

THE PSYCHOLINGUISTIC CHARACTERISTICS OF  
YOUNG INDIAN AND METIS STUDENTS IN  
NORTHERN SASKATCHEWAN SCHOOLS

A Thesis

Submitted to the Faculty of Graduate Studies

In Partial Fulfilment of the Requirements

For the Degree of

Master of Education

In the College of Education

University of Saskatchewan

by

Robert Vernon Wilson

Saskatoon, Saskatchewan

© Robert V. Wilson, March, 1972



NOV 03 1972

617564

## ABSTRACT

The Illinois Test of Psycholinguistic Abilities was administered to twenty-one females and twenty-seven males seven years of age. Eight of these Indian and Metis females and nine of the males attended a rural school, while seven females and eight males attended classes in residential schools. The remaining six females and ten males went to school in a city.

Profiles of differential abilities were made for each sex and school type. When the sub-tests were averaged according to the value of the mean scaled scores obtained by the total group, the ascending order was auditory association, grammatic closure, verbal expression, auditory closure, auditory decode, visual association, verbal decode, auditory memory, manual expression, visual closure, sound blending and visual memory. No significant differences existed between the males and the females. The urban school students performance on the Illinois Test of Psycholinguistic Abilities was superior to the performance of rural and residential school students.

The author has agreed that the library, University of Saskatchewan, may make this thesis freely available for inspection. Moreover, the author has agreed that permission for extensive copying of this thesis for scholarly purposes may be granted by the professor or professors who supervised the thesis work recorded herein, or, in their absence, by the Head of the Department or the Dean of the College in which the thesis work was done. It is understood that due recognition will be given to the author of this thesis, and to the University of Saskatchewan in any use of material in this thesis. Copying or publication or any other use of the thesis for financial gain without approval by the University of Saskatchewan and the author's written permission is prohibited.

Requests for permission to copy or to make other use of material in this thesis in whole or in part should be addressed to:

Head of the Department of Educational Psychology,  
College of Education,  
University of Saskatchewan,  
Saskatoon, Canada.

## ACKNOWLEDGEMENTS

The author is indebted to Drs. H. W. Savage and H. D. Peters of the College of Education, University of Saskatchewan, Saskatoon, for their assistance. He is grateful for the cooperation of the superintendents of schools for the Northern Areas and the Prince Albert Public and Separate School systems and he wishes to acknowledge the cooperation of the teachers and the students involved in the study and that of the Department of Public Health, Province of Saskatchewan.

The author is grateful for the toleration and understanding given by his wife during the research and writing of this thesis.

TABLE OF CONTENTS

	Page
LIST OF TABLES . . . . .	vii
LIST OF FIGURES . . . . .	viii
Chapter	
I INTRODUCTION . . . . .	1
The Indian-Metis Milieu . . . . .	4
A Statement of the Problem . . . . .	6
II REVIEW OF THE LITERATURE . . . . .	7
Reading and Psycholinguistics . . . . .	7
The Culturally Disadvantaged . . . . .	13
Summary . . . . .	27
III TEST INSTRUMENTS . . . . .	29
The Illinois Test of Psycholinguistic Abilities (ITPA) . . . . .	29
Definition of Psycholinguistic Terms . . . . .	33
Statistical Characteristics of the ITPA . . . . .	34
Reliability . . . . .	34
Validity . . . . .	35
Summary . . . . .	36
IV THE EXPERIMENTAL DESIGN . . . . .	37
The Sample . . . . .	37
The Reasons for the Sample Selection . . . . .	39
Data Collection . . . . .	40

TABLE OF CONTENTS (continued)

Chapter		Page
V	DATA ANALYSIS . . . . .	42
	Chronological Age and Psycholinguistic Age . . . . .	42
	Mean Scores and Standard Deviations . . . . .	43
	Statistical Procedures . . . . .	49
VI	CONCLUSIONS AND IMPLICATIONS . . . . .	58
	The Total Study . . . . .	58
	Sex . . . . .	60
	School Type . . . . .	61
	Limiting Factors . . . . .	64
	Contributions Made By The Study . . . . .	64
	Further Research . . . . .	65
	BIBLIOGRAPHY . . . . .	68
	APPENDIX A . . . . .	72
	APPENDIX B . . . . .	74

LIST OF TABLES

Table		Page
I	Grade Retardates in Provincial Schools in 19 Indian-Metis Settlements, Northern Saskatchewan, June, 1961 . . . . .	5
II	Correlations of Kindergarten Binet I.Q. Scores with Second Grade Achievement Scores . . . . .	22
III	Correlations of ITPA Total Language Scores with Second Grade Achievement Scores . . . . .	22
IV	Degree of Success in Expert Classifications of Defect Type Through Inspection of ITPA Profiles . . . . .	36
V	Chronological Ages and Psycholinguistic Ages of Subjects in Months . . . . .	43
VI	Psycholinguistic Ages by School Type and Sex . . . . .	44
VII	Raw Scores on Each ITPA Subtest for the Total Sample, Each School Type and Each Sex . . . . .	45
VIII	Scaled Scores on Each ITPA Subtest, the Sum of the Scaled Scores and the Mean Psycholinguistic Age by Total Sample, School Type and Sex . . . . .	46
IX	The Equality of Male and Female Mean Scaled Scores . . . . .	50
X	A Test for the Equality of Mean Scale Scores by School . . . . .	51
XI	Significance of Total Interaction Between School Types and Sex . . . . .	52

LIST OF FIGURES

Figure		Page
1	Psycholinguistic Profiles for A Ten-Year Old . . . . .	11
2	The Clinical Model of the Illinois Test of Psycholinguistic Abilities . . . . .	30
3	A Model of the Psycholinguistic Abilities as Measured by the Illinois Test of Psycholinguistic Abilities	31
4	Profile of Abilities for Total Sample and Sex . . . . .	47
5	Profile of Abilities by School Type . . . . .	48
6	Visual Association Interaction Pattern . . . . .	54
7	Manual Expression Interaction Pattern . . . . .	55
8	Auditory Memory Interaction Pattern . . . . .	56
9	Visual Closure Interaction Pattern . . . . .	57



## CHAPTER I

### INTRODUCTION

Concepts of education are changing and an appreciation of the importance of psycholinguistics is part of this change. Communication is dependent upon a set of psycholinguistic skills. The child who is being stimulated by visual and auditory stimuli must be able to discriminate between those stimuli which are relevant and those which are irrelevant to effective communication with other people. The ability to manipulate symbols makes it possible for man to deal with ideas and thought processes in a graphic form called writing as well as in a verbal form called speech. It is important, therefore, that educators understand how children may be aided in the development of skills which are so vital to learning and communication.

