup required study. Variables scoring most strongly were: 100 at
+.946 (Intensify); 250 at -.703 (Enlarge or elaborate); 101 at -.639
(Contend without support); A7 at -.587 (Assumed cause-effect); C4 at -.547
(Complex structure); 202 at -.516 (Switch to unrelated ideas). In the
case of this function, four of the six major variables were cognitive

strategy items rather than aspects of reasoning and tended to be stylistic manoeuvers rather than aspects of reasoning.

A person scoring high on function three tended to speak very strongly with little elaboration, but with supported contention delivered in a simple, direct way. There was no changing to unrelated ideas and no assumed cause and effect. It appeared that this person made strong, simple, specific statements from which it was extremely difficult to infer whatever aspects of reasoning may have been in operation.

Table 11 shows the mean scores (centroids) attained by each of the four cultural groups on cognitive functions identified as discriminants among groups.

Table 11

Group Means on Stepwise Canonical Discriminant
Functions for Four Cultural Groups

Group	Cases	Function One	Function Two	Function Three
Indian	20	0.390	-1.115	-1.574
Metis	20	-2.611	0.165	0.146
Inuit	20	0.686	-1.656	1.230[a]
Non-native	40	0.768[a]	1.303[a]	0.099

[a]Indicates group with largest positive mean on each function.

A high positive mean indicated that the members of that group only likely operated according to the variables loading heavily on that function. Placements in Figure 4 show statistically that the forty non-natives in the sample were most like function two ($\overline{X}$ = 1.303) but were also more like function one ($\overline{X}$ = .768) than was true for any other group.

Figure 4

Group Placement According to Function Means
for Four Cultural Groups

FUNCTION ONE (Conflict analytical)

High   + -   Low
├──────────┼──────────┼──────────┼──────────┼──────────┼──────────┤
                    (+.768)   (-2.611)
                   Non-native   Metis
                        (+.686)
                         Inuit
                            (+.390)
                            Indian

- -

FUNCTION TWO (Conflict-relational)

High   + -   Low
├──────────┼──────────┼──────────┼──────────┼──────────┼──────────┤
               (+1.303)   (-1.115)
              Non-native   Indian
                        (.165)   (-1.656)
                        Metis   Inuit

- -

FUNCTION THREE (non-significant)

High   + -   Low
├──────────┼──────────┼──────────┼──────────┼──────────┼──────────┤
               (+1.230)   (+.146   (-1.574)
                 Inuit   Metis   Indian
                               (+.099)
                              Non-native
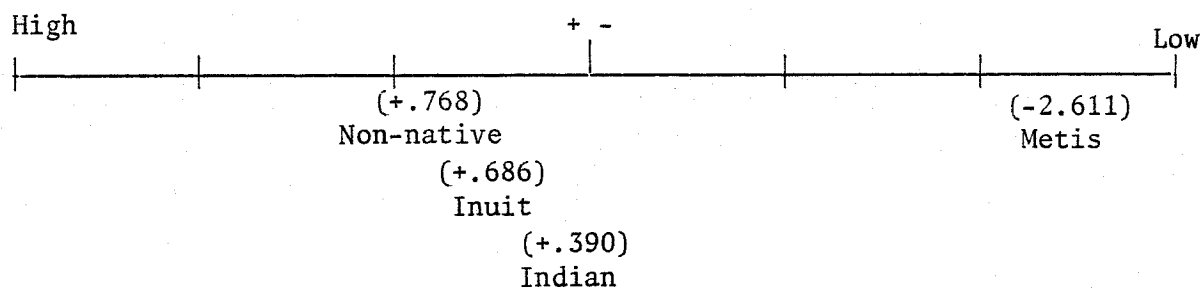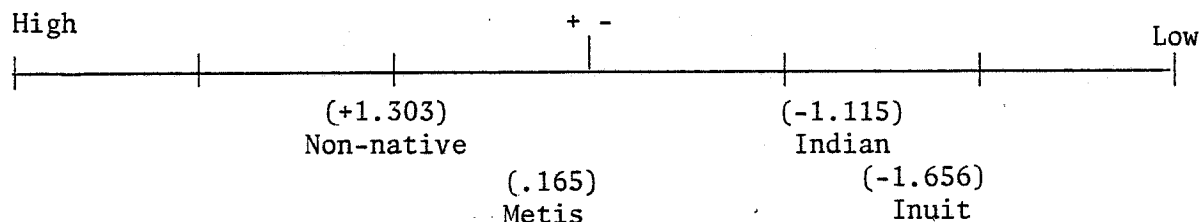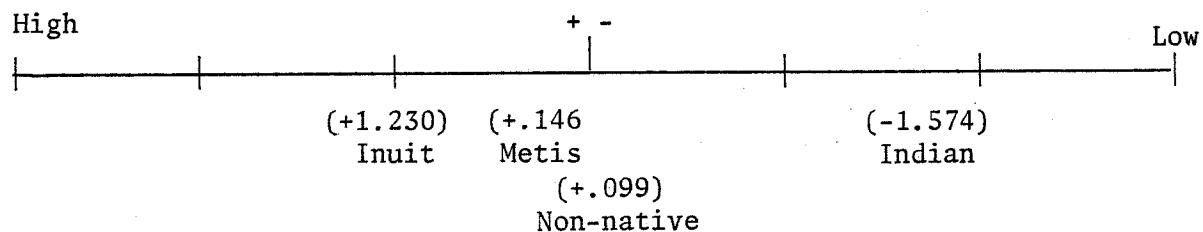
Accordingly, the descriptors would define the group primarily as Conflict-relational with some tendencies towards being Conflict-analytical. On function one, the Conflict-analytical, the non-natives were most like the Inuit and least like the Metis. The Indian group tended towards the Conflict-analytical style and related to no other identified style.

The Metis group was somewhat like function two (Conflict-relational) but a mean score of .165 did not suggest a strong identification with that style. The Metis loaded almost as strongly on function three ($\overline{X}$ = .146), which was a non-significant function.

The Inuit group identified most strongly with function three scoring a mean of 1.230, but also loaded positively on function one ($\overline{X}$ = .686), the Conflict-relational. The Inuit group was related negatively to the Conflict-relational style. Group mean on function two was -1.656.

The power of the analysis to discriminate is shown by figures in Table 12 which indicate that 88 percent of the one hundred cases were correctly classified. The non-native group had the highest predictability (92.5 percent), followed by the Metis group (90 percent) and the Indian group at 85 percent. Lowest predictability was for the Inuit (80 percent) and even for that group only four of the twenty protocols fell outside of their actual classification.

On the basis of findings of the discriminant analysis Hypothesis 1 was rejected. Significant differences were found among the four cultural sub-groups in the study: Indian, Metis, Inuit and non-native. Therefore the alternate hypothesis of the existence of significant differences in the cognitive styles used by each of the four cultural sub-groups was accepted.

Table 12

Summary of Classification Results of Stepwise
Discriminant Analysis for Four Cultural Groups

Actual Group	Cases	Predicted Group Membership			
		1	3	4	5
1 (Indian)	20	17 (85%)	0 (0%)	2 (10%)	1 (5%)
3 (Metis)	20	1 (5%)	18 (90%)	0 (0%)	1 (5%)
4 (Inuit)	20	2 (10%)	0 (0%)	16 (80%)	2 (10%)
5 (Non-native)	40	1 (2.5%)	1 (2.5%)	1 (2.5%)	37 (92.5%)

Percent of grouped cases correctly classified: 88 percent.

Native and Non-native Cultural Groups

Hypothesis 2. *There will be no statistically significant differences found in the cognitive style identified and associated predominantly with the total indigenous group (Indian, Metis, Inuit) as compared to the non-native group.*

Discriminant analysis was performed to test Hypothesis 2. Table 13 shows the results of the direct method discriminant analysis where all variables entered the equation and contributed in varying degrees to the discriminatory power of function one. As the table indicates, twenty-seven variables were removed when the stepwise analysis was performed, either for lack of significance or because they did not fit together with other variables in the equation. Variables most heavily weighted on function one were: -.620 (100) (Intensify), +.525 (101) (Contend without support),

Table 13

Direct Method Standardized Canonical Discriminant Function
Coefficients for Two Cultural Groups

Variables	Function One Coefficients	Variables	Function One Coefficients
100	-.620	255*	-.158
101*	.525	150*	.154
A4	.514	A5 *	.146
257*	-.492	B2 *	.137
B7	-.478	201*	.131
202	-.470	203*	.126
B4	.447	153*	-.121
D1	-.440	A7 *	.109
A6	-.419	103*	-.108
B3	.344	252	.104
B1	-.355	200*	-.099
102*	-.328	B5 *	-.087
152	.291	A8 *	.075
A2*	.277	253*	.070
256 *	.269	251*	.067
A1	.239	C2 *	.062
250 *	.228	A3 *	-.058
B8	.223	254*	.039
C4	.220	C3 *	.032
151	-.198	C1 *	-.022
B6*	-.190	B9 *	.009

Eigenvalue: 1.72; Canonical correlation: .80; Wilke's Lambda:
.37; d.f.: 16; Sig.: <.0001

*Indicates variables removed by stepwise analysis.

and +.514 (A4) (Appeal for sympathy). The smallest contributions were: +.009 (B9) (Indirect), -.022 (C1) (Problem solving) and +.032 (C3) (Contradictory statements).

The relative strength of function one as a discriminator of the cognitive styles between the native and non-native groups was indicated by the relatively high eigenvalue (1.72) and a Wilke's lambda of .37. The canonical correlation of .80 showed that 64 percent of variance between the two cultural groups was accounted for by function one.

The minor contribution of the discarded variables was confirmed by the stepwise analysis (Table 14) when after sixteen variables had been entered, the Wilke's lambda was .424 compared to that of .37 in the direct method with all variables. Similarly, the canonical correlation decreased from .80 to .76 for a loss of six percent variance accounted for.

The stepwise analysis identified variables loading most strongly on function one in either positive or negative direction (Table 15). The major variables were: A4 at +.491 (Appeal for sympathy); A2 at +.435 (Value premises); D1 at -.420 (Field independent); 202 at -.395 (Switch to unrelated ideas); 100 at -.390 (Intensify); A6 at -.388 (Authority support); and B3 at +.383 (Global, concrete).

Based on these major scores a person identified by function one tended to appeal for audience support on moral and ethical grounds. Conclusions were developed from value premises. Such a person operated from a field-dependent orientation, would "stick to the topic" of discussion but would not make strongly emphasized statements. Authority figures were not cited for support of arguments. Such a person was seen to speak holistically and in concrete terms. This study labelled the function two cognitive style to be Moral-relational.

Table 14

Summary of Stepwise Discriminant Analysis of
Variables for Two Cultural Groups

Variables	Wilke's Lambda	Change in Minimum D Squared	Standardized Coefficient
D1	.785	1.115**	-.420
202	.708	1.687**	-.395
B3	.644	2.257**	.383
152	.602	2.701**	.343
A4	.578	2.979**	.491
B7	.541	3.465**	-.337
A2	.511	3.906**	.435
A6	.495	4.167**	-.388
151	.482	4.386**	-.343
B1	.471	4.589**	-.313
B4	.460	4.787**	.252
100	.451	4.962**	-.390
252	.443	5.138**	.229
A1	.436	5.274**	.254
B8	.430	5.423**	.169
C4	.424	5.537**	.179

** $p < .001$; Eigenvalue = 1.36; Canonical correlation = .76
(58% of variance); Wilke's lambda = .424

Table 15

Stepwise Method Canonical Discriminant Function
Coefficients for Two Cultural Groups

Variables	Function One Coefficients	Variables	Function One Coefficients
A4	.491	151	-.343
A2	.435	B7	-.337
D1	-.420	B1	-.313
202	-.395	A1	.254
100	-.390	B4	.252
A6	-.388	252	.229
B3	.383	C4	.179
152	.343	B8	.169

The next procedure in the discriminant analysis identified group means for function one (Table 16) and found that the native cultural group scored a positive mean of .941 on function one, contrasted with the non-native group mean of -1.412. The difference between the two groups is more dramatically illustrated in Figure 5 where the disparity between the groups is indicated on the positive-negative continuum. According to the findings of the discriminant analysis the native cultural group (Indian, Metis and Inuit) in this study could be described as thinking in the Moral-relational cognitive style. This analysis did not identify a cognitive style for the non-native group but did show that the non-natives could not be described as Moral relational.

Table 17 illustrates the predictability of the two groups on the discriminants identified in this analysis. The procedure correctly

Table 16

Group Means (Centroids) on Stepwise Canonical Discriminant
Functions for Two Cultural Groups

Group	Number of Cases	Function One Group Means
1 (Native)	60	.941
2 (Non-native)	40	-1.412

Figure 5

Group Placement According to Function Means
for Two Cultural Groups

FUNCTION ONE (Moral-relational)

High   + -   Low
|———|————|————|————|————|————|————|
                  (+.941)   (-1.412)
                  Native   Non-native
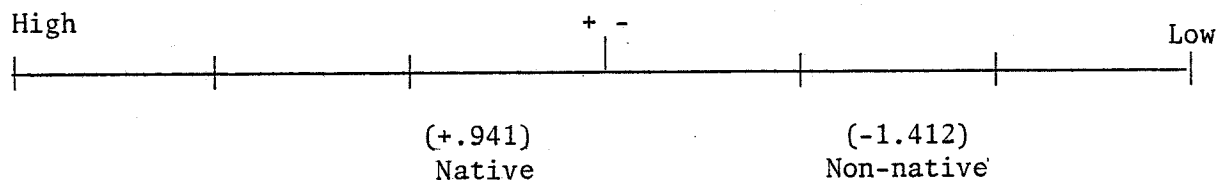
classified 86 percent of the total sample into native and non-native.

On the basis of findings of the discriminant analysis, Hypothesis
2 was rejected. Significant differences in cognitive style were found
between the native (Indian, Metis and Inuit) cultural group and the non-
native group in this study. Therefore, the alternate hypothesis of
significant differences in the cognitive style identified with the total
indigenous group (Indian, Metis and Inuit) as compared to the non-native
group was accepted.

Table 17

Summary of Classification Results of Stepwise Discriminant
Analysis for Two Cultural Groups

Actual Group	Number of Cases	Predicted Group Membership	
		1	2
1	60	51 (85.0%)	9 (15%)
2	40	5 (12.5%)	35 (87.5%)

Percent of grouped cases currectly classified: 86 percent

Language Facility

Hypothesis 3. *There will be no statistically significant differ-
ences found in the cognitive style identified as being associated with
protocols in the study on the basis of being monolingual or bilingual.*

Table 18 shows the results of the direct method discriminant
analysis which was performed on the one hundred protocols grouped on the
basis of eighteen monolingual English speakers and eighty-two bilingual
speakers of English and a native language. Examination of the table
shows that twenty-six variables were removed from the equation in the
subsequent stepwise analysis.

With the direct method all variables of the DACS scale contributed
to discrimination between the two groups on the basis of language facility.
Power to discriminate ranged from high absolute scores of +.636 (C4) and
+.609 (150) to lows of -.010 (C2) and -.001 (256). Although the analysis
identified function one, it failed to reach the .05 level of significance
(.2077). The high Wilke's lambda (.528) and low canonical correlation (.69),

Table 18

Direct Method Standardized Discriminant Function Coefficients
for Language Facility Groups

Variable	Function One Coefficients	Variable	Function One Coefficients
C4	0.636	A7	0.231*
150	0.609	C1	0.222*
B2	-0.577	200	0.180*
A2	-0.510	B1	0.178*
D1	-0.508	251	0.151*
202	0.483	B6	-0.123*
255	0.426	103	-0.114*
250	0.413	201	0.093*
C3	-0.403	B9	-0.084*
102	-0.378	A5	0.082*
B5	-0.374*	257	0.078*
101	0.356	B8	0.077
A1	-0.344*	252	0.074*
151	0.343*	153	-0.070*
B7	-0.331*	A3	0.059*
100	-0.311*	A8	0.034*
254	-0.253	203	-0.023*
A6	0.251	A4	-0.018*
253	-0.250	B3	-0.017*
B4	0.248*	C2	-0.010*
152	-0.234	256	-0.001*

Eigenvalue: .894; Canonical correlation: .69; Wilke's lambda:
.528; d.f.: 42; Sig.: .2077

* Indicates non-significant variables removed in stepwise
analysis.

i.e. 47.6 percent of variance in the discriminant function accounted for by the two groups indicated a non-significant degree of separation between monolingual and bilingual speakers by the direct method.

The stepwise discriminant analysis retained sixteen variables in the equation (Table 19), and each was credited with making a significant change in the minimum D squared. However, the high Wilke's lambda (.60) and low canonical correlation (.631) confirmed the direct method analysis that the variable of linguistic facility was a relatively poor discriminator. The variables included in function one accounted for only 40 percent of variance between the monolingual and bilingual groups using the stepwise procedure.

The relative contribution to the discriminatory power of function one is shown in Table 20. In order of importance the high scoring variables were: A2 at -.593 (Value premises); C4 at +.583 (Complex sentence structure); 101 at -.453 (Contend without support); D1 at -.439 (Field independent); B2 at -.407 (Self-centered, subjective); 255 at +.400 (Focus on a few points).

The cognitive style of a person scoring high on function one included the characteristic of speaking in complex sentences (subordinate clauses, modifiers, complicated vocabulary). This person did not base arguments on value premises and focused on only a few points. Such an individual made supported contentions, tended to be field dependent but did not speak subjectively. This pattern of variables contained contradictions, i.e., a field-dependent thinker would be expected to speak in subjective terms. A possible explanation may relate to the fact that all interviews were conducted in English which, for a large proportion of the sample, was a second language. The desire to speak correct English may have been the

Table 19

Summary of Stepwise Discriminant Analysis of
Language Facility Groups

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.
1	152		0.890	0.823	0.0007**
2	255		0.837	1.292	0.0002**
3	C4		0.795	1.709	0.0001**
4	250		0.769	1.992	0.0000**
5	A1		0.742	2.311	0.0000**
6	254		0.724	2.536	0.0000**
7	102		0.711	2.694	0.0000**
8	B2		0.701	2.828	0.0001**
9	202		0.690	2.979	0.0001**
10	150		0.678	3.151	0.0001**
11	D1		0.665	3.340	0.0001**
12		102	0.672	3.236	0.0001**
13	B1		0.661	3.404	0.0001**
14	C3		0.651	3.557	0.0001**
15	A6		0.642	3.703	0.0001**
16	A2		0.632	3.862	0.0001**
17		A1	0.637	3.786	0.0001**
18	B8		0.629	3.921	0.0001**
19	B5		0.621	4.055	0.0002**
20	101		0.611	4.221	0.0002**
21	102		0.600	4.427	0.0002**
22	253		0.589	4.631	0.0002**
23		B1	0.595	4.516	0.0002**
24		B5	0.602	4.398	0.0001**

Wilke's Lambda: .602; Canonical correlation: .631; Eigenvalue: .66;
Significance: **$p < .001$, *$p < .01$

Table 20

Stepwise Method Canonical Discriminant Function
Coefficients for Language Facility Groups

Variables	Function One Coefficients	Variables	Function One Coefficients
A2	-.593	C3	-.346
C4	.583	253	-.344
101	.453	152	-.332
D1	-.439	254	-.327
B2	-.407	202	.312
255	.400	A6	.237
250	.381	102	-.231
150	.362	B8	.224

Eigenvalue: .662

over-riding consideration in responses of a large proportion of the sample. The discrepancy in group size (eighteen monolinguals and eighty-two bilinguals) may also have affected the results.

Table 21 depicts group means on the linguistic criterion and shows the bilingual group scoring a positive mean of .377 on function one. The monolingual English speakers were clearly separated on function one discriminants with a mean score of -1.720. However, the group means indicated generally less separation than was found in the analyses of cultural variables.

In spite of relatively weak separation of groups on the basis of being able to speak English only or native languages in addition to English, the analysis correctly classified 86 percent of the total group (Table 22). Predictability was not significantly greater than chance

Table 21

Group Means on Stepwise Canonical Discriminant
Functions for Language Facility Groups

Actual Group	Number of Cases	Function One Group Means
1 (Monolingual)	18	-1.720
2 (Bilingual)	82	0.377

for the bilingual group but was 77.8 percent for the monolinguals. Considering the high predictability for monolinguals the language variable was considered an important factor influencing cognitive style.

Table 22

Summary of Classification Results of Stepwise Discriminant
Analysis for Language Facility Groups

Actual Group	Number of Cases	Predicted Group	Membership
1	18	14 (77.8%)*	4 (22.2%)
2	82	10 (12.2%)	72 (87.8%)*

* Monolingual cases correctly classified = 77.8 percent. Bilingual classification rate was not significant.

Since separation between the monolingual and bilingual groupd did not reach the .05 level of significance, Hypothesis 3 was accepted. However, the language variable was retained as a strong influence on cognitive style because of its ability to predict the monolinguals.

Figure 6

Group Placement According to Function Means
for Language Facility Groups

FUNCTION ONE (Conflict relational)

High   + -   Low
├──────────┼──────────┼──────────┼──────────┼──────────┤
                        (+.377)   (-1.72)
                       Bilingual   Monolingual
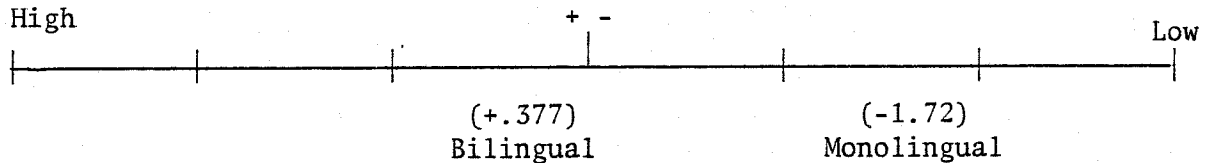
Eighty-six percent of all respondents were correctly classified by the
analysis as either monolingual or bilingual.

Post-secondary Education

Hypothesis 4. *There will be no statistically significant differ-*
ences found among cognitive styles of respondents identified with four
groups at different levels of post-secondary education.

All variables entered the direct method discriminant analysis
(Table 23) in the procedure used to test hypothesis four. Twenty-two
variables were removed by the stepwise analysis performed later. Major
variables contributing to functions in the direct method ranged from -.948
for B1 on function two to .000 for variable 256 on function one.

The direct method discriminant analysis found function one to be
significant (.0256) but neither functions two nor three reached the .05
level of significance in their power to discriminate among groups (Table
24). For function one 64.2 percent of variance was accounted for by the
groups (canonical correlation .801).

Table 23

Direct Method Standardized Canonical Discriminant Function
Coefficients for Post-secondary Education Groups

Variables	Function One Coefficients	Function Two Coefficients	Function Three Coefficients
A1	.052	.184	.454
A2*	-.241	.356	-.233
A3	.476	-.163	.004
A4*	-.482	-.143	.304
A5*	.322	.430	.251
A6	-.418	.217	-.133
A7*	.414	-.201	-.302
A8	.215	-.302	-.024
B1	-.165	-.948	-.227
B2	.189	-.936	.830
B3	.486	.354	-.236
B4*	.220	-.730	-.153
B5*	-.085	.212	.060
B6	-.156	-.533	-.251
B7	.238	.780	.820
B8*	.130	.558	.279
B9*	-.274	-.038	-.188
C1*	-.169	-.158	.185
C2	-.274	.729	-.312
C3*	.267	.006	-.047
C4	-.382	-.464	-.006
D1	-.373	-.208	.006
100*	-.419	.220	.138
101*	.066	-.637	-.022
102*	-.061	.216	-.069
103*	-.145	.127	.050
150	.175	.350	-.118
151	-.186	-.928	-.286
152	-.057	-.456	-.151
153	.173	.755	-.298
200*	-.004	-.088	.240
201	.279	.345	-.483
202*	.089	.071	-.185
203*	-.261	-.013	-.354
250	.097	-.742	-.268
251	-.336	-.121	-.300
252*	-.220	.024	-.156
253*	.243	-.381	-.105
254	-.124	-.193	-.496
255*	-.075	-.359	-.269
256*	.000	-.034	-.316
257*	.134	.438	.204

*Indicates non-significant variables removed by stepwise analysis.

Table 24

Relationships of Canonical Discriminant Functions Defined
by Direct Method Discriminant Analysis for
Post-Secondary Education Groups

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig.
1	1.794	55.47	.801	.124	126	.0256
2	.982	30.36	.704	.346	82	.5207
3	.459	14.18	.561	.686	40	.9086

The stepwise analysis (Table 25) performed thirty-nine steps before retaining twenty variables which were found to be the most significant and giving the best fit for three functions. Fifteen of the variables entering the process made significant changes ($p < .01$) in the minimum distance between closest groups. The Wilke's lambda of .217 indicated that the length of time respondents had spent in post-secondary education at a university was not a strong discriminator in identifying differences in cognitive style. However, the first two functions were significant discriminators at the .01 level.

Table 26 shows that functions one and two were significant discriminators ($< .001$ and .0084) and function three with eigenvalue of .277 was of minor importance in identifying differences in cognitive style. Canonical correlation of function one (.747) and function two (.611) gave support to the power of these functions to discriminate.

Coefficient discriminant weights for functions one to three (Table 27) show the loading of each variable in a positive or negative direction.

Table 25

Summary of Stepwise Discriminant Analysis of Variables
for Post-secondary Education Groups

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.	Between Groups	
1	A2		.930	.052	.5735	1	3
2	D1		.687	.423	.0453	0	2
3	254		.660	.643	.2445	0	1
4	B3		.577	.859	.0170	0	2
5	C4		.532	.954	.0215	0	2
6	203		.510	1.166	.0148	0	2
7	152		.491	1.335	.0129	0	2
8	251		.473	1.445	.0148	0	2
9		A2	.488	1.409	.0092*	0	2
10	202		.472	1.468	.4267	1	2
11	A2		.453	1.534	.0181	0	2
12		152	.467	1.395	.0183	0	2
13	B9		.450	1.626	.0410	2	3
14		A2	.465	1.423	.4499	1	2
15	A8		.439	1.648	.0115	0	2
16		202	.452	1.468	.0134	0	2
17	152		.437	1.640	.0119	0	2
18	B7		.415	1.945	.4036	1	2
19	151		.399	2.027	.3640	0	1

Table 25 (Continued)

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.	Between Groups	
20	201		.362	2.328	.0050*	0	2
21	252		.349	3.443	.3666	0	1
22		151	.360	2.288	.0058*	0	2
23	250		.346	2.518	.0046*	0	2
24		B9	.356	2.373	.0043*	0	2
25	C2		.339	2.433	.0061*	0	2
26	153		.326	2.534	.0075*	0	2
27	A6		.304	2.551	.0118	0	2
28	B2		.275	2.567	.0179	0	2
29	B6		.265	2.850	.0127	0	2
30	151		.255	3.144	.0091*	0	2
31		203	.264	2.888	.0115	0	2
32		252	.273	2.795	.0093*	0	2
33	A1		.263	3.119	.0060*	0	2
34		251	.273	2.894	.0070*	0	2
35	150		.259	3.086	.0066*	0	2
36	B1		.242	3.338	.0054*	0	2
37	A3		.227	3.369	.0081*	0	2
38	251		.217	3.494	.0094*	0	2

**p < .001   *p < .01

108

Table 26

Relationships of Canonical Discriminant Functions Defined by
Stepwise Analysis of Post-secondary Education Groups

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig.
1	1.259	59.06	.747	.217	60	<.0001
2	.596	27.97	.611	.491	38	.0084
3	.277	12.97	.465	.783	18	.2675

Function one with eigenvalue of 1.259 was most significant as a group descriptor. The six strongest discriminating variables in the function were: B3 at +.526 (Global, concrete); C4 at -.462 (Complex sentence structure); D1 at -.453 (Field-independent); 201 at +.366 (End idea and begin again); A6 at -.356 (Authority support); A8 at +.349 (Derogatory). It was of interest to note that five of the six variables were from the aspects of reasoning portion of the DACS scale.

An interpretation of these variables indicates that a person scoring high on function one tends to think in a global, concrete, field-dependent style. Such a person does not speak in complex sentence structures, does not support ideas by reference to authority figures, and appears to end an idea and then begins again. Such a person tends to make derogatory remarks about people and institutions. The cognitive style of such a person was labelled in this study as being Inexact-relational.

Characteristics of the cognitive style defined by function two were derived from the variables loading most heavily on that function.

Table 27

Stepwise Method Canonical Discriminant Function Coefficients
for Post-secondary Education Groups

Variables	Function One Coefficients	Function Two Coefficients	Function Three Coefficients
A1	.237	.243	-.397
A3	.323	-.283	.201
A6	-.356	.274	.009
A8	.349	-.345	.280
B1	-.009	.614	.058
B2	.030	-1.050	-.360
B3	.526	.369	.132
B6	-.176	-.282	.503
B7	.174	.368	-.922
C2	-.009	.649	.143
C4	-.462	-.301	-.097
D1	-.453	-.151	.139
150	-.014	.558	.102
151	-.277	-.283	.277
152	-.353	-.405	.244
153	.182	.474	.092
201	.366	.323	.340
250	-.310	-.913	.385
251	-.255	.101	.291
254	-.041	-.067	.530
Eigenvalues:	1.259	.596	.277

They were: B2 at -1.050 (Self-centered, subjective); 250 at -.913

(Enlarge or elaborate); C2 at +.649 (Role descriptors); B1 at +.614

(Stimulus centered, objective); 150 at +.588 (De-emphasize); 153 at +.474

(Become specific).

Interpretation of these results suggested that a person with the cognitive style described by function two was likely to be objective, to be concerned with role expectations and to de-emphasize statements. This person voiced little elaboration and tended to speak in specifics rather than generalizations. In sum, this person could be described as having a cognitive style which this study designated as Inexact-analytical.

Although function three was not a significant discriminator, it was described for discussion purposes since several of the study groups scored heavily on its variables. Major contributors to the function were: B7 at -.922 (Assumed cause-effect); 254 at +.530 (Agree generally; disagree in part); B6 at +.503 (Amphiboly); A1 at -.397 (Fact premise); 250 at +.385 (Enlarge or elaborate); B2 at =.360 (Self-centered, subjective). Such variables described a style of cognition which was ambivalent (agree, disagree) while enlarging on points which are awkwardly stated. Discussion was objective but cause and effect were not assumed.

Table 28 summarizes the group means (centroids) scored by each of the four groups on the three functions. Group zero (no university) scored most heavily on function one in a positive direction and were most unlike function three (-.119). According to the style definition of function one, people with no university education in this study were said to be Inexact-relational thinkers. Group one (less than one year) consisted of only eight protocols, a very small number from which to obtain a valid result. This group had a small positive mean on function one (.024) but was not significant since the standard mean was above zero. Group two, consisting of people who had attended university for from one to three years, scored positively on function three ($\overline{X}$ = .765) but were negatively related

Table 28

Group Means on Stepwise Discriminant Functions
for Post-secondary Education Groups

Actual Group	Number of Cases	Function One Group Means	Function Two Group Means	Function Three Group Means
No university	42	1.063[a]	.474	-.119
< 1 year	8	.024	-1.876	-1.191
1-3 years	24	-.048	-.742	.765[a]
4-6 years	26	-1.680	.496[a]	-.147

[a]Group obtaining highest positive mean on function

to function two ($\overline{X}$ = -.742) and function one ($\overline{X}$ = -.048). Function three

was not a significant discriminator.

The highest mean score for function one was attained by group

three (four to six years of university), but it was strongly in a negative

direction ($\overline{X}$ = -1.680) suggesting such people did not operate in a

relational style. This group did score positively on function two ($\overline{X}$ =

.496) and although this was not a high mean score, it was the only positive

relationship of this group to any one of the three functions. Function

two variables described an Inexact-analytical style.

Figure 7 depicts the distribution of groups on cognitive functions

in relation to length of time spent in university level education.

Respondents with no university and those with less than one year related

positively to function one (Inexact-relational) while those with two to

four years of university study were definitely not identified with this

style (X = -1.680). The "no university" group was slightly Inexact-

analytical but those with less than one year of university study were

Figure 7

Group Placement According to Function Means for
Post-secondary Education Groups

FUNCTION ONE (Inexact-relational)

```
High                            + -                              Low
|----+-------+-------+-------+---|---+-------+-------+-------+----|
         (1.063)    (.024)  (-.048)         (-1.680)
         Group 0    Group 1 Group 2         Group 3
```

_ _
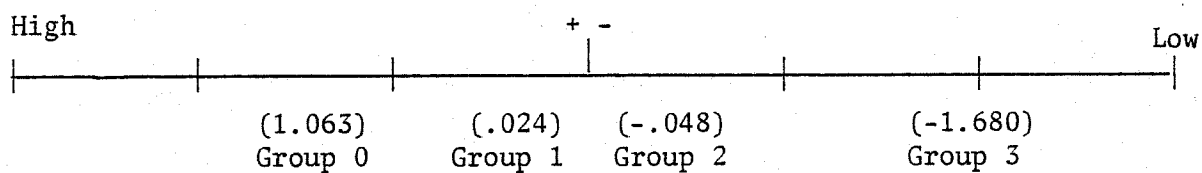
FUNCTION TWO (Inexact-analytical)

```
High                            + -                              Low
|----+-------+-------+-------+---|---+-------+-------+-------+----|
                  (.474)      (-.742)      (-1.876)
                  Group 0     Group 2      Group 1
                  (.496)
                  Group 3
```

_ _

FUNCTION THREE (non-significant)

```
High                            + -                              Low
|----+-------+-------+-------+---|---+-------+-------+-------+----|
                  (.765)   (-.119)   (-1.191)
                  Group 2  Group 0   Group 1
                                     (-1.47)
                                     Group 3
```
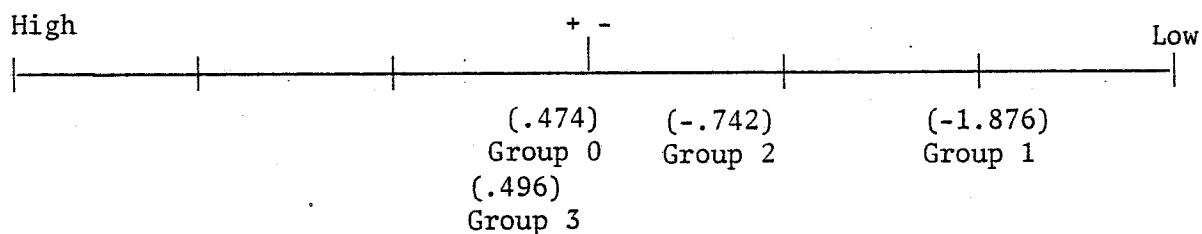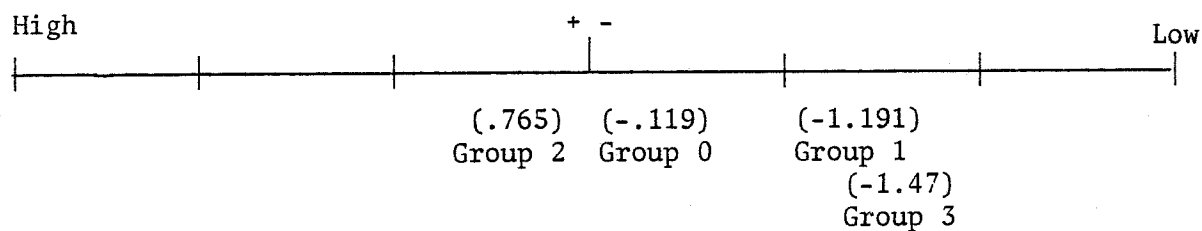

definitely not in that category ($X = -1.876$). The group with the longest

time at university was most like the Inexact-analytical style ($X = .496$)

while those with one to three years related to non-significant function

three.