Messino reported Osgood's definition of psycholinguistics as "the relationship between the structure of a message and the characteristics of the individuals who produce and receive it (30, 3)." If we agree with Piaget (11) and Hunt (7), we must concede that the reception of stimuli, decoding of the message and association of signals with some meaning relevant to the subject is essential for the development of intellectual potential. These processes also have a tremendous influence on the development of a psychologically, emotionally, mentally and socially normal personality. They permit a person to learn vicariously from another man's experience. They allow man to share individual reactions and knowledge with other fellowmen.

The acquisition of language, however, is dependent not only upon experience but also upon the normal development of an intact physiological structure and a psychologically sound mind. The process of discrimination between the extremely intricate inflections and grammatical structures of any language requires the perceptive ability to decode the tangle of symbols, associate these sounds and sights with some meaning and evaluate the significance of the experience. If physiological abnormalities exist which are comprehensive enough to be detrimental to the normal reception or transmission of language stimuli, it is probable that the individual will not be as linguistically competent as he might otherwise be. The individual who has developed a psychosis, who has schizophrenic inclinations, who is autistic or neurotic may thereby experience impediment to the normal acquisition and use of language.

The implications of language retardation for the child in a social setting are extensive. Language is the basis for human cooperation and social organization. The inability of a child to interact successfully with social institutions contributes to his own social ineptness. Language defects such as stuttering or other articulatory abnormalities often cause the person to isolate himself, or to be isolated by his peers. This isolation will contribute in turn to an increase in language deprivation, which is inter-related with emotional maladjustment which can also be a very real contributor to academic failure.

The importance of language as it relates to academic success is crucial to the child. Sustained language deprivation is very

difficult to remediate and contributes not only to reading inadequacies but to inadequate concept formation as well. The ultimate end may be failure, disgrace, frustration and discouragement with the academic community.

Psycholinguistic skills are developed to a degree in every culture. A reciprocating influence exists, however, between these skills and the quality of language developed by an individual or a cultural group. In a society such as ours which is so heavily dependent upon facility in communication with one another by the use of verbal symbols, it seems reasonable to assume that a great deal of practice in the use of language would be usual. In an environment where there are fewer verbal experiences, one might expect to find children who have developed less verbal facility and a comparative narrowness and shallowness of verbal understanding. In order to have developed the language characteristics found in a normal middle class environment one must have extensive opportunity to hone his language skills by emulating and exchanging verbal experiences with a language model.

The opportunities to acquire and use a language correctly are less common in the lower socio-economic strata of our society than in the middle class. It is not usually possible for lower class homes to provide either the cultural richness or the technological and educational experiences found in the more privileged segments of the population where resources conducive to language development are more widely enjoyed (24).

### The Indian-Metis Milieu

The Indian population of Saskatchewan appears to this writer to possess the characteristics ascribed by Brooks to the lower socio-economic segment of a population. In discussing the disadvantaged class Brooks states:

It is characterized by extremely overcrowded living conditions, high rates of unemployment, chronic economic insecurity, a disproportionate number of broken families, a low educational level and inadequate diet and medical attention (24, 5).

The child living under such conditions may not develop his full intellectual potential or correct language facility because the environment typically offers little opportunity to talk or question, or to develop verbal behavior patterns based on adequate examples. This will result, Brooks believes, in inferior perception and concept formation.

Renaud (36) has commented extensively on the current socio-economic maladjustment of the Saskatchewan Indian and Metis population. These maladjustments result in different pre-school and regular school experiences for native and Metis children as compared to most white children.

Handley and Kowalchuk found that Indian and Metis pupils leave school in greater numbers and sooner than white children.

The most revealing aspect of this enrollment figure is the sharp and continuous decrease in enrollment beginning as early as Grade 3, and continuing on with increasing speed until, with Indian students, only .5% are in Grade 12 and in Northern Saskatchewan only .3% as compared to total provincial figure of 5.1% (34, 1).

From the data, Handley and Kowalchuk concluded:

First, the pupils are not adequately prepared to continue on in an academic stream. This has many implications for the present school program offered them. Second, parents are not encouraging their children to continue on through school, and the pupils themselves see little point in continuing school for various reasons. Third,

a conclusion which is too often drawn--the Indian and Metis students do not have sufficient mental ability to continue on in an academic stream . . . (34, 1).

Handley (33) has demonstrated a great deal of support for Renaud. He has stated that fewer and fewer of the natives are willing to hunt and fish and at least one-half of the population become dependent upon welfare during the course of the year. He also discussed the greatly disproportionate percentage of Indian and Metis children admitted to child care centres. The Indian and Metis population constitutes 7 1/4 percent of the total population; yet child care admissions totalled 31 percent of all admissions, and this would not likely include all children placed in residential schools for their own benefit.