In spite of the lack of strength of the educational variable as a discriminator, the stepwise discriminant analysis was able to correctly classify 74 percent of all protocols into their actual groups (Table 29). Group one, with only eight protocols, was correctly classified in 100 percent of the cases, but the small number of cases left the validity of this finding in some question, particularly since the group mean on function one was at the mean. Second highest group to be correctly classified was group three (four to six years of university) with 88.5 percent correct classification. Lowest classification level was recorded for group two at 58.3 percent. This also was the lowest classification rate for any analysis in the study.

Table 29

Summary of Classification Results of Stepwise Discriminant
Analysis for Post-secondary Education Groups

Actual Group	Number of Cases	Predicted Group Membership			
		0	1	2	3
No university	42	29 (69.0%)	4 (9.5%)	7 (16.7%)	2 (4.8%)
< 1 year	8	0 (0.0%)	8 (100.0%)	0 (0.0%)	0 (0.0%)
1-3 years	24	5 (20.8%)	2 (8.3%)	14 (58.3%)	3 (12.5%)
4-6 years	26	1 (3.8%)	1 (3.8%)	1 (3.8%)	23 (88.5%)

Percent of grouped cases correctly classified: 74 percent

The discriminant analysis performed to test Hypothesis 4 "that there will be no significant differences found among cognitive styles of respondents identified with four groups at different levels of post-secondary education" resulted in the finding of significant differences. The null hypothesis therefore was rejected and the alternate hypothesis was accepted.

Male and Female Groups

Hypothesis 5. *There will be no statistically significant differences found between the cognitive style identified for males and females.*

The discriminant analysis was performed to test the hypothesis of no differences between the cognitive styles of male and female groups in the study. Table 30 shows the results of the direct method analysis where all variables were entered simultaneously. The discriminant scores indicate the negative or positive weights of each variable on function one. Variables which contributed the major amounts of discrimination to function one were: 256 at -.694 (Deduce and voice conclusions); A1 at -.608 (Fact premises); 153 at +.515 (Become specific); B7 at -.496 (Opposites and contrasts). The stepwise analysis which followed removed twenty-four of the forty-two variables as being either non-significant or not fitting meaningfully into the equation.

The stepwise discriminant analysis is summarized in Table 31. The relatively low eigenvalue (.782) and high Wilke's lambda (.561) indicated that the sex variable was a weak discriminator between groups. This was confirmed by the canonical correlation of .663 (43.5 percent of variance accounted for). However, each of the twenty variables which entered the equation accounted for a significant change in the minimum D squared.

Table 30

Direct Method Standardized Discriminant Function
Coefficients for Male and Female Groups

Variables	Function One Coefficients	Variables	Function One Coefficients
A1	-.608	D1*	.045
A2*	-.021	100*	.158
A3*	.158	101*	-.036
A4*	.103	102	.305
A5*	-.026	103*	-.485
A6	.464	150	.485
A7*	-.411	151	.360
A8*	.191	152	.102
B1	.192	153	.515
B2*	.280	200	.301
B3*	-.133	201*	.087
B4*	-.010	202	.344
B5	.363	203	-.284
B6	-.240	250*	-.041
B7	-.496	251	.179
B8	.334	252	-.198
B9*	-.137	253*	-.334
C1*	.104	254*	-.079
C2*	.153	255*	.005
C3*	-.200	256	-.694
C4*	.148	257*	.270

Eigenvalue: 1.006; Canonical correlation: .708; Wilke's lambda: 496;
d.f.: 42; Sig.: .108

*Indicates non-significant variables removed by stepwise analysis

Table 31

Summary of Stepwise Discriminant Analysis of Variables
for Male and Female Groups

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.
1	C4		.928	.322	.0071*
2	B5		.887	.532	.0029*
3	A6		.855	.707	.0017*
4	B8		.831	.846	.0014*
5	102		.809	.983	.0011*
6	256		.786	1.130	.0009**
7	153		.759	1.322	.0005**
8	A1		.732	1.523	.0003**
9	150		.693	1.847	.0001**
10	B1		.677	1.983	.0001**
11	B6		.655	2.189	.0001**
12	202		.640	2.339	.0001**
13	151		.629	2.457	.0001**
14	B7		.602	2.748	.0000**
15	251		.590	2.885	.0000**
16	203		.582	2.991	.0000**
17	252		.573	3.094	.0001**
18		C4	.580	3.015	.0000**
19	200		.568	3.163	.0000**
20	152		.561	3.256	.0001**

Eigenvalue: .782; Canonical correlation: .663; Wilke's lambda: .561;
Significance: **$p < .001$, *$p < .01$

Table 32 shows the discriminant function weights resulting from the stepwise analysis. Eighteen variables contributed to the discriminatory power of function one. Major contributors were: 256 at -.774 (Deduce and voice conclusions); 150 at +.606 (De-emphasize); A1 at -.597 (Fact premises); 153 at +.531 (Become specific); A6 at +.485 (Authority support); B7 at -.482 (Opposites, contrasts).

Table 32

Stepwise Method Canonical Discriminant Function
Coefficients for Male and Female Groups

Variables	Function One Coefficients	Variables	Function One Coefficients
256	-0.774	B6	-0.357
150	0.606	B8	0.344
A1	-0.597	203	-0.305
153	0.531	103	0.304
A6	0.485	252	-0.290
B7	-0.482	B5	0.289
B1	0.479	251	0.274
151	0.446	200	0.253
202	0.398	152	0.194

A synthesis of the meaning of these variables suggests a person whose cognitive style includes making cautious statements which seek support from authority figures (experts). Fact premises are not used frequently and statements tend to be about specific points. Conclusions are seldom voiced and opposites and contrasts are not used as a strategy. The study classified this study as Conflict-relational.

Table 33 shows the group means on the stepwise analysis functions for study of the sample on the basis of sex groups. Group one (males) identified with function one with a positive mean of .686. In contrast, females scored a mean of -1.119 which suggested that their cognitive style was very unlike that described for function one.

Figure 8 demonstrates the relative degree of separation between males and females in relation to the cognitive style characteristic of each. Neither group registered mean scores at the extremes of the positive-negative continuum. However, group one (sixty-two males) was significantly more like the characteristics described by function one than was true for the thirty-eight females in the study group.

Table 33

Group Means on Stepwise Canonical Discriminant
Functions for Male and Female Groups

Actual Group	Number of Cases	Function One Group Means
1. Male	62	0.686
2. Female	38	-1.119

Although the sex variable was not a strong discriminator between groups, the analysis correctly classified 82 percent of the study protocols (Table 34). Prediction was slightly higher for females (84.2 percent) than it was for males (80.6 percent). This meant that only six females and twelve males fit with a cognitive style other than that of the group with which they were actually identified.

Figure 8

Group Placement According to Function
Means for Male and Female Groups

FUNCTION ONE (Conflict-relational)

High   + -   Low
|————————|————|————|————|————————|————|————————|
                          (+.686)   (-1.119)
                           Males   Females
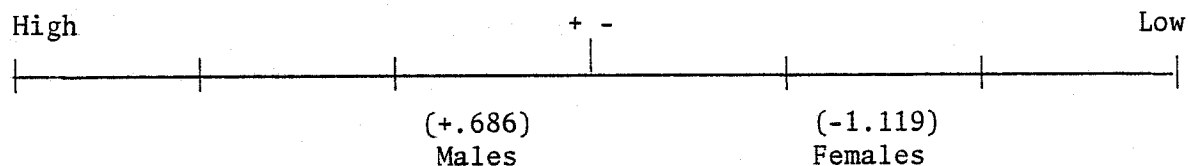
Table 34

Summary of Classification Results of Stepwise
Discriminant Analysis for Male and Female Groups

Actual Group	Number of Cases	Predicted Group	Membership
1	62	50 (80.6%)	12 (19.4%)
2	38	6 (15.8%)	32 (84.2%)

Percent of group correctly classified: 82 percent

On the basis of findings of the stepwise discriminant analysis,
Hypothesis 5 of no significant differences being found in the cognitive
style of males and females was rejected. The alternate hypothesis that
there were significant cognitive style differences on the basis of sex
was accepted.

Age Groups

Hypothesis 6. *There will be no statistically significant differences found among the cognitive styles characteristic of four age groups of respondents.*

Table 35 shows the results of the direct method discriminant analysis of one hundred protocols divided into four groups on the criterion of age. All variables entered the equation simultaneously in the direct method equation and each contributed some degree of discriminatory power to the functions. However, the stepwise procedure performed later removed twenty-one of the forty-two variables for lack of significant power to discriminate or because they did not fit with other variables in the equation. Function one with eigenvalue of 1.773 was able to discriminate significantly among groups as was function two (eigenvalue 1.008). The third function with a very low eigenvalue of .575 was not a significant discriminator (Table 36).

Variables loading on function one ranged from highs of 256 at -.643 (Deduce and voice conclusions); 203 at +.639 (Move from idea to audience); and A4 at +.595 (Appeal for sympathy) to lows of C1 at +.032 (Problem solving) and 151 at -.026 (Accept conditionally). On function two, the high loadings were: 153 at -.828 (Become specific); A5 at -.649 (Appeal to beliefs); and B1 at -.498 (Stimulus centered, objective). Variables which loaded the least on this function were: 203 at +.005 (Move from idea to audience); 253 at +.012 (Paraphrase and rephrase); and B3 at -.016 (Global, concrete).

The stepwise discriminant analysis (Table 37) performed thirty-nine steps in determining the twenty-one variables which formed the best equation for three functions. The Wilke's lambda of .196 indicated that

Table 35

Direct Method Standardized Discriminant Function
Coefficients for Four Age Groups

Variable	Function One Coefficients	Function Two Coefficients	Function Three Coefficients
A1*	.146	-.307	-.248
A2	.063	-.347	.087
A3*	.262	-.257	-.096
A4	.595	.119	.294
A5	-.176	.649	.084
A6	.056	.428	.162
A7	-.486	.095	-.492
A8	.381	.142	.215
B1*	-.119	.498	.262
B2*	.052	-.376	-.199
B3	-.510	-.016	.229
B4	.293	-.021	-.281
B5*	-.038	.067	-.251
B6	.206	.150	.007
B7*	-.337	.325	-.382
B8*	-.038	.436	.148
B9	.280	-.173	.402
C1*	.032	-.038	-.262
C2*	.239	-.001	-.170
C3	-.218	-.317	-.079
C4*	.250	-.264	-.205
D1	-.015	.406	.067
100*	.222	-.032	-.099
101*	.130	.023	-.532
102	.055	-.389	.176
103	-.313	-.363	-.151
150*	-.047	.121	-.469
151*	-.026	-.353	.083
152*	.416	-.155	.265
153*	.125	-.828	-.320
200	.568	-.066	-.079
201*	-.397	.306	-.249
202*	-.247	.079	.063
203	.639	.005	-.335
250*	.066	.178	.189
251	.485	-.472	.165
252*	.143	-.139	-.099
253*	-.141	.012	.565
254	.222	-.162	.323
255	-.103	.083	.273
256	-.643	-.343	.626
257	-.285	.300	.837
Eigenvalues:	1.773	1.008	.575

*Indicates variables removed by stepwise analysis

Table 36

Relationship of Canonical Discriminant Functions Defined by
Direct Method Discriminant Analysis for Four Age Groups

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig.
1	1.773	52.84	.800	.114	126	.0447
2	1.008	30.03	.709	.316	82	.4873
3	.575	17.14	.604	.635	40	.8032

the age factor was of some significance in relation to describing different
cognitive styles of respondents. Seven variables changed the minimum D
squared at the .001 level of significance while fifteen variables were
significant at the .01 level. Groups two and three stood out as differing
from other groups on the majority of steps in the analysis. Group two
differed on twenty-nine steps and group three on thirty steps. In com-
parison, group four differed on only fourteen steps and group one on three
steps.

The relative importance of three functions determined by the
stepwise procedure is shown in Table 38. Function one, with eigenvalue
of 1.315 and canonical correlation of .754 (57 percent of variance), was
the most significant function. Function two was of minor discriminating
power and function three failed to reach significance at the .05 level.

The variables which loaded on each of the three functions are
tabulated in Table 39. Each variable is listed together with its negative
or positive discrimination score on each function. Major contributors to

Table 37

Summary of Stepwise Discriminant Analysis of
Variables for Four Age Groups

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.	Between Groups	
1	B7		.957	.215	.8916	3	4
2	203		.844	.183	.3416	2	4
3	A2		.779	.435	.0792	2	4
4	A5		.730	.674	.0661	2	3
5	B3		.672	.830	.0116**	1	2
6	200		.598	.966	.0652	2	3
7	B9		.559	1.224	.0102**	2	4
8	B6		.533	1.460	.0570	3	4
9		B7	.551	1.193	.0417*	2	3
10	153		.516	1.562	.0133**	2	3
11	D1		.495	1.771	.0008**	1	2
12	A4		.458	1.864	.0013**	1	2
13	N14		.426	2.023	.0525	3	4
14		A2	.441	1.688	.0926	3	4
15	B2		.419	1.998	.0215*	2	3
16	A8		.403	2.174	.022 *	2	3
17	B7		.384	2.516	.0122**	2	3
18		A5	.397	2.336	.0343**	3	4
19	255		.382	2.473	.0426*	3	4

Table 37 (Continued)

Step	Variables Entered	Variables Removed	Wilke's Lambda	Change in Minimum D Squared	Sig.	Between Groups	
20	256		.341	2.550	.0046**	2	4
21	A5		.328	2.723	.0242*	2	3
22		B2	.338	2.556	.0610	3	4
23	152		.322	2.700	.0261*	2	3
24	A7		.295	2.841	.084	3	4
25	C3		.273	2.963	.1022	3	4
26	102		.262	3.023	.1399	3	4
27	A2		.251	3.110	.0767	2	3
28	C2		.241	3.320	.0751	2	3
29	257		.223	3.527	.0752	2	3
30		B7	.232	3.364	.0677	2	3
31	B4		.218	3.734	.0474*	2	3
32	254		.206	3.920	.0515*	2	3
33		152	.214	3.920	.0309*	2	3
34	B7		.203	4.043	.0395*	2	3
35		C2	.211	3.886	.0335*	2	3
36	A6		.200	3.949	.0484*	2	3
37	103		.186	3.963	.0749	2	3
38		153	.190	3.946	.0488*	2	3
39		B7	.196	3.722	.0487	2	3

$**p < .001$ $*p < .01$

Table 38

Relationships of Canonical Discriminant Functions Defined by
Stepwise Discriminant Analysis for Four Age Groups

Function	Eigenvalue	Percent of Variance	Canonical Correlation	Wilke's Lambda	D.F.	Sig.
1	1.315	57.15	.754	.196	63	.0000**
2	.641	27.88	.625	.453	40	.0084*
3	.344	14.96	.506	.744	19	.1920

**$p < .001$ *$p < .01$

function one were: 256 at -.632 (Deduce and voice conclusions); 203 at

+.539 (Move from idea to audience); A4 at +.618 (Sympathy appeal); 200 at

+.504 (Note difference between ideas); B4 at +.445 (Parts specific, linear);

and B3 at -.444 (Global concrete). A synthesis of these variables suggested

that a person scoring high on this function operates from an analytical

orientation and expresses premises in a linear, organized way. Such a

person leaves the topic to address the audience directly and seeks support

on moral and ethical grounds. Conclusions seldom are voiced but different

ideas are discussed. A situation is not seen holistically but from a

linear perspective. The study classified this cognitive style Conflict-

analytical.

Major function two variables were: A2 at -.633 (Value premises);

A5 at +.555 (Appeal to beliefs); 251 at -.555 (Analogies, metaphors); B6

at +.559 (Equivocation); 255 at +.505 (Focus on a few points); and 102 at

-.402 (Reject without support). Taken together, these variables suggested

that a person scoring high on function two makes a strong appeal to

Table 39

Stepwise Method Canonical Discriminant Function
Coefficients for Four Age Groups

Variable	Function One Coefficients	Function Two Coefficients	Function Three Coefficients
A2	-.010	-.633	-.363
A4	.618	.059	.091
A5	.022	.555	.172
A6	.238	.318	.109
A7	-.389	.114	-.715
A8	.326	.194	.412
B3	-.444	.049	.254
B4	.445	.017	-.484
B6	.063	.559	.074
B9	.291	-.372	.422
C3	-.413	-.191	-.110
D1	.256	.353	-.216
102	-.094	-.402	.158
103	-.433	-.319	-.480
200	.504	-.162	-.139
203	.539	-.205	-.281
251	.310	-.555	.183
254	.185	-.270	.253
255	-.340	.505	.152
256	-.632	-.014	.345
257	-.123	.297	.615
Eigenvalue:	1.315	.641	.344

societal beliefs but does not speak from a value orientation. This person

does not use analogies or metaphors and may often equivocate (speak with

double meaning). Discussion focusses on only a few points and ideas may

be rejected without support for the rejection. Such a cognitive style was

labelled in this study as Moral-relational.

Since function three failed to reach the .05 level of significance

and none of the four age groups received high mean scores on this function,

it was not considered a significant discriminator.

Table 40 and Figure 9 show the mean scores for each of the four

age groups on the functions identified by the stepwise analysis. As is

demonstrated, the strongest positive score attained by any group was $\overline{X}$ =

1.130 for group four on function two. Group four in the study was in the

age group of over forty years. Heavy loading on function two would suggest

that the older people in the sample appealed to what people should believe

in, but did not elaborate on what that might involve. This group tended

Table 40

Group Means on Stepwise Canonical Discriminant
Functions for Four Age Groups

Actual Group	Number of Cases	Function One Group Means	Function Two Group Means	Function Three Group Means
1 (< 20 years)	26	-1.770	.223	-.168
2 (20-30 years)	30	.308	-.982	.415
3 (31-40 years)	17	1.089[a]	-.071	-1.095
4 (> 40 years)	22	.831	1.130[a]	.478[a]

[a] Group obtaining largest absolute mean on function

Figure 9

Group Placement According to Function Means for Four Age Groups

FUNCTION ONE (Conflict-analytical)

High   + -   Low
├─────────┼─────────┼─────────┼─────────┼─────────┼─────────┤

            (1.089)   (.308)   (-1.77)
            Group 3   Group 2   Group 1
                           (.831)
                           Group 4

- -
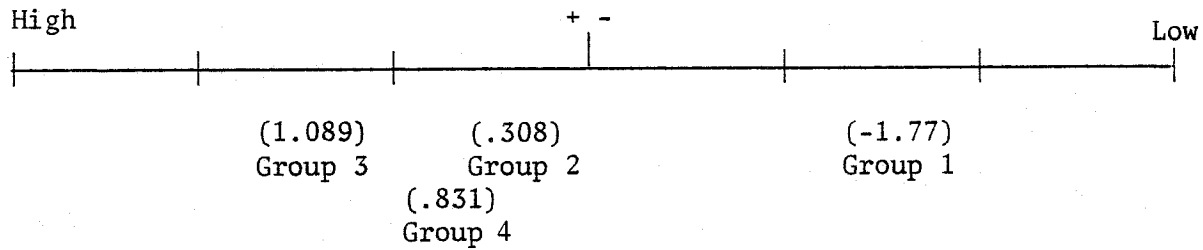
FUNCTION TWO (Moral-relational)

High   + -   Low
├─────────┼─────────┼─────────┼─────────┼─────────┼─────────┤

            (1.130)   (.223)   (-.982)
            Group 4   Group 1   Group 2
                           (-.071)
                           Group 3

- -

FUNCTION THREE (non-significant)

High   + -   Low
├─────────┼─────────┼─────────┼─────────┼─────────┼─────────┤

                        (.415)   (-.168)   (-1.095)
                        Group 2   Group 1   Group 3
                        (.478)
                        Group 4
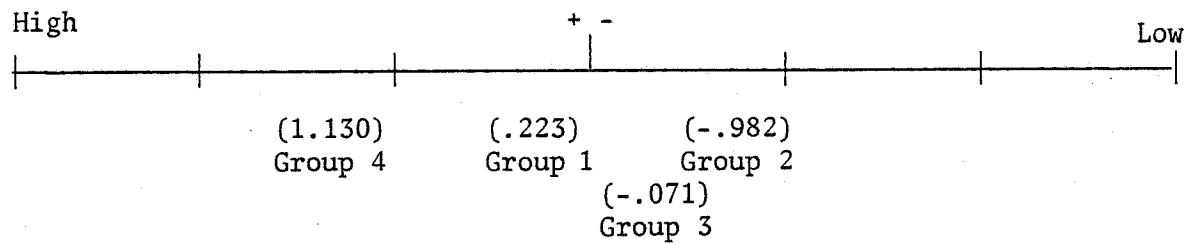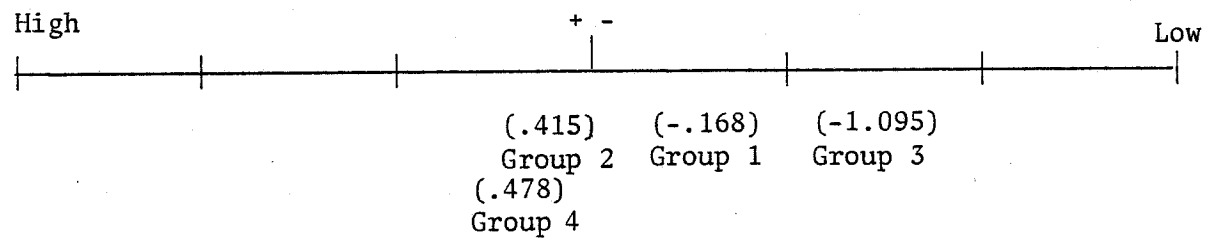
to reject other ideas. The cognitive style for function two was labelled Moral-relational.

Group one, the under-twenty age group, showed its only positive loading on function two, but scored lower than the over-forty group. They tended to see the world as right or wrong but did not discuss their ideas in any organized way.

Group three, the thirty-one to forty age group, scored the highest group mean on function one. Second highest score on function one was received by group two, the twenty to thirty year age group. According to the variables associated with this function, respondents between twenty and forty years of age were likely to operate in a Conflict-analytical cognitive style.

Table 41 confirmed that age was not a strong discriminator among

Table 41

Summary of Classification Results of Stepwise Discriminant
Analysis for Four Age Groups

Actual Group	Number of Cases	Predicted Group Membership			
		1	2	3	4
1	26	23 (88.5%)	1 (3.8%)	0 (0.0%)	2 (7.7%)
2	30	5 (16.7%)	18 (60.0%)	6 (20.0%)	1 (3.3%)
3	17	1 (5.9%)	4 (23.5%)	11 (64.7%)	1 (5.9%)
4	22	1 (4.5%)	2 (9.1%)	5 (22.7%)	14 (63.6%)
Ungrouped		0 (0.0%)	2 (40.0%)	1 (20.0%)	2 (40.0%)

Percent of group correctly classified: 69.4 percent

groups. Only 69.4 percent of the total group was correctly classified for the lowest prediction score of all variables investigated in the study. Prediction for group one stood out as most accurate with 88.5 percent of the protocols being correctly classified. Five protocols were ungrouped.

The discriminant analysis found that age was a significant variable in relation to differences in cognitive style among protocols in this study. On the basis of these results, Hypotheses 6 was rejected.

DISCUSSION OF RESULTS

The content analysis scores for respondents in this study strongly suggested the existence of significant differences in cognitive style among the four cultural groups. It was of interest to note that the Indian respondents who were from a cultural group, which has been stereotyped by the non-native society as being highly non-verbal, spoke at a similar amount to any other group (mean response time 5.6 minutes) and also received the highest mean score on the DACS scale (X = 229.3) of variables which were deemed to be indicative of cognitive style. The fact that the interviewer was of Indian background may have encouraged Indian people to verbalize; the questions concerning education may have sparked unusually lengthy response; or the stereotype of the "silent Indian" did not fit, at least for this group of respondents.

The Metis group scores presented an interesting anomaly: although Metis respondents were less talkative than the other four groups (mean response time 4.5 minutes), they reached the second highest mean score (220.7) on the DACS scale. This finding may discount another commonly held stereotype (that the Metis people are more talkative than the Indian people). It may also suggest that the speech of Metis people in this study was

highly indicative of their cognitive style—i.e., few words were outside of the behaviors which were included in the DACS scale.

The Inuit group in the study averaged the same amount of verbalization as the non-native group (5.4 minutes per respondent) but scored the lowest mean number of DACS scale variables (183.8). It could be speculated that this group of Inuit was more talkative than the stereotype of the "smiling Inuit" or that in this situation the stereotype could not be applied. The low mean response score of DACS variables for the Inuit group may indicate that the questions were not meaningful because of lack of experience of the group with higher education; that responses were being avoided; or that the DACS scale items were inappropriate to measure the cognitive styles of the Inuit sample in the study.

It was not surprising that all respondents tended to preface remarks with "I think ..." or "I believe ..." statements since they were asked to respond to opinion questions. These types of questions may also have led to the wide use of value premises among all groups since opinions and values may be closely related. It was noted that the Indian group which recorded the largest amount of verbalizing was the only group to score high on item 250 (Enlarge and elaborate). This style of verbalizing has been noted as characteristic of the oratory of historically famous Indian spokesman (Snow, 1977; Morris, 1971).

The Indian group differed from the remaining three in the use of the B2 (Self-centered, subjective) strategy. This variable was among the four top scores for Metis, Inuit and non-native, but not for the Indian group. It would appear reasonable that to enlarge and elaborate a speaker likely would go beyond personal experiences for support. This seemed to be the case with the Indian speakers.

Only the Metis and non-native groups included variable 100 (Intensify) as a top scoring strategy. It could be speculated that these two groups considered it more advantageous to state opinions very strongly than to elaborate and explain as a way of having their ideas seen as credible.

Stepwise discriminant analyses found that cultural background, language facility, level of higher education attained, age and sex all contributed significantly to group differences in cognitive styles.

The first question investigated in the study concerned the hypothesized existence of no significant differences in cognitive styles identified as being typical of Indian, Metis, Inuit and non-native groups. The stepwise discriminant analysis found that significant differences did exist among groups but the nature of the analysis and the diversity among individuals were such that each specific cultural group did not identify exclusively with any one cognitive style (Table 42). It was more a matter of determining the degree to which each group was more or less like each of the three styles associated with the discriminant functions. From these findings it was possible to extrapolate a composite description of the major attributes of the cognitive styles identified with the Indian, Metis, Inuit and non-natives in the study.

The Indian group consisted of two parents, six university students, five high school students, four teacher trainees, one political leader and two teachers. This meant that sixteen of the twenty Indian protocols were from students, a fact that may have influenced the cognitive style which was identified with the group.

The only function with which the Indian group showed any positive identification in this analysis was labelled by this study as the Conflict-

analytical cognitive style. Mean score for the group was .390. The cognitive behaviors associated with the Conflict-analytical style included a tendency to speak in a factual analytical way. Situations were seen as independent from people and surrounding events. Premises were based in factual information; emphasis and clarity were sought through the use of contrasts and opposites. Unexpectedly speech was not linear and well organized but rather was often unclear and equivocal. Audience support was not sought on either moral or ethical grounds. This combination of behaviors suggested an analytical cognitive style which also included some relational behaviors. Because of the conflicting analytical and relational behaviors, the style was labelled Conflict-analytical.

A later analysis of the total study group on the criterion of length of time spent in university study found those respondents who had spent the most time at university were likely to identify with the Inexact-analytical style. Since 80 percent of the Indian group either were students or had received university study it was not surprising to find the Indian group identifying with a similar cognitive style.

The Inuit group consisted of three parents, six university students, five high school students, two teacher trainees, one education official, one political leader and two adult community members. The parent group was very small and, as with the Indian group, the largest component was made up of students (65 percent). Results of the analysis showed that the high proportion of students in the Inuit group influenced the total cognitive style of the group towards the Conflict-analytical of the Indian group, and incrementally. Strongest identification was to the non-significant third function. On its secondary loading, the group was labelled as somewhat Conflict-analytical.

Mean score for the Inuit group on the Conflict-analytical function
(Figure 10) was .686 (higher than the Indian group) but lower than the
non-native group ($\overline{X}$ = .768). It was noted earlier that the Inuit group
recorded the lowest mean number of DACS scale variables of all the groups.
The Inuit loaded heavily on the non-significant function three which
suggested that neither of the two significant functions correctly described
the ways of thinking among this group.

Makeup of the non-native group was four parents, six university
students, seven high school students, eleven education officials (principals,
superintendents), eight teachers and four community adults. The group
contained an obvious weighting towards people with long involvement in the
formal education system. When students and educators were combined,
thirty-two of the forty protocols, or 80 percent, were from these back-
grounds. Educators alone constituted nearly half of the total group.

In the case of the non-native group, formal education appeared not
to have influenced them completely in the direction of the Conflict-
analytical style of cognition. Highest group mean for non-natives was
1.303 on the Conflict-relational function aligning the non-natives with
the Metis on this style. With a mean of .768 on function one and 1.303
on function two, this group was most likely to be a combination of both
cognitive styles. However, the non-natives identified with the analytical
style more than was true for any other group.

The tendency among non-natives to be both relational and analytical
may have been associated with the group makeup where nineteen of forty
protocols were from educators, who perhaps tempered an analytical orienta-
tion with people-oriented tendencies as they became proponents of the
education system as teachers rather than being clients of the system as

students in the process of being taught cognitive skills. It is of interest to note that the non-native group was the only one of the four to show some loading towards both cognitive styles. Each of the native groups was definitely not associated with at least one of the styles and the Indian group clearly identified with no style except the Conflict-analytical. This finding may have suggested a high degree of individual differences within the non-native group.

The high predictability of members of the four cultural groups being correctly classified lent credence to the assumption made in this study that there would be strong cognitive style patterns associated with cultural groups. The analysis correctly classified 88 percent of the total study group. Individual differences may have accounted for the fact that no group other than the Indians loaded exclusively on only one function. The patterns found to be common to each group appeared to be highly probable with only 12 respondents out of 100 who were out of phase with the cognitive styles of their cultural group.

When the Indian, Metis and Inuit groups were combined into a total native group and compared to the non-natives, discrimination was not as highly significant as it was in analysis of the four cultural groups. Wilke's lambda was .424 compared to .076 in the four-group analysis (Table 42).

The native group identified ($\overline{X}$ = .941) with function one which was labelled Moral-relational. This style was characterized by value-orientation, field-dependence, strong moral appeal, global concrete description and no need of support from authority figures. These findings were not unexpected, but it was surprising to find the native group so clearly different from the non-natives on this function. With a mean

score of -1.412, the non-natives were definitely not Moral-relational. This finding may offer important insights into understanding the often discussed "communication barrier" between non-native teachers and native patients, between social service workers and native clients, and between non-native employers and native employees. If cognitive styles of native and non-native cultural groups are so strongly different it is reasonable to expect difficulties in cross-cultural communication and understanding.

It is of interest to observe that when the three native groups were combined the differences which had existed in the analysis of the four separate groups tended to fade in importance. In other words, when the Indian, Metis and Indian groups were compared to the non-native respondents the commonalities among the native groups outweighed the differences. As a totality, the natives were significantly different from the non-natives. However, from a statistical perspective the power to discriminate when all native groups were combined became significantly weaker. The Wilke's lambda increased from .076 in the four group analysis to .424 when two groups were analyzed. This finding may offer important insights to educators in that it cannot be assumed that a teaching approach which fits for Inuit students will also work well with Indian and/or Metis students.

The remaining variables analyzed in the study were all significant discriminators (Table 42). Not surprisingly, age and educational back-ground (university or no university) were strongest of the demographic discriminators on the basis of low Wilke's lambdas.

On the education variable, respondents with no post-secondary education were most likely to show a Moral-relational style. The age groups (forty and over, and under twenty) were likely not to have experienced education at the university level. There appeared to be

Table 42

Summary of Stepwise Analyses Performed
on Six Discriminant Variables

Variables	Functions	Eigenvalue	Canonical Correlation	Wilke's Lambda	Significance
1. Four cultural groups	1	1.795	.801	.076	<.0001
	2	1.543	.779	.214	<.0001
	3	.840	.676	.543	.0042
2. Two cultural groups	1	1.350	.759	.424	<.0001
3. Language facility	1	.662	.631	.602	<.0001
4. Post-secondary education	1	1.259	.747	.217	<.0001
	2	.596	.611	.491	.0084
	3	.277	.465	.783	.2675
5. Sex groups	1	.782	.662	.560	<.0001
6. Four age groups	1	1.315	.754	.196	<.0001
	2	.641	.625	.453	.0084
	3	.344	.506	.744	.1920

common threads of field-dependence, people orientation, appeal to moral beliefs and simple verbal construction among the young and old, and those with little or no university training. These attributes tended to be relational rather than analytical.

At the other extreme, the groups with university degrees were identified as Inexact-analytical. Comparable age groups (twenty to forty years) scored high on attributes of linearity, analysis of ideas and objectivity but also with threads of uncertainty. Adults with university background tended to use the Inexact-analytical style which also was identified in the first analysis. This would fit the university educated group among the non-natives and the student components of each of the native groups.

The original study sample was not controlled for variables other than culture, and the selection was such that 80 percent of the non-native group were teachers and students. The general orientation for the non-native group and for the age groups with university education was towards analytical thinking styles. When it is considered that one of the goals of the education system is to teach people to think analytically, it would be disconcerting to find conflicting results (Bruner, 1973; Dewey, 1963).

The sex variable was not a strong discriminator, a finding which was contrary to other similar studies (Cohen, 1971; Witkin, 1977). Like-wise, the cognitive style with which the males identified was contrary to the socially acceptable but unauthenticated images of the male and female in Western society. Males in the study were not problem solvers; they de-emphasized what was said, looked for support from authorities, and talked mostly in specifics. These qualities contradict the image of the strong, independent, problem-solving male which is prevalent in Western

society. Results may have been confounded by the cultural mix within the total sample, and the fact that sex roles and expectations may be culturally determined (Mead, 1935; Brown, 1963). Since the four cultural groups had been found to differ significantly in cognitive style, those differences may well have over-ridden differences between men and women. The high Wilke's lambda (.56) and low canonical correlation (.662) indicated that the sex was not a strong determinant of cognitive style.