TABLE I

GRADE RETARDATES IN PROVINCIAL SCHOOLS IN 19 METIS INDIAN SETTLEMENTS, NORTHERN SASKATCHEWAN, JUNE, 1961

Grade	Number of Students Enrolled	Students Retarded One or More Grades	
		Number	Percent
1	450	207	46
2	224	144	64
3	282	202	72
4	237	168	71
5	179	117	65
6	124	79	64
7	113	80	71
8	67	39	58
9	36	20	57
10	13	3	23
11	4	1	25

Indian and Metis Education Services in Saskatchewan (34, 9)

Educators who teach Indian children have become increasingly interested in determining what psychological skills and abilities are functioning in their students' acquisition and use of language, and in comparing these psychological skills and abilities with those of children who have experienced a more verbal and culturally advantaged background. From the preceding evidence, it appears that native students are not accustomed to as enviable a learning environment as are the children in a middle class population. We might expect the native child to have developed certain psychological and psycholinguistic deficiencies which will handicap his educational achievement as he struggles with a curriculum designed for a different culture and taught by teachers foreign to the northern Saskatchewan Indian society.

#### A Statement of the Problem

The present study was designed to determine the psycholinguistic strengths and weaknesses developed by primary grade Indian children in northern Saskatchewan as evaluated by the Illinois Test of Psycholinguistic Abilities.

## CHAPTER II

### REVIEW OF THE LITERATURE

The publication of the 1961 experimental edition of the Illinois Test of Psycholinguistic Abilities stimulated a great deal of research in the areas of reading and cultural background. The review of the literature will explore the relationship of the ITPA scores to each of these factors.

#### Reading and Psycholinguistics

Success in the complex process of reading is affected by the unique characteristics of both the reader and the author of the message, and the relationship of each to the structure and content of that message. This process possesses the essential features of the definition of psycholinguistics reported by Messino (30, 3). It is important therefore to provide some understanding of how psycholinguistic skills effect reading.

Hepburn (26) used the ITPA to assess the psycholinguistic skills of children who were good and poor readers. The children were matched for intelligence, age, grade, socio-economic and cultural factors. Hepburn found that poor readers scored lower on the auditory-vocal automatic, auditory-vocal association and visual-motor association subtests. They did not appear to manipulate visual symbols as easily as good readers.

Hirsch (1) found that visual-motor sequencing of words and symbols could be improved by using the Fernald Kenesthetic Method of teaching reading. It was suggested that this approach to the teaching of reading may help to overcome some of the poor visual-motor skills characteristic

of poor readers; however the small sample in the study should caution us against such generalization.

Hyatt's (28) two year study was designed to determine whether children have psycholinguistic deficits when they come to school or if these deficits arose out of a differential adaptation to school. He utilized the ITPA to assess psycholinguistic skills at the beginning of grade one and at the end of grade two. The children were also evaluated on their readiness and ability to read during this time. Hyatt found that school tended to ameliorate psycholinguistic deficits which existed prior to school entrance. He also concluded that good readers achieved superior scores on the visual-motor sequential, auditory decode, auditory-vocal association and vocal expression subtests of the ITPA.

Kass (29) investigated the psycholinguistic correlates of reading disabilities in children manifesting no known sensory handicap. The children were all of average intelligence, in grade two to four and within an age range from seven years to nine years eleven months. All subjects were retarded one-half year in reading at year two, one and one-half years at year three and two years at year four.

The ITPA, plus a visual automatic test, the Monroe Sound Blending Test, and WISC Mazes test, the Graham-Kendall Memory for Designs test and the Primary Mental Abilities Perceptual Speed test were used. Kass reported that poor readers manifest low scores on the following:

- (a) Auditory-vocal automatic subtest of the ITPA;
- (b) Auditory-vocal association subtest of the ITPA;
- (c) Visual Motor Sequencing subtest of the ITPA;
- (d) Monroe Sound Blending test;
- (e) The Primary Mental Abilities Perceptual Speed test;



- (f) The WISC Mazes;
- (g) Graham-Kendall Memory for Designs test and marginal deficits in the Visual Automatic test.

These weaknesses are predominantly at the automatic-sequential level of organization. The greatest strength, according to Kass' data, appear to be in the visual decoding areas.

McLeod (19) investigated the psycholinguistic correlates of disability with twenty-three second grade students. These students manifested no physical, visual or auditory defects and no endogenous experiences likely to impede reading development. They were all one year retarded in reading. The researcher used students of the same age, sex and grade to serve as controls. The controls and experimentals had approximately equal scores on the WISC Performance subtests. The experimental group had a mean chronological age of 87.4 months, while the controls had a mean chronological age of 86 months.

The results of McLeod's experiments support the findings of Kass. The poorer reading group was weak on automatic-sequencing skills; however, they made stronger use of context in decoding and associating words with meaning. Poor readers were weaker in phoneme discrimination than were good readers. The greater the similarity between phonemes, the greater the number of errors made in discrimination and vocal reproduction by poor readers. McLeod interpreted this to mean that poor readers decode and encode a reduced number of linguistic signals as compared to normal readers.

Outridge (23), in conjunction with the staff at the Barona Opportunity School in Queensland, Australia, investigated several children using the ITPA. In one study, five children were tutored for forty-five minutes each day for nine weeks in a "crash" program designed

to improve the psycholinguistic abilities of each child. Each child's post-program test results were contrasted with his own pre-program test results.

One subject aged ten years, had a Binet I.Q. of 92, and WISC full scale I.Q. of 93. He had no sensory disabilities, but was termed a dyslexic. It was also suggested that "G" had brain damage.

Figure I presents both his pre and post-test results on the ITPA.



were matched for I.Q.'s and age. They all had at least one year of school experience, with no uncorrected physical or sensory deficits. One group of fifteen was reading at a grade 3-5 level while the other fifteen were reading at the grade 1-4 level. The more retarded readers scored lower on the auditory-vocal automatic subtest, the whole of the automatic-sequential level of organization, and the total language age of the ITPA, but higher on visual decoding and vocal encoding. Both groups had lower language ages than their mental ages would predict.

Sutton (1) matched twelve educable mentally handicapped students who scored relatively high on conventional reading tests, with twelve who scored relatively low to determine if high achievers did better than low achievers on visualizing tests. The high achievers scored better on the visual-motor sequencing subtest of the ITPA, but not significantly so.

In summary, the literature suggests that good and poor readers do achieve differently on the subtests of the ITPA. The poor readers more often appear to have difficulty at the automatic-sequential level of the test. The visual-motor sequential and the auditory-vocal automatic subtests in particular appear to challenge poor readers. Occasionally, low scores on the auditory sequential subtest will accompany low reading scores.

The poor readers often appear to have a low achievement on the auditory-vocal association and auditory decode subtests at the representational level of the ITPA. The poor readers also appear to have a lower psycholinguistic age than do good readers.

### The Culturally Disadvantaged

The cultural environment may well effect the development of psycholinguistic skills. It is important therefore that a review of the literature provide an understanding of how a different cultural setting may effect achievements on the subtests of the ITPA.

The various researchers who have studied the effect of cultural deprivation on academic learning generally agree that children from lower socio-economic homes are "poorly prepared to produce what the school demands (10, 105)." The concomitant failure experiences and negative attitudes can quite possibly be related to "stimulus deprivation experiential poverty and inadequate training in auditory and visual discrimination (10, 105)" with the ultimate verbal impoverishment of the child.

Passow (10) and Frazier (25) both advocate curriculum changes to meet the needs of these children in the classroom. Both advocated a greater emphasis on the development of auditory and visual perception, expressive abilities and the modification of curriculum content. Frazier suggests the importance of language as a beginning point in the education process. "A youth may fail in mathematics or economics which means only that he is deficient in these subjects, but if he fails language he is fundamentally uneducated (25, 9)." This single statement articulates the beliefs of the present writer and serves to justify the need for the present study.

Burkholder emphasized that fear of failure and academic retardation are " . . . caused by language difficulties at the grade one level (32, 6)." MacArthur suggests these difficulties impede the academic achievement of the older student:

Native teenagers tend to slip further behind their white classmates in most cognitive abilities, but especially those of a verbal comprehensive nature. This suggests, if native youth are to more fully realize their early potential, more emphasis in curricula on written and oral English as subjects of instruction and more use of non-verbal stimuli as media of instruction (35, 5).

Vygotsky (11) emphasized the importance of verbal mediating abilities in the development of cognitive skills. Verbal symbols are the key to the classification of experiences, objects and events. These symbols allow man to organize his outer and inner environments into mutually dependent verbal taxonomies. This makes it possible to develop increasingly complex concepts, and to more fully understand our relationship to these concepts. The development of thoughts and the communication of these thoughts in language is contingent upon ability to acquire and manipulate verbal symbols.

Blank and Solomon (13) believed that socially disadvantaged pre-schoolers lack the ability to organize their ideas and thought. They called this an abstract ability, and stated: ". . . We feel that an internal symbolic system can best be achieved through the development of abstract language (13, 380)." They blamed the failure to develop an internal language or abstractive ability on a deprivation of verbal dialogue in the home, and consequently not having a good parental model to follow. The authors believed that children subjected to such experiences have an inability to separate words, action and processes. They therefore advocated that the formation of concepts be stressed in the belief that academic thinking is preceded by the development of language skills. The importance of correct sequencing ability was also stressed, particularly when sentences become chains of thoughts dealing in abstract concepts.

Newton (21) also attributed the development or lack of development of verbal skills to the cultural environment and verbal patterns used by the child's parents in the home. She believed language to be the greatest influence on intellectual development and the probability of success in life. She further advocated curriculum changes consistent with those of Passow (10) and Deutsch dealing with the amelioration and prevention of problems in the development of intellectual, conceptualizing and verbal skills. The program advocated by Newton was primarily linguistically oriented as reported in the literature (20, 20).

Ralph (22) suggested that language deficits are cumulative, and adversely affect measured intelligence and school achievement. He alluded to the overlap of speaking and thinking and it is for this reason that verbal responses can be viewed as a measure of general deficiencies in mental skills. These measures include the use of vocabulary, verbal output, pronunciation, articulation, grammar, syntax, concept formation and reasoning. Ralph believed deficiencies in these skills resulted in the child omitting and substituting consonants in all positions in words, especially final consonants. Vowels were often distorted, and syllabication often incorrect with extraneous syllables added in some instances.

The causal factors underlying such language deficits were poor auditory discrimination and the inability to sequence sounds into meaningful words. This resulted in the inability to abstract and compare concepts verbally. Ralph drew a parallel between the child raised in an institutional setting and the child whose lack of attentive mothering in many crowded, noisy, marginal income homes " . . . results in a

greater likelihood of speech and language impairment due to a type of vocal neglect (22, 208-209)." This is directly related to the objectives of the present study as it investigates the psycholinguistic functioning of native children in residential settings, far from their homes and families.

Ralph made the following specific recommendations for curriculum planners: (a) help children to be more discriminating in selection of objectives and adverbs, (b) build a more accurate use and knowledge of grammar and syntax, (c) gradually increase sentence length and complexity, (d) qualify statements by learning to use conjunctives and subordinate clauses. The effectiveness of such a program was attested to by improvement on the ITPA and on the Revised Stanford-Binet.

Ralph fully supported the work of Bereiter and Engleman (2) who have had some initial success in developing a language program designed to improve concept formation and information processing. The principles employed by these kindergarten specialists include: (a) the language taught must be capable of representing the reality of naming and pointing and of creating a symbolic equivalent of what is observed in physical reality; (b) the language taught must have provision for indicating truth or nontruth in an unambiguous way; (c) the language must be shared by teacher and students, so the child may benefit from teacher feedback and example designed to bring him closer to the concept.