The poorest discriminator of the study was that having to do with language facility. Whether people spoke English only or English and one or more native languages did not appear to relate to clearly differing cognitive styles. The bilingual group tended towards the field-dependent, relational style, but with a curious mixture of complex, partially organized verbal delivery. It may be speculated that since all interviews were conducted in English, a second language for most of the bilinguals, their concern with trying to use the language correctly got in the way of a fluent expression of ideas. Perhaps, as McLuhan would have said, "the medium became the message."

Summary

Figure 10 summarizes the overall interpretation of the six discriminant analyses performed, the cognitive styles identified by each function, and the groups most strongly identified with each. Some associations became apparent among the styles of cultural groups and those styles identified with groups on the criteria of demographic variables, i.e., time spent in university studies.

Although the Indian and Inuit groups identified with the Conflict-analytical style in the first analysis, it was a secondary loading for the Inuit and a low positive mean for the Indians. When the Indian, Metis and

Figure 10

Summary of Analyses, Cognitive Style Identifications
and Relationships to Groups

Analysis	Groups, Cognitive Styles and Means

1. Four cultural groups
    Indian
    Metis
    Inuit
    Non-native
	1. Conflict-analytical 1. Non-native (.768)
	                                   2. Inuit (.686)
	                                   3. Indian (.390)
	
	2. Conflict-relational 1. Non-native (1.303)
	                                   2. Metis (.165)
	
	3. Function Three 1. Inuit (1.230)
	                                   2. Metis (.146)
	                                   3. Non-native (.099)

2. Two cultural groups
    Native
    Non-native
	1. Moral-relational 1. Native (.941)

3. Language facility
    Bilingual
    Monolingual
	1. Inexact-relational 1. Bilingual (.377)

4. Post-secondary education
    No university
    < 1 year
    1-3 years
    4-6 years
	1. Inexact-relational 1. No university (1.063)
	                                     2. < 1 year (.024)
	
	2. Inexact-analytical 1. 4-6 years (.496)
	                                   2. No university (.474)
	
	3. Function Three 1. 1-3 years (.765)
	                                   2. No university (-.119)

5. Sex groups
    Males
    Females
	1. Conflict-relational 1. Males (.686)

6. Age groups
    < 20 years
    21-30 years
    31-40 years
    40+ years
	1. Conflict-analytical 1. 31-40 years (1.089)
	                                     2. 40+ years (.831)
	                                   3. 21-30 years (.308)
	
	2. Moral-relational 1. 40+ years (1.130)
	                                   2. < 20 years (.223)
	
	3. Function Three 1. 40+ years (.478)
	                                   2. 21-30 years (.415)

Inuit were combined, they were strongly identified as Moral-relational, a style characterized by more relational than analytical attributes.

The native samples were likely to be bilingual (English and one or more native languages). On the basis of this variable, the indigenous respondents were likely to be classified in Inexact-relational thinkers. However, language facility was a particularly weak discriminator making this finding highly speculative.

The total native group contained a lower proportion of university educated respondents than was true of the non-natives. It was not surprising therefore to find the native (indigenous) cultural group fitting the relational patterns of the non-university education group. This group also contained more high school students and older parents, both of which tended to be relational thinkers.

For the non-native group, there was a combination of analytical and relational patterns. The tendency towards being analytical was strengthened by the large proportion of educators who were likely to be university educated and in the thirty to forty year age range.

RESULTS AND THE THEORETICAL MODEL

This section discusses findings in the study as they were integrated into the Logics of Communication theoretical model. Developed by Schneidman (1966), and adapted to this study, the model postulated that if an individual's cognitive style (Idio-logic) were known, it would be possible to interpret and describe that person's world view (Contra-logic), his mentational personality traits (Psycho-logic), and the teaching-learning mode (Peda-logic) best suited to his way of thinking.

Analyses performed in the study suggested the existence of several

significantly different cognitive styles which were operant among the study groups. Each of these styles (Idio-logics) was made up of a series of variables from the DACS scale. From the theoretical meanings of variables in the model, a composite was drawn of the four logics which appeared to fit for each identified style. Earlier findings determined the cognitive styles which most strongly described groups of respondents in the study. A final synthesis of these findings is described, culminating in a description of the logics which accompanied each cognitive style, with emphasis on the Peda-logics (teaching-learning style).

Logics of Indian, Metis, Inuit Cultural Groups

Figure 11 shows major characteristics of the Idio-logic, Contra-logic, Psycho-logic and Peda-logic of those cultural groups identified most closely with function one (Conflict-analytical). Only the aspects of reasoning categories from the DACS scale were included and they were marked positive (the group is like this) or negative (the group is not like this). Cognitive strategies were not included for the Conflict-analytical style since the six most important variables were all aspects of reasoning. The cultural groups to which Figure 11 applied were the non-natives, the Inuit and the Indians. The attributes of function one were of secondary importance to the Inuit and non-natives but were the only descriptors for the Indians. The non-natives identified more closely than any other group with the Conflict-analytical cognitive style but as a group they loaded most heavily on the Conflict-relational style.

The first four descriptors of Figure 11, all with positive loadings, describe a person whose Idio-logic includes taking pains to clarify what is said by illustrating with opposite examples. This person sees parts of a

Figure 11

Logics of the Conflict-analytical Cognitive Style
Related to Cultural Background
(Non-native, $\overline{X}$ = .768; Inuit, $\overline{X}$ = .686; Indian, $\overline{X}$ = .390)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
B.7 Complete opposition			
+.703 (Meaning is clarified and strengthened by using contrasts and opposites. Statement is well organized.)	One believes that a position is stronger by explaining what it is not; a thing is defined by what it excludes.	Such a person tends to be methodical, philosophical, painstaking, impatient, theoretical and over-reactive (if a thing is changed, it is destroyed).	This person will learn material presented in his mode of contrasts. In explaining a thing, exploration can be made of what it is not as well as what it is.
D.1 Field-independent style	One believes that specific items or attributes of a situation are more or less separate from the total field. The parts are seen as having meaning in themselves and if studied according to certain principles will lead to solutions.	This person tends to be interested in the abstract and theoretical and in applying general rules and principles to problem solving. He will take critical elements out of the total context and restructure these items in a different context to arrive at a solution.	Such a person will learn if material is organized and structured, and demands analysis and abstraction. He will respond well to requests to "intellectualize" about problems and less well to assignments of an affective, personal orientation.
+.690 (Attributes of a stimulus can be abstracted from the total field for their meaning.)			
A.1 Premise based on factual knowledge	One believes that factual information relates causally to the conclusion, and give it validity. Facts are essential.	Such a person tends to be detached, objective, consistent, predictable, organized, definite, reality-oriented.	Such a person will react positively to an organized presentation of factual information by facts and figures data.
+.588 (Factual statements lead to and support a conclusion.)			
B.5 Equivocation	One believes that a word has only one meaning; the context has no influence on meaning and everyone understands the same meanings of the word.	Such a person tends to be rigid, dogmatic, denies that differences exist and is reluctant to change his behavior in different situations.	This person will only react positively if the intended meanings of words are clearly explained. Presentation must be precise and unambiguous for this learner may put his own interpretation on the words.
+.625 (Meaning is unclear because words may have two meanings, or may be ambiguous. Interpretation is left to the listener.)			
A.4 Conclusion appealing to sympathy for persons involved.	One believes that truth must always be conditioned by moral considerations, not only by objective considerations. Something cannot be true while also being morally or ethically false, nor totally false while being morally satisfying.	Such a person tends to be in search of approval, concerned with standards of right and wrong, philosophic, contemplative.	Such a person will react positively to hearing the moral implications of a situation discussed, especially if it seems that they will be consistent with his standards.
-.678 (Conclusion aims for acceptance by seeking pity from the listener on moral and ethical grounds.)			
B.4 Parts-specific, linear orientation to a situation.	One believes that the components of a situation give it meaning. Things occur in linear fashion from a beginning to an end that follows a scientific law or rule. Goals are important.	Such a person tends to be ambitious, achievement oriented, conscious of "wasting time," sees himself in control and able to solve problems, is confident, competitive and objective.	This person reacts positively to material presented in linear organization; must be challenged to solve problems, achieve external rewards and master objective information.
-.737 (Components of a situation explain its meaning. They relate linearly in organized, causal fashion.) (Related to B.1)			

144

situation in isolation from the whole and analyzes their meanings. Factual statements (within the speaker's perception of fact) are important premises in the development of a conclusion. Efforts to be explicit become clouded by a tendency to be ambiguous and leave the listener free to interpret meaning. This speaker does not attempt to convince an audience to agree on moral or ethical grounds. Something of a conflict appears in the analytical style in that speech is not presented in a linear, organized fashion.

The Contra-logic (world view) of a Conflict-analytical thinker suggests that such a person believes that what a thing is can be explained by defining what it is not. Parts of a situation are believed to exist almost in isolation from the total context and understanding the parts is seen as an aide to solving the puzzle of the whole. Cause and effect are believed to operate in all situations and therefore facts must be known and understood before solutions can be suggested. Since parts are believed to be important in themselves, words (as parts) are believed to have intrinsic meanings in themselves and contexts do not change meanings. What is seen as true is not constrained by moral or ethical considerations, which follows logically if facts are accepted as true in themselves. The Conflict-analytical thinker in this study breaks the pattern of objective analytical behaviors by not following through in a linear fashion which assumes a beginning and an end. Goals are unimportant to the person who is analytical but exhibits conflicting behavior.

The Psycho-logic (mentational psychological characteristics) of the Conflict-analytical style of cognition include being philosophical, methodical and interested in theoretical abstraction. General rules and principles are applied to problem-solving in a detached, objective and

consistent way. Such a person tends to be rigid, dogmatic and slow to change his behavior in different situations. Standards of right and wrong and peer approval are not of primary concern. Because this person simultaneously does not perceive situations from a linear orientation, there is no strong achievement motivation and no obvious air of either confidence or competitiveness.

The Peda-logic (teaching-learning mode) best suited to the person whose cognitive style is Conflict-analytical suggests a process which will create optimum learning. The teacher of such a person must present material in an organized, structured style where explanations explore the "what is not" of situations, and analyze and abstract solutions according to rules and principles.

Factual information must be given and the intended meaning of words must be clearly explained so that there is no misinterpretation. Discussion of the moral and ethical implications of a situation make this person uneasy, particularly if his beliefs and standards are challenged. Because this cognitive style is somewhat conflicted linear organization and extrinsic rewards are not especially required.

The logics of the Inexact-analytical cognitive style in this study suggest, in summation, that a teacher of a group of such thinkers would likely achieve success by being structured, well-organized, and business-like in approach. Such learners can be challenged to analyze, theorize, and explore what is not as well as what is. Objective, factual information is well accepted and attempting to relate on the affective level (small groups, norms of openness, relating interpersonally) must be carefully approached. At the same time, the conflicting components of this style suggest a negative reaction to material which is presented linearly in a

problem solving format with the motivation of external rewards. This may require a combination of humanism and objectivity in teaching.

Function Two described the Conflict-relational cognitive style (Figure 12) which was found to be strongly associated with the non-native and Metis groups. The non-natives were more strongly identified with this style than they were with any other as was the case with the Metis. The Indian and Inuit groups were definitely not weighted towards the Conflict-relational in cognitive style. Of the six most important variables from the aspects of reasoning portion of the DACS scale, only two had a positive loading indicating that people strongly exhibited those behaviors. Negative loadings pointed out things that this group did not demonstrate in the verbalization of responses. The strong positive loadings were for seeking authority support and being objective. These behaviors suggest a conflict, for seeking solutions from experts is not really analytical problem solving. Being objective is not really relational, and making strong unfounded statements is a stylistic manoeuver. Neither factual statements nor value based premises are used to arrive at conclusions. This person appears not to do his own problem-solving but constantly refers to "experts." This style includes the strategies of making strong statements, changing to unrelated topics and speaking in specifics.

Such a person operates from a Contra-logic of strong belief and deference to a leader, expert, authority or a group seen as knowledgeable. Neither factual information nor value based judgements are believed to be necessary to support conclusions. Belief in the validity of expert opinion is considered sufficient support for conclusions.

A person who believes strongly in authority figures tends to be authoritarian, rigid, conventional and in fear of being placed at a

Figure 12

Logics of Conflict-relational Cognitive Style
Related to Cultural Background
(Non-native, $\overline{X}$ = 1.303; Metis, $\overline{X}$ = .165)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.1 -.584	Premise based on factual knowledge (Factual statements lead to and support a conclusion.)	One believes that factual information relates causally to the con-. clusion, and give it validity. Facts are essential.	Such a person tends to be detached, objective, consistent, predictable, organized, definite, reality-oriented.	Such a person reacts positively to an organized presentation of factual information supported by facts and figures data.
A.6 +.455	Conclusion supported by an authority (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)	One believes that a statement is largely true because of the rank of status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person reacts positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.
A.2 -.407	Premises based on value orientation. (Conclusion derives from value statements which give sufficient support.)	One believes that values, judgement, beliefs give sufficient support to conclusions. Facts are used only to illustrate value statements.	Such a person tends to be conforming, affective, subjective, receptive, spontaneous, social, easily defeated.	Such a person reacts positively to personal warmth, firm direction; a social approach to teaching, flexibility, short term goals.
B.1 +.394	Stimulus-centered objective and analytical premise and conclusion.	One believes that a situation is best understood by systematically analyzing its components. Anything can be done by an orderly approach to the stimulus and process. Natural laws operate.	Such a person tends to be objective, concerned with each part of a totality, listens carefully for solutions, is ambitious, independent, and confident of control over the environment.	This person reacts positively to well-organized material that challenges an analytical problem-solving approach. Objective material is favored and skill mastery motivates.
B.2 -.357	Self-centered, subjective and relational premise and conclusion. (Components of a situation have meaning in relation to total context and a personal orientation to it.)	One believes that a situation has meaning only in relation to its personal context. Every situation is part of and related to everything else and its components have little meaning in themselves.	Such a person tends to be subjective, concerned with global characteristics, is passive, not in control, and concerned with social relationships and self.	This person reacts positively to affective presentation of material in a holistic and relational manner. The teacher is first a person and must relate well on emotional level to motivate learners.
B.3 -.388	Concern with global and concrete characteristics (Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.

disadvantage in relation to others of equal or greater status. Since

neither facts nor values are believed to be important, the Conflict-

relational person cannot be described as either objective and organized

nor subjective and spontaneous.

According to the Logics model, the Peda-logic best suited to the

Conflict-relational thinker must include frequent reference to experts or

authorities. Material that is presented must be well-documented unless

the teacher can claim to be an authority on the subject. Since this

thinker relates to the world on intense terms, this same style is appreci-

ated in the teacher. Theorizing and generalizing are not received as

positively as discussion and solution of specific situations. The teacher

of such a group of thinkers would do well to be very knowledgeable about

the content being taught and to be able to corroborate statements by

reference to authorities in the field.

Logics of Native and Non-Native
Cultural Groups

Results of the analysis of one hundred protocols grouped according

to native (Indian, Metis, Inuit) and non-native cultural groups showed that

the native group identified strongly with function one. On the basis of

DACS scale variables, this function was labelled the Moral-relational

cognitive style (Figure 13).

Major Idio-logic characteristics of this style of cognition include

a strong tendency to seek sympathy and support for the persons involved in

an issue on moral and ethical considerations. Conclusions are supported

from a value orientation which is considered to be sufficient reason for

validation. A situation is understood and described in its total context

of people and events. Parts have sparse meaning in and of themselves.

Figure 13

Logics of Moral-relational Cognitive Style
Related to Cultural Background
(Native, $\bar{X}$ = .941)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.4	Conclusion appealing to sympathy for persons involved.	One believes that truth must always be conditioned by moral considerations, not only by objective considerations. Something cannot be true while also being morally or ethically false, nor totally false while being morally satisfying.	Such a person tends to be in search of approval, concerned with standards of right and wrong, philosophic, contemplative.	Such a person will react positively to hearing the moral implications of a situation discussed, especially if it seems that they will be consistent with his standards.
+.491	(Conclusion aims for acceptance by seeking pity from the listener on moral and ethical grounds.)			
A.2	Premised based on value orientation.	One believes that values, judgement, beliefs give sufficient support to conclusions. Facts are used only to illustrate value statements.	Such a person tends to be conforming, affective, subjective, receptive, spontaneous, social, easily defeated.	Such a person will react positively to personal warmth, firm direction; a social approach to teaching, flexibility, short term goals.
+.435	(Conclusion derives from value statements which give sufficient support.)			
D.2	Field-dependent style	One believes that nothing exists in isolation from its total context, and its parts cannot be separated from the whole. Each situation is uniquely concrete and personal and principles do not really apply.	This person tends to perceive things holistically. Events are relative to the social environment. Interpersonal relationships are a major consideration in making decisions. Problems are seen as being beyond control of an individual.	Such a person will react positively to context in the affective domain, and to a warm personal atmosphere in the classroom. The teacher is first an individual. Objective, analytical learning will not be well received.
+.420	(A situation can only be perceived within its total context of people and events.)			
A.6	Conclusion supported by an authority.	One believes that a statement is largely true because of the rank status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person will react positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.
-.388	(Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)			
B.3	Concern with global and concrete characteristics.	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.
+.383	(Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)			
B.7	Complete opposition	One believes that a position is stronger by explaining what it is not; a thing is defined by what is excluded.	Such a person tends to be methodical, philosophical, painstaking, impatient, theoretical and over-reactive (if a thing is changed, it is destroyed).	This person will learn material presented in his mode of contrasts. In explaining a thing, exploration can be made of what it is not as well as what it is.
-.337	(Meaning is clarified and strengthened by using contrasts and opposites. Statement is well organized.)			

Similarly, the global, concrete characteristics of a situation are important to understanding meaning; theoretical abstractions are not seen as important. Because the rationale comes from within; from the speaker's values, total experience and concrete knowledge of the situations, it is not considered necessary to validate conclusions by seeking support from authority figures. Discussion does not change to unrelated topics.

The Contra-logic or world view of the Moral-relational person describes someone who believes that truth must always be considered in relation to what is morally and ethically right or wrong. If something is morally wrong, it cannot in reality be true. This person believes that values and beliefs are sufficient support for conclusions. Inner beliefs do not need outside facts other than to illustrate or explain. Authority comes from personal and cultural values, not from experts or authorities. The Moral-relational thinker believes that situations exist and occur within a total interaction of happenings, and cannot be totally explained in isolation from the environment. Each situation and time is unique because of its experiential environment and therefore laws and principles cannot really apply as a general explanation. Since this is the case, experts or authorities do not offer general solutions nor support for unique situations. Further, it is sufficient to understand concretely since generalized rules may not fit specific problems.

A person who sees the world holistically and bases behavior in values and beliefs tends pyschologically to be concerned about social relationships and reacts to situations as they exist within a total social environment. The Psycho-logic makes such a person seek approval of others, conform to social norms, to be affective, receptive, spontaneous and easily defeated. Problems are seen as being beyond the control of an individual

and interpersonal relationships are a major consideration of decision-making. The Moral-relational person is concerned about standards of right and wrong, is anxious in new situations for fear of social disapproval, is not achievement motivated on an individual basis and tends to be philosophic and contemplative. This person is not rigid, conventional nor impressed by authority figures.

The Peda-logic person of the Moral-relational style suggests that the most positive teaching approach is one oriented in personal warmth, flexibility within firm direction, and short-term attainable goals. A warm, personal atmosphere and content presented in the affective style and social context of total reality is well received. Moral implications of situations can be discussed but theorizing, analyzing and generalizing do not encourage learning. Small group work in a non-competitive atmosphere may work well with this type of learner. It is more important that the teacher relate personally to the learner than it is that experts be cited to validate content.

Logics and Language Facility

Characteristics of the Idio-logic of what this study classified as the Inexact-relational style of cognition are outlined in Figure 14. The analysis of the language facility variable found that bilingual speakers (English and one or more native languages) were related to this style. However, language facility was not a powerful discriminator between groups.

The major attribute of this group was the tendency to speak in complex, carefully planned English language construction. This behavior was not generally associated with a relational style of cognition, but the second most powerful characteristic, field dependence, did fit closely with the relational pattern. This finding suggested an element of conflict in

Figure 14

Logics of Inexact-relational Cognitive Style
Related to Language Facility
(Bilingual, $\bar{X}$ = .377)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.2 Premise based on value orientation.	One believes that values, judgement, beliefs give sufficient support to conclusions. Facts are used only to illustrate value statements.	Such a person tends to be conforming, affective, subjective, receptive, spontaneous, social, easily defeated.	Such a person reacts positively to personal warmth, firm direction; a social approach to teaching. flexibility, short term goals.
-.593 (Conclusion derives from value statements which give sufficient support.)			
C.4 Complex sentence structure	One believes that meanings become more clear when speech is carefully planned and grammatically complex. A complex situation is illustrated by a complicated verbal code.	Such a person is concerned with explicit meanings; with analyzing each facet of a situation and with careful planning or verbalization that can then be delivered in a clear, cool, deliberate style. He may modify speech to suit the listener.	This person enjoys carefully organized and planned discussion in a learning situation. He needs time to plan discourse and will want to look at each facet of a problem before voicing a possible solution.
+.583 (Discourse is grammatically complex, organized and planned in patterns of complete structures.)			
D.2 Field-dependent style	One believes that nothing exists in isolation from its total context, and its parts cannot be separated from the whole. Each situation is uniquely concrete and personal and principles do not really apply.	This person tends to perceive things holostically. Events are relative to the social environment. Interpersonal relationships are a major consideration in making decisions. Problems are seen as being beyond control of an individual.	Such a person reacts positively to context in the affective domain, and to a warm personal atmosphere in the classroom. The teacher is first an individual. Objective, analytical learning will not be well received.
+.439 (A situation can only be perceived within its total context of people and events.)			
B.2 Self-centered, subjective, and relational premise and conclusion.	One believes that a situation has meaning only in relation to its personal context. Every situation is part of and related to everything else and its components have little meaning in themselves.	Such a person tends to be subjective, concerned with global characteristics, is passive, not in control, and concerned with social relationships and self.	This person reacts positively to affective presentation of material in a holistic and relational manner. The teacher is first a person and must relate well on emotional level to motivate learners.
-.407 (Components of a situation have meaning in relation to total context and a personal orientation to it.)			
C.3 Contradiction	One believes that contradictory conditions are possible at the same time. A thing and its opposite can exist at the same time. All things are seen as being possible.	Such a person has a difficult time choosing an alternative or making a decision. He wants to be "for" and "against" something at the same time. He is more comfortable with theoretical discussion than with problem solving.	This person needs the security of a directed approach so he is not forced to choose alternatives. He needs time to "think things over slowly" before being pressed for a decision.
-.346 (Contradictory premises are made with the speaker unaware the one statement makes the other impossible.)			
A.6 Conclusion supported by an authority.	One believes that a statement is largely true because of the rank status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person reacts positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.
+.237 (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)			

the cognitive style of the bilingual which was thought to relate to the difficulty of trying to express thoughts in a second language.

The Inexact-relational person tends to perceive situations field dependently, that is, within the total context of events and people (relational), but the two remaining aspects of reasoning are contradictory. Premises are not based in a value orientation, and statements are not made from a subjective, self-centered focus. At the same time, the bilingual group is not strongly objective nor field independent. In general, there appears to be vacillation between analytical and relational tendencies.

The Contra-logic or world view of the person categorized as Inexact-relational carries with it the contradictions of the Idio-logic. Such a person believes that complex situations can be explained most clearly through grammatically complex, carefully planned speech. Simultaneously, situations are seen in totality and the belief is that parts cannot be isolated to explain the whole. This person again reverses the pattern with the stance that values, judgements and beliefs are not valid support for conclusions and that facts are necessary. In line with that somewhat objective philosophy, this person does not speak in subjective terms as would be expected from a field-dependent perception of a situation.

Mentational psychological traits of the Inexact-relational person include concern for explicit meaning, for carefully planned and cool, deliberate verbalization. Each facet of a situation must be analyzed. The field-dependence orientation makes this person be concerned with social relationships and the realization that events cannot be controlled. Social relationships are a major consideration. In contradiction, however, such a person is not subjective, affective, passive nor concerned with inter-

personal relationships.

Assuming that the findings from this analysis have tentative validity, the Peda-logic style which will encourage optimum learning for the Conflict-relational thinker requires a combination of careful organization, objective presentation of facts. Such a learner needs time to think out and formulate a response before voicing it, particularly if it is to be made in a second language. A warm, personal atmosphere will encourage learning. The teacher must first be seen as an individual who encourages an aura of personal warmth. The teacher must be well planned and organized; must be both flexible and firm in giving directions and expectations for short term goals. Motivation is best achieved if actions are on the emotional level. Content is best received if presented in an holistic, relational manner rather than in analytical, objective terms, and the vocabulary used must be understandable.

Logics and Post-secondary Education

Two significantly different cognitive styles were identified for respondents who had spent varying amounts of time in university level studies. A third function and style was identified but it was found to be non-significant at the .05 level. Major characteristics of function one formed a pattern of behavior which was labelled as Inexact-relational. Figure 16 traces the logics of this style as they fit the Logics of Communication model of this study. Respondents who had started university but had not completed a year and those who had never attended university identified most strongly with this style ($\overline{X} = 1.063$). The subjects with no university showed secondary loadings on both of the remaining functions.

Examination of the Idio-logic of the Inexact-relational style (Figure 15) reveals that five of the six major contributing variables were

Figure 15

Logics of Inexact-relational Cognitive Style
Related to Length of Post-Secondary Education
(No university, $\bar{X}$ = 1.063; < one year, $\bar{X}$ = .024)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
B.3 +.526 Concern with global and concrete characteristics. (Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.
C.5 +.462 Simple, direct sentence structure (Sentences are short, direct and grammatical; structure is not complex.)	One believes that meaning is dependent on time, place, authority and other social interactions. What is said is a personal reaction, not an explanation of specifics. One therefore states a simple, affective response.	Such a person sees concrete specifics but does not generalize. He reacts to things on a personal level and sense meaning is embedded in the situation; he hesitates to explain and solve situations.	This person may be uncomfortable if asked to discuss, explain and generalize in analytical style. New concepts are best approached from a concrete, personalized viewpoint.
D.2 +.453 Field-dependent style (A situation can only be perceived within its total context of people and events.)	One believes that nothing exists in isolation from its total context, and its parts cannot be separated from the whole. Each situation is uniquely concrete and personal and principles do not really apply.	This person tends to perceive things holistically. Events are relative to the social environment. Interpersonal relationships are a major consideration in making decisions. Problems are seen as being beyond control of an individual.	Such a person reacts positively to context in the affective domain, and to a warm personal atmosphere in the classroom. The teacher is first an individual. Objective, analytical learning will not be well received.
A.8 +.349 Conclusion and/or premise is derogatory of persons or institutions. (Statements appeal to emotions of listener, especially negative attitudes of persons or groups involved in the argument.)	One believes that whether one accepts a conclusion depends on the listener's feelings towards the agency or person involved in the argument. Subjective and objective characteristics cannot be separated.	Such a person tends to be hostile, aggressive, dogmatic, opinionated and rigid, and would project his own standards on others.	This person reacts positively if the teacher first understands his attitudes. The world is "good" or "bad" so build on, or totally isolate, your material from his attitudes.
A.6 -.356 Conclusion supported by an authority. (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)	One believes that a statement is largely true because of the rank, status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person reacts positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.
A.3 +.323 Premise appealing to fear of losing stated consequences. (Conclusion is grounded in a suggestion of negative consequences or it is rejected.)	One believes that what is true is what men want to believe is true, and what they want to reject is false. Life is believed to be fraught with unknown dangers from which others must be protected.	Such a person tends to be aggressive, goal-oriented, impulsive, emotional, subjective, moralistic. He over-simplifies project standards and will bully to win.	Such a person reacts positively to being convinced that something bad could also happen to him if he rejects a conclusion. He responds to his own devices.

from the aspects of reasoning portion of the DACS scale. An Inexact-relational thinker from this analysis is primarily concerned with the concrete and global characteristics of a situation. This person has difficulty relating to a situation if it is removed from its total context of people and events.

Comments and conclusions are expressed in short, direct, grammatically straightforward sentences. Arguments may be emotional and derogatory of persons or institutions which are involved in the contents of the discussion. Conclusions are not supported by citing experts or authorities which are purported to agree.

The Contra-logic or world view of a person whose cognitive style is Inexact-relational includes the belief that situations are part of a much larger, global interaction and are largely controlled by the total social situation. Situations take their meaning from time, place, authority and other social interactions. A person speaks only for himself and therefore makes direct, affective statements. Since each situation is unique within a total context, general principles do not apply. A person cannot simultaneously be objective and subjective: one's feelings towards the institution or individual in the situation determine acceptance or rejection of a conclusion. Since situations are specific and concrete, there are no authorities who can solve problems simply because they have the rank of expert.

The Psycho-logic or intellectual psychological traits of the Inexact-relational thinker suggests that such a person is sensitive to social, affective situations but is anxious in new situations and feels powerless to change things. Since situations are seen as embedded in a total context, the Inexact-relational person sees specifics but does not

generalize to solve problems which are beyond the control of an individual. Such a person tends to be dogmatic and rigid and projects his own standards on a situation which can only be dealt with subjectively.

The learner whose cognitive style is Inexact-relational will react positively to a warm personal atmosphere and individual attention. Content is best presented within a context of reality, and generalizing and theorizing in an analytical style create an uncomfortable situation for this person. The teacher who wishes to "tune in" to this type of learner must first understand the learner's attitudes and then either build on or isolate content from those attitudes. This learner cannot be impressed by "experts" but rather by material presented from a concrete, personalized viewpoint. Respondents in this study who had attended university for between four and six years (holders of one and possibly two degrees) loaded on function two in the discriminant analysis. The group loaded only on this function in which the variables constituted a style of cognition classified as Inexact-analytical (Figure 16).

The Idio-logic of a person whose cognitive style is Inexact-analytical includes the pattern of viewing situations in an objective analytical way and seeking meaning in the abstract parts of a statement. When such a person responds, the vocabulary focuses on impersonal role descriptors rather than the individual, personal attributes. There is little subjective orientation by such a person to the situation or problem which is seen as an objective problem solving exercise. Statements that are made by this person tend to be specific, stated in a tentative format and contain little elaboration of the conclusion as stated.

The Inexact-analytical thinker from this analysis views the world as an orderly system which can be understood and probably controlled by a

Figure 16

Logics of Inexact-analytical Cognitive Style
Related to Length of Post-secondary Education
(4-6 years, $\overline{X}$ = .496; No university, $\overline{X}$ = .474)

IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
B.2 **-1.050** Self-centered, subjective, and relational premise and conclusion. (Components of a situation have meaning in relation to total context and a personal orientation to it.)	One believes that a situation has meaning only in relation to its personal context. Every situation is part of and related to anything else and its components have little meaning in themselves.	Such a person tends to be subjective, concerned with global characteristics, is passive, not in control, and concerned with social relationships and self.	This person reacts positively to affective presentation of material in a holistic and relational manner. The teacher is first a person and must relate well on emotional level to motivate learners.
C.2 **+.649** Concern with role descriptors (Vocabulary focuses on impersonal role descriptors rather than on individual, subjective description.)	One believes that an individual's role is the over-riding consideration. If everyone lives up to role expectations, problems will be solved, i.e., a teacher is a source of information, not an individual.	Such a person tends to speak objectively of others in terms of their role performance rather than their behavior as emotional individuals. He tends to be distant, impersonal and critical of those who fail to measure up to expectations.	This person learns when context is formally presented by a teacher who "acts like a teacher." Expectations for himself and the teacher are known because of their roles, and personal relationships must remain at this level.
B.1 **+.614** Stimulus-centered objective and analytical premise and conclusion. (The meaning is found in abstract parts of a statement stated in objective, analytic terms.)	One believes that a situation is best understood by systematically analyzing its components. Anything can be done by an orderly approach to the stimulus and process. Natural laws operate.	Such a person tends to be objective, concerned with each part of a totality, listens carefully for solutions, is ambitious, independent, and confident of control over environment.	This person reacts positively to well-organized material that challenges an analytical problem-solving approach. Objective material is favored and skill mastery motivates.
B.3 **+.369** Concern with global and concrete characteristics. (Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.
B.7 **+.368** Complete opposition (Meaning is clarified and strengthened by using contrasts and opposites. Statement is well organized.)	One believes that a position is stronger by explaining what it is not; a thing is defined by what is excluded.	Such a person tends to be methodical, philosophical, painstaking, impatient, theoretical and over-reactive (if a thing is changed, it is destroyed).	This person learns material presented in his mode of contrasts. In explaining a thing, exploration can be made of what it is not as well as what it is.
A.8 **+.345** Conclusion and/or premise is derogatory of persons or institutions. (Statements appeal to emotions of listener, especially negative attitudes of persons or groups involved in the argument.)	One believes that whether one accepts a conclusion depends on the listener's feelings towards the agency or person involved in the argument. Subjective and objective characteristics cannot be separated.	Such a person tends to be hostile, aggressive, dogmatic, opinionated and rigid, and would project his own standards on others.	This person reacts positively if the teacher first understands his attitudes. The world is "good" or "bad" so build on, or totally isolate, your material from his attitudes.

systematic analysis of its components and an orderly approach to solutions. An individual's role is seen as the primary consideration and problems will be solved if everyone lives up to role expectations. The personal context is unimportant and "gets in the way" of arriving at objective realistic solutions.

Psychologically, the personality type who is an Inexact-analytical thinker is likely to be ambitious, independent and confident of the ability to control the environment. Such a person seeks solutions to problems but always in an objective way. Others are spoken of in objective terms and are criticized for failing to fulfill role expectations. This Inexact-analytical thinker is distant and impersonal with others and social relationships are of minor importance.

Teaching the learner who operates from this Inexact-analytical style is likely to succeed if material is presented objectively. An orientation to analytical problem solving and the mastery of skills brings a favorable response. A teacher is expected "to be a teacher" and live up to his role. Personal relationships are not to go beyond this level.

Logics of Males and Females

The variable of sex was a significant discriminator among respondents in the study. The discriminant analysis identified one significant function which on the basis of variables it contained, was designated as a Conflict-relational cognitive style. Three of the six major variables which made up the equation of function one were aspects of reasoning from the DACS scale and the remainder were from the cognitive strategies portion of the instrument. Males in the study loaded positively on function one while women were negatively related.

Figure 17 outlines the logics of the Conflict-relational thinker as defined in this analysis. The uncertainty of this style of thinker is demonstrated in the need to cite authority figures and experts as support for statements and arguments. Premises are not based on factual knowledge but neither value based premises are used. This person makes little effort to clarify or emphasize statements by the use of either opposites or contrasts. This person's reasoning process is supported by using the cognitive strategies of seldom voicing conclusions; of de-emphasizing whatever comments are made and by avoiding general statements and confining remarks to the specifics.

The Contra-logic of the Conflict-relational thinker from this analysis includes the belief that statements are true if they are made by an "expert." People who occupy authority positions are believed to be authorities. Facts are not considered as essential to establishing validity of statements but rather, the status of the speaker is considered proof of its truth.

The mentational psychological traits which predominate in a person who operates within this Inexact-relational style include tendencies to be authoritarian, rigid, conventional, inhibited and impressed by authority figures. This person is not philosophical, theoretical or methodical. It is as if individual decision-making does not exist; the responsibility rests with the authorities.

The Peda-logics or teaching-learning approach of this Conflict-relational cognitive style suggest the necessity for a well-organized presentation of materials. There may be conflicting reactions to the use of facts and figures and the analytical problem-solving approach. However, material which is presented must be well documented unless the teacher can

Figure 17

Logics of Conflict-relational Cognitive Style
Related to Sex
(Males $\overline{X}$ = .686)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.1 -.597	Premise based on factual knowledge. (Factual statements lead to and support a conclusion.)	One believes that factual information relates causally to the conclusion, and give it validity. Facts are essential.	Such a person tends to be detached, objective, consistent, predictable, organized, definite, reality-oriented.	Such a person reacts positively to an organized presentation of factual information supported by facts and figures data.
A.6 +.485	Conclusion supported by an authority. (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)	One believes that a statement is largely true because of the rank, status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person reacts positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.
B.7 -.482	Complete opposition (Meaning is clarified and strengthened by using contrasts and opposites. Statement is well organized.)	One believes that a position is stronger by explaining what it is not; a thing is defined by what is excluded.	Such a person tends to be methodical, philosophical, painstaking, impatient, theoretical and over-reactive (if a thing is changed, it is destroyed).	This person reacts positively presented in his mode of contrasts. In explaining a thing, exploration can be made of what it is not as well as what it is.
B.1 +.479	Stimulus-centered objective and analytical premise and conclusion. (The meaning is found in abstract parts of a statement stated in objective, analytic terms.)	One believes that a situation is best understood by systematically analyzing its components. Anything can be done by an orderly approach to the stimulus and process. Natural laws operate.	Such a person tends to be objective, concerned with each part of a totality, listens carefully for solutions, is ambitious, independent, and confident of control over environment.	This person reacts positively to well-organized material that challenges an analytical problem-solving approach. Objective material is favored and skill mastery motivates.
B.6 -.357	Amphiboly (Meaning is unclear because of awkward grammatical structure. The speaker may be unclear about what he is saying. Second language speakers may fall into this category for lack of language facility.)	One believes that words are not of primary importance. Something can be said in many ways; it is up to the listener to understand. Knowledge and truth are not relative to the speaker or to society.	Such a person tends to be rigid, dogmatic, authoritarian, expects to be understood and blames those who do not. Trusts his own judgements and is slow to change ideas.	This person reacts positively only if presentations are simple, straightforward and not dependent on discussion and feedback. Once he thinks he understands he stops listening. He thinks what he says is perfectly clear.
B.8 +.344	Incomplete opposition (Meaning is confused by phrases used to illustrate opposites between which are not comparable. The statement becomes non-cohesive.)	One believes that everything is opposed to everything else. All positions are incompatible, all beliefs are opposed. Attitudes and beliefs are opposed to reality, feelings to fact, present to past and future.	Such a person tends to be dichotomous, either-or, fear compromise, would work alone, would not relate well to others, would be pessimistic and expect the worst of everything.	This person learns material that seems to give some credence to his beliefs. Gradually he may be convinced that things are not always in opposition to each other.

claim to be an authority in the field. Expert opinion is definitely valued. This student will react well to material which supports the beliefs which suggest that events are always "either-or" situations. Over time this person may be convinced that things are not always in opposition to each other. Such a person tends to prefer organization and structure from a teacher rather than personal warmth and an affective orientation. Theoretical discussion based on well documented material is a valued way of learning.

Logics of Age Groups

Respondents were categorized into four age groupings for which the discriminant analysis identified three functions or different cognitive styles. Functions one and two were significantly different at the .05 level but the third function did not have significant discriminatory power.

Function one was categorized as being the Conflict-analytical cognitive style and was strongly identified with the age group of 31-40 years. For respondents over the age of 40, and for those from 21 to 30 years it was a secondary loading.

The Idio-logic of respondents identified with the Conflict-analytical style (Figure 18) indicates that such a person does not state value based premises but does appeal to assumed beliefs and attitudes of the audience. Such appeals tend to be subjective and appeal on the affective level. Such a person operates from a field-dependent orientation and looks to authority support for statements and conclusions. An unexpected behavior is the tendency to be amphibolus, that is to obscure the meaning of statements in grammatically unclear or incorrect grammatical construction.

Figure 18

Logics of Conflict-analytical Cognitive Style
Related to Age
(31-40, $\bar{X}$ = 1.089; 40+, $\bar{X}$ = .831; 21-30, $\bar{X}$ = .308)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.2 -.633	Premises based on value orientation. (Conclusion derives from value statements which give sufficient support.)	One believes that values, judgement, beliefs give sufficient support to conclusions. Facts are used only to illustrate value statements.	Such a person tends to be conforming, affective, subjective, receptive, spontaneous, social, easily defeated.	Such a person reacts positively to personal warmth, firm direction; a social approach to teaching, flexibility, short term goals.
B.6 +.559	Amphiboly (Meaning is unclear because of awkward grammatical structure. The speaker may be unclear about what he is saying. Second language speakers may fall into this category for lack of language facility.)	One believes that words are not of primary importance. Something can be said in many ways; it is up to the listener to understand. Knowledge and truth are not relative to the speaker or to society.	Such a person tends to be rigid, dogmatic, authoritarian, expects to be understood and blames those who do not. Trusts his own judgements and is slow to change ideas.	This person reacts positively only if presentations are simple, straightforward and not dependent on discussion and feedback. Once he thinks he understands he stops listening. He thinks what he says is perfectly clear.
A.5 +.555	Conclusion appealing to assumed beliefs and attitudes of listener. (Support is sought by subjective statements on the affective level which have little connection to the content of the message.)	One believes that the truth of a conclusion must be judged in relation to beliefs and attitudes of society. Objectivity is secondary to concurrence of the views of speaker and listener.	Such a person tends to be insecure, conservative, needing approval, receptive, retiring, seeking support of others.	This person reacts positively to material presented with a "feeling tone"—i.e., folk metaphors, slogans, idioms. His favorites can be identified by studying his conversation.
B.9 -.372	Indirect Context (Premise is an indirect statement leading to a direct conclusion. Premise is relativized to himself to gain acceptance.)	One believes that relative statements are logically equivalent to direct statements. All things are relative; there is no objective truth independent of human belief, conjecture, or bias.	Such a person tends to be relativistic, insecure, defensive. He fears commitment, distrusts his perceptions, feels alienated and holds his own opinions in low regard.	This person learns material presented as being relative to points of view, attitudes, beliefs. Things presented as absolute may arouse defensiveness.
D.1 +.353	Field-independent style (Attributes of a stimulus can be abstracted from the total field for their meaning.)	One believes that specific items or attributes of a situation are more or less separate from the total field. The parts are seen as having meaning in themselves and if studied according to certain principles will lead to solutions.	This person tends to be interested in the abstract and theoretical and in applying general rules and principles to problem solving. He will take critical elements out of the total context and restructure these items in a different context to arrive at a solution.	Such a person learns if material is organized and structured, and demands analysis and abstraction. He will respond well to requests to "intellectualize" about problems and less well to assignments of an affective, personal orientation.
A.6 +.318	Conclusion supported by an authority. (Conclusion is given support by alleging that knowledgeable persons or groups agree. The reference is neither substantial nor developed.)	One believes that a statement is largely true because of the rank, status or "expert" label of the person making it; men in authority are authorities.	Such a person tends to be authoritarian, rigid, conventional, inhibited, impressed by authority and in fear of being at a disadvantage.	This person reacts positively to material which quotes, refers to or otherwise relies on an authority or expert. Material must be well documented unless the speaker can claim to be an authority.

The world view of a Conflict-analytical thinker includes the belief that truth is tempered by moral considerations. If something is morally or ethically wrong, it cannot possibly be true. Conversely, if something is morally right, it must be at least partly true. This same person holds a strong belief in the scientific rule that states that all things operate from a beginning to an end and therefore goals are important. Situations are not believed to exist within a social context, but are isolated cause and effect events which must be solved on moral grounds.

Psychologically this person is philosophical, contemplative, and concerned with what is morally right or wrong. This person constantly seeks approval for being ethical and moral.

Learners whose style of cognition is Conflict-analytical will be interested in discussing the moral implications of situations, particularly if they are consistent with his own standards. At the same time, such a learner reacts positively to objectively presented material, especially if it is well organized in linear fashion and demands problem solving for external rewards. The teacher is expected to encourage theorizing, analyzing and philosophizing, but personal warmth and the affective approach are not valued.

The youngest and oldest respondents in the study identified with function two as Moral-relational in thinking style (Figure 19). The over 40 group showed a secondary tendency towards the Conflict-analytical style, but those respondents under 20 years of age identified only with the Conflict-relational style.

The Idio-logic for the Conflict-relational thinker in this analysis suggests that such a thinker bases arguments on moral and ethical

Figure 19

Logics of Conflict-relational Cognitive Style
Related to Age
(40+, $\overline{X}$ = 1.130; < 20, $\overline{X}$ = .223)

	IDIO-LOGIC	CONTRA-LOGIC	PSYCHO-LOGIC	PEDA-LOGIC
A.4 +.618	Conclusion appealing to sympathy for persons involved. (Conclusion aims for acceptance by seeking pity from the listener on moral and ethical grounds.)	One believes that truth must always be conditioned by moral considerations, not only by objective considerations. Something cannot be true while also being morally or ethically false, nor totally false while being morally satisfying.	Such a person tends to be in search of approval, concerned with standards of right and wrong, philosophic, contemplative.	Such a person reacts positively to hearing the moral implications of a situation discussed, especially if it seems that they will be consistent with his standards.
B.4 +.445	Parts-specific, linear orientation to a situation. (Components of a situation explain its meaning. They relate linearly in organized, causal fashion.)	One believes that the components of a situation give it meaning. Things occur in linear fashion from a beginning to an end that follows a scientific law or rule. Goals are important.	Such a person tends to be ambitious, achievement oriented, conscious of "wasting time," sees himself in control and able to solve problems, is confident, competitive and objective.	This person reacts positively to material presented in linear organization; must be challenged to solve problems, achieve external rewards and master objective information.
B.3 -.444	Concern with global and concrete characteristics. (Similar to B.2. Concrete, sensed characteristics of a situation are important to meaning. Abstractions are not readily seen.)	One believes that situations are part of a global interaction of happenings. Concrete description is an aid to a sufficient level of understanding. Control rests in the total social situation.	Such a person tends to be sensitive to social relationships, powerless, anxious in new situations, not motivated to achievement goals, relates well to affective, social situations.	This person reacts positively to material presented in a total context of reality. Theorizing, analyzing, generalizing are difficult. Personal warmth and individual attention are important motivators.
C.3 -.413	Contradiction (Contradictory premises are made with the speaker unaware the one statement makes the other impossible.)	One believes that contradictory conditions are possible at the same time. A thing and its opposite can exist at the same time. All things are seen as being possible.	Such a person has a difficult time choosing an alternative or making a decision. He wants to be "for" and "against" something at the same time. He is more comfortable with theoretical discussion than with problem solving.	This person needs the security of a directed approach so he is not forced to choose alternatives. He needs time to "think things over slowly" before being pressed for a decision.
A.7 -.389	Assumed cause-effect relationship. (Premises are made that imply a cause-effect relationship between events having no obvious connection.)	One believes that every event is causally related to every other event but a cause can exist without the effect occurring; man's action can in no way assure a hoped for effect.	Such a person tends to be dependent, indecisive, both for-and-against, caught in an uncontrollable situation.	This person reacts positively if the means are made to seem more important than the far-off hoped-for end goal. His general pessimism and feeling of helplessness must be overcome.
A.8 +.326	Conclusion and/or premise is derogatory of persons or institutions. (Statements appeal to emotions of listener, especially negative attitudes of persons or groups involved in the argument.)	One believes that whether one accepts a conclusion depends on the listener's feelings towards the agency or person involved in the argument. Subjective and objective characteristics cannot be separated.	Such a person tends to be hostile, aggressive, dogmatic, opinionated and rigid, and would project his own standards on others.	This person reacts positively if the teacher first understands his attitudes. The world is "good" or "bad" so build on, or totally isolate, your material from his attitudes.

166

considerations and attempts to win audience support on these grounds. This person does not make contradictory statements but may speak in derogatory terms about persons and institutions. Unexpectedly, the orientation to a situation will be linear and meanings are sought in components of a question. At the same time, that cause and effect are not assumed, this person does not take a global orientation to situations.

The Contra-logic of the younger and older Moral-relational thinker indicates a belief in the importance of "right and wrong" as moral issues. If something is false morally and ethically, it cannot possibly be true. This person believes that a situation derives meaning from its parts and that events occur in linear fashion according to a scientific rule or law. Global aspects of situations are not important. Contradictory situations are not seen as being possible and at the same time, cause and effect are not seen as valid explanations of events. Conflicting elements in this world view suggest that the way a person feels towards people in the situation is a determining factor in whether or not one accepts a con-clusion as valid.

Intellectual psychological attributes of the Moral-relational thinker include a concern with standards of right and wrong and a search for the approval of others. This person tends to be philosophic but at the same time, ambitious, conscious of "wasting time," oriented towards achievement, confident, and objective. Such a person is not sensitive to social relationships or affective situations. This thinker can make decisions, at times can be rigid and opinionated and may force "right and wrong" ideas onto other people.

The Moral-relational learner will be interested in discussing the moral implications of a situation. At the same time, material is best

presented in linear form, well organized, objective and with external
rewards as a motivator. Personal warmth and friendship from the teacher
are not highly prized. A teacher must first understand the moral attitudes
of this person and then, either build on and support these attitudes or
totally isolate material from the learner's biases and present information
in an objective way.

Summary

Chapter four described the statistical analyses performed on the
data as well as the extrapolation of findings to the Logics of Communica-
tion theoretical model.

Six hypothesis of no differences were tested in this study and
were rejected when the stepwise discriminant analysis procedures found
that significant differences did exist among groups. Hypotheses
investigated the existence of differences in cognitive styles in relation
to cultural background, facility to speak one or more than one language,
level of post-secondary education attained, sex and age of respondents.

Cultural background was found to be the most significant discrim-
inator among groups and language facility was the factor which gave the
least clearly defined discrimination between cognitive styles.

It was found that with shades of variation native people (Indian,
Inuit and Metis) as a total group tended towards being relational thinkers
while non-natives tended to be analytical thinkers. Indian, Metis and
Inuit people differed significantly from each other and from non-native
people. Those respondents who were bilingual had little or no university,
who were male and either older than 40 years or younger than 20 years
exhibited behaviors which in this study were associated with a relational
cognitive style.

Those respondents who were non-native, who held university degrees, who were between 30 and 40 years of age tended to be more analytical in cognitive style behaviors. On the analysis of distinct indigenous cultural groups the Inuit and Indian respondents were high in analytical behaviors while the non-natives were both analytical and relational.

This chapter concluded with a discussion of the cognitive behaviors associated with each identified cognitive style, the world view, psychological attributes and the learning-teaching approach that would best facilitate learning for groups associated with each style.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the major findings and conclusions of the study. Findings are related to the literature and implications are drawn for teachers and learners in cross-cultural classrooms. Recommendations are made for further research and for the implementation of changes in techniques for the teaching of Indian, Metis, Inuit and non-native students. The conclusions presented here must remain tentative due to the exploratory nature of the study, the small sample, and the use of an instrument which had not been validated in similar studies.

STUDY OVERVIEW

The present study was undertaken to investigate and compare the cognitive styles identified as being characteristic of adults and young adults from Indian, Metis, Inuit and non-native cultural backgrounds. Protocols of verbalized data were collected through tape-recorded interviews with twenty Treaty and Status Indians, twenty Metis, twenty Inuit and forty non-native subjects from communities across northern Canada and Alaska. Represented in the study were parents, university students, high school students, teacher trainees, teachers, education officials, political leaders and community residents including school drop-outs, government employees, missionaries and graduates of the public and high school systems.

The study sample consisted of 62 males and 38 females. Of the one hundred interviewees, eighty-two were bilingual (speakers of English

170

and a native language) while the remaining eighteen spoke only English. On the basis of educational background, twenty-six respondents had attended university for four to six years while forty-two had no university level education. Age distribution of the sample saw twenty-six respondents of nineteen years or younger and twenty-two over the age of forty years. Nearly 50 percent of the group (forty-seven respondents) were between twenty and forty years of age.

The data from one hundred protocols were typed and submitted to a content analysis coding instrument. The Data Analysis of Cognitive Style (DACS) scale was developed for this study primarily from three research projects which explored facets of cognitive style (Cohen, 1976; Schneidman, 1966; Witkin, 1977).

The DACS scale which evolved after piloting and revising three preliminary versions consisted of forty-four variables. The scale was made up of twenty-four variables which were categorized as aspects of reasoning and which included aspects of relevance, meaning, language and structure, and field articulation. The remaining twenty variables of the scale were classified into cognitive strategies. These included types of statements which were verbalized and strategies which enhanced or hindered the flow of ideas in the discourse.

The 528 minutes and 32 seconds of data which had been transcribed from tape-recorded interviews was typed in triple-spaced format for analysis. Three coders who had been trained in the use of the DACS scale analyzed the body of data. Coder reliability tests had produced a reliability score of 90 percent among three coders. The DACS instrument was accepted as valid for this study on the basis of support in the literature for the use of the content analysis procedure for such a study

(Carney, 1972; Holsti, 1969). Similarly, research into cognition and culture (Bruner, 1966; Berry, 1974; Kleinfeld, 1970; Cole, Gay and Glick, 1969; Boas, 1911) supported the postulation that cognitive behaviors as identified in this study differed among cultures.

Coded data were tabulated and key-punched for computer analysis. Statistical findings were obtained from submitting data for analysis to the SPSS program discriminant analysis (Klecka, 1975). The analysis produced discriminant functions made up of the variables from the DACS scale which contributed the most to differentiation along the respective patterns of cognitive style. The analysis identified the existence of discrimination among functions which described cognitive styles and derived a "probability of membership" of each respondent in respective cognitive style groups. In other words, once the different cognitive styles (functions) had been defined it was possible to determine the percentage of a group which "fit" with the cognitive style identified for that group.

A second major component of the total analysis involved extra-polation from the findings to the Logics of Communication theoretical model adapted for this study from that developed by Schneidman (1966). The model attempted to clarify the interrelationships among cognitive style (Idio-logic), world view (Contra-logic), personality traits (Psycho-logic), and learning style (Peda-logic) of the different groups. Findings from the content analysis and discriminant analysis identified five significantly different cognitive styles of the study groups defined according to the independent variables of cultural group, language facility, educational level, sex and age.

Within the theoretical model each cognitive style (Idio-logic)

consisted of major variables from the DACS scale which were seen as constituting its major characteristics. The model itself contained only aspects of reasoning behaviors from the DACS scale. Cognitive strategies were not included but were seen as contributing to the overall style and the label which was attached.

From the Idio-logics (style of reasoning and making concludifying statements), the Contra-logics were developed in line with Schneidman's findings. The Contra-logics described some attributes of the world view or philosophy which matched the different Idio-logics. For example, the Conflict-analytical thinker tended to operate from a somewhat different world view than was the case for the Conflict-relational thinker. Schneidman's original work did not suggest a cause and effect relationship between the two logics but found a correlation between a certain world view which would "justify" or make possible a certain way of thinking.

The third component of the Logics of Communication model consisted of the Psycho-logics. These were defined (Schneidman, 1966) as those mentational psychological characteristics of individuals who were identified with certain cognitive styles and world views. Again, cause and effect were not assumed, but there appeared to be a close relationship among the cognitive style (Idio-logics), the world view (Contra-logics) and the intellectual personality characteristics (Psycho-logics). Differing cognitive styles were reflected in differing personality attributes.

The final portion of the theoretical model which Schneidman had developed and which was adapted to this study was concerned with the Peda-logics. These were defined as the learning-teaching styles which would permit the greatest amount of learning to occur in the most positive

way according to each differing pattern of logics. In sum then, the Logics of Communication model suggested that an individual or a group which was identified in the study with a certain cognitive style (Idio-logic) would hold to a certain world view (Contra-logic); would exhibit certain psychological traits (Psycho-logic); and would respond positively to certain teaching-learning styles (Peda-logic).

Within the present study, the logics were developed for each of the five cognitive styles identified as being significantly different from each other on the basis of the variables which were studied. Implications for teaching in cross-cultural situations were discussed and recommendations were made in relation to findings in the present study.

SUMMARY OF MAJOR FINDINGS AND CONCLUSIONS

Examination of the data identified by the content analysis suggested the existence of important differences among cultural groups included in the study (Figure 20). The Indian group which has been stereotyped as highly non-verbal was found to be the most talkative and to score the highest average number of items on the measurement scale. The Metis group whose members were the least talkative scored the second highest mean number of items. The Inuit group whose members spoke as much as the non-natives scored significantly fewer items on the DACS scale than was true for any other group.

Hypothesis 1

The null hypothesis, "*There will be no statistically significant differences found in the cognitive styles identified as being used predominantly by each of the four cultural sub-groups in this study: Indian,*

Figure 20

Summary of Cognitive Styles and Primary
Identification of Study Groups

ANALYTICAL	RELATIONAL

Conflict-analytical   .   Conflict-relational

  Non-native   Non-native

  Inuit   Metis

  Indian   Males

  31-40 age group

Inexact-analytical   Inexact-relational

  4-6 years university   Bilinguals

                                        No university

                                        < 1 year university

Moral-relational

                                        Native

                                        40+ age group

                                        < 20 age group

Metis, Inuit, non-native" was rejected in the present study. Significant differences were found in the cognitive styles identified for each of the four cultural groups, and the study therefore concluded that significant differences did exist in the cognitive styles identified for Indian, Metis, Inuit and non-native cultural groups.

The discriminant analysis identified three culturally related functions of cognitive styles on which the four groups differed. Only the first two functions reached the .05 level of significance and were labelled Conflict-analytical and Conflict-relational. The analysis correctly classified 88 percent of all respondents according to cultural group.

The present study found that the cognitive style of the Indian group could be described as somewhat Conflict-analytical (X = .390). This group showed no identification with the Conflict-relational style. The Metis group tended to be somewhat Conflict-relational (X = .165). This group was not at all Conflict-analytical but showed some tendency towards the non-significant third function. The Metis group stood out for the tendency to make strong statements (a cognitive strategy). The only group to show some identification with all three functions was that of the non-natives. This group was primarily Conflict-relational (X = 1.303) but also was more like the Conflict-analytical style (X = .768) than was true for any other group.

The Inuit group showed the second strongest identification with the Conflict-analytical style (X = .686), but the highest loading for the group was on non-significant function three suggesting that the DACS scale items perhaps were inappropriate descriptors for the Inuit group.

On the basis of these findings it was concluded that among the four cultural groups in the study, the non-native sample was the most

analytical in thinking style. A portion of the Inuit group was almost as strongly analytical as the non-natives. The Indian group while not strongly analytical was definitely not identified with any other style. In contrast, the Metis group showed no tendency towards being analytical but rather tended towards the relational style. A further conclusion about the non-native group emphasized the diversity within the classification of "non-native." Although the non-native group was comparatively more analytical than any one of the indigenous cultural groups, taken in isolation the non-native group was more strongly relational in its thinking than it was analytical.

Hypothesis 2

The second null hypothesis of the study, "*that there will be no statistically significant differences found in the cognitive style identified and associated predominantly with the total indigenous group (Indian, Metis, Inuit) as compared to the non-native group,*" was rejected by the analysis in the present study and the alternate hypothesis was accepted.

Significant differences were found between the two groups. The analysis found that 86 percent of all cases were correctly classified into the native or non-native groups. Although the power to discriminate among native and non-native groups was not as great as it was among the four cultural groups, the findings were more strongly supported by other research (Cohen, 1976; Weitz, 1971; Witkin, 1962). The native group identified moderately with the Moral-relational style described by function two ($\overline{X}$ = .941). The non-native group, on the other hand, was definitely not Moral-relational in cognitive style.

On the basis of these findings it was concluded that significant differences did exist between the cognitive style characteristic of the indigenous sample in the study and the style of cognition common to the non-native study group. To the extent that the present study allowed for generalization, it was concluded that similar differences may exist within the Canadian population of the indigenous and non-native cultural groupings.

Results of the two analyses which held cultural background as the dependent variable were compared. It was concluded that (1) native and non-native cultural groups differed significantly from each other in cognitive styles and that (2) Indian, Metis and Inuit cultural groups differed significantly from each other and therefore could not be "lumped together" as having any one style of cognition. In fact the differences when the indigenous groups were studied separately were more highly significant than the differences when the three groups were combined and compared to the non-native group. Sample size may have been responsible.

The remaining four hypotheses tested in the study were concerned with demographic variables and their relationship to differences in cognitive style.

Hypothesis 3

The third hypothesis that, "*There will be no statistically differences in the cognitive style identified as being associated with protocols in the study on the basis of being monolingual or bilingual,*" was accepted when no significant differences were found. With a canonical correlation of .631, the language factor accounted for only 40 percent of variance between monolingual and bilingual speakers. In spite of its being a relatively weak discriminator, the language facility analysis correctly classified

86 percent of cases into groups. The alternative hypothesis was rejected that significant differences in cognitive style related to whether a speaker was monolingual or bilingual.

The larger proportion of the present study sample (82 percent) was designated bilingual which was defined as speaking English and one or more native languages. The bilingual protocols were identified as exhibiting an Inexact-relational style of cognition but the mean on this function was only moderately strong (.377). In contrast, however, the monolingual group registered a strong negative relationship to the Inexact-relational ($\overline{X}$ = -1.72) pointing out that the two groups were somewhat different. Since the criterion for being bilingual in this study was the ability to speak English and a native language, it was assumed that the majority of the bilingual group also belonged to one of the three indigenous cultural groups. The finding that bilinguals tended towards a relational cognitive style supported the results of the second hypothesis, where in comparison to the non-natives, the native (indigenous) cultural group was identified as being relational rather than analytical thinkers.

The study concluded therefore that a relationship did exist among cultural group identification, whether the language of the culture was spoken, and the cognitive style, but the nature and direction of that relationship were unknown. The inexactness evident in the cognitive style of the bilinguals may have related to the necessity in the present study to speak in a second language where concern for correct form interfered with a clear demonstration of the reasoning process.

Hypothesis 4

The fourth null hypothesis to be investigated stated that, "*There will be no statistically significant differences found among cognitive*

styles of respondents identified with four groups at different levels of post-secondary education." The hypothesis was rejected and only two functions were significant. The canonical correlation of .465 for function three (22 percent variance) showed it to be a non-significant function. On the basis of educational background, 74 percent of the respondents were correctly classified. The most striking finding and best separation came in relation to function one which described an Inexact-relational cognitive style. The group which related most strongly to this category was the group that had not attended university and those who had attended for less than one year. Mean score was 1.063. In contrast, the group with four to six years of attendance at university scored an even stronger negative mean, -1.680. The probable holders of university degrees (four to six years) definitely did not think in a relational style. They related secondarily to function two ($\overline{X}$ = .496) which was labelled the Inexact-analytical style. People with less than one year at university tended to be like those with no university experience while those students who had spent between one and three years at university were neither relational nor analytical in their style of cognition. They identified with the non-significant third function which contained strong elements of uncertainty and ambivalence.

On the basis of the results of this analysis the alternate hypothesis was accepted that significant differences in cognitive styles did relate to the length of time respondents had spent in post-secondary education. This study concluded that education at the university level was strongly related to the cognitive style behaviors of individuals or groups and the longer the involvement in university education, the stronger the tendency towards thinking in an analytical style.

The demography of the study sample was such that the majority of
the respondents with four to six years of university education were within
the non-native group (teachers, superintendents, principals) and it was not
surprising therefore to find that the highly educated non-natives tended to
be the most analytical in thinking style. The fact that "Conflict" and
"Inexact" were also descriptors of the analytical styles of the university
educated respondents suggested that (1) while universities promoted the
analytical thinking mode they succeeded only partially in training people
to think analytically, (2) that teachers who had spent time in northern
teaching perhaps felt unsure about the "fit" of the analytical style in
the milieux in which they worked.

Hypothesis 5

The present study rejected the hypothesis that, *"There will be no
statistically significant differences found between the cognitive style
identified for males and females."* The discriminant analysis found the
cognitive style of males to differ significantly from that of females in
the present study and the alternate hypothesis therefore was accepted.

Males made up 62 percent of the total study group and identified
strongly ($\overline{X}$ = .686) with the cognitive style designated as Conflict-
relational. Females scored a strong negative relationship to this style
($\overline{X}$ = -1.119). The analysis correctly classified 82 percent of males and
females. The study concluded that sex was an important variable in
relation to cognitive style and further, that males tended to be relational
thinkers while females did not. At the same time, females did not identify
with being analytical thinkers. It therefore was concluded that either
(1) females in the study did not exhibit any one identifiable cognitive

style other than not being relational or (2) the measurement scale of the present study was inadequate for identification of the cognitive style of females of the demographic background of those in the study. This finding was contradictory to most other research on male-female cognitive differences.

Hypothesis 6

The null hypothesis of the present study that, *"There will be no statistically significant differences found among cognitive styles identified as being associated with four different age groups of respondents,"* was rejected. Two significantly different functions identified with cognitive styles were found in relation to different age groupings. The alternate hypothesis therefore was accepted that there were differences in cognitive styles associated with four different age groups of respondents. The analysis correctly classified 69.4 percent of respondents into age groups.

Respondents who were between thirty and forty years of age identified strongly with the function identified as Conflict-analytical. The under twenty group was the only age category to show no Conflict-analytical identification. The youngest (under twenty years) and the oldest (over forty years) respondents tended to both fit the Moral-relational cognitive style. Those respondents between twenty and thirty years of age grouped towards the non-significant third function.

A synthesis of the findings in the discriminant analyses performed to test the six hypothesis is shown in Figure 21. Although, as has been stated previously, no groups were characterized as being totally analytical nor totally relational in cognitive styles, the variables which formed

Figure 21

Cognitive Styles Defined for Cultural Groups According to
the Data Analysis of Cognitive Style (DACS) Scale
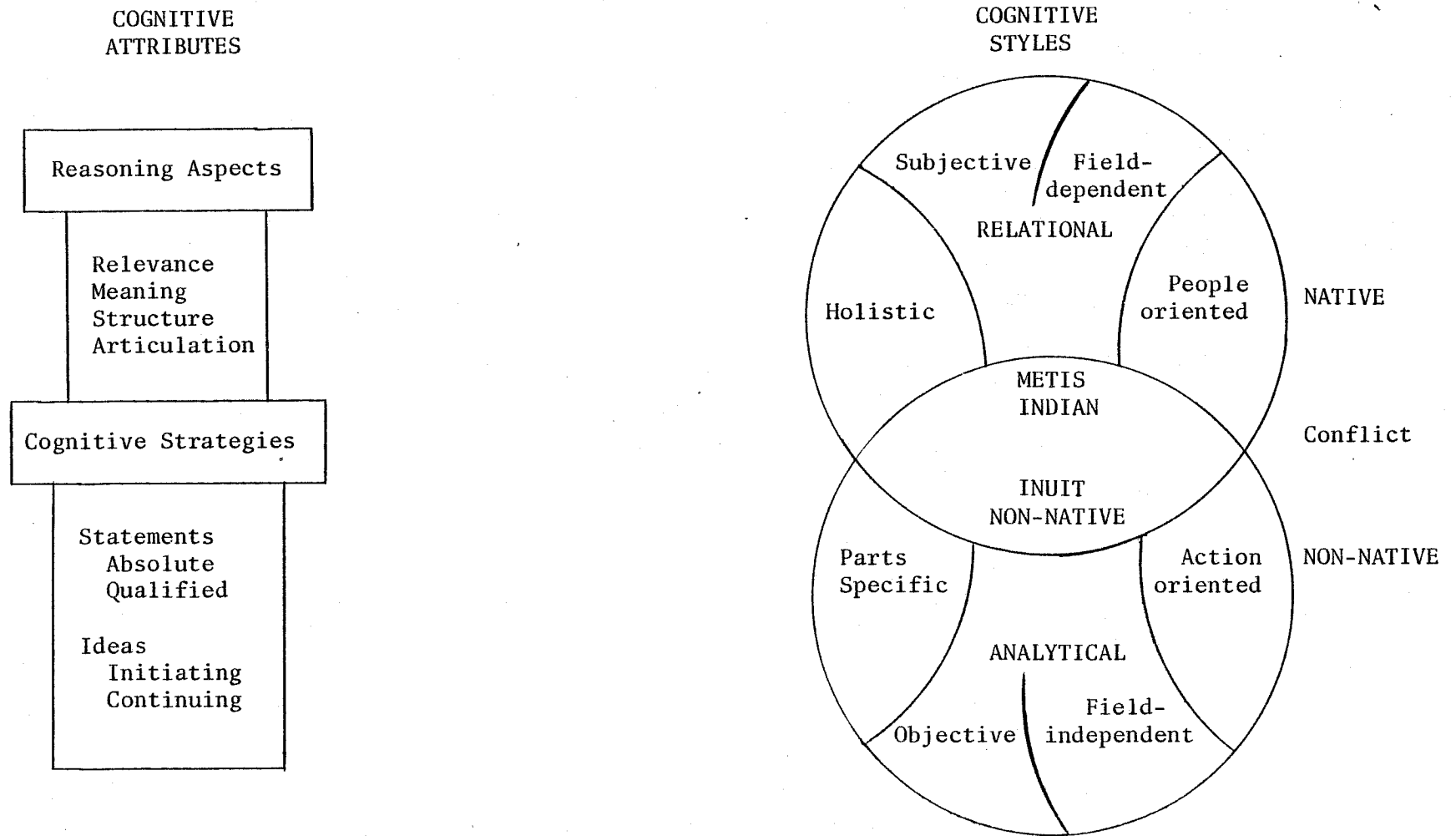
significant functions tended to be in one or the other of those two directions. The descriptors Conflict, Inexact or Moral were added to the identifying label to more specifically define the set of variables making up the function patterns.