Brooks (24) used the ITPA in a study of visual perception in disadvantaged children. The investigator believed that visual concept development was essential to the development of language and in the



absence of adequate visualizing skills, verbalizing abilities would be deficient. The primary media of communication should be gestural and non-verbal, because the child could not label his experience adequately to communicate with others.

Brooks' contribution to the work of diagnostic research in communication deficiencies provided a basis for the development of remedial programs. She emphasized the development of perceptual skills such as: (a) form discrimination, (b) size constancy, (c) depth perception, (d) distance judgment, (e) perspective and (f) figure-ground discrimination.

The children in Brooks' experiment ranged from two and one-half years to five and one-half years. The 37 children in the experimental group received nine months of tutoring to develop perceptive abilities and language. The 18 children in the control group did not receive this tutoring. All the children were pre and post-tested on the Frostig test and the ITPA.

The experimental group improved on four of five subtests on the Frostig test at .01 level of significance. The overall perceptual quotient improvement was 19.1 points as compared to 6.6 points for the control group. The experimental group's mean subtest improvement on the ITPA was 8.2 points, while the controls only progressed 3.2 points. The relationship between the ITPA motor encoding and visual decoding subtests as compared to the Frostig test was not significant, indicating that different abilities were assessed by each test.

Hutchens (27) pre and post-tested eight children selected because of their high scores on the ITPA. The children were subjected

to a minimum of two sessions of widely diversified language tutoring each week for four months. The children's ages ranged from five years three months to six years two months. They did not have any sensory, physical or emotional impairments that would interfere with learning.

Hutchens' study was based on Fries' (6) principles of teaching children to read by utilizing the previously learned language skills of auditory discrimination to guide students into recognizing speech patterns and sounds, and then transferring these learned experiences to a visual recognition of the same patterns and sounds in reading. The program was designed to increase the psycholinguistic skills of the selected group of eight, and by capitalizing on these skills, teach them to read. The reading and psycholinguistic progress of the experimental group was then compared to a control group, and the transfer of modalities involved in the learning process was studied. The eight students all gained considerably more in learning to read and in psycholinguistic skills than did the control group.

Hutchens' characteristics of the culturally deprived are significant enough to warrant mentioning. Hutchens described the typical life style of the culturally deprived child as:

- (a) physical and visual rather than aural;
- (b) content centered rather than form centered;
- (c) external oriented, rather than introspective;
- (d) problem centered rather than abstract centered;

- (e) inductive rather than deductive;
- (f) spatial rather than temporal;
- (g) slow, careful, persevering (in areas of importance) rather than quick, facile, flexible;
- (h) definite lack of formal language skills, preference for informal language and gestures (27, 14).

Hutchens also commented on the inability of the culturally deprived to form concepts due to non-discrimination of environmental cues which resulted in an inability to generalize, common lack of competition, poor work habits, academic non-involvement, self-centeredness, non-deferred gratification, lack of symbolic reward, inconsistent and misguided motivation leading to a loss of values and poor self-esteem.

In conclusion Hutchens focused the blame for academic underachievement on poor verbal and written communication skills. He concluded that language is essential for concept formation for inner abstracting and categorizing abilities. Remediation should incorporate a widely diversified language program, where abstracting and categorizing the environment is practised to help ameliorate the problem.

Messino (30) used the ITPA to assess the environmental utilization of psycholinguistic skills of culturally disadvantaged slow learners in relation to the ecology of test intelligence. It was Messino's thesis that low I.Q. scores on standard intelligence tests are greatly influenced by the environmental language patterns and do not therefore truly measure intellectual potential until this influence has been adjusted for.

Messino compared the non-language subtests of the ITPA with those subtests requiring verbal skills. He thus obtained a picture of the

subject's psycholinguistic skills, ruling out to an extent, the bias resulting from cultural influences. The lexical or sign dependent or verbal subtests reflect the language level of the community, while the non-lexical or sign independent subtests reflect the individual's psycholinguistic abilities not derived from a language code. Messino compared these two subtest categories and when the lexical score was lower, he declared the language deficits to be socially engendered.

His project included children from an area where the group sample yielded a median I.Q. of 90 or less on the Revised Stanford-Binet, Form L-M, 1960. Messino concluded that the psycholinguistic skills of the group were greatly influenced by the language sophistication in the community, and as a result, measured intelligence or individual intelligence test scores were usually lower and achievement in school was poorer. Evidence was provided to suggest that the pattern of psycholinguistic deficiencies is uninfluenced by intelligence. Messino's results also suggested that the disadvantaged child had a more highly developed use of gestural and informal language structure than he had of verbal or grammatical structures.

Sanderson (31), in a study of disadvantaged pupils in Wayne County, North Carolina found that one obvious academic deficit of disadvantaged children was a poor mastery of language skills. Further training for teachers in teaching the communication skills of language arts as a means of helping to improve the achievement level of students was recommended by a number of authors including Sanderson. It was concluded that a low level of achievement was due to poor reading, writing and verbal skills and that as a result, the students drop out of school.

Goldman and Sanders (14) investigated the effects of poor auditory skills on the learning process, and claimed the culturally disadvantaged child characteristically was unable to differentiate between phonemically similar sounds. It was their contention that this auditory deficiency was the result of a poor verbal environment in conjunction with high noise levels in the home. This combination of adverse influences did not allow the child to develop auditory skills as sophisticated as those found in economically and culturally disadvantaged students.

Hirshoren (15) tested forty Caucasian children between the ages of five years and six years three months, with the ITPA and the Revised Stanford-Binet Intelligence Scale (RSB) to see which instrument could best predict academic achievement from the beginning of kindergarten to the beginning of grade two. The results of the study are presented in Tables II and III.