The groups within the study which favored an analytical cognitive style were: the non-native cultural group; the Inuit and Indian respondents when indigenous groups were compared; the 31 to 40 year age group and those respondents with two to four years of university education, possible recipients of degrees.

Respondents who were characterized as thinking according to a more relational cognitive style included: the non-native cultural group when compared to three separate native groups; the Metis when compared to other indigenous groups; males as compared to females, the bilingual group; respondents with no university and those with less than one year of university; the native cultural group (Indian, Metis and Inuit compared to non-native); the youngest (under twenty years) and the oldest (over forty years) subjects in the study.

On the basis of these findings it was concluded that the non-native respondents who were likely to be in the 31-40 year age bracket and holders of one or more university degrees were most likely of all groups to operate from analytical cognitive styles, albeit, inexact and with some sense of conflict.

The total indigenous cultural group who were likely to be bilingual, were likely to have little if any university education, were likely to be younger (students) or older (parents) with little formal education operated generally from a relational cognitive style. Males were more relational than females and Metis were more relational than were the Indian or Inuit

cultural groups.

Cognitive strategies which were coded on the DACS scale and which were used in conjunction with the different styles tended to complement the reasoning behaviors being used. For example, the Metis group which used neither fact nor value premises to support conclusions made strongly emphasized statements. The analytical component of the non-native group spoke in well-organized, grammatically complex structures. The Inuit tended to make brief, simply stated conclusions and the Indians made elaborations and analogical explanations to support their stance.

In summary, the total study sample was found to identify with cognitive styles which tended either towards the analytical or towards the relational. Because of individual differences and uncontrolled variables, the study did not find clearly dichotomous groups. Cultural background, when combined with the demographic variables of language, education, sex and age appeared to be an important determiner of the cognitive style of groups and of a high percentage of individuals.

The Relationship of Findings to Related Literature

The results of the present study are supported in earlier literature reporting findings from social science research into cognition and culture. The finding that cognition and culture are somehow related has appeared in the literature since the work of Boas (1911) and even before. The exact nature and extent of that relationship have yet to be totally explained since both culture and cognition contain intangibles which have defied efforts of researchers to observe, measure and explain them. This study assumed, with support from previous research (Schneidman, 1966; MacArthur, 1970; Cohen, 1969) that some aspects of cognition could be

described by observing and analyzing relationships among characteristic behaviors which were considered to be components of the cognitive process. Those attributes which were considered tended to group into patterns of behavior common to different groups of individuals. The labels which were created to describe significant patterns were derived largely from the work of Witkin (1962), Cohen (1969), Nakamura (1964) and Bruner (1966).

Cohen (1976) stated that:

Conceptual styles are essentially integrated rule-sets for the selection and organization of sense data. Within each rule-set certain assumptions and relationships are logically possible, and others are not. They are definable without reference to specific substantive content and are not related to mental ability. (p. 305)

Inferences made from the cognitive styles to the idio-logics of the Logics of Communication theoretical model were based on Schneidman's (1966) research into communication, cognitive style and the logics of reasoning.

Schneidman stated:

Our second assumption is that individuals think in various *ways*, i.e., that each individual has, along with his culturally-common ways of thinking, some patterns of thinking which he may share with some other individuals and some which are unique to him. There is no one way of thinking, but there are many patterns of thinking. (Schneidman, 1966, p. 1)

The findings regarding the relationship between cultural background and cognitive style were supported by such researchers as Nakamura (1964), Whorf (1956), Weitz (1971), and Ramirez III and Castaneda (1974). Research conducted by Ramirez III and Castaneda found that Mexican-American children differed significantly from Anglo-American children in cognitive styles, which, according to their definition included learning styles, incentive-motivational styles, human-relational styles and communication styles. Cole, Gay, Glick *et al*. (1971) had identified the existence of significantly different cognitive and learning styles among the Kpelle people

from those of comparable age groups of Americans. Berry (1976), MacArthur (1969), Kleinfeld (1970), and others had concluded that the processes of cognition among various groups of the indigenous people differed significantly from those processes within the North American non-native cultures. Similar results were found in the present study.

The finding that significant differences in styles of cognition existed among the indigenous cultural groups (Indian, Metis and Inuit) was largely unsupported in the research literature. Support for such a finding does exist within the folklore, mythology, oral tradition and cultural knowledge of the groups themselves. For example, the Crees, Chipewyans and Inuit know within themselves that they are different from each other in their history, in their world view, in their languages, values and the ways in which they think. However, non-native researchers have tended to either conduct comparative studies between non-native culture and distinct native cultural groups or between the non-native culture and a conglomerate of all indigenous people as one group. This researcher was able to locate few studies in which indigenous cultural groups were compared to each other on the variable of cognitive style. MacArthur (1969) compared facets of cognition of Inuit children of Greenland and northern Canada with cognitive abilities of Indian and non-native children in Alberta and found important differences among groups. In a 1976 report Berry noted both similarities and differences in cognitive abilities of Temne and Eskimo children.

In addition to the finding that cultural background was significantly related to differences in cognitive styles, the present study also found the existence of significant relationship among cognitive styles, language facility, education at the post-secondary level, sex and age.

Earlier documentation in support of these findings exists in reports by such researchers as Kleinfeld (1970), Witkin (1977), Bruner (1966), Berry (1976), Cole and Scribner (1974), Whorf (1956), and Taylor and Skanes (1976). The importance of language of instruction for a group of Canadian Indian children was studied by King (1975) who found that bilingual and monolingual speakers differed significantly in cognitive development according to the Piagetian levels of animism.

The works of Cohen (1969), Witkin (1977) and Schneidman (1966) and Nakamura (1964) in general supported the finding of the present study, that cultural background and demographic variables relate significantly to differences in cognitive styles among groups. Cohen and Witkin drew from their work descriptions of patterns of cognition which in many ways paralleled those drawn from the present study. This was of importance since much of the rationale and theoretical framework of the present study had developed from the findings of these earlier researchers.

Implications for the Education of Indian, Metis, Inuit and Non-native Students

The findings drawn from the present study and supported by related research have implications for the education of children and adults from Indian, Metis, Inuit and non-native cultural backgrounds. These implications are discussed in this section under four headings: programme planning, teaching, teacher training and integrated and local control school situations.

Programme Planning

The results of this study revealed some cognitive style commonalities among the Indian, Metis and Inuit cultural groups as well as some

unique differences which suggest directions for programme planners and curriculum developers.

If taken as a combined indigenous cultural group being educated in the system of the dominant non-native society, striking differences emerge for the indigenous group in the choice of preferred learning materials from that which generally is offered. The people of the indigenous cultures would choose people-oriented material which is presented within a total context of reality. Hypothetical situations are not found to be particularly interesting, and theorizing, analyzing and generalizing are not as well received as are discussions of the moral and ethical implications of events. These students are field-dependent and therefore tend to see a situation in its total context, not as a problem to be solved in isolation from its environment. The affective aspects of situations are seen as important. It is suggested that programme planners and curriculum developers emphasize these perspectives in the programme goals and the learning context offered for the native students.

For example, instead of presenting Canadian history as a chronological series of events, causes and effects, perhaps it would be more useful to select several events for detailed study in the reconstructed context of the time of the event, the people involved and the moral and ethical implications of the actions taken.

Because of the relational cognitive styles of the Indian, Inuit and Metis students, the "hidden curriculum" assumes great importance. The total context in which the content is to be learned may be as crucial as the context itself. It is suggested that the social expectations, norms and interaction patterns be taught and discussed as part of the programme and not be left to incidental learning. Perhaps such topics as prejudice,

discrimination, language and cultural uniqueness demand a greater proportion of direct teaching than has been the case in most school programmes.

When the three indigenous groups were studied in comparison to each other, some unique cognitive styles and learning preferences emerged. All three groups prefer that material be presented in a well-organized, structured manner. While the Indian and Inuit groups enjoy a problem-solving orientation, the Metis show a preference for seeking support from authoritative sources (experts). The Metis group reacts positively to socially presented material with short-term goals whereas the Indian and Inuit groups are more interested in working from a facts and figures approach. In general, the Inuit and Indian learners tend to approach learning from a somewhat analytical stance while the Metis group is somewhat relational with a strong reliance on authority.

Considering the commonalities and differences in cognitive styles and learning preferences among the groups, programme planners may be required to design some materials which can be used for all groups plus some which are specific and unique to each group. Perhaps the greatest error of the school system in this regard has been the standardized curriculum.

The non-native group in the present study was found to relate to both analytical and relational cognitive styles and learning modes when compared to each separate indigenous group. In the analysis of the non-native groups compared to the native groups, the non-natives were definitely not relational style thinkers. These somewhat contradictory findings make it difficult to suggest program changes which would enhance learning for this group. However, the finding that the non-natives were highly relational on at least one analysis may suggest that a more

people-oriented, social reality approach to content would be advantageous for at least some members of this group.

Teaching

Personal warmth, individual attention, flexibility and firmness are the most desired teacher behaviors when learners operate from relational cognitive styles. The total indigenous group according to the theoretical model tended to be relational thinkers which assumes a strong social orientation to the world in general and to the classroom in particular. Such students tend to see the teacher first as a person and secondly as a teacher. If the personal relationship between teacher and learner is a positive one, then learning will be enhanced, providing of course that the teacher can combine friendliness with organization, firmness and the expectation that students are capable of producing a high standard of work. A teacher who fails to win the students' personal regard will experience difficulty in motivating Indian, Metis or Inuit students to learn no matter how "skilled" he may be in "techniques" of how to teach. At the same time, the native student has the right to expect teaching competence as well as personal warmth and caring.

The majority of teachers of Indian, Metis and Inuit students in grade schools and adult learning institutions are members of the non-native cultural group. According to the present study, these teachers are likely to come from a university education background and are likely to operate from an analytical cognitive style. This style is characterized by objectivity, concern with role expectations, and an orientation towards analytical problem solving. The potential for misunderstanding and conflict between teacher and learner is obvious.

In light of these findings it is suggested that teachers who are working with Indian, Metis or Inuit students assess their own and their students' cognitive styles. The behavioral descriptors given in the present study of the different styles may serve as guides in such an assessment.

To some extent, a teacher may be able through re-training to change some aspects of his teaching approach. To some extent a learner may be able to adapt his mode of learning. Unless a satisfactory compromise is possible so that the teaching-learning situation becomes a mutually positive experience, the teacher should be replaced. Improved selection procedures for hiring teachers to work with Indian, Metis and Inuit children may be able to better identify those teachers whose cognitive and teaching styles will match more closely with the cognitive and learning styles of the indigenous students.

Teacher Training

The findings of the present study indicate the need for important changes in the programmes designed to train teachers for Indian, Metis and Inuit students. Teacher training programmes in most universities and teacher training institutions in Canada are similar to each other in focus and content. Training generally aims to equip teachers with skills and competencies which will enable them to assist students to become competent, analytical thinkers. Logical reasoning, objective problem solving, linear cause and effect organization are intellectual goals of the education system and hence of the teachers in universities and in schools. The present study found that the longer a person had studied at a university (at least up to four years) the more likely that person was to identify

with an analytical cognitive style. Those people who had not attended
university or who had spent less than a year in university level studies
had retained a largely relational style of cognition. A premise of the
present study and of other similar research suggests that a close match in
cognitive and learning styles between teachers and learners will enhance
learning. It follows then that university based teacher training as it has
been carried out is not necessarily the optimal way to train teachers to
work with relational style thinkers (Indian, Inuit and Metis students).
Alternatives do exist. It is possible to change components of university
based training as it presently is offered, i.e., more time spent learning
about different cognitive and learning styles and cultural differences,
more direct input of Indian, Metis and Inuit adults into the preparation
of teachers for their schools and field experiences with teaching native
children before making that career choice. Other possibilities might
include apprenticeship teaching with a native or non-native teacher who
has learned to be a successful teacher of Indian, Inuit and Metis children,
or apprenticeship with an elder who has mastered the art of teaching
students of his culture.

Integrated and Local Control Schools

The present study found that in general the indigenous people of
Canada think in styles significantly different from that of the majority
culture members. This finding has serious implications for teachers and
for students in integrated learning situations. Assuming a teacher can
learn how to assess the learning styles of the students and assuming the
teacher is able to teach to a variety of learning styles, it is suggested
that different approaches be used with different learners. This would not

mean segregating all native students into one group and all non-natives into another for not all individuals will fit the group norm (i.e., the non-natives in the present study were both relational and analytical). In practice, instead of grouping students according to ability or success in mastering content, the students may be grouped according to preferred thinking and learning styles. Such teaching would require flexibility, perhaps some change in content and some changes in what is labelled as success at the end of the year. Because of its possible mixture of students of a variety of cultural backgrounds, the integrated classroom is the most difficult situation in which to match teaching and learning styles. However, it is not an impossibility. Many teachers already spend large amounts of time on "individualized attention." What must change then is not so much the time as the ways in which the "attention" is given.

The policy paper *Indian Control of Indian Education* of 1972 affirmed the right of Indian people of Canada to control the schooling of Indian children. The policy has become known as "local control" and is being implemented with varying degrees of actual control in schools on Indian reserves and in Metis and Inuit communities throughout the north.

The findings of the present study suggest important implications for what is taught in these schools and who does the teaching. If, as the study found, the cognitive styles of native people differ significantly from those of non-native people, then it follows that teachers of native ancestry are more likely than non-native teachers to be able to teach in styles which match the learning styles of native children. The finding that university level study is an important variable in relation to cognitive styles calls into question the practice of training native teachers in university based programs as a preparation for teaching native

students. In a similar vein, the majority of teachers in local control
and northern schools continue to come from the non-native society. This
factor in part may negate the achievement of the goals for Indian education
as stated in the 1972 policy paper.

A further finding suggested that significant differences exist
among the cognitive styles of Indian, Metis and Inuit people. This, too,
requires serious consideration when teachers are trained and teaching
material is designated for different northern schools. The present study's
finding that cognitive styles are learned and are closely interrelated to
language, world view and cultural identification pose serious questions
for the indigenous people of Canada who realize that "the way of life
expressed in a world view of existence must be transmitted to the next
generation" (Roberts and Akinsanya, 1976, p. 1).

SUGGESTIONS FOR FURTHER STUDY

Given the seriousness of the educational situation of the indigenous
people of Canada, much more research is required into questions of cognitive
styles, learning styles and teaching styles as they affect the progress of
students. The present study, although exploratory in nature and concerned
with only one sample of one hundred people, found strong support for the
contention that cognitive and learning styles differ between individuals
and among cultural groups. Earlier research (Cohen, 1977; Floyd, 1976;
Ramirez III and Castaneda, 1974) supported the premise of the present study
that if teaching style can match learning style, the process of learning
and mastery of skills and content will be enhanced. Further research may
offer more precise information about how the Indian, Metis and Inuit
student learns and therefore how such students can be taught so that

learning is a positive experience.

There is a need for such specific studies as:

1. A study of cognitive styles using the DACS scale of measurement but with interviews conducted in the first language of all respondents.

2. A comparative study within the three native cultural groups where one group of respondents has had little formal schooling while the other group has completed the secondary school level of education.

3. A study comparing the cognitive styles of members of an indigenous cultural group who have attended an integrated school and those who have attended a school controlled by members of that cultural group.

4. Studies are needed to compare cognitive styles of children and adults from within the same and different cultural groups.

5. Comparative studies of the teaching styles of native and non-native teachers are required to ascertain the relative influence of cultural background and teacher training.

6. Analysis of the goals of educational curricula, schools and universities to ascertain more clearly the cognitive strategies which are rewarded and their correlation to the goals of society.

7. Comparative studies of cognitive styles of males and females from within different cultural groups. Sex roles may have differing influences on cognitive styles within different cultures.

8. The Data Analysis of Cognitive Style Scale as developed for the present study requires further research use and refinement. Studies similar to the present one but conducted with other cultural groups (Vietnamese, Portuguese, Chileans) could further validate the DACS scale for cross-cultural use.

BIBLIOGRAPHY

Adams, P. (Ed.). *Language in thinking*. Baltimore, Md.: Penguin Books, 1972.

Alexander, H. G. *The language and logic of philosophy*. Albuquerque, N.M.: University of New Mexico Press, 1967.

Bartlett, F. C. *Remembering*. London: Cambridge University Press, 1932.

Belth, M. *The process of thinking*. New York, N.Y.: David McKay Company Inc., 1977.

Berlo, D. K. *The process of communication: An introduction to theory and practice*. New York, N.Y.: Holt, Rinehart and Winston, 1960.

Berry, J. W. *Human ecology and cognitive style. Comparative studies in cultural and psychological adaptation*. New York, N.Y.: Sage Publications (In Canada: Toronto, Ont.: John Wiley and Sons), 1976.

Berry, J. W., & Dasen, P. R. *Culture and cognition: Readings in cross-cultural psychology*. London: Methuen and Co., Ltd., 1974.

Berry, J. W., & Wilde, G. J. S. *Social psychology: The Canadian context*. Toronto, Ont.: McClelland and Stewart, 1972.

Best, J. W. *Research in education* (3rd ed.). Englewood Cliffs, N.J.: Prentice-Hall Inc., 1977.

Bloomfield, L. *Language*. New York, N.Y.: Holt, 1933.

Bloomfield, L. Philosophical aspects of language. In: *Studies in the history of culture. The discipline of the humanities*. Published for the Conference of Secretaries of the American Council of Learned Societies. Minaska, Wisc.: Banta, 1942a.

Bloomfield. L. *Outline guide for the practical study of foreign languages*. Baltimore, Md.: Linguistic Society of America, 1942b.

Boas, F. *Handbook of American Indian languages*. Washington, D.C.: Smithsonian Institute, 1911.

Bowd, A. D. Ten years after the Hawthorne Report: Changing psychological implications for the education of Canadian native peoples. *Canadian Psychological Review*, October 1977, *18*(4).

Bowles, R. P. *et al. Assimilation, integration or separation?* Scarborough, Ont.: Prentice-Hall of Canada Ltd., 1972.

Brislin, R. W. (ed.). *Topics in culture learning, vol. 1, 1973*. Honolulu, Hawaii: East-West Culture Learning Institute, 1973.

Brislin, R. W. *Topics in culture learning, vol. 2, 1974*. Honolulu, Hawaii: East-West Culture Learning Institute, 1974.

Brislin, R., Bochner, S., & Lonner, W. J. (Eds.). *Cross-cultural perspectives on learning.* Toronto, Ont.: John Wiley and Sons, 1975.

Brown, I. C. *Understanding other cultures.* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963.

Bruner, J. S. *Studies in cognitive growth.* New York, N.Y.: John Wiley and Sons, 1966.

Bruner, J. S. *Beyond the information given: Studies in the psychology of knowing,* Jeremy M. Anglin (Ed.). New York, N.Y.: W. W. Norton and Company, Inc., 1973.

Bruner, J.S. *The relevance of education,* Anita Gil (Ed.). New York, N.Y.: W. W. Norton and Company, 1971.

Bryde, J. F. *Modern Indian psychology.* Vermillion, S.D.: University of South Dakota, 1971.

Bryde, J. F. The Sioux Indian student: A study of scholastic failure and personality conflict. Unpublished Ph.D. dissertation, University of Denver, 1965.

Budd, R. W., Thorp, R. K., & Donohew, L. *Content analysis of communications.* Toronto, Ont.: Collier-Macmillan, 1967.

Burden, V. *The process of intuition.* Wheaton, Ill.: The Theosophical Publishing House, 1975.

Campbell, D. T. Eliminating plausible rival hypotheses by supplementary variation. A paper presented at the meeting of the American Psychological Association, Washington, D.C., 1967.

Carkhuff, R. R., & Truax, C. B. *Toward counselling and psychotherapy: Training and practice.* Chicago, Ill.: Aldine, 1967.

Carney, Thomas F. *Content analysis, a technique for systematic inference from communications.* Winnipeg, Man.: University of Manitoba Press, 1972.

Carnoy, M. *Education as cultural imperialism.* New York, N.Y.: David McKay Company, 1974.

Carroll, John B. *Language and thought.* Toronto, Ont.: Prentice-Hall, 1964.

Carson, R. C. *Interaction concepts of personality.* Chicago, Ill.: Aldine Publishing Company, 1969.

Caton, C. E. *Philosophy and ordinary language.* Urbana, Ill., 1970.

Chamberlin, J. E. *The harrowing of Eden: White attitudes toward North American natives.* Toronto, Ont.: Fitzhenry and Whiteside, 1975.

Charles, C. M. A science-mythology relationship among Indian children. *Journal of Educational Research,* January 1964, *37,* 261-264.

Cohen, R. A. Conceptual styles, culture conflict and nonverbal tests of intelligence. *American Anthropologist,* 1969, *71.*

Cole, M., Gay, J., Glick, J. A., Sharp, D. W. *et al. The cultural context of learning and thinking.* New York, N.Y.: Basic Books, 1971.

Covert, J. R. The use of post-literate technology in a pre-literate culture: Examples and implications. *Canadian and International Education,* June 1977, *6*(1).

Dennis, P. A. Lévi-Strauss in the Kindergarten: The Montessori pre-schooler as Bricoleur. *International Review of Education,* 1974, *20*(1), 3-17.

Denny, P. J. Semantics and the teaching of elementary grades in native languages. Unpublished paper, University of Western Ontario, London, Ontario.

Dewey, J. *Experience and education.* London: Collier-Macmillan, 1963.

Disch, R. *The future of literacy.* Toronto, Ont.: Prentice-Hall of Canada Ltd., 1973.

Doob, L. W. *Becoming more civilized: A psychological exploration.* New Haven, Conn.: Yale University Press, 1960.

Doob, L. W. *Communication in Africa: A search for boundaries.* New Haven, Conn.: Yale University Press, 1961.

Duncan, H. D. *Symbols in Society.* New York, N.Y.: Oxford University Press, 1968.

Edgerton, R. B., & Langness, L. L. *Methods and styles in the study of emotions.* Nebraska Symposium on Motivation, in press, 1972.

Farnham-Diggory, Sylvia. *Cognitive processes in education: A psychological preparation for teaching and curriculum development.* New York: N.Y.: Harper and Row Publishers, 1972.

Fischer, D. G., Hunt, D., & Randhawa, B. S. Empirical validity of Ertl's brain-wave analyzer (BWAO2). University of Saskatchewan, Saskatoon, Saskatchewan, 1979 (in press).

Floyd, A. *Cognitive styles, The Open University educational studies: A second level course, personality and learning block 5.* Walton Hall, Milton Keynes. The Open University Press, 1976.

Fodor, J. A. *The language of thought.* New York, N.Y.: Thomas A. Crowell, 1975.

Fox, David J. *The research process in education.* Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1969.

French, D. The relationship of anthropology to studies in perception and cognition. In S. Koch (Ed.), *Psychology: A study of a science.* Vol. 6. Toronto, Ont.: McGraw-Hill, 1963.

Gagné. R. Intracultural vs intercultural education systems. Unpublished paper, Department of Indian Affairs and Northern Development.

Gerbner, G. *et al.* (Eds.). *The analysis of communication content. Developments in scientific theories and computer techniques.* Toronto, Ont.: John Wiley and Sons, 1969.

Gibson, E. J. *The senses considered as perceptual systems.* New York, N.Y.: Houghton Mifflin, 1966.

Gordon, G. N. *The languages of communication.* New York, N.Y.: Hastings House, 1969.

Greene, J. *Language and thinking.* London: Methuen, 1975.

Greenfield, P. M., Reich, L. C., & Oliver, R. R. On culture and equivalence. In J. S. Greenfield, R. R. Oliver, and J. S. Bruner, *Studies in cognitive growth.* New York, N.Y.: Wiley, 1966.

Guilford, J. P., & Fruchter, B. *Fundamental statistics in psychology and education* (5th ed.). Toronto, Ont.: McGraw-Hill, 1973.

Hall, E. T. *The silent language.* Garden City, N.Y.: Doubleday, 1959.

Hall, E. T. *The hidden dimension.* New York, N.Y.: Doubleday and Company, Inc., 1969.

Hall, E. T. *Beyond culture.* Garden City, N.Y.: Doubleday, 1976.

Hallowell, A. (Ed.). *Culture and experience.* Philadelphia, Pa.: University of Pennsylvania Press, 1955.

Harmon, G. (Ed.). *On Noam Chomsky: Critical essays.* Garden City, N.Y.: Anchor Books, 1974.

Harris, A. *Language and values: Some philosophical questions.* Walton Hall, Bletchley. Buckinghamshire: The Open University Press, 1973.

Heckinger, F. M. (Ed.). *Pre-school education today: New approaches to teaching three, four and five-year-olds.* New York: Doubleday, 1966.

Herskovits, M. J. *Cultural dynamics.* New York, N.Y.: Alfred A. Knopf, 1964.

Herskovits, M. J. *Cultural relativism: Perspectives in cultural pluralism.* New York, N.Y.: Random House, 1972.

Holsti, O. R. *Content analysis for the social sciences and humanities.* Don Mills, Ont.: Addison-Wesley Publishing Company, 1969.

Honigman, J. J. Psychological anthropology. *Annals,* 1969, *383*, 145-148.

Honigman, J. J., & Honigman, I. *Eskimo townsmen.* Canadian Research Centre for Anthropology, University of Ottawa, Ottawa, 1965.

Hull, R. F. C. (Trans.). *The portable Jung,* J. Campbell (Ed.). New York, N.Y.: The Viking Press, 1971.

Horton, R. African traditional thought and western science. *Africa,* 1967, *37*, 50-71, 155-187.

Hoyt, E. E. An approach to the mind of the young Indians. *Journal of American Indian Education,* June 1961, *1*, 17-23.

Kagan, J., & Lesser, G. S. *Contemporary issues in thematic aperception methods.* Springfield, Ill.: Charles C. Thomas, 1961.

Kaplan, A. *The conduct of inquiry: Methodology for behavioral science.* Scranton, Pa.: Chandler Publishing Company, 1964.

Keddie, N. (Ed.). *Tinker, tailor. The myth of cultural deprivation.* Markham, Ont.: Penguin Books, 1973.

King, C. A comparative study of animistic thought of Ojibway children on Wikwemikong Reserve, Manitoulin Island. Unpublished Master's thesis, University of Saskatchewan, Saskatoon, 1975.

Klecka, W. R. Discriminant analysis. In N. H. Nie, C. H. Hull, J. G. Jenkins *et al.* (Eds.), *Statistical package for the social sciences.* Toronto: McGraw-Hill, 1975.

Kluckhohn, Clyde. *Mirror for Man: Anthropology and modern life.* Toronto, Ont.: McGraw-Hill, 1949.

Kleinfeld, J. *Cognitive strengths of Eskimos and implications for education.* Fairbanks, Alaska: Institute of Social, Economic and Government Research, University of Alaska, 1970.

Kleinfeld, J. S. Intellectual strengths in culturally different groups: An Eskimo illustration. *Review of Educational Research,* 1973a, *43*, 341-359.

Leach, E. *Lévi-Strauss.* Glasgow, Scotland: William Collins Sons and Company Ltd., 1970.

Lee, Dorothy. Lineal and nonlineal codifications of reality. *Psychosomatic Medicine,* 1950, *12*.

Lee, Dorothy. *Freedom and culture.* New York, N.Y.: Prentice-Hall, 1959.

Lévi-Strauss, C. *The Savage Mind.* London: Weidenfeld and Nicolson, 1962.

Levy-Bruhl, C. *Les fonctions mentales dans lès sociétés inferieures.* Paris: F. Alcan, 1918.

Levy-Bruhl, C. *La mentalité primitive.* Presses Universitaires de France, 1910. Trans., *How natives think.* Allen and Unwin, 1926.

Lewin, K. *Dynamic theory of personality.* New York, N.Y.: McGraw-Hill Book Co., 1933.

Lloyd, B. B. *Perception and cognition: A cross-cultural perspective.* Baltimore, Md.: Penguin Books, 1972.

MacArthur, R. S. Some cognitive abilities of Eskimo, white and Indian-Metis pupils aged 9 to 12 years. *Canadian Journal of Behavioral Science,* 1969, *1,* 50-59.

MacArthur, R. S. Cognitive strengths of central Canadian and northwest Greenland Eskimo children. Paper presented at the annual meeting of the Canadian Psychological Association, Victoria, 1973.

Mann, H., Sigler, M., & Osmond, H. Four types of personalities and four ways of perceiving time. *Psychology Today,* December 1972, *6*(7).

Markel, N. N. *Psycholinguistics: An introduction to the study of speech and personality.* Homewood, Ill.: Dorsey Press, 1969.

Mead, M. *Sex and temperament in three primitive societies.* New York, N.Y.: Wm. Morrow & Co., Inc., 1935.

Medawar, P. B. *Induction and intuition in scientific thought.* London: Methuen and Co., 1969.

Merriman-Webster. *Webster's seventh new collegiate dictionary.* Toronto, Ont.: Thomas Allen, 1967.

Merton, R. K. *Social theory and social structure.* New York, N.Y.: Free Press, 1949. (Revised ed., 1957)

Mohatt, G. Harvard Research Project, Ojibwe Cultural Foundation, Manitoulin Island, Ontario, 1977 (unpublished report).

Morris. A. *The treaties of Canada with the Indians of Manitoba and the Northwest Territories.* Toronto: Belfords, Clarke & Co. Publishers, 1971. (Originally published by Coles Publishing, 1862)

Morris, C. *Signification and significance: A study of the relations of signs and values.* Cambridge, Mass.: M.I.T. Press, 1964.

Michelson, N. I., & Galloway, C. G. Cumulative language deficit among Indian children. *Exceptional Children,* 1969, *36,* 187-190.

Michelson, N. I., & Galloway, C. G. Verbal concepts of Indian and non-Indian school beginners. *Journal of Educational Research,* 1973, *67,* 55-56.

Nagler, Mark. *Perspectives on the North American Indians.* Toronto, Ont.: McClelland and Stewart, 1972.

Nakamura, H. *Ways of thinking of Eastern peoples: Indian-China-Tibet-Japan.* Honolulu, Hawaii: East-West Center Press, 1964.

Nakamura, H. *Parallel developments: A comparative history of ideas.* Ronald Burr (Ed.). Kodansha Ltd., Japan, and Harper Row, New York, 1975.

National Indian Brotherhood. Indian control of Indian education. Ottawa, 1972.

Nie, N. H., Hull, C. H. *et al.* *SPSS: Statistical package for the social sciences* (2nd ed.). Toronto, Ont.: McGraw-Hill, 1975.

Pask, G., & Scott, B. C. E. Learning strategies and individual competence. *International Journal of Man-Machine Studies,* 1972, *4*(3), 217-253.

Phillips, J. L. Jr. *The origins of intellect: Piaget's theory.* San Francisco, Calif.: W. H. Freeman and Company, 1969.

Phillips, Susan U. *Participant structures and communicative competence: Warm Springs children in community and classroom.* C. B. Cazden, V. P. John, and D. Hymes (Eds.). Columbia University, N.Y.: Teachers College Press, 1972.

Piaget, J. *The language and thought of the child.* Marjorie Warden (Trans.). New York, N.Y.: Harcourt, Brace World, Inc., 1926. (Original French edition, 1923)

Piaget, J. *Psychology and epistemology: Towards a theory of knowledge.* Arnold Rosin (Trans.). New York, N.Y.: The Viking Press, 1970.

Piaget, J. *et al.* *Judgement and reasoning in the child.* Marjorie Warden (Trans.). London: Routledge and Kegan Paul, Ltd., 1928.

Pool, Ithiel de Sola (Ed.). *Trends in content analysis.* Urbana, Ill.: University of Illinois Press, 1959.

Preston, R. J. The means to academic success for Eastern Cree students. Unpublished paper, McMaster University.

Price-Williams, D., Gordon, W., & Ramirez III, M. Skill and conservation: A study of pottery-making children (1969). In J. W. Berry and P. R. Dasen (Eds.), *Culture and Cognition: Readings in cross-cultural psychology.* London: Methuen and Co., 1974.

Radin, Paul. *Primitive man as philosopher*. New York, N.Y.: Dover Publications, 1927, 1957.

Ramirez III, M., & Castaneda, A. *Cultural democracy, bicognitive development and education*. New York, N.Y.: Academic Press, 1974.

Reid, L. A. *Philosophy and education: An introduction*. New York, N.Y.: Random House, 1965.

Roberts, J. E., & Akinsanya, S. K. *Schooling in the cultural context: Anthropological studies in education*. New York, N.Y.: David McKay Company, Inc., 1976.

Rogers, C. R. *Freedom to learn*. Columbus, Ohio: Charles E. Merrill, 1969.

Rogers, E. M. *Modernization among peasants: The impact of communication*. Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1969.

Rogers, E. M., & Shoemaker, F. F. *Communication of innovations: A cross-cultural approach*. Toronto, Ont.: Collier-Macmillan Canada Ltd., 1971.

Rokeach, M. *Beliefs, attitudes and values: A theory of organization and change*. London: Jossey-Bass Inc., Publishers, 1968.

Ross, B. M., & Millson, C. Repeated memory of oral prose in Ghana and New York. *International Journal of Psychology*, 1970, 5, 175-181.

Sapir, E. *Language: An introduction to the study of speech*. New York, N.Y.: Harcourt, Brace and World Inc., 1921.

Sapir, E. *Selected writings of Edward Sapir in language, culture and personality*. Berkeley, Calif.: University of California Press, 1949.

Sargent, S., & Williamson, R. C. *Social psychology* (3rd ed.). New York, N.Y.: Ronald Press, 1966.

Schatzman, L., & Strauss, A. L. *Field research: strategies for a natural sociology*. Englewood Cliffs, N.J., 1973.

Schneidman, E. S. *The logics of communication: A manual for analysis*. China Lake, Calif.: U.S. Naval Ordinance Test Station, 1966.

Schneidman, E. S. (Ed.). *Essays in self-destruction*. New York, N.Y.: Science House, 1967.

Schneidman, E. S., & Farberow (Eds.). *Clues to suicide*. Toronto, Ont.: McGraw-Hill Book Company, 1957.

Schubert, Josef (Ed.). Research in cross-cultural psychology. Proceedings of a symposium sponsored by the Division of Social Sciences, Faculty of Arts and Sciences, University of Regina, March 3-4, 1972. Regina: University of Regina, 1972.

Seelye, H. N., & Tyler, V. L. (Eds.). *Intercultural communication resources.* Brigham Young University and Illinois Office of Education, 1977.

Snow, Chief John. *These mountains are our sacred places: The story of the Stoney Indians.* Toronto, Ont.: Samuel Stevens, 1977.

Spencer, K. *Mythology and values.* Memoirs of the American Folklore Society, vol. 48, 1957.

Steiger, B. *Medicine talk: A guide to walking in balance and surviving on Mother Earth.* New York, N.Y.: Doubleday and Company, 1975.

Stone, P. J. *et al. The general inquirer: A computer approach to content analysis.* Cambridge, Mass.: M.I.T. Press, 1966.

Tatsuoka, M. M. Discriminant analysis. The study of group differences. *Selected topics in advanced statistics: An elementary approach.* Champaign, Ill.: Institute for Personality and Ability Testing.

Taylor, L. J., & Skanes, G. R. Cognitive abilities in Inuit and White children. *Canadian Journal of Behavioral Science,* 1976, *8,* 1-8.

Taylor, L. J. A cross-cultural examination of some of Jensen's hypotheses. *Canadian Journal of Behavioral Science,* 1977, *9*(4).

Ulibarri, H. Teacher awareness of socio-cultural differences in multi-cultural classrooms. *Sociology and sociological research,* October 1960, *45*(1).

Voss, J. F. *Approaches to thought: A symposium of the Learning Research and Development Center, University of Pittsburgh.* Columbus, Ohio: Charles E. Merrill Publishing Company, 1969.

Vygotsky, L. S. *Thought and language.* Eugenia Huafmann and Gertrude Vakar (Trans. and Eds.). Cambridge, Mass.: M.I.T. Press, 1962.

Wagner, R. *The invention of culture.* Englewood Cliffs, N.J.: Prentice-Hall Inc., 1975.

Wallace, A. F. C. *Culture and personality.* New York, N.Y.: Random House Inc., 1961.

Watson, G., & Johnson, D. *Social psychology: Issues and insights.* Toronto, Ont.: J. B. Lippincott Company, 1972.

Westcott, M. R. *Towards a contemporary psychology of intuition: A historical, theoretical and empirical inquiry.* Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1968.

Weitz, J. M. Cultural change and field dependence in two native Canadian linguistic families. Unpublished Ph.D. dissertation, University of Ottawa, 1971.

Whitehead, J. M. (Ed.). *Personality and learning I*. London: Hodder and Stoughton, The Open University Press, 1975.

Whorf, B. L. *Language, thought and reality*. John B. Carroll (Ed.). Cambridge, Mass.: M.I.T. Press, 1956.

Witkin, H. A. *et al*. *Psychological differentiation: Studies of development*. New York, N.Y.: Wiley, 1962.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research*, Winter 1977, *47*(1). (American Educational Research Association, Washington, D.C.)

Young, P. T. *Understanding your feelings and emotions*. Toronto, Ont.: Prentice-Hall, 1975.

APPENDIX A

LETTER OF PERMISSION

UNIVERSITY OF CALIFORNIA, LOS ANGELES

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO   SANTA BARBARA • SANTA CRUZ

NEUROPSYCHIATRIC INSTITUTE
THE CENTER FOR THE HEALTH SCIENCES
760 WESTWOOD PLAZA
LOS ANGELES, CALIFORNIA 90024

February 28, 1978

Ms. Del M. Koenig
Indian and Northern Education Program
College of Education
University of Saskatchewan
Saskatoon, S7N 0W0
CANADA

Dear Ms. Koenig:

I am responding to your letter of February 9. I am enormously interested
that you are studying the cognitive styles of Canadian Indian, Eskomo and
non-native cultural groups. I am especially interested in what you find
in studying the cognitive styles of people whose native language might be
other than standard average European.

Before I say another sentence I need to point you in the direction of a book,
although I have no idea where you might get it. The book is by Hajime
Nakamura. The title is Ways of Thinking of Eastern Peoples. It was published
by the U.N. Press in New York abuit 10 or 15 years ago. I believe I might own
the only copy extant in North America. I have found this to be one of the
seminal books in my life. It is an absolutely scholarly, quiet, turgid
masterpiece in which Nakamura points out that Japanese, Chinese and Indians
not only speak a different language but think through styles of logic which
are not Aristotelian as we take for granted in the Western world.
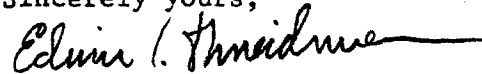
Now as for my system, my system is given in my chapter in Gerber's book to
which you allude, The Analysis of Communication Content. What I do is take
texts and analyze them in terms of the 26 idiosyncrasies of reasoning (given
on pages 264-266) and in terms of the 35 cognitive maneuvers (listed on page
267). I then go through a complicated procedure which is almost nowhere but
in my head, tabulating the idio-logic of such a person. Then from that I
"divine" the contra-logic, the psycho-logic and the pedago-logic. It seems
to work for me, but it has not been computerized.

Del M. Koenig
February 28, 1978
Page Two

There is a thick manual for this somewhere which defines these terms in
some detail and gives examples, but it is buried somewhere in the U. S.
Naval Archives. A person that you might write to who has been working
with this system and is the only other person in the world who knows it --
indeed he knows it much better than I do -- is Dr. Peter Tripodes, 39
Thornton Avenue, Venice, California 90291; 213/392-1625. He might be
able and I'm sure he would be willing to help you.

The favor that I should like to ask you is that you write me further
about what you've done and if you're able at all to incorporate my system
either in whole or in part. I look forward to hearing from you.

Sincerely yours,

Edwin S. Shneidman, Ph.D.
Professor of Thanatology

ESS:jn

APPENDIX B

Original Logical Analysis Instrument

Table I

ASPECTS OF REASONING

I. IDIOSYNCRASIES OF RELEVANCE

Those features of the argumentative style invoking the intrusion of

conceptual elements extraneous to the argument.

A. *Irrelevant Premise:* Premise is irrelevant to the conclusion it

is purportedly instrumental in establishing.

B. *Irrelevant Conclusion:* Conclusion is irrelevant to the major

body of premises which purportedly establish it.

C. *Argumentum Ad Baculum:* Appeal to force or fear in one or more

premises where the conclusion in question does not involve these

concepts.

D. *Argumentum Ad Hominem:* Appeal to real or alleged attibutes of

the person or agency from which a given assertion issued in

attempting to establish the truth or falsity of that assertion.

E. *Argumentum Ad Misericordiam:* Appeal to pity for oneself or for

an individual involved in the conclusion where such a statement

is extraneous to the concepts incorporated in the conclusion.

F. *Argumentum Ad Populum:* Appeal to already present attitudes of

one's audience where such attitudes are extraneous to the

concepts incorporated in the conclusion.

G. *Argumentum Ad Verecundium:* Appeal to authority whose assertions

corroborate or establish the conclusion where no premises are

asserted to the effect that the authority is dependable or

sound.

H. *False or Undeveloped Cause:* Falsely judging or implying a causal relationship to hold between two events.

I. *Complex Question:* A premise or conclusion of an argument contains a qualifying clause or phrase, the appropriateness or adequacy of which has not been established.

J. *Derogation:* A premise or conclusion contains an implicit derogation of an individual group, where the concepts expressing derogation are neither relevant nor substantiated.

II. IDIOSYNCRASIES OF MEANING

A. *Equivocation:* The use of a word or phrase which can be taken in either of two different senses.

B. *Amphiboly:* An unusual or clumsy grammatical structure obscuring the content of the assertion incorporating it.

C.1 *Complete Opposition:* The phrasing indicates an opposition or disjointedness of elements which are in fact opposed and disjointed.

C.2 *Incomplete Opposition:* The phrasing indicates an opposition or disjointedness of elements which are in fact not opposed or disjointed.

D. *Indirect Context:* Indirect phrasing is used rather than direct phrasing in contexts where the latter is appropriate.

E. *Mixed Modes:* An instance in which the context contains two or more of the following modes within the same context: descriptive, normative, or emotive-personal.

III. ENTHYMEMATIC IDIOSYNCRASIES

Argument contains suppressed premise or conclusion.

A. *Contestable Suppressed Premise:* A suppressed premise, necessary for rectifying initial validity of argument, is contestable.

B. *False Suppressed Premise:* A suppressed premise necessary for rectifying initial invalidity of argument is false, either logically or empirically.

C. *Plausible Suppressed Premise:* A suppressed premise necessary for rectifying initial invalidity of argument is plausible but not obvious.

D. *Suppressed Conclusion:* The conclusion, while determined by the context of discussion, is never explicitly asserted, so that the point allegedly established by the argument is not brought clearly into focus.

IV. IDIOSYNCRASIES OF LOGICAL STRUCTURE

A. *Isolated Predicate:* A predicate occurs in a premise which occurs neither in the remaining premises nor in the conclusion, the function of such recurrence being to bind or relate the isolated predicate to other predicates.

B. *Isolated Term:* A predicate occurs in the conclusion which does not occur in the premise.

V. IDIOSYNCRASIES OF LOGICAL INTER-RELATIONS

A.1 *Truth-Type Confusion:* A confusion between unquestionable assertions on the one hand—logically true assertions and definitions—with empirical assertions on the other hand.

A.2 *Logical-Type Confusion:* Confusion between general and specific or between abstract and concrete.

B. *Contradiction:* Making conflicting or contradictory assertions.

C. *Indentification of a Conditional Assertion With Its Antecedent:* Treating an assertion of the form "If A, then B" as equivalent to A.

D. *Illicit Distribution of Negation:* Treating an assertion of the form "It is false that if A, then B" as equivalent to "If A, then it is false that B."

E. *Illicit Derivation of Normative from Descriptive:* To derive a normative statement from a descriptive, i.e., a statement of the form, "It is necessary that X," "One should do X," "X ought to be," from ordinary descriptive statements, i.e., statements containing no words expressing imperativeness.

Table II

COGNITIVE MANEUVERS

I. ABSOLUTE STATEMENTS VS. QUALIFIED STATEMENTS

    A. *Absolute Statements:*

        100. To Intensify

        101. To Allege But Not Substantiate

        102. To Deny or Reject, With or Without Warrant

        103. To Shift the Sense of Another's Assertion

        104. To Move Toward Greater Generality

    B. *Qualified Statements:*

        150. To Modify, Lessen, Attenuate or De-emphasize

        151. To Accept Conditionally

        152. To Thwart the Development of the Discussion

        153. To Move Toward Greater Specificity

        155. To Transfer Authority or Responsibility

II. INITIATING A NEW NOTION OR CONTINUING IN PREVIOUS NOTION

    A. *Initiating a New Notion:*

        202. To Make a Distinction Between Two Notions

        203. To Branch Out

        204. To Stop Short and Begin Again, Relevantly or Irrelevantly

        205. To Interrupt

        207. To Shift Focus from Topic to Audience

        208. To Shift Focus from Audience to Subject

        209. To Digress

A. *Initiating a New Notion* (Cont'd)

    210.   To Initiate a Discontinuity

    211.   To Terminate a Point or Trend of Discussion

    213.   To Take the Initiative

    215.   To Obscure or to Equivocate by Phrasing or Context

    216.   To Yield

    217.   To Attack

B. *Continuing in a Previous Notion:*

    250.   To Enlarge or Elaborate the Preceding

    251.   To Analogize, Relevantly or Irrelevantly

    252.   To Synthesize or Summarize

    253.   To Perpetuate an Obscurity or Equivocation

    254.   To Paraphrase

    256.   To Cite a Premise Belatedly

    257.   To Agree

    258.   To Repeat or Rephrase

    259.   To Ignore an Interruption or Allegation

    260.   To Render Another's Assertion Stronger or Weaker by
          Restating It

    262.   To Agree With the Whole But To Take Issue With a Part,
          Implicitly or Explicitly

    263.   To Deny the Whole But Agree With in Part, Implicitly or
          Explicitly

    264.   To Focus on Part of the Preceding, With or Without Warrant

    265.   To Deduce (Or To Purport to Deduce) From the Preceding

    266.   To Unite Or Link

    267.   To Draw a Contradiction

B. *Continuing in a Previous Notion* (Cont'd)

    268. To Resolve a Discontinuity

    269. To Perpetuate or Aggravate a Discontinuity

APPENDIX C

DATA ANALYSIS OF COGNITIVE STYLE
(DACS) CODING KEY

DATA ANALYSIS COGNITIVE

STYLE (DACS) CODING KEY

Part One

ASPECTS OF REASONING

Code	Category
	A. *Relevance*
A.1	1. Fact premise
A.2	2. Value premise
A.3	3. Fear of consequences
A.4	4. Appeal for sympathy
A.5	5. Appeal to beliefs
A.6	6. Authority support
A.7	7. Assumed cause-effect
A.8	8. Derogation
	B. *Meaning*
B.1	1. Stimulus centered, objective
B.2	2. Self-centered, subjective
B.3	3. Global, concrete
B.4	4. Parts specific, linear
B.5	5. Equivocation (double meaning)
B.6	6. Amphiboly (unusual grammar)
B.7	7. Opposites, contrasts
B.8	8. Non-comparable opposites
B.9	9. Indirect---"I think that---"
	C. *Languages and Structure*
C.1	1. Problem solving
C.2	2. Role descriptors
C.3	3. Contradictory statements
C.4	4. Complex sentences
C.5	5. Simple direct sentences
C.6	6. Word usage
	D. *Field Articulation*
D.1	1. Field independent (objective)
D.2	2. Field dependent (personal)

Part Two

COGNITIVE STRATEGIES

I. *Types of Statements*

Code

    A. *Absolute statements*

Code		
100	100.	Intensify
101	101.	Contend without support
102	102.	Reject without support
103	103.	Become general

    B. *Qualified statements*

150	150.	De-emphasize
151	151.	Accept conditionally
152	152.	Close line of thought
153	153.	Become specific

II. *Flow of Ideas*

    A. *Initiating new ideas*

200	200.	Note difference between ideas
201	201.	End idea and begin again
202	202.	Switch to unrelated ideas
203	203.	Move from idea to audience

    B. *Continuing discussion of ideas*

250	250.	Enlarge or elaborate
251	251.	Analogies, metaphors, images
252	252.	Summarize
253	253.	Paraphrase, rephrase, repeat
254	254.	Agree generally; disagree in part
255	255.	Focus on few points
256	256.	Deduce and voice conclusion
257	257.	Verbalize link between ideas

DATA ANALYSIS OF COGNITIVE STYLE (DACS)

PART ONE—ASPECTS OF REASONING

(Reasoning components include modes of deduction and induction, patterns of logic, language usage and structure, and field articulation processes by which an individual arrives at a conclusion.)

A. *Criteria of Relevance*

1. Premise Based on Factual Knowledge

   a) *Definition:*

   A premise or statement is considered relevant to the conclusion because of factual information. A proven or assumed relationship is thought to exist between such statements and the conclusion. The speaker assumes that objectively stated facts are authentic and relevant.

   b) *Examples:*

   i) In Ontario, they have tenure here. You can't fire a teacher after he's got his permanent teacher certificate. And (therefore) we have a lot of incompetent teachers here [assumed relationship between 1, 2 (premises) and 3 (conclusion)].

   ii) Who did we take in English? We took Miller, Henry Miller. That was, I imagine it was sort of a different level for some people and they never did well in it (DACS Interview, B-19).

   c) *Key Words:*

   description of situation or object, statistics, information, abstractions

A. 2. Premise Based on Value Orientation

a) *Definition:*

A premise or statement is considered relevant to the conclusion of spoken or implied values, rather than facts. In the opinion of the speaker such a value premise is deemed to be functional in establishing the conclusion. What is stated as fact likely contains embedded opinion or judgement.

b) *Examples:*

i) A person feels better if he has to work for things. *Students should have to pay for their education.* (The implied value is that it is good for people to work for what they get. This value then supports the practice of charging tuition fees.)

ii) Well, I was accepted when I went back home. It's just how you treat people, I guess. If you think you're a hotshot or something just because you've got something you will put people off. (Implied value is that everyone is equal. Going away and getting an education is accepted as long as you talk and behave like everyone else when you return home. Greater education does not enhance status at home.)

c) *Key Words:*

feeling words, belief words, right and wrong, evaluative and prescriptive words (should, ought to, good, bad, fair)

A. 3. Premise Appealing to Fear of Loosely Stated Consequences

  a) *Definition:*

    One or more of the premises implies (implicitly or explicitly)

    that certain undesirable consequences will effect his audience

    if the conclusion is rejected. The speaker appeals to emotional

    states of his audience.

  b) *Examples:*

    i) The northern land cannot provide food for northern people

      any longer. [Therefore] northern people need education

      and training for jobs in the South. (The statement implies

      that the future may demand that northerners plan to move

      south. The appeal is to the expected reaction of the

      audience against possible hunger and deprivation for

      northern people.)

    ii) Well, I'm all for the regional colleges, community college

      type institutions. I think they're doing a good job. Now

      I'm afraid if they got that type of educational institution

      up here in the north it would be a band-aid treatment. It

      will be a long time before the north gets enough people to

      make those things operate full force. (The statement

      implies negative consequences of a community college in

      the north and cites the lack of population as a reason.

      However, the consequences are not spelled out.)

  c) *Key Words:*

    Speculation about the future in a negative way.

A. 4. Conclusion Appealing for Sympathy for Person(s) Involved

a) *Definition:*

The speaker attempts to invoke pity for himself or subjects being discussed. Such sentiments are not a part of the objective content, but tend to promote acceptance of his conclusion. Moral and ethical considerations are deemed to be essential in assessing the situation.

b) *Examples:*

i) When our children come home from school in the south they can't even hunt and trap. They don't know how to live like an Inuk. (School is guilty of taking Inuit children and changing them into people who no longer fit in. Sympathy is invoked by citing the school for unethical action.)

ii) I guess I sort of resented when I first went to school. I wanted to speak Indian all the time. It's catching up with me now; sometimes I can't communicate with white people. I can't learn when they discuss something 'cause I can't communicate. (Speaker expresses resentment because of being forced to learn a different language. Childhood conflict relates to his being unable to communicate even today. Therefore, he deserves certain sympathy and consideration.)

c) *Key Words:*

Describing examples of the results of past and present actions, usually in a negative way.

A. 5. Conclusion Appealing to Assumed Beliefs and Attitudes of Audience

   a) *Definition:*

   The conclusion is subjective, grounded in societal beliefs and attitudes more than in analysis and factual information. The appeal is to "folk beliefs" or familiar attitudes. Idiomatic expressions are used.

   b) *Examples:*

   i) It would be really good for a lot of the native people who are learning to write their language if they could take a linguistic course. This is what they've been asking for. (The speaker has accepted and expresses the belief that a "linguistic course" is "a good thing" for native people who are learning to write their language. Little if any factual data are given to support this idea.)

   ii) I don't know how an Indian could teach another Indian what he should learn. The adults who can't speak English should have a teacher that speaks their language, but if they speak English they should have a white person teaching them what's required. (The speaker appeals to the attitude prevalent in society that education is a prerogative of the white people, and therefore only they really know what should be taught.)

A. 6. Conclusion Supported by an Authority

 a) *Definition:*

  Naming or implying one or more "authority" persons or groups

  which would tend to support the speaker's conclusion. The

  authoritative-sounding reference is neither developed nor

  substantiated.

 b) *Examples:*

  i) Any good teacher will tell you that attendance is

   important. (Statement implies that "good" teachers

   would support this idea and that teachers are authorities

   in the field of education.)

  ii) We have always known that our children should learn the

   native language first. (The speaker implies by the use

   of "we" that all members of the native group agree with

   him, and that they know best.)

 c) *Key Words:*

  we, they, them, educators, government, native people, white

  people, parents, teachers

A. 7. Assumed Cause-Effect Relationship

   a) *Definition:*

The conclusion derives from an implied cause-effect relation-
ship between events which are assumed to be related in a causal
manner. Applies to factual but not to hypothetical situations.

   b) *Examples:*

     i) You can't fire a teacher here after he's got his permanent
teaching certificate and we have a lot of incompetent
teachers. (The implied cause-effect relationship is that
incompetent teachers are caused by the fact that teachers
cannot easily be fired.)

    ii) There are no materials written in Cree so how can you
teach the language? (The second example suggests that
the lack of written material causes an absence of the
teaching of Cree. Other variables such as the necessity
for competent teachers, funds for programs, space, time
and equipment, students to take such courses, etc., are
omitted.)

   c) *Key Words:*

implied "therefore," use of "so," "then," "later"

A. 8. Conclusions and/or a Premise is Derogative of Persons
        or Institutions

    a) *Definition:*

        The premise or conclusion contains an implied or explicit

        derogation of an individual, group or institution. The

        concepts are assumed to be relevant to the discussion but are

        not substantiated. Appeal is to audience emotion by attempting

        to elicit negative reactions towards agencies being discussed.

    b) *Examples:*

       i) So what they're doing by saying Indian is their first

          language is just covering up for their own incompetence

          for not teaching English in the proper manner. (The

          speaker states that they (teachers) are incompetent in

          the teaching of English. They then increase their wrong

          doing by *blaming* the students' inadequate English on the

          fact that Indian is their first language. Neither

          accusation is substantiated. The appeal is to audience

          emotion and the idea that teachers should be able to make

          people learn.)

      ii) I think they [teacher aides] do most of the dirty work

          that the teachers should have been doing themselves, like

          cleaning up. (Statement is derogatory of teachers using

          teacher aides in the way that is described. The accusa-

          tion is not substantiated, and the teacher behavior is

          given a negative emotional reading, i.e., "dirty work.")

B. *Idiosyncrasies of Meaning*

    1. Stimulus-Centered, Objective, and Analytical Premise
        and Conclusion

        a) *Definition:*

The components and attributes of a situation (stimulus) have

meaning in themselves and the situation is understood and

explained by analyzing and describing the components. The

tone of the discussion is largely impersonal and objective.

        b) *Example:*

Another thing, I would look at all education programs presently

being implemented or projected with a view to placing a

priority of importance on taking those programs to the people

whatever the social and economic problems that people are

required to face if they are realistically going to look at

getting training now. (The statement discusses components and

factors related to the conclusion about "getting training now."

The speaker suggests priorizing the delivery aspect of education

in order to systematically cope with some aspects of the total

situation.)

        c) *Key Words:*

objectives, goals, analyze, problems, priority, action words

B. 2. Self-Centered, Subjective, and Relational Premise
and Conclusion

a) *Definition:*

The components of a situation have meaning only in reference
to some total context. Abstracting or giving information
requires a descriptive mode of discussion and relates to
reality from a personal orientation.

b) *Examples:*

i) Well, one of the important things I'm really interested
in and I think is really important . . .

ii) I'm involved in language, that's my main interest.
(Personal experience and involvement are the bases for
discussing educational change and the topic is seen from
that orientation. The context becomes the importance of
language instruction from a personal experience view-
point.)

iii) Well, I don't know about people but what I don't like
about it [the city] is it's too crowded for me. I've
grown up where there are not too many people around.
You can go hunting and all that. (Student reaction to
city life is expressed in terms of personal experience
and is given in descriptive mode.)

c) *Key Words:*

personal pronouns, emotional and experiential words

B. 3. Concern With Global and Concrete Characteristics

    a) *Definition:*

       Only the global, concrete characteristics of a stimulus

       (situation) have meaning in themselves, and then only in

       reference to the total situation. Obvious, sensed features

       are noted. Few obscure abstract relationships are noted.

       Experiential material rather than properties of the object

       are important.

    b) *Example:*

       I like my kids to go to school. Education is good to get a

       job but sometimes there are no jobs and they quit. (State-

       ment evaluates education on the bases of whether known people

       like school, and whether students will get a job after

       schooling. Only two concrete aspects are considered. No

       indication is given concerning abstract properties or relation-

       ships, i.e., goals of learning for its own sake, philosophy of

       education.)

    c) *Key Words:*

       sensory words, evaluators, emotional words, concrete

       descriptions

B. 4. Parts-Specific, Linear Orientation to a Situation

    a) *Definition:*

        The parts or attributes of a given situation (stimulus) are considered to have meaning in themselves. Components are seen to relate linearly and underlie a notion of multiple causality. Abstractions and conclusions are based on non-obvious features or parts of a situation or object.

    b) *Examples:*

        i) Students who have poor attendance and poor work habits will fail their grade. (Two behavioral attributes of a situation are seen as being factors contributing to a result, in this case, grade failure.)

        ii) . . . where again nothing but natives would operate it (the school), native-owned, and they would teach. (Three related actions or attributes of a situation are described in an organized, systematic way.)

    c) *Key Words:*

        time referents, goal directed words, causal words, action words

B. 5. Equivocation

a) *Definition:*

A word or phrase is used which can be taken in two different ways. At times, a word or phrase is repeated and given different meanings. Meanings tend to be ambiguous.

b) *Examples:*

i) If that was me I'd really go under so somebody would pay attention to this kid, eh. (The phrase "go under" is used in the sense of "giving up," but its meaning could be unclear to anyone not totally familiar with the English language.)

ii) The economy has been sold out on the railroad train in the middle 60s when the oil things were snapped up, eh. (An idiomatic expression stated as a metaphor carries an obscure and ambiguous meaning to anyone not completely familiar with this type of English.)

c) *Key Words:*

idiomatic expressions, incorrectly used words, words with double meanings

B. 6. Amphiboly

    a) *Definition:*

        The speaker uses an unusual, grammatical structure which makes the content obscure. Awkward phrasing would indicate an unclear idea of what he is talking about, or in the case of a speaker of a second language, a lack of facility in that language.

    b) *Examples:*

        i) Looks like he doesn't like playing the violin, but he's supposed to. (Is he supposed to play the violin, or is he supposed to like playing the violin?)

        ii) The higher, the one that went through, they give the example to the ones that are coming in there. (Unusual grammatical structure makes the meaning unclear.)

    c) *Key Words:*

        confused word order, mixing of singular and plural agreement, mixing tenses and gender

B. 7. Complete Opposition

    a) *Definition:*

        The speaker uses contrasts and opposites to make distinctions and to clarify the position he holds. He is well-organized and methodical in his presentation.

    b) *Examples:*

        i) The white students are there, it's easier for them because they're home, but the students that come from the north, it's not that easy. (The speaker deliberately contrasts white and northern students on the criteria of being at home or away. The contrasts serve to emphasize the point being made about the difficulty of attending school in the south.)

        ii) Their life situation is city-oriented whereas the majority of the students in that age group live in the villages. (The contrast is made explicit by use of the word "whereas) at the beginning of the opposition statement.)

    c) *Key Words:*

        but, either/or, however, whereas, on the other hand

B. 8. Incomplete Opposition

    a) *Definition:*

    The speaker uses phrases which indicate an opposition between points which are not comparable.

    b) *Examples:*

      i) In the election of 1960, and in the world around us, the question is whether the world will exist *half-slave* or *half-free*. (The ideas of being *half-slave* and *half-free* mean the same thing, not an either/or situation. Two ideas with the same meaning cannot be contrasted.)

      ii) The government is still responsible for the education (financing) for Indian people. That depends if a person can afford to do that. You'll find most Indians can't afford to pay. (The two ideas are not logically comparable. If the government is responsible (by Treaty) then there is no question existing of who is able to afford to pay. The treaties made no stipulation about need as a criterion.)

    c) *Key Words:*

    Contrasts are presented in grammatically correct format, but the substantive contrast cannot logically be made.

B. 9. Indirect Content

a) *Definition:*

The speaker prefaces statements with "I think that," "It seems that," "It looks like" where the content is really in direct form (absolute). The speaker thus weakens his premises to gain acceptance for a strong conclusion.

b) *Examples:*

i) My husband is a teacher and I really don't know what I'd change other than to have good teachers . . . (The speaker suggests that he/she really knows very little about the topic, but then proceeds to state a strong conclusion. The premise appears disconnected from the conclusion.)

ii) *I think* there should be one center in the north. *I think* it would be much better for them too. They could still feel they were at home *you know*. (The speaker makes his premises indirect by use of the phrase, "I think." He assumes that the listener accepts and will agree with his conclusion by adding "you know" at the end.)

c) *Key Words:*

I think, I feel, I guess, I believe, maybe, I don't know but, you know

C. *Language and Structure*

1. Problem Solving Orientation

    a) *Definition:*

       The speaker describes the situation from a problem orientation and quite freely proposes solutions. Solutions tend to be couched in abstract, impersonal, logical terminology and structure.

    b) *Examples:*

       i) I think perhaps we can approach it from another viewpoint. Maybe we have to provide . . . some of these courses could be useful if job situations were in settlements and they can be created in some settlements. . . . Instead of bringing in outside labor, why not use local labor. (The speaker seeks alternative approaches to deal with a situation that he sees as a problem. He quite readily suggests solutions to the problem. The statement is impersonal and logical in tone and structure.)

       ii) I think the biggest change I would make is I would try to pertain to staffing and then go into curriculum. (The situation is seen as a problem requiring solution which is offered in a sequential, organized manner.)

    c) *Key Words:*

       action words, impersonal, analytical vocabulary and style

C. 2. Concern With Role Description

    a) *Definition:*

    Vocabulary focuses on role descriptors (impersonal) rather than on individual, subjective terms. Individuals and groups are discussed in terms of role expectations as the overriding considerations.

    b) *Example:*

    Those people (should teach) who could do the best job. Obviously, you know, if you are training a person to become a specialist in some, say, industrial arts, metal work, let's say, you have to have a specialist in metal work, possibly a qualified teacher as well, to teach that. The best would be a native person who had these qualifications. (The role of the teacher is seen as demanding expertise within his specialized role as teacher and skilled worker. The role expectations appear to be the overriding consideration. No mention is made of individual, subjective or personal attributes as being important.)

    c) *Key Words:*

    qualified, competent teachers, interested, hard-working students

C. 3. Contradiction

a) *Definition:*

The speaker contradicts himself within the same context. He does not conceive that one condition makes another an impossibility.

b) *Example:*

I think we would try to get every form of book . . . and gradually turn them over towards getting them oriented towards the non-native way of thinking . . . I think it is time we revert back to our own way of thinking and try to think of ourselves. (The speaker appears to suggest two opposing ideas within close proximity of each other. The wording of the second sentence suggests that the speaker believes that one condition makes the other impossible but he speaks in support of both. Can they think in a non-native and native way at the same time?)

C. 4. Complex Sentence Structure

    a) *Definition:*

Sentences are grammatically complex, syntax is carefully correct, thoughts are expressed in completed sentences of varied length and style. The preparation and delivery of explicit thoughts is the purpose of the language code. Generalizations are commonly used.

    b) *Example:*

Once again I can only go back on the experiences I've had and what I've seen. Where students have been taken or asked to go to another place of learning to continue their education, this education may be stopped very quickly by the parents once the need to return to the settlement is there. (This passage is grammatically correct; structure is complex, sentences are varied length and type. Thoughts are clearly expressed. The speaker makes a point of limiting himself to speaking from experience, yet makes a somewhat generalized conclusion about students and parents in total, rather than about one or several specific statements.)

Note: *Category C.4* is a label given to an entire protocol on the basis of assessment of the vocabulary, grammatical structure, organization and tone of the passage.

C. 5. Simple, Direct Sentence Structure

    a) *Definition:*

        Sentence structure and grammatical arrangement is uncomplicated

        and direct. Sentences are short; subordinate clauses are

        infrequent.

    b) *Examples:*

        i) How do people learn the best, most easily?

            I think by doing things you know.

            I learn things by doing things.

            (Each sentence is clear, direct, of simple structure

            and complete in its meaning.)

        ii) When you're used to a quiet environment, you know, and

            then you come down to a real noisy place, it sort of

            gets you, you want to get out. (A subordinate clause

            is used but style, vocabulary and structure is direct,

            spontaneous and clear.)

Note: *Category C.5* is designated for an entire protocol on the basis of assessment of the vocabulary, grammatical structure, organization and tone of the passage.

D. *Field Articulation*

1. Field Independent Style

   a) *Definition:*

   The ability to discuss a situation from an impersonal, objective, abstract point of view. Parts or attributes of the stimulus are perceived separately from the total field.

   b) *Example:*

   Well, along the lines of my definition of education, I feel that education is for the needs of the people. And we are currently going through educational change in our community involving the two philosophies; one where the school has established a unit of standard and the other philosophical viewpoint where the school should meet the standards of the individual or meet the interests of the individual. So in answer to your question, I suspect that if I was in charge of education or helping steering it anyway, I would steer it to a position in the future where our educational centres and the buildings or institutions would help meet peoples' interests.

   Note: *Category D.1* is given to a total response which is assessed by the coder, as fitting a field independent style of discussion.

D. 2. Field Dependent Style

    a) *Definition:*

        The global, holistic view of a situation as it is experienced in relation to the surrounding people and events. Personal attributes and sentiments are likely to be expressed and take account of others' views.

    b) *Example:*

        They went down to Victoria from this area. They went down to Victoria there and then it was too far for the parents to check on the kids and then there's no report from their school, where they are attending school. No reports to the parents like, what kind of activities they have and all that there.

Note: *Category D.2* is given to a total response which is assessed by the coder, as fitting a field dependent style of discussion.

PART TWO—COGNITIVE STRATEGIES

I. Types of Statements

A. *Absolute Statements*

100. To Intensify

a) *Characterization:*

To increase or "step-up" the impact of concepts presented earlier, or to emphasize concepts that are to follow. Also used to intensify the degree of affirmation.

b) *Examples:*

i) America has not been standing still. *Let's get that straight!*

ii) We would try to get a hold of *every possible* form of books, magazines, *whatever it may* be that is *nothing but* pro-Indian.

(Statements become stronger because of expressions used.)

c) *Key Words:*

superlative adjectives and adverbs, repeated expressions, expletives

A. 101. Content Without Support

    a) *Characterization:*

        To make an assertion which is contextually important but whose context contains no factual statements which support it.

    b) *Examples:*

        i) I cannot live any longer, I do not wish to live any longer. *Death is better than living. Sometimes it is the best.*

            (Suicide Notes, Female Note #11)

        ii) So you see, in sense of sheer brains, in sheer creativity, they've got it.

            (DACS Interview F-14)

            (In both cases, the speaker asserts certain things to be true. Neither assertion is supported.)

A. 102. Reject Without Support

    a) *Characterization:*

        To deny or reject an assertion, again without supporting

        information.

    b) *Examples:*

        i)   Too often in opposing whether we are moving ahead or

            not we think only of what the federal government is doing.

            Now, that isn't the test of whether America moves.

            (Great Debates, Nixon, A-57)

        ii) Like up in Barrow they got no modern conveniences like

            flush toilets. Isn't that awful to say.

            (DACS Interview, A-15)

            (In both examples, the speaker attempts to reject or deny

            the statements just made.)

A. 103. To Move Toward Greater Generality

    a) *Characterization:*

        To go from a more specific to a more general statement.

    b) *Examples:*

        i)   This seems to me like a boy in the 1890s—with all that the 90s may mean. Prince Albert coat and high-button shoes—*old-fashioned type of thing.*

            (TAT Study, Case #335, Card 1)

        ii) We have water available, electricity, we don't have that at home. So that's one thing about it, *different conditions.*

            (DACS Interview, B-52)

            (In both cases, an overall statement attempts to sum up what has been stated specifically.)