Hirshoren concluded that the ITPA total language score was as good a predictor of future achievement on the California Achievement Test as was the RSB I.Q. This was significant at the .01 level, with the visual-motor sequential subtest of the ITPA being the single most likely correlated subtest in predicting future school achievement two years later, and the auditory-vocal association subtest, auditory decoding and auditory-vocal automatic subtests being highly correlated with total achievement, reading, arithmetic and English grammatical skills respectively.

The following quoted from Hirshoren (15) may be used to summarize the study:

- (1) The Total Language score of the ITPA, at least at the kindergarten level, was as valid a predictor as was the Stanford-Binet I.Q. for school achievement two years later.

TABLE II

CORRELATIONS OF KINDERGARTEN BINET I.Q. SCORES  
WITH SECOND GRADE ACHIEVEMENT SCORES

(p &lt; .01)

---



---

	r
Reading Vocabulary	.46
Reading Comprehension	.40
Arithmetic Reasoning	.44
Arithmetic Fundamentals	.56
Mechanics of English	.63
Spelling	.56
Total Achievement	.60

---

TABLE III

CORRELATIONS OF ITPA TOTAL LANGUAGE SCORES WITH  
SECOND GRADE ACHIEVEMENT SCORES

(p &lt; .01)

---



---

	r
Reading Vocabulary	.47
Reading Comprehension	.43
Arithmetic Reasoning	.58
Arithmetic Fundamentals	.75
Mechanics of English	.72
Spelling	.60
Total Achievement	.72

---

Taken from (15) "A Comparison of the Predictive Validity of the Revised Stanford-Binet Intelligence Scale and the Illinois Test of Psycholinguistic Abilities."

(2) Performance on the ITPA subtests at the automatic sequential level (Auditory-Vocal Automatic, Auditory-Vocal Sequential, and Visual-Motor Sequential) was significantly related to performance on all seven of the achievement variables from the CAT at the .05 level.

(3) At the representational level of the ITPA:

- (a) performance on the Auditory Decoding subtest was significantly related to achievement on the Arithmetic Reasoning, Arithmetic Fundamentals, and Mechanics of English subtests as well as to the Total Achievement Score ( $p. < .05$ );
- (b) performance on the Visual Decoding subtest was significantly related to achievement on the Arithmetic Fundamentals, Mechanics of English, and spelling subtests as well as to the Total Achievement score ( $p. < .05$ );
- (c) performance on the Auditory-Vocal Association subtest was significantly related to achievement in all areas of the CAT ( $p. < .05$ );
- (d) performance on the Visual Motor Association subtest was significantly related to achievement on the Reading Comprehension, Arithmetic Fundamental, Mechanics of English, and Spelling subtests, as well as to the Total Achievement score ( $p. < .05$ );
- (e) performance on the Vocal Encoding subtest was significantly related to achievement on the Arithmetic Reasoning, Arithmetic Fundamentals, Mechanics of English, and Spelling subtests as well as to the Total Achievement score ( $p. < .05$ ); and
- (f) performance on the Motor Encoding subtest was significantly related to achievement on the Reading Comprehension, Arithmetic Reasoning, Arithmetic Fundamentals, Mechanics of English and Spelling subtests, as well as to the Total Achievement score ( $p. < .05$ ).

(4) Use of stepwise multiple correlations provided better prediction of future achievement in all academic areas tested by the CAT with the exception of the reading subtests for which the Visual-Motor Sequential subtest alone provided the best prediction of future status.

(5) Including the Stanford-Binet I.Q. as a predictor variable did not improve upon the predictions of future achievement obtained by using the ITPA subtests alone (15, 521).

It is suggested by this author that the claims made by Hirshoren be considered with caution in view of the small sample and the unremarkable reliability studies of the ITPA as found in Appendix B.

McCarthy's (4) review of the literature relating to language development in children strongly supported the thesis that children understood gestures before words. She suggested greater use of pantomime to elaborate simple word explanations could alter learning in the very

young or retarded child. McCarthy commented on the fact that boys appeared to develop language skills somewhat less readily than do girls. She supported a widely accepted opinion that a greatly diversified experiential background facilitated language development which in turn appeared to be helpful in concept development.

McCarthy's review supported the opinion that intelligence and academic achievement are related to speech development. It was found that the ability to do well in school assignments is highly correlated with the sophistication of language development. She reported that students from the lower socio-economic strata in society were less verbal, and have developed poorer inner language than their middle and upper class counterparts. The family life of the lower socio-economic child was not as beneficial to the development of language skills as was the family life of the better socio-economic homes. This may account for a generally poorer level of language development in residential schools as well. McCarthy commented that the retarding effect of institutionalization on language development may also in part be attributed to differences in experiences while in school and at home and could even be due to differences in teacher training and expertise. She also concluded that contact with adults was influential in determining language development and in an institution, adult conversation was more limited, as was the opportunity to practise new skills with significant other persons.

It is of interest to note that McCarthy's review of the literature appeared to strengthen the argument for larger, consolidated types of schools. The language level of rural school students did not appear to be as highly developed as students' language skills in urban, larger schools. She reported that bilingual students appeared to be handicapped in language



skills. It was concluded, therefore, that the locale in which verbal assessments were made affected responses.

McConnel et al (18) studied the inhibiting effect of cultural deprivation on language and perception during the early formative years. The study involved five teachers and one hundred twenty-eight children ranging in age from two years eight months to five years eleven months. The project was conducted in two experimental day care centers and two control day care centers in Nashville.

Home visits to instruct parents on how they could be of assistance in teaching their children language skills was a feature of the experimental program. The curriculum for the experimental group focused on language development, sensory-perceptual training, music and a story hour. Listening skills, sentence structure, word forms, visual, tactile, and expressive skills were emphasized. The class format followed the Bereiter and Engleman design (2). Classes were held five days per week, one half day each day. The controls experienced a traditional socializing program.