B. 151. To Accept Conditionally

a) *Characterization:*

To accept a certain condition as true on the condition that another assertion is true. Usually occurs in the form "If A, then B."

b) *Examples:*

i) The man in this looks like he's mad at something, looks like someone else not in the picture—and the woman seems to be trying to restrain him. I don't know why she is trying to restrain him, whether she is trying to protect him or whoever he is mad at. I think *if he can express himself without concern to other people's feelings or beliefs then he will break away and do whatever he feels he has to do.*

(From TAT Study, Case #919, Card 4)

ii) I would think that we would have special classes where *if a student came in that didn't speak English then we would have instructors who would know how to speak to this student.*

(DACS Interview, A-13)

(The speaker discusses the topic in terms of a hypothetical situation with conditional solutions.)

c) *Key Words:*

if, then

B. 152. To Close a Line of Thought

a) *Characterization:*

To close-off, terminate or otherwise bring to an end a trend in content before it has been fully developed. Often done to avoid discomfort, embarrassment, further questioning.

b) *Examples:*

i) Well, it looks like a . . . guess a girl sitting on the floor. Actually looks like her head is laying on the side of a cot or bath tub. *I don't know.* Looks like could be a pistol to the left. *I don't know, that's all.*

(From TAT Study, Case #022, Card 3-BM)

ii) That was pretty hard, like, he favored one grade and we'd be stuck with our questions. And that's the main thing I didn't like about it, but other than that, *I don't know, it's all the same I think.*

(DACS Interview, C-30)

(In both examples, the "I don't know" response indicates that the speaker wishes to terminate the discussion.)

c) *Key Words:*

I don't know, I can't think of anything

B. 153. To Become More Specific

    a) *Characterization:*

    To go from a more general to a more specific statement.

    b) *Examples:*

       i) This seems to me like a boy in the 1890s—with all that the 90s may mean—*Prince Albert coat and high-button shoes . . .*

         (From TAT Study, Case #355, Card 1)

      ii) Probably the first thing I would do is I would analyze the first system and adopt changes for that. Then I, when you say changes you should be aware that I, when I view changes, I probably would view it from the perspective of being a student.

         (DACS Interview, B-35)

         (Additional information and ideas are given by describing specifics.)

Note: This category is similar to and in some cases, overlaps with Number 250 (Enlarge or Elaborate).

II. Flow of Ideas

A. *Initiating New Ideas*

200. To Make a Difference Between Two Ideas

    a) *Characterization:*

To draw a contrast between different properties in the same thing or different things sharing some property. A distinction is made between things which would ordinarily not be distinguished in the way employed. However, to say "A woman is only a woman but a good cigar is a smoke" is *not* to make a bona fide distinction—it is more a joke than a real distinction—since the items are too unrelated, but to say "A cockroach is a pest but a spider is an ally" is to make a *bona fide* distinction, because cockroaches and spiders are similar in many respects. Often the word "but" or "although" is found in this context.

    b) *Examples:*

       i) . . . She is sorry *but* she is not really sorry for the act itself. She is only sorry for getting caught . . . (From TAT Study, Case #434, Card 4)

       ii) . . . and I agree we don't have the motivation or maybe we haven't really pushed forth *but I think we have some very intelligent people and some very creative people.* (DACS Interview, F-35)

    c) *Key Words:*

but, although

A. 201. To Stop Short and Begin Again

a) *Characterization:*

To terminate a line of discussion without logical or gram-
matical closure and immediately to begin again.

b) *Examples:*

i) She's losing him for some reason. But he doesn't—I
don't think he's really sure he's correct but he's
going through with it.

(From TAT Study, Case #756, Card 6-BM)

ii) What kind of things they should do? Probably some kind
of nurse. I don't know, whatever, you know, they would
like to be.

(DACS Interview, C-48)

A. 202. To Switch to Unrelated Ideas

   a) *Characterization:*

     To strike off tangentially from the dominant content of a discussion, and touch on a minor but unrelated theme and to remain on that tangential theme for a while.

   b) *Examples:*

     i) Kennedy says: "So I would say our prestige is not so high. No longer do we give the image of being on the rise; no longer do we give the image of vitality." To which Nixon replies: "I would say first of all that *Senator Kennedy's statement is not going to help our Gallup polls abroad and isn't going to help our prestige either.* Let's look at the other side of the coin. Let's look at the vote on the Congo, the vote was 70 to 0 against the Soviet Union . . ."
     (From *Great Debates*, Nixon, C.35)

     ii) I'm a firm believer that the schools and the colleges and that should help me feel a better person and I'll tell you what it is to be a better person, to help you pursue your own guides in your programs. *Now there's a compromise and I'm a realist but that's generally where I'd go.*

A. 203. To Move From Idea to Audience

    a) *Characterization:*

        The speaker suddenly abandons the subject matter with which

        he was involved and addresses himself to his audience about

        matters unrelated to his substantive topic.

    b) *Examples:*

        i)   Looks like this guy is worried about something. They

           might have had an argument. The mother is looking out

           the window. They might have had an argument and that's

           why he has that look on his face. *I am not crazy if that*

           is what you want to know.

           (From TAT Study, Case #162, Card 6-BM)

       ii) If there was some kind of a learning process here that

           has to do with law, I think there might be more people

           that would stay up here to take it instead of having to

           go some place else. Do they have universities for law

           at Canada?

           (DACS Interview, A-15)

B. *Continuing Discussion of Ideas*

250. Enlarge or Elaborate

a) *Characterization:*

The speaker, having mentioned a point, then enlarges or elaborates upon it, often by becoming more specific.

b) *Examples:*

i) This is a son coming home to mother and telling her how sorry he is that his plans for life have not borne fruit. *He had desired at his age in life to be able to provide for her and make her proud of him.*

(From TAT Study, Case #592, Card 6-BM)

ii) And I think the point is you have to offer a hell of a lot to an individual, *a man, a woman, a young man, a young woman* to make them spend 8 months in Edmonton and to do that for five years.

(DACS Interview, F-14)

B. 251. To Use Analogies, Metaphors, Images

    a) *Characterization:*

        The use of any self-contained, subordinate, clearly delineated

        piece of text which serves to illustrate something in the

        dominant text, using an analogy.

    b) *Examples:*

        i)   . . . He's been forced into this thing and found out

            that she's connected with it. That made force more

            binding. *Like to have your cake and eat it too*

            (Metaphorical analogy).

            (From TAT Study, Case #756, Card 4)

        ii) . . . and if they wish to change something, some type of .

            education program up there, then they know what department

            to go to, but now they are just being, they are more or

            less put in a position of being a tennis ball, get back

            and forth between territorial and federal.

            (DACS Interview, B-35)

B. 252. To Summarize, Synthesize

a) *Characterization:*

To "sum-up," as it were, the content of the immediately

preceding text, either considered by itself or relative to

certain attitudes, beliefs, views, etc.

b) *Examples:*

   i) Well, it's a young man who is probably aspiring to be

   a great musician, and he's looking at the instrument of

   his choice. *Probably dreaming of his future as a great*

   musician.

   (From TAT Study, Case #609, Card 1)

   ii) "Now what all this, of course, adds up to is this:

   America has not been standing still."

   (From *Great Debates,* Nixon, C-27)

   iii) . . . I think so, I could be wrong, but *that's the way*

   it looks to me at the present time.

   (DACS Interview, G-11)

B. 253. To Paraphrase, Re-Phrase, Repeat

a) *Characterization:*

To paraphrase or otherwise repeat a statement made previously.
The repeated assertion may only approximate the meaning of the
original.

b) *Examples:*

i) These are kind of trick things. *I mean, you make what
you want out of them.*

(From TAT Study, Case #756, Card 18-GH)

ii) I would prefer having a total commitment from nothing
but native people from administration all the way down.
I would prefer to have the school located somewhere by
itself where *again nothing but natives would operate it.*

(DACS Interview, A-13)

B. 254. To Agree Generally But Disagree in Part

a) *Characterization:*

To accept and give general approval, but take exception to
specific aspects. Often the word "but," "however," "well,"
or "now" is found in this context. (Usually found in dyadic
context.)

b) *Examples:*

i) Nixon had just said: "Everyone of these items that I
have mentioned, he's been wrong, dead wrong, and for that
reason, he has contributed to my lack of prestige."
Kennedy answers: "Now, I didn't make *most* of the state-
ments that you said I made." (Kennedy then assents to
one of them, i.e., the statement that USSR is first·in
outerspace but denies the others.)
(From *Great Debates,* Kennedy, D-19)

ii) . . . and someone might say what's so hard about being
politically active in a place like Fort Franklin, 220
people, well, I don't know there's a lot to be said
about that.
(DACS Interview, F-14)

B. 255. To Focus on Few Points From the Preceding

    a) *Characterization:*

        The speaker isolates a preceding point or small body of
preceding text, generally without providing justification
or a smooth transition to the point in question, and focuses
on it to the detriment of the overall development of the text.

    b) *Examples:*

        i) Murder, murder because it looks as if she is trying to
choke her; strangle her to death. In this case, she
would be angry, or mad, whatever you would call it. In
her mind, though, she is thinking . . . *I'd say murder
would be in her mind right now. In her mind would be to
kill, you know.*

        ii) The higher university levels? I'm not too familiar with
that. According to this kid here, I've been talking to
him everytime I see him. He passes with flying colors
and yet he doesn't get the job and yet he is qualified
for it.

        (DACS Interview, A-70)

B. 256. Deduce and Voice Conclusion From the Preceding

   a) *Characterization:*

   To render logical closure by concluding that something is the
   case on the basis of something else's being the case; usually
   indicated by (a) a body of text followed by a sentence begin-
   ning with *"consequently," "therefore," "so," "hence,"* and the
   like; or (b) a sentence followed by a sentence or a body of
   text beginning with *"because," "as a consequence of,"* etc.;
   or (c) cases (a) and (b) *where connecting terms are under-
   stood,* but not explicitly stated.

   b) *Examples:*

   i)   The other point I would make, with regard to economic
       assistance, and technical assistance, is that the United
       States must not rest its case here alone. This is,
       primarily, an ideological battle, a battle for the minds
       and the hearts and the souls of men. *We must not meet
       the Communists purely in the field of gross atheistic
       materialism. We must stand for our ideals.*
       (From *Great Debates,* Nixon, B-19)

   ii) . . . and you know what courses to take, because, you
       know, because your community is just more or less next
       door and you can see what services that community requires.
       I think a person will direct his attention along these
       lines.
       (DACS Interview, B-35)

B.   257.   To Verbalize a Link Between Ideas

   a)   *Characterization:*

      To join the content of one or more chunks of text which are in some way relevant to the speaker's immediately evolving text; sometimes to unite his present view with his previous view. Such words as "well," "like," "and," "so," and "but" are sometimes used in this sense.

   b)   *Examples:*

      i)   *Here again may I indicate that Senator Kennedy and I are not in disagreement as to the aims. We both want to help the old people. We want to see that they do have adequate medical care but the question is the means.*

        (From *Great Debates,* Nixon, A-16)

      ii)   . . . but that's generally where I would go. *If we can be specific, in this particular school . . .*

        (DACS Interview, F-14)

APPENDIX D

INTERVIEW QUESTIONS

Data Coding Instructions

Sample:

Non-native	- 40 interviews
Indian (treaty and status)	- 20 interviews
Metis	- 20 interviews
Inuit	- 20 interviews
TOTAL	100 interviews

Questions:

1. If you were in charge of education for the north, what changes would you make?
   (2 minutes)

2. What things did they (students) like or dislike about being in the south in this program (higher education)?
   (2 minutes)

3. What do you think is a useful way for northern students to learn?
   - listening to the teacher
   - in discussions
   - reading
   - watching films, slides, pictures
   - practising doing things

4. What particular things do northern students (or you) like to learn about?
   (2 minutes)

5. Do you think northern students should stay in the north for higher education and training? What would be good or bad about it?
   (2 minutes)

Total data time per interview = 10 minutes
Total data - 1000 minutes = 16.6 hours

APPENDIX E

Summary of Total Time per Interview Protocol

INDIAN

1. A-1 - 1001 (parent)

 Q.1 - 1 min. 10 sec.
 Q.2 - 1 min. 10 sec.
 Q.3 -   15 sec.
 Q.4 -   15 sec.
 Q.5 - 2 min.
 _____
 4 min. 50 sec.

2. A-72 - 1035 (parent)

 Q.1 - 1 min. 45 sec.
 Q.2 -   45 sec.
 Q.3 - not asked
 Q.4 - 1 min.
 Q.5 - 1 min. 15 sec.
 _____
 4 min. 45 sec.

3. B-10 - 2008 (Univ. student)

 Q.1 - 2 min.
 Q.2 - 2 min.
 Q.3 - 1 min. 45 sec.
 Q.4 -   50 sec.
 Q.5 - 1 min. 40 sec.
 _____
 7 min. 15 sec.

4. B-15 - 2013 (Univ. student)

 Q.1 - 2 min.
 Q.2 - 1 min.
 Q.3 -   20 sec.
 Q.4 - 2 min. 30 sec.
 Q.5 - 1 min.
 _____
 6 min. 50 sec.

5. B-16 - 2014 (Univ. student)

 Q.1 - 2 min.
 Q.2 - 1 min. 5 sec.
 Q.3 -   20 sec.
 Q.4 -   20 sec.
 Q.5 - 1 min. 30 sec.
 _____
 5 min. 15 sec.

6. B-21 - 2019 (Univ. student)

 Q.1 - 2 min.
 Q.2 - 1 min. 40 sec.
 Q.3 - 1 min. 30 sec.
 Q.4 - 1 min. 20 sec.
 Q.5 - 1 min.
 _____
 7 min. 30 sec.

7. B-22 - 2020 (Univ. student)

 Q.1 - 1 min. 35 sec.
 Q.2 - 2 min.
 Q.3 - 2 min.
 Q.4 - 1 min. 25 sec.
 Q.5 - 1 min. 35 sec.
 _____
 8 min. 35 sec.

8. B-37 - 2034 (Univ. student)

 Q.1 -   50 sec.
 Q.2 - 1 min. 35 sec.
 Q.3 -   50 sec.
 Q.4 - 1 min. 40 sec.
 Q.5 -   50 sec.
 _____
 5 min. 45 sec.

9. C-32 - 3026 (high school)

 Q.1 - 1 min.
 Q.2 - 1 min.
 Q.3 - not asked
 Q.4 -   15 sec.
 Q.5 - 2 min.
 _____
 4 min. 15 sec.

10. C-34 - 3028 (high school)

 Q.1 -   35 sec.
 Q.2 - 2 min.
 Q.3 - 2 min.
 Q.4 - not asked
 Q.5 - not asked
 _____
 4 min. 35 sec.

INDIAN

11. C-80 - 3039 (high school)

Q.1 -   55 sec.
Q.2 -   40 sec.
Q.3 - 2 min. 30 sec.
Q.4 - not asked
Q.5 -   50 sec.

           4 min. 55 sec.

12. C-43 - 3040 (high school)

Q.1 - 1 min. 15 sec.
Q.2 - 1 min. 10 sec.
Q.3 - 1 min. 10 sec.
Q.4 -   25 sec.
Q.5   30 sec.

           4 min. 30 sec.

13. C-91 - 3060 (high school)

Q.1 -   50 sec.
Q.2 - not asked
Q.3 - 2 min.
Q.4 -   30 sec.
Q.5 -   30 sec.

           3 min. 50 sec.

14. D-5 - 4005 (teacher trainee)

Q.1 - 2 min.
Q.2 -   55 sec.
Q.3 -   20 sec.
Q.4 -   45 sec.
Q.5 -   20 sec.

           4 min. 20 sec.

15. D-6 - 4006 (teacher trainee)

Q.1 - 1 min. 30 sec.
Q.2 -   10 sec.
Q.3 -   10 sec.
Q.4 - 1 min. 30 sec.
Q.5 - 45 sec 45 sec.

           4 min. 5 sec.

16. D-16 - 4015 (teacher trainee)

Q.1 - 2 min.
Q.2 - 1 min.
Q.3 -   45 sec.
Q.4 -   30 sec.
Q.5 - 2 min.

           6 min. 15 sec.

17. D-30 - 4016 (teacher trainee)

Q.1 - 1 min. 10 sec.
Q.2 - 1 min. 30 sec.
Q.3 - not asked
Q.4 - 1 min. 10 sec.
Q.5 -   55 sec.

           4 min. 45 sec.

18. F-3 - 6002 (teacher)

Q.1 - 2 min.
Q.2 - 2 min.
Q.3 - 2 min.
Q.4 - not asked
Q.5 - not asked

           6 min.

19. F-31 -   (teacher)

Q.1 - 1 min. 30 sec.
Q.2 -   30 sec.
Q.3 - not asked
Q.4 - 1 min.
Q.5 - 1 min. 15 sec.

           4 min. 15 sec.

20. G-1 - 7001 (political leader)

Q.1 - 2 min.
Q.2 - 2 min.
Q.3 - 2 min.
Q.4 - 1 min. 30 sec.
Q.5 - 2 min.

           9 min. 30 sec.

METIS

1. A-6 - 1005 (parent)

    Q.1 - 1 min.
    Q.2 - 1 min. 5 sec.
    Q.3 - 1 min.
    Q.4 -   10 sec.
    Q.5 -   10 sec.
    _____
            3 min. 25 sec.

2. A-10 - 1009 (parent)

    Q.1 -   40 sec.
    Q.2 -   45 sec.
    Q.3 - 1 min.
    Q.4 - not asked
    Q.5   30 sec.
    _____
            2 min. 55 sec.

3. A-11 - 1010 (parent)

    Q.1 - 1 min. 30 sec.
    Q.2 - 1 min.
    Q.3 - not asked
    Q.4 -   45 sec.
    Q.5 -   55 sec.
    _____
            4 min. 10 sec.

4. A-13 - 1016 (parent)

    Q.1 - 1 min.
    Q.2 -   45 sec.
    Q.3 -   50 sec.
    Q.4 - 2 min.
    Q.5 -   40 sec.
    _____
            5 min. 15 sec.

5. A-33 - 1025 (parent)

    Q.1 - 1 min. 45 sec.
    Q.2 -   15 sec.
    Q.3 - 1 min. 50 sec.
    Q.4 - not asked
    Q.5 - not asked
    _____
            3 min. 50 sec.

6. A-36 - 1026 (parent)

    Q.1 - 1 min. 10 sec.
    Q.2 - 2 min.
    Q.3 - 1 min.
    Q.4 - not asked
    Q.5 - 2 min.
    _____
            6 min. 10 sec.

7. A-37 - 1027 (parent)

    Q.1 -   50 sec.
    Q.2 - not asked
    Q.3 -   50 sec.
    Q.4 -   55 sec.
    Q.5 -   10 sec.
    _____
            2 min. 45 sec.

8. A-71 - 1034 (parent)

    Q.1 - 1 min. 10 sec.
    Q.2 - not asked
    Q.3 - not asked
    Q.4 - 2 min.
    Q.5 - 1 min.
    _____
            4 min. 10 sec.

9. B-30 - 2028 (Univ. student)

    Q.1 - 1 min. 10 sec.
    Q.2 - 2 min.
    Q.3 -   30 sec.
    Q.4 - not asked
    Q.5 - not asked
    _____
            3 min. 40 sec.

10. B-31 - 2029 (Univ. student)

    Q.1 - 1 min. 30 sec.
    Q.2 - 1 min. 10 sec.
    Q.3 - not asked
    Q.4 - 1 min. 10 sec.
    Q.5 -   45 sec.
    _____
            4 min. 35 sec.

METIS

11. B-62 - 2056 (Univ. student)

Q.1 - 1 min. 30 sec.
Q.2 - 1 min. 30 sec.
Q.3 - 1 min. 10 sec.
Q.4 - not asked
Q.5 - 1 min.

_____
5 min. 10 sec.

12. C-76 - 3035 (high school)

Q.1 -   15 sec.
Q.2 - 2 min.
Q.3 - 2 min.
Q.4 -   40 sec.
Q.5 -   25 sec.

_____
5 min. 20 sec.

13. C-77 - 3036 (high school)

Q.1 - 1 min. 45 sec.
Q.2 - not asked
Q.3 - 2 min.
Q.4 -   45 sec.
Q.5 - 2 min.

_____
6 min. 30 sec.

14. E-14 - 5015 (Educ. office)

Q.1 - 1 min.
Q.2 - 1 min.
Q.3 - 1 min. 45 sec.
Q.4 -   15 sec.
Q.5 - 1 min. 35 sec.

_____
5 min. 35 sec.

15. F-12 - 6009 (teacher)

Q.1 - 1 min. 50 sec.
Q.2 - 2 min. 50 sec.
Q.3 - 2 min.
Q.4 - 1 min. 35 sec.
Q.5 -   30 sec.

_____
8 min. 45 sec.

16. F-35 - 6015 (teacher)

Q.1 - 2 min.
Q.2 -   30 sec.
Q.3 - not asked
Q.4 -   30 sec.
Q.5 - not asked

_____
3 min.

17. G-5 - 7005 (political leader)

Q.1 - 1 min.
Q.2 - 2 min.
Q.3 - 1 min. 30 sec.
Q.4 - not asked
Q.5 -   10 sec.

_____
4 min. 40 sec.

18. G-11 - 7010 (political leader)

Q.1 -   55 sec.
Q.2 - 1 min.
Q.3 - not asked
Q.4 - not asked
Q.5 - 2 min.

_____
5 min. 55 sec.

19. G-29 - 7015 (political leader)

Q.1 - 2 min.
Q.2 -   20 sec.
Q.3 - not asked
Q.4 -   15 sec.
Q.5 -   55 sec.

_____
3 min. 30 sec.

20. G-15 - 7021 (political leader)

Q.1 -   30 sec.
Q.2 -   50 sec.
Q.3 - not asked
Q.4 - not asked
Q.5 - 1 min.

_____
2 min. 20 sec.

INUIT

1. A-15 - 1018 (parent)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 - 2 min.
    Q.4 - not asked
    Q.5 - 1 min. 50 sec.
    _____
    7 min. 50 sec.

2. A-17 - 1020 (parent)

    Q.1 - 2 min.
    Q.2 -   50 sec.
    Q.3 -   30 sec.
    Q.4 -   35 sec.
    Q.5 -   30 sec.
    _____
    4 min. 25 sec.

3. A-44 - 1050 (parent)

    Q.1 - 1 min. 30 sec.
    Q.2 - 2 min.
    Q.3 - 1 min.
    Q.4 - not asked
    Q.5 - 1 min.
    _____
    5 min. 30 sec.

4. B-25 - 2023 (Univ. student)

    Q.1 - 2 min.
    Q.2 - 1 min. 35 sec.
    Q.3 -   45 sec.
    Q.4 - not asked
    Q.5 - 2 min.
    _____
    6 min. 20 sec.

5. B-42 - 2039 (Univ. student)

    Q.1 - 1 min. 45 sec.
    Q.2 - 1 min. 20 sec.
    Q.3 -   45 sec.
    Q.4 -   40 sec.
    Q.5 - 2 min.
    _____
    6 min. 30 sec.

6. B-46 - 2043 (Univ. student)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 - 1 min. 15 sec.
    Q.4 -   45 sec.
    Q.5 - 1 min. 10 sec.
    _____
    7 min. 10 sec.

7. B-50 - 2045 (Univ. student)

    Q.1 - 1 min. 25 sec.
    Q.2 - 1 min. 15 sec.
    Q.3 -   40 sec.
    Q.4 - 2 min.
    Q.5 -   45 sec.
    _____
    6 min. 5 sec.

8. B-51 - 2046 (Univ. student)

    Q.1 - 1 min.
    Q.2 - 1 min. 30 sec.
    Q.3 -   45 sec.
    Q.4 -   50 sec.
    Q.5 - 1 min.
    _____
    4 min. 35 sec.

9. B-52 - 2047 (Univ. student)

    Q.1 - 1 min. 45 sec.
    Q.2 - 1 min. 30 sec.
    Q.3 -   45 sec.
    Q.4 -   25 sec.
    Q.5 - 1 min.
    _____
    5 min. 25 sec.

10. C-30 - 3024 (high school)

    Q.1 -   55 sec.
    Q.2 - 1 min. 45 sec.
    Q.3 - 1 min. 40 sec.
    Q.4 - 1 min. 30 sec.
    Q.5 - not asked
    _____
    5 min. 50 sec.

INUIT

11. C-44 - 3041 (high school)

    Q.1 -   55 sec.
    Q.2 - 1 min. 55 sec.
    Q.3 - 1 min. 45 sec.
    Q.4 -   45 sec.
    Q.5 - 1 min.

          6 min. 10 sec.

12. C-46 - 3043 (high school)

    Q.1 - 1 min. 15 sec.
    Q.2 -   30 sec.
    Q.3 -   50 sec.
    Q.4 - 1 min. 15 sec.
    Q.5 -   35 sec.

          4 min. 25 sec.

13. C-48 - 3045 (high school)

    Q.1 -   44 sec.
    Q.2 -   35 sec.
    Q.3 -   12 sec.
    Q.4 -   15 sec.
    Q.5 -   44 sec.

          2 min. 30 sec.

14. C-90 - 3059 (high school)

    Q.1 -   45 sec.
    Q.2 -   35 sec.
    Q.3 - 2 min.
    Q.4 -   20 sec.
    Q.5 -   10 sec.

          3 min. 50 sec.

15. C-12 - 4012 (teacher trainee)

    Q.1 - 1 min. 30 sec.
    Q.2 -   52 sec.
    Q.3 - 1 min. 45 sec.
    Q.4 -   15 sec.
    Q.5 - 1 min.

          5 min. 22 sec.

16. D-13 - 4013 (teacher trainee)

    Q.1 - 1 min. 30 sec.
    Q.2 - 1 min.
    Q.3 -   30 sec.
    Q.4 -   50 sec.
    Q.5 - not asked

          3 min. 40 sec.

17. E-1 - 5001 (Educ. official)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 - 2 min.
    Q.4 - 1 min.
    Q.5 -   45 sec.

          7 min. 45 sec.

18. G-4 - 7004 (leader)

    Q.1 - 2 min.
    Q.2 - not asked
    Q.3 - not asked
    Q.4 - 2 min.
    Q.5 - 1 min.

          5 min.

19. I-16 - 9018 (AVC Student)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 - 2 min.
    Q.4 -   45 sec.
    Q.5 -   45 sec.

          7 min. 30 sec.

20. I-17 - 9019 (AVC Student)

    Q.1 -   45 sec.
    Q.2 -   30 sec.
    Q.3 - 1 min.
    Q.4 -   10 sec.
    Q.5 -   25 sec.

          2 min. 55 sec.

NON-NATIVE

1. A-27 - 1013 (parent)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 - not asked
    Q.4 - not asked
    Q.5 - 1 min. 30 sec.
    _____
    5 min. 30 sec.

2. A-12 - 1015 (parent)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 -   20 sec.
    Q.4 -   30 sec.
    Q.5 - 1 min.
    _____
    5 min. 50 sec.

3. A-30 - 1022 (parent)

    Q.1 - 2 min.
    Q.2 - 1 min.
    Q.3 - 1 min.
    Q.4 - 1 min. 30 sec.
    Q.5 - 1 min. 50 sec.
    _____
    7 min. 20 sec.

4. A-41 - 1030 (parent)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 -   50 sec.
    Q.4 - not asked
    Q.5 - 1 min.
    _____
    5 min. 50 sec.

5. B-19 - 2017 (Univ. student)

    Q.1 - 2 min.
    Q.2 - not asked
    Q.3 - 1 min. 10 sec.
    Q.4 -   5 sec.
    Q.5 -   35 sec.
    _____
    3 min. 50 sec.

6. B-28 - 2026 (Univ. student)

    Q.1 - 1 min. 20 sec.
    Q.2 - not asked
    Q.3 - not asked
    Q.4 - 1 min. 50 sec.
    Q.5 - 1 min. 40 sec.
    _____
    4 min. 50 sec.

7. B-35 - 2032 (Univ. student)

    Q.1 - 2 min.
    Q.2 - 2 min.
    Q.3 -   45 sec.
    Q.4 -   30 sec.
    Q.5 - 1 min.
    _____
    6 min. 15 sec.

8. B-43 - 2040 (Univ. student)

    Q.1 -   45 sec.
    Q.2 - 1 min. 10 sec.
    Q.3 -   45 sec.
    Q.4 - 1 min. 15 sec.
    Q.5 -   20 sec.
    _____
    4 min. 15 sec.

9. B-44 - 2041 (Univ. student)

    Q.1 -   15 sec.
    Q.2 -   10 sec.
    Q.3 -   10 sec.
    Q.4 -   10 sec.
    Q.5 - 1 min.
    _____
    1 min. 45 sec.

10. B-82 - 2052 (Univ. student)

    Q.1 -   30 sec.
    Q.2 - not asked
    Q.3 - not asked
    Q.4 - 1 min.
    Q.5 - 1 min.
    _____
    2 min. 30 sec.

NON-NATIVE

11. C-10 - 3010 (high school)

     Q.1 - 2 min.
     Q.2 - 2 min.
     Q.3 -   55 sec.
     Q.4 -   30 sec.
     Q.5 - 1 min.
             _____
             6 min. 25 sec.

12. C-16 - 3016 (high school)

     Q.1 - 2 min.
     Q.2 -   55 sec.
     Q.3 -   35 sec.
     Q.4 -   15 sec.
     Q.5 - 1 min. 45 sec.
             _____
             5 min. 30 sec.

13. C-49 - 3046 (high school)

     Q.1 - 1 min. 25 sec.
     Q.2 - not asked
     Q.3 -   55 sec.
     Q.4 - 1 min.
     Q.5 - 1 min. 10 sec.
             _____
             4 min. 30 sec.

14. C-5 - 3047 (high school)

     Q.1 -   35 sec.
     Q.2 -   35 sec.
     Q.3 - 1 min. 15 sec.
     Q.4 - 1 min.
     Q.5 - 1 min.
             _____
             4 min. 25 sec.

15. C-83 - 3052 (high school)

     Q.1 - 2 min.
     Q.2 -   20 sec.
     Q.3 -   40 sec.
     Q.4 -   10 sec.
     Q.5 -   20 sec.
             _____
             3 min. 30 sec.

16. C-89 - 3058 (high school)

     Q.1 - 1 min. 5 sec.
     Q.2 -   35 sec.
     Q.3 - 1 min. 30 sec.
     Q.4 -   5 sec.
     Q.5 -   45 sec.
             _____
             4 min.

17. C-97 - 3066 (high school)

     Q.1 - 1 min. 25 sec.
     Q.2 -   40 sec.
     Q.3 - 2 min.
     Q.4 -   30 sec.
     Q.5 - 1 min.
             _____
             5 min. 35 sec.

18. E-10 - 5010 (Educ. official)

     Q.1 - 2 min.
     Q.2 - 2 min.
     Q.3 - not asked
     Q.4 - 2 min.
     Q.5 - 2 min.
             _____
             8 min.

19. E-30 - 5013 (Educ. official)

     Q.1 - 1 min. 50 sec.
     Q.2 -   45 sec.
     Q.3 - not asked
     Q.4 -   50 sec.
     Q.5 - 1 min. 10 sec.
             _____
             4 min. 35 sec.

20. E-31 - 5014 (Educ. official)

     Q.1 - not asked
     Q.2 - 2 min.
     Q.3 - not asked
     Q.4 - 1 min. 25 sec.
     Q.5 - not asked
             _____
             3 min. 25 sec.

NON-NATIVE

21. E-17 - 5018 (Educ. official)　　22. E-21 - 5022 (Educ. official)

```
    Q.1 - 2 min.                         Q.1 - 2 min.
    Q.2 - not asked                      Q.2 - not asked
    Q.3 - 2 min.                         Q.3 - 1 min. 5 sec.
    Q.4 -         45 sec.                Q.4 - inaudible
    Q.5 -         45 sec.                Q.5 - 2 min. 50 sec.
          _____                          _____
          5 min. 30 sec.                       5 min. 55 sec.
```

23. E-22 - 5023 (Educ. official)　　24. E-60 - 5027 (Educ. official)

```
    Q.1 - 2 min.                         Q.1 - 2 min.
    Q.2 - not asked                      Q.2 - 2 min.
    Q.3 - 2 min.                         Q.3 - not asked
    Q.4 -         50 sec.                Q.4 - not asked
    Q.5 - 1 min. 15 sec.                 Q.5 - 1 min. 15 sec.
          _____                          _____
          6 min.  5 sec.                       5 min. 15 sec.
```

25. E-39 - 5029 (Educ. official)　　26. E-40 - 5030 (Educ. official)

```
    Q.1 -         50 sec.                Q.1 - 2 min.
    Q.2 - 2 min.                         Q.2 - 1 min. 30 sec.
    Q.3 -         50 sec.                Q.3 - not asked
    Q.4 - not asked                      Q.4 - not asked
    Q.5 - 2 min.                         Q.5 - 2 min.
          _____                          _____
          5 min. 40 sec.                       5 min. 30 sec.
```

27. E-41 - 5031 (Educ. official)　　28. E-50 - 5042 (Educ. official)

```
    Q.1 - 2 min.                         Q.1 - 2 min.
    Q.2 - 1 min.                         Q.2 - 1 min.
    Q.3 - 2 min.                         Q.3 - not asked
    Q.4 - 1 min. 45 sec.                 Q.4 -         55 sec.
    Q.5 -         55 sec.                Q.5 - 1 min.  5 sec.
          _____                          _____
          7 min. 40 sec.                       5 min.
```

29. F-1 - 6001 (teacher)　　　　　　30. F-4 - 6005 (teacher)

```
    Q.1 - 2 min.                         Q.1 - 2 min.
    Q.2 -         20 sec.                Q.2 - 1 min. 45 sec.
    Q.3 - 1 min. 15 sec.                 Q.3 - 2 min.
    Q.4 - not asked                      Q.4 - 2 min.
    !.5 - 2 min.                         Q.5 -         45 sec.
          _____                          _____
          5 min. 35 sec.                       8 min. 30 sec.
```

NON-NATIVE

31. F-10 - 6007 (teacher)   32. F-11 - 6008 (teacher)

     Q.1 - 2 min.   Q.1 - not asked
     Q.2 - 1 min. 10 sec.   Q.2 - 1 min. 45 sec.
     Q.3 - 2 min.   Q.3 - 1 min. 35 sec.
     Q.4 - not asked   Q.4 - not asked
     Q.5 - 2 min.   Q.5 -   50 sec.
             _____   _____
             7 min. 10 sec.   4 min. 10 sec.

33. F-13 - 6010 (teacher)   34. F-14 - 6011 (teacher)

     Q.1 - 2 min.   Q.1 - 2 min.
     Q.2 -   50 sec.   Q.2 - not asked
     Q.3 - 2 min.   Q.3 - not asked
     Q.4 - 1 min. 25 sec.   Q.4 - 1 min.
     Q.5 - 1 min. 50 sec.   Q.5 - 2 min.
             _____   _____
             8 min. 5 sec.   5 min.