The pre-testing indicated that the children had a mean language age seven months below their chronological age, and two-thirds of the ITPA subtest scores were eight months below the chronological age of the candidates. The auditory-vocal automatic subtest indicated the poorest level of functioning. The data also indicated visual decoding skills were more advanced developmentally than were auditory decoding skills.

Nine months after instruction, data from the experimental group indicated a gain of fifteen months in language age, while the control group had gained only two months. This finding supports the cumulative language retardation theory. Visual perception, auditory skills, expressive

skills and comprehension all improved a greater number of months for the experimental groups than did the same skills measured on the control groups.

The findings of the study justified the emphasis on early childhood intervention, better teacher training and specially designed programs to enhance language and perceptual skills, structure in words and sentence mastery.

The review of the literature appears to support the use of ITPA test scores in screening students for possible problems in learning to read, and in developing the psychological and emotional skills necessary for academic, social and personal mental health. The ITPA research has provided information which has been employed to give direction to corrective and remedial educational programs involving children from most intellectual and socio-economic levels in North American society. These programs appear to have been generally successful in accelerating academic achievement. This evaluative instrument makes provision for verbal and non-verbal assessment of skills in the major sensory modalities utilized in school. In addition, the use of the test to predict future success in school appears to be as effective as the main psychological battery presently accepted by educators and psychologists.

The growing body of research accruing from the use of the ITPA is indication of the professional endorsement this instrument has received from both psychological and educational personnel. It appears to be an adequate diagnostic tool for use in research dealing with psycholinguistics and academic achievement.

### Summary

Researchers appear to agree that cultural experiences differentially affect the development of auditory and visual perception, expressive abilities, abstracting abilities and concept formation. Inadequacies in these areas appear characteristic of children from lower socioeconomic homes. These children seem unable to meet the demands of school from school entrance until they terminate their formal educational experiences.

Some researchers have suggested that children educated in institutional settings differ from children in non-institutional programs. In addition, there appears to be some suggestion that children differ in their language development according to sex.

Several researchers have suggested educational principles to follow in educating children from culturally disadvantaged environments. These principles are designed to enhance different language processes, concept formation, abstracting abilities, sequencing skills and blending abilities. The ITPA has been widely utilized to evaluate the relevant success of these programs.

The use of the ITPA in research has supported the suggestion that children from disadvantaged environments have deficiencies in the auditory-vocal skills. They have inadequate concept formation, and lower expressive abilities. They are usually more facile in visual-motor skills.

There is very little research on the education of native children in northern Saskatchewan schools. The author was unable to locate any research to indicate whether the psycholinguistic development

of native children varied according to the type of school they attend and, if so, how it varies. In addition, it was not possible to determine if psycholinguistic development varied according to the sex of the individual.

## CHAPTER III

### TEST INSTRUMENTS

#### The Illinois Test of Psycholinguistic Abilities (ITPA)

Since the construction and standardization of the ITPA was done quite recently, the terms and rationale for the test battery may be unfamiliar to some readers. The following pages provide an explanation of what the test was designed to measure as well as a brief summary of the standardization data.

The Illinois Test of Psycholinguistic Abilities was developed primarily from the communications model constructed by Osgood in 1957. The model, presented in Figure 2, was adapted by McCarthy and Kirk with incorporations from a model by Wepman which depicted the levels of functioning in the central nervous system, to give the present model of psycholinguistic abilities as illustrated in Figure 3. It features three levels of psychological functioning, three processes within the psycholinguistic process, and two channels of communication. These constructs in the model are evaluated by twelve subtests.

#### The Psycholinguistic Process

McCarthy and Kirk include three separate processes necessary for language acquisition and use, the first of which is the receptive process or decoding ability. "Decoding is the ability to comprehend auditory and visual symbols: that is, the ability to comprehend spoken words, written words and pictures ( 8, 7)." The second process is the ability