35. F-34 - 6014 (teacher)   36. F-15 - 6019 (teacher)

     Q.1 - 2 min.   Q.1 - 1 min. 30 sec.
     Q.2 - not asked   Q.2 - 1 min. 25 sec.
     Q.3 - not asked   Q.3 - 2 min.
     Q.4 - 2 min.   Q.4 - not asked
     Q.5 - 2 min.   Q.5 - 1 min. 45 sec.
             _____   _____
             6 min.   6 min. 40 sec.

37. I-9 - 9011 (Tech. student)   38. I-18 - 9020 (Tech. student)

     Q.1 - 1 min. 10 sec.   Q.1 - 2 min.
     Q.2 -   40 sec.   Q.2 -   30 sec.
     Q.3 - 2 min.   Q.3 - 2 min.
     Q.4 - 1 min.   Q.4 -   30 sec.
     Q.5 -   25 sec.   Q.5 -   30 sec.
             _____   _____
             5 min. 15 sec.   5 min. 30 sec.

39. I-32 - 9024 (Tech. student)   40. I-34 - 9026 (Comm. leader)

     Q.1 - 2 min.   Q.1 - 2 min.
     Q.2 -   30 sec.   Q.2 - 1 min. 30 sec.
     Q.3 - 2 min.   Q.3 - not asked
     Q.4 -   30 sec.   Q.4 - not asked
     Q.5 -   30 sec.   Q.5 - 2 min.
             _____   _____
             5 min. 30 sec.   5 min. 30 sec.

APPENDIX F

SAMPLE OF CODED DATA

A-37-Metis parent—1

A.1. If you were in charge of education what changes would you make?

257   201   B2   A1   250   B2
Well, I don't know, I have children here going to school and we
150   256   100   A4   B2   A1   C1
kind of gave up on their schooling a lot of times. I ask them why and
150   A2   100   B3   B4   B5
there's not always a satisfactory reply, of course. Other types than the
B9   257   A1
type of teacher they're with you know. The teacher, well, they got separate
A1   C2   A1   B4
teachers; they teach them some stuff; some teachers learn some other things.
150 100 256 257 B2 202 250 A1 100 B2 150
It's hard to say. Myself, I had no schooling as far as I'm concerned,
153   153   153   B9   256
four years at school at Providence at the convent. You know, never had
101   A4   257   A2
any education. . . . Of course, them days you had two three books that's
B3   A4   202 B2   A1   A2
about all you had. I have a couple girls here they don't care about the
202   B2   100   250   A1   153
gymnasium. I'll tell you this, a couple of years ago my little daughter
153   A2   202   B2   A1
was about eleven, and she didn't want to go barefoot to school and I asked
A4   C1
her why . . . . (can't hear tape).

Q. 3. What things do northern people want to learn?

150   202   100   250
That part is hard to say. Every individual, like the children, they
A2   256   C2   A5
have different ideas. It's up to the teachers to ask them what type of
153   A2
schooling they would like to go through, any type of work or job they would
A7   A4   A2
like to learn. Because the children nowadays, the world is going ahead so
100   C1 A7 256   A4   253   A2   100
fast that they seem to be lost right there. Things are going ahead too
B9   256   A5   250 200   A1
fast. I think they should learn more about work. You see, in the old times
B2   153 153 153   A7   B6   B3
we went to work about 13, 14, 15. By the time you were about 18 a fellow
A2   100   A2   250
could get on his own. He had a lot of experience about work and so on, how
153   B4   B5   100 101 256 A5
to get on. Nowadays they go through a lot of schooling with no work. It's
A8   101   A2   A8   256
all play or school or anything. They don't believe in work. That's one
150 B2 153   201 B2 250 A1   153 153
thing. That's my point of view. I have children grown up, around 18, 17,
153   C2   256   251   100   A4
20. They still think they should depend on the old folks.

A-37-2

Q. 2.   What is a good way to learn?

B9   100   A2   100   B4   100   A5

I always say, "learn things the hard way, that's the best way to

100   B2   153   B2   B2   A4   250   A2   B2

learn." Myself, I had no schooling and I had to head for the bush when I

B2   A1   B4   100   A2   A5   100   B8   A7

was young, and I learned the bush life myself through hard work, but wanted

A2   100   B2   A2   100   103   B2   B4   100   B2   A2   253   A5

to learn.   I was determined to learn.   I kept it up.   I didn't give up.

B2   250   A2   100   B2   A4   250   103

I went through a tough life in my young days and through life, of course,

B7   B2   256   254   256   B2   100   151   A2   B2

but I enjoyed doing it.   The outdoor life I really enjoyed while I was at

200   150   B2   100   250   B2   A2

it.   The only reason I'm not back in the bush today is that I'm unable to

151   B2   B2   253   100   C2   B4   256   A4   B8   B2

put out the work I used to.   I can't do any hard work anymore, but I have

A2   103   202   B2   A2   B7

the experience.   I wanted to teach in the regional college but all of the

A1   B2   B2   250   B2   100   B6

answer I got from the boys I have, they just told me straight they don't

100   A4   A7   253   252   152   A4

want none of the bush living.   So what you going to do?

Q. 5.   Should students be able to stay in the north for higher education?

B9   A2   256   100   B3   B7

I guess it would be good staying in the north rather than going out

151   A7   253   A2   100   101

if they could arrange things that way.   It would be a lot better.

APPENDIX G

DACS Protocol Scores

DACS Protocol Scores

Coding Category REASONING	Indian Profiles																				TOTAL
	1001	1035	2008	2013	2014	2019	2020	2034	3026	3028	3039	3040	3060	4005	4006	4015	4016	6002	6004	7001	
A. Relevance																					
A.1	28	15	43	42	10	7	24	9	13	12	8	12	5	18	20	31	18	40	29	40	424
A.2	19	15	42	63	27	24	28	19	20	8	17	30	13	29	18	46	29	55	51	34	587
A.3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2
A.4	2	-	3	2	11	2	3	-	1	-	3	-	1	2	1	4	-	2	-	1	38
A.5	3	-	2	3	1	2	2	-	-	1	2	-	2	3	1	-	7	5	4	-	38
A.6	4	2	2	3	2	1	2	-	5	1	3	-	1	1	3	1	6	2	5	7	51
A.7	9	6	11	9	8	5	4	2	3	1	8	6	6	4	2	6	2	8	6	6	112
A.8	-	-	1	-	-	5	2	1	3	-	2	1	5	3	-	1	-	-	6	-	30
B. Meaning																					
B.1	1	2	1	2	-	-	2	-	1	-	1	-	-	1	-	-	-	1	2	1	15
B.2	6	7	36	59	26	19	45	7	16	8	16	24	3	29	21	15	9	9	19	25	399
B.3	2	-	1	-	3	5	2	1	4	6	4	-	8	1	1	3	-	1	-	4	46
B.4	8	7	12	7	1	3	7	-	6	4	3	3	7	8	4	2	5	6	3	10	106
B.5	-	-	1	-	2	-	-	-	1	1	-	-	2	-	-	-	-	-	-	-	7
B.6	1	-	-	-	-	1	-	-	-	1	-	1	-	-	-	1	-	-	2	2	9
B.7	1	5	4	6	3	6	3	2	2	2	4	3	4	7	4	8	1	3	5	5	75
B.8	1	2	1	2	-	-	1	-	2	1	-	-	1	-	-	1	-	-	2	1	15
B.9	18	16	5	44	13	26	54	35	19	17	20	14	4	9	32	19	18	6	17	33	419
C. Language Structure																					
C.1	1	2	7	6	2	4	1	2	1	2	3	3	4	4	4	2	4	4	2	4	62
C.2	1	4	4	3	-	-	4	2	1	2	1	2	6	2	1	1	1	1	2	2	40
C.3	1	1	-	-	1	-	-	1	3	-	-	2	-	-	-	-	-	-	-	-	9
C.4	-	1	-	1	-	1	1	1	1	-	-	1	1	-	-	1	1	1	1	-	12
C.5	1	-	1	-	1	-	-	-	-	1	1	-	-	1	1	-	-	-	-	1	8
D. Field Articulation																					
D.1	1	1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	1	1	-	7
D.2	-	-	1	1	1	-	1	-	1	1	1	1	1	1	1	1	-	-	-	1	13
TOTAL	108	86	178	253	113	112	186	84	103	69	97	103	74	123	114	143	103	145	157	177	2526

Coding Category STRATEGIES	Indian Profiles 1001	1035	2008	2013	2014	2019	2020	2034	3026	3028	3039	3040	3060	4005	4006	4015	4016	6002	6004	7001	TOTAL
A. Absolute Statements																					
100.	30	6	30	45	10	21	23	20	16	8	9	12	7	11	6	28	9	25	25	19	360
101.	3	9	13	12	8	7	2	4	7	5	2	3	6	8	5	1	3	12	13	7	130
102.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	2	4	–	3	10
103.	2	–	2	3	6	12	4	–	12	11	1	1	4	6	4	4	2	2	2	1	79
B. Qualified Statements																					
150.	7	1	12	17	11	7	9	9	12	6	17	1	1	7	8	11	4	6	3	8	157
151.	–	10	8	3	5	7	8	1	1	3	6	–	5	5	6	16	5	3	11	10	113
152.	2	–	–	1	2	–	4	3	2	–	2	–	–	6	–	–	–	–	–	3	25
153.	7	3	21	5	13	32	1	1	3	3	5	4	18	11	8	13	2	15	5	10	180
A. Initiating New Ideas																					
200.	4	2	1	4	1	4	2	3	2	1	–	–	3	1	4	–	2	–	3	2	39
201.	1	–	1	1	1	1	3	–	1	1	1	2	–	–	1	–	1	1	2	2	20
202.	1	–	1	3	3	1	–	2	1	1	–	2	1	–	–	–	–	–	1	2	19
203.	2	–	–	2	4	–	–	1	2	–	–	–	–	–	–	–	1	–	2	1	15
B. Continuing Discussion of Ideas																					
250.	16	11	35	17	12	18	11	3	6	16	7	6	21	16	28	26	14	28	25	31	347
251.	2	11	–	2	–	6	1	2	–	–	2	3	–	1	–	1	3	6	3	–	43
252.	1	1	4	2	2	2	2	1	2	–	–	–	–	3	2	2	3	1	3	5	36
253.	4	–	10	11	9	10	2	3	3	11	3	6	2	3	5	4	2	2	12	4	106
254.	1	1	1	1	1	–	2	3	–	2	1	2	–	1	4	–	–	–	2	2	24
255.	–	–	–	1	2	1	–	–	4	–	–	2	–	–	1	–	–	–	1	–	12
256.	19	9	9	16	10	21	9	10	6	6	10	7	15	16	8	8	10	4	4	7	204
257.	2	9	26	11	5	9	11	4	8	5	6	3	4	4	8	7	1	7	6	5	141
TOTAL	104	73	174	157	105	159	94	70	88	79	72	54	87	99	99	121	64	116	123	122	2060
GRAND TOTAL	212	159	352	410	218	271	280	154	191	145	169	157	161	222	213	264	167	261	280	299	4586

DACS Protocol Scores

Coding Category REASONING	\multicolumn{20}{c}{Metis Profiles}	TOTAL
	1005	1009	1010	1016	1025	1026	1027	1034	2028	2029	2056	3035	3036	5015	6009	6015	7005	7010	7015	7021	
A. Relevance																					
A.1	17	5	7	11	4	11	12	11	19	16	12	10	15	8	29	5	17	9	3	5	226
A.2	25	8	26	45	14	35	25	14	28	27	28	2	38	13	41	5	13	22	9	14	432
A.3	–	–	1	–	–	2	–	–	–	–	–	–	–	–	1	–	–	1	–	–	5
A.4	9	5	6	9	–	7	9	4	5	5	1	–	3	9	2	1	9	2	2	4	92
A.5	2	2	2	2	–	14	6	3	6	2	2	–	–	2	7	–	3	1	–	1	55
A.6	–	–	1	7	–	6	–	1	1	1	–	–	–	1	3	4	–	3	3	3	34
A.7	6	1	5	6	5	6	5	1	4	4	3	1	10	4	6	2	11	3	2	5	90
A.8	4	4	4	2	6	3	2	–	–	–	5	–	3	5	2	–	1	–	–	–	41
B. Meaning																					
B.1	3	–	3	3	–	3	–	1	1	2	4	–	–	–	–	–	1	2	1	–	24
B.2	19	17	8	35	4	14	32	20	34	34	28	10	49	9	29	4	8	28	20	10	412
B.3	1	1	3	2	1	4	5	8	3	2	–	–	1	3	4	2	5	5	–	1	51
B.4	14	2	6	16	2	10	6	7	9	9	10	–	5	3	8	9	6	6	5	3	136
B.5	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	3
B.6	–	–	2	5	–	2	2	–	–	–	–	–	–	–	–	–	1	–	1	–	13
B.7	17	4	5	11	–	18	4	6	1	2	2	–	2	8	6	–	3	4	2	4	99
B.8	1	–	1	5	–	3	2	–	–	–	–	–	3	–	–	–	–	–	1	–	16
B.9	25	18	18	28	18	15	5	12	16	16	13	7	45	9	38	7	7	21	5	11	334
C. Language Structure																					
C.1	6	2	2	6	1	6	2	2	2	2	4	–	1	2	5	2	2	3	2	3	55
C.2	7	3	2	1	2	5	4	2	1	1	5	–	3	1	6	2	1	1	1	–	48
C.3	–	–	–	–	–	–	–	r	–	–	–	–	–	–	–	–	–	–	–	–	–
C.4	–	–	–	1	–	–	–	–	1	1	1	–	–	1	1	–	1	1	–	–	8
C.5	1	1	1	–	1	1	1	1	–	–	–	1	1	–	–	1	–	–	1	1	12
D. Field Articulation																					
D.1	–	–	–	1	–	–	–	–	1	–	1	–	–	–	–	–	–	1	–	–	4
D.2	1	1	1	–	1	1	1	1	–	1	–	1	1	1	1	1	1	–	1	1	16
TOTAL	158	74	104	196	59	168	123	94	132	125	119	32	180	79	189	45	91	113	59	66	2206

284

Coding Category STRATEGIES	Metis Profiles																				TOTAL
	1005	1009	1010	1016	1025	1026	1027	1034	2028	2029	2056	3035	3036	5015	6009	6015	7005	7010	7015	7021	
A. Absolute Statements																					
100.	38	9	25	34	9	33	18	23	22	23	29	8	35	11	50	12	19	19	7	14	438
101.	8	4	11	4	–	11	4	5	6	6	9	2	4	10	11	–	6	4	5	4	114
102.	–	1	–	–	–	–	–	–	–	–	–	–	1	4	–	2	1	–	–	–	9
103.	3	1	4	9	1	7	4	3	–	–	7	2	4	5	8	2	4	6	–	2	72
B. Qualified Statements																					
150.	11	17	12	20	4	3	7	4	2	3	18	7	30	4	17	3	3	4	5	2	176
151.	2	–	–	5	–	21	2	5	2	1	5	1	7	4	8	1	5	4	2	2	77
152.	2	–	1	–	–	1	1	1	–	–	1	3	2	2	1	1	–	3	1	3	23
153.	17	4	8	38	3	17	15	7	2	2	21	5	8	17	17	8	24	26	11	9	259
A. Initiating New Ideas																					
200.	–	1	–	1	–	–	2	5	2	2	–	–	1	6	4	1	5	6	1	1	38
201.	–	–	1	–	–	1	3	1	1	1	–	3	2	2	1	–	–	2	–	1	19
202.	1	3	3	–	–	2	4	–	2	2	1	1	–	–	–	1	–	1	–	–	21
203.	–	1	–	3	1	–	–	5	–	–	1	1	–	–	–	–	–	–	1	–	13
B. Continuing Discussion of Ideas																					
250.	32	12	17	28	7	20	11	19	15	14	12	4	17	21	39	12	17	13	10	7	327
251.	2	–	3	5	–	9	2	1	2	2	1	–	2	1	3	1	3	3	–	–	40
252.	2	1	–	–	1	6	1	–	–	–	–	–	1	4	2	–	3	–	–	–	21
253.	8	5	10	3	3	11	5	6	6	6	9	1	5	10	13	1	7	2	2	2	115
254.	1	2	–	–	–	2	1	1	–	–	–	–	1	1	2	–	–	–	–	1	12
255.	2	4	2	–	–	1	–	–	–	–	–	1	1	1	–	1	–	–	–	–	13
256.	12	6	11	30	6	27	13	20	12	12	30	16	38	13	23	8	15	7	8	2	309
257.	9	4	8	2	1	5	4	7	8	7	7	2	5	4	8	2	8	1	5	5	102
TOTAL	150	75	116	182	35	177	97	113	82	81	151	57	163	117	209	58	117	104	58	55	2197
GRAND TOTAL	308	149	220	378	94	345	220	207	214	206	370	89	343	196	398	103	208	217	117	121	4413

DACS Protocol Scores

Coding Category REASONING	Inuit Profiles																				TOTAL
	1018	1020	1050	2023	2039	2043	2045	2046	2047	3024	3041	3043	3045	3059	4012	4013	5001	7004	9018	9019	
A. Relevance																					
A.1	25	19	32	19	23	29	7	29	7	14	17	11	9	11	18	5	14	13	38	13	353
A.2	26	20	25	32	21	23	30	71	9	20	19	11	6	20	11	14	30	13	38	25	464
A.3	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
A.4	3	3	2	3	--	--	--	1	--	--	4	--	--	--	--	3	4	2	5	1	31
A.5	1	--	2	2	--	--	--	1	--	--	2	1	--	--	--	--	2	1	1	--	13
A.6	4	9	6	1	3	--	--	3	1	1	2	--	--	--	--	2	1	4	1	2	40
A.7	4	5	3	12	1	1	1	7	1	2	12	--	--	4	3	2	2	5	3	--	68
A.8	--	2	--	1	--	--	--	1	--	1	--	--	--	--	--	5	--	--	--	--	10
B. Meaning																					
B.1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	1	--	--	6
B.2	14	18	8	34	34	22	42	25	21	28	40	11	11	16	18	31	19	30	37	12	471
B.3	1	--	2	2	2	3	5	1	2	4	2	3	3	6	--	--	1	3	9	--	49
B.4	2	5	6	6	4	10	4	11	5	5	4	3	1	2	3	2	8	8	5	--	94
B.5	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
B.6	2	--	2	--	1	--	1	2	--	--	2	--	--	--	--	1	--	--	1	1	13
B.7	7	2	5	4	2	1	2	2	1	2	9	1	--	4	3	4	4	1	6	7	67
B.8	--	--	--	--	--	1	1	--	--	--	1	--	--	--	--	--	--	1	--	--	4
B.9	22	8	14	19	11	38	10	29	4	3	16	20	12	17	4	10	15	16	31	21	320
C. Language Structure																					
C.1	1	1	6	7	4	3	3	3	1	1	1	1	2	4	1	2	6	5	4	--	56
C.2	--	6	3	4	--	--	4	1	--	2	5	--	--	--	--	1	2	4	5	3	40
C.3	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	1	2	1	--	--	6
C.4	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	3
C.5	1	--	1	1	1	--	1	1	1	1	1	1	1	1	1	1	--	1	1	1	17
D. Field Articulation																					
D.1	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	3
D.2	1	--	1	1	1	--	1	1	1	1	1	1	1	1	1	1	--	1	1	1	17
TOTAL	115	101	120	149	108	134	112	189	55	75	138	64	46	86	63	85	115	110	186	87	2148

Coding Category STRATEGIES	Inuit Profiles																				TOTAL
	1018	1020	1050	2023	2039	2043	2045	2046	2047	3024	3041	3043	3045	3059	4012	4013	5001	7004	9018	9019	
A. Absolute Statements																					
100.	5	30	16	42	15	20	15	13	4	8	22	6	4	5	4	9	21	19	35	14	307
101.	2	1	3	2	--	1	2	--	--	--	10	--	--	1	--	2	6	5	1	3	39
102.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	2
103.	2	--	5	1	1	5	1	1	1	1	13	1	2	4	--	1	4	6	1	2	52
B. Qualified Statements																					
150.	6	7	11	11	5	7	4	4	6	6	7	1	3	5	5	11	8	5	24	9	145
151.	7	5	8	9	6	6	6	5	4	5	6	2	1	1	2	1	6	4	8	5	97
152.	1	--	--	3	4	2	5	2	1	2	3	1	1	1	2	2	--	1	1	3	35
153.	9	4	3	19	7	10	--	10	--	--	11	5	--	3	5	4	10	13	9	2	124
A. Initiating New Ideas																					
200.	--	2	1	--	1	1	--	--	--	1	--	--	3	1	--	--	2	2	--	--	14
201.	--	--	2	2	2	2	--	1	--	2	3	--	1	--	--	--	2	1	1	4	23
202.	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	5
203.	4	--	--	--	4	2	2	1	1	--	--	--	2	--	--	--	--	4	2	--	22
B. Continuing Discussion of Ideas																					
250.	15	18	12	23	7	15	8	12	6	8	10	7	2	13	10	4	18	12	38	4	242
251.	--	2	--	2	--	1	--	2	1	--	1	--	--	--	--	--	2	2	2	--	15
252.	--	--	1	3	2	--	1	1	--	1	6	--	--	1	--	1	1	--	--	1	19
253.	3	3	6	9	9	3	3	3	1	2	9	5	4	1	3	4	4	8	3	5	88
254.	--	--	3	1	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	7
255.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	5	7
256.	2	10	21	16	6	10	10	5	11	11	16	5	2	10	6	10	12	12	8	11	194
257.	8	8	1	4	5	9	4	11	1	2	10	2	3	--	--	4	3	3	10	2	90
TOTAL	67	90	93	147	74	94	61	74	37	49	127	35	28	46	37	54	101	97	145	71	1527
GRAND TOTAL	182	191	213	296	172	228	173	263	92	124	265	99	74	132	100	139	216	207	331	158	3675

DACS Protocol Scores

Coding Category REASONING	Non-native Profiles																				TOTAL
	1013	1015	1022	1030	2017	2026	2032	2040	2041	2052	3010	3016	3046	3047	3052	3058	3066	5010	5013	5014	
A. Relevance																					
A.1	17	19	14	9	8	8	12	4	2	3	12	10	6	8	2	6	17	16	14	5	192
A.2	23	17	23	20	12	5	41	17	6	10	36	9	6	7	13	21	17	28	12	4	327
A.3	--	--	1	--	--	--	--	1	1	1	--	1	--	--	--	--	1	--	--	--	6
A.4	2	3	5	--	1	2	2	1	1	4	1	5	--	1	3	--	3	--	2	--	36
A.5	6	8	3	1	2	4	2	--	1	1	3	2	1	3	1	4	2	--	3	--	47
A.6	1	3	1	2	1	5	6	1	1	--	2	2	--	3	--	1	1	3	3	1	37
A.7	10	3	8	7	7	2	3	4	3	2	6	7	2	4	3	4	13	2	--	2	92
A.8	4	2	10	4	2	1	9	3	--	--	7	5	--	--	2	3	4	1	3	--	60
B. Meaning																					
B.1	4	2	5	1	1	5	3	7	--	1	2	--	1	3	1	1	1	1	2	1	42
B.2	22	11	17	21	9	11	33	32	16	1	18	9	12	51	14	2	22	5	5	2	313
B.3	--	1	1	3	1	--	1	1	--	2	4	1	--	2	1	3	5	--	--	--	26
B.4	11	6	11	5	5	3	7	10	--	2	9	3	10	6	5	3	7	10	4	5	122
B.5	1	--	--	--	--	1	--	--	--	--	--	--	2	--	--	--	--	--	--	--	4
B.6	6	3	2	1	--	1	3	2	3	1	1	--	--	1	--	1	--	2	3	--	30
B.7	6	8	6	5	4	3	6	10	3	3	11	8	4	11	1	1	13	5	1	--	109
B.8	1	1	--	1	--	1	1	1	2	--	--	--	--	--	--	1	1	3	1	--	14
B.9	38	29	5	8	14	22	43	19	3	14	13	20	7	24	7	10	21	31	27	9	364
C. Language Structure																					
C.1	3	3	5	2	5	2	1	1	--	2	3	3	--	3	2	2	1	4	5	1	48
C.2	3	2	1	2	1	3	2	1	--	--	1	1	2	4	3	1	10	3	3	--	43
C.3	--	1	--	1	--	--	3	--	2	--	1	1	1	--	1	--	1	--	2	1	15
C.4	1	1	--	--	--	--	--	1	--	--	1	1	--	--	--	1	--	1	1	1	9
C.5	--	--	1	1	1	1	1	--	1	1	--	--	1	1	1	--	1	--	--	--	11
D. Field Articulation																					
D.1	1	1	1	1	1	1	--	--	--	1	1	1	--	--	--	1	1	1	1	1	14
D.2	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1	--	--	--	--	--	6
TOTAL	160	124	120	95	75	81	180	117	46	49	132	89	56	133	61	66	142	116	92	33	1967

DACS Protocol Scores

Coding Category REASONING	Non-native Profiles																				TOTAL
	5018	5022	5023	5027	5029	5030	5031	5042	6001	6005	6007	6008	6010	6011	6014	6019	9011	9020	9024	9026	
A. Relevance																					
A.1	13	19	3	22	12	6	62	10	10	18	16	28	3	17	11	22	18	50	11	18	369
A.2	15	17	17	29	20	17	42	18	51	69	29	21	16	34	23	50	29	44	16	24	581
A.3	--	--	1	--	1	--	--	--	1	--	--	--	1	--	--	--	--	--	--	1	5
A.4	3	--	--	3	1	1	1	1	3	3	3	1	1	--	2	1	--	4	2	1	31
A.5	1	1	2	1	2	--	1	--	2	8	2	1	2	1	1	7	--	3	2	--	37
A.6	1	1	3	25	6	5	13	4	3	4	3	2	4	5	2	11	2	2	1	5	102
A.7	--	--	4	1	--	7	11	2	4	3	5	2	4	6	1	5	2	3	1	1	62
A.8	2	--	--	1	1	1	2	1	--	4	2	--	2	--	1	1	1	3	3	1	26
B. Meaning																					
B.1	1	--	3	1	2	1	--	--	6	1	4	--	2	--	--	--	2	7	9	1	40
B.2	11	9	17	11	15	3	14	3	26	25	29	7	13	10	17	15	12	65	10	12	324
B.3	--	--	1	2	1	--	--	--	--	--	1	--	--	--	1	1	--	1	--	--	8
B.4	8	5	6	6	5	2	7	1	13	4	8	2	10	1	1	5	6	9	6	1	106
B.5	1	--	1	--	--	--	--	--	--	1	--	--	3	--	--	--	1	--	1	--	8
B.6	2	--	1	--	--	1	--	--	7	--	1	--	1	--	--	--	--	2	1	1	17
B.7	8	3	7	2	1	4	3	2	13	11	9	2	12	1	1	8	1	13	3	1	105
B.8	3	--	--	--	1	1	--	1	--	--	2	1	1	1	--	--	--	--	--	--	11
B.9	7	28	5	8	18	11	13	10	14	46	26	25	16	11	19	13	20	5	4	27	326
C. Language Structure																					
C.1	3	3	1	3	6	2	3	3	3	1	3	5	6	1	5	7	4	--	1	4	64
C.2	4	2	3	--	--	3	2	1	2	2	3	2	8	1	3	3	2	4	2	3	50
C.3	--	2	--	2	1	--	--	--	--	--	--	--	--	--	--	--	1	1	1		8
C.4	1	--	1	1	1	1	1	1	1	1	1	--	1	1	--	1	--	1	1	--	15
C.5	--	1	--	--	--	--	--	--	--	--	--	1	--	--	1	--	1	--	--	1	5
D. Field Articulation																					
D.1	1	1	1	1	1	1	1	1	1	1	--	--	1	--	--	1	--	--	1	1	14
D.2	--	--	--	--	--	--	--	--	--	--	1	1	--	1	1	--	1	1	--	--	6
TOTAL	85	92	77	119	95	67	176	59	160	202	148	101	107	91	90	151	102	218	76	104	2320

Coding Category STRATEGIES	Non-native Profiles																				TOTAL
	1013	1015	1022	1030	2017	2026	2032	2040	2041	2052	3010	3016	3046	3047	3052	3058	3066	5010	5013	5014	
A. Absolute Statements																					
100.	39	19	29	20	22	16	20	23	13	14	33	16	18	24	5	13	23	16	19	16	398
101.	10	4	12	6	3	5	3	11	7	4	8	4	--	1	2	6	7	3	5	3	104
102.	--	--	3	2	--	--	--	1	--	1	--	--	--	--	1	2	1	--	1	--	12
103.	2	2	2	4	7	5	3	3	1	1	16	11	6	5	1	2	7	5	9	3	95
B. Qualified Statements																					
150.	15	5	4	8	6	6	10	10	4	5	11	15	8	15	7	2	8	9	8	7	163
151.	2	9	4	5	5	8	13	--	3	7	5	8	11	3	3	7	9	6	6	3	117
152.	--	1	--	--	1	--	--	1	--	--	--	--	--	1	--	--	1	--	1	--	6
153.	16	8	12	6	7	3	14	5	1	5	26	13	15	5	6	6	14	16	11	23	212
A. Initiating New Ideas																					
200.	3	--	3	4	1	4	1	2	2	--	5	1	1	2	2	2	1	2	3	1	40
201.	--	--	3	2	1	--	1	2	1	1	--	1	--	3	--	--	2	--	4	--	21
202.	1	2	4	1	--	--	4	--	7	1	4	--	1	3	3	--	1	2	1	--	35
203.	--	3	--	1	--	--	1	--	7	2	--	--	--	--	--	--	--	--	--	2	16
B. Continuing Discussion of Ideas																					
250.	16	18	21	8	13	14	20	13	5	10	19	15	5	24	12	11	18	17	19	12	290
251.	4	3	3	4	3	--	3	2	1	--	1	2	1	3	1	1	4	1	3	3	43
252.	--	2	1	--	--	2	1	4	--	1	1	2	4	5	2	1	1	2	1	1	31
253.	7	5	5	4	3	9	7	8	3	2	5	3	9	12	3	6	2	4	8	--	105
254.	2	--	--	2	--	2	1	--	1	--	--	1	--	2	--	1	--	--	--	--	12
255.	--	2	--	3	2	1	--	1	--	--	--	--	--	--	1	1	3	1	--	--	15
256.	33	24	29	8	15	17	11	32	13	15	30	14	12	23	16	9	24	11	8	5	349
257.	6	7	7	5	2	5	6	3	1	3	1	8	5	1	3	5	8	5	9	2	92
TOTAL	156	114	142	93	91	97	119	121	70	72	165	114	96	132	68	75	134	100	116	81	2156

Coding Category STRATEGIES	N o n - n a t i v e P r o f i l e s																				TOTAL
	5018	5022	5023	5027	5029	5030	5031	5042	6001	6005	6007	6008	6010	6011	6014	6019	9011	9020	9024	9026	
A. Absolute Statements																					
100.	32	17	18	9	18	16	25	10	22	44	24	18	31	31	17	32	13	35	17	20	449
101.	6	1	3	4	3	4	8	--	15	16	--	1	6	3	6	11	4	3	5	9	108
102.	--	--	1	--	--	1	--	--	--	2	--	--	--	--	2	--	--	--	--	--	6
103.	7	1	4	1	5	3	4	--	5	9	6	--	11	1	1	3	--	3	3	5	72
B. Qualified Statements																					
150.	5	9	7	9	8	7	8	12	10	11	7	5	18	3	2	9	6	20	7	3	166
151.	11	2	6	--	4	5	3	4	5	7	14	5	13	7	5	10	6	10	6	4	127
152.	1	--	--	--	--	--	--	--	--	1	1	--	--	--	1	2	1	--	--	--	7
153.	28	5	8	7	9	4	29	--	15	9	16	5	15	8	3	4	6	12	8	19	210
A. Initiating New Ideas																					
200.	--	--	2	1	--	1	2	--	1	3	3	4	3	3	2	2	1	--	2	2	32
201.	1	--	1	--	--	--	--	--	--	1	--	--	--	1	--	1	--	--	--	--	5
202.	2	1	--	--	--	--	--	--	3	3	2	1	--	1	--	1	--	6	1	3	24
203.	2	2	3	2	2	--	--	--	4	--	1	--	--	--	1	3	1	--	1	--	22
B. Continuing Discussion of Ideas																					
250.	9	12	11	13	9	8	20	8	12	17	9	15	25	11	17	7	12	29	11	11	266
251.	3	2	3	3	2	2	3	3	7	6	1	1	4	9	7	2	1	4	2	2	67
252.	3	--	1	--	1	1	--	--	1	2	--	1	3	--	--	--	--	--	1	1	15
253.	11	3	5	4	5	--	5	5	2	8	8	5	9	5	5	4	4	4	1	4	97
254.	1	1	2	--	1	--	2	--	1	1	2	--	6	--	1	1	8	2	--	1	30
255.	1	1	1	1	--	--	--	--	--	1	1	2	1	--	1	--	--	1	2	--	13
256.	5	5	6	7	10	7	5	6	10	19	12	6	19	2	11	9	15	23	12	3	192
257.	2	4	3	6	3	8	14	2	11	9	4	2	5	12	5	9	12	8	5	3	127
TOTAL	130	66	85	67	80	67	128	50	124	169	111	71	169	97	87	110	90	160	84	90	2035
GRAND TOTAL	531	396	424	374	341	312	603	347	400	492	556	375	428	453	306	402	568	594	368	308	8478

APPENDIX H

DEMOGRAPHY OF SUBJECTS

Table 43

Ages of Participants by Cultural Group

Age Category	Group			
	Indian	Metis	Inuit	Non-native
< 20 years	6	2	8	10
20-30 years	8	4	9	8
30-40 years	4	4	2	8
> 40 years	1	8	1	12
Unknown	1	2	0	2
Total	20	20	20	40

Table 44

Sex of Participants by Cultural Group

	Group			
	Indian	Metis	Inuit	Non-native
Male	8	13	9	29
Female	12	7	11	11
Total	20	20	20	40

Table 45

Language Facility of Participants by
Cultural Group

Language Facility	Group			
	Indian	Metis	Inuit	Non-native
Monolingual	1	1	0	16
Bilingual	20	20	20	22
Total	21	21	20	38

Table 46

Post-Secondary Education of Participants
by Cultural Group

Education Level	Group			
	Indian	Metis	Inuit	Non-native
No university	8	13	10	10
< 1 year	4	2	3	—
1-3 years	2	4	5	8
4-6 years	6	1	2	22
Total	20	20	20	40

Table 47

Marital Status of Participants by
Cultural Group

| Marital | Group | | | |
Status	Indian	Metis	Inuit	Non-native
Single	9	6	16	16
Married	8	11	2	20
Wid/Sep/Div	3	2	2	4
Unknown	—	1	—	—
Total	20	20	20	40