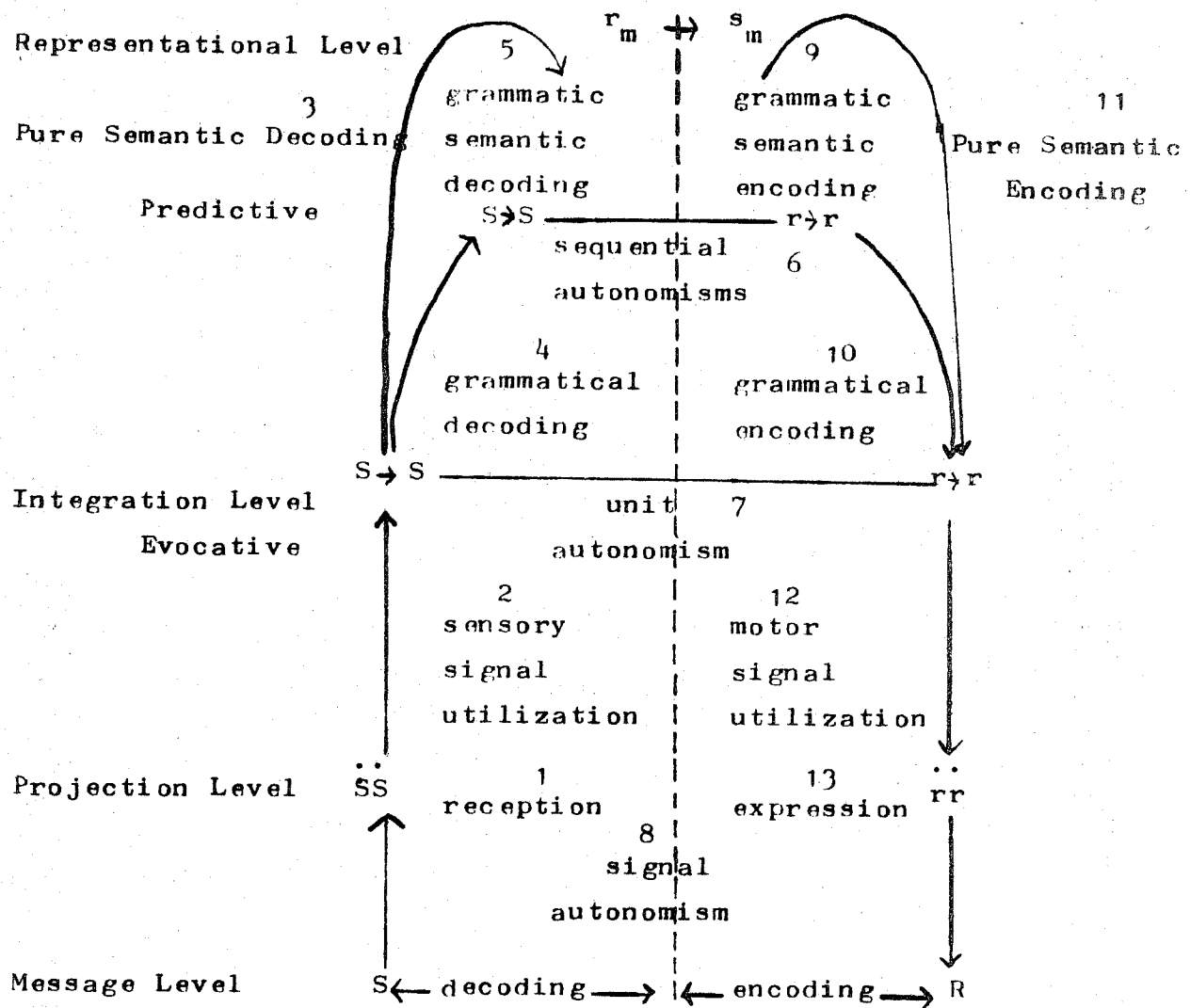
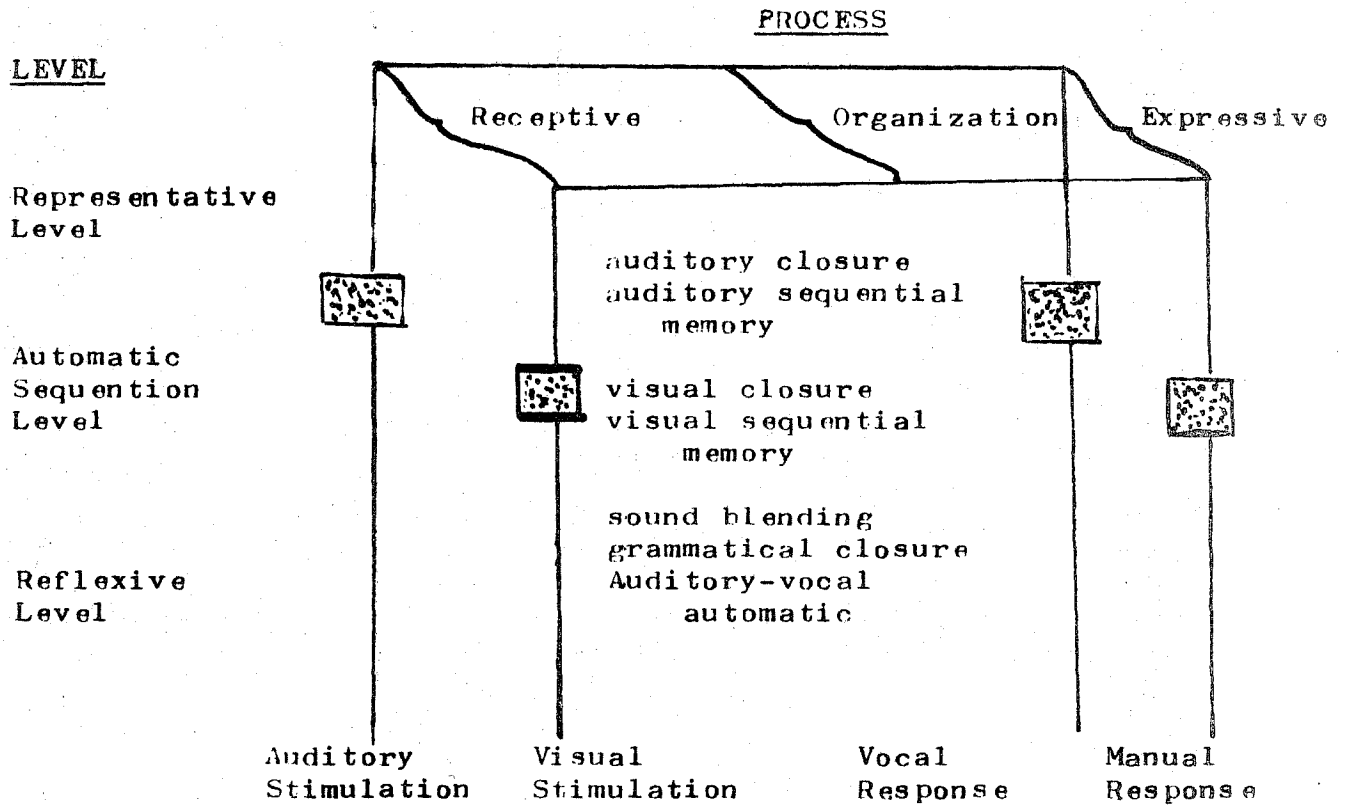


FIGURE 2

THE CLINICAL MODEL OF THE ILLINOIS TEST  
OF PSYCHOLINGUISTIC ABILITIES

After Osgood (1957) from the ITPA, "An Approach to Differential Diagnosis," Samuel A. Kirk and James J. McCarthy, (17, 401).



<u>LEVEL</u>	<u>TEST</u>
A. Representative	1. Auditory ) reception
	2. Visual )
	3. Auditory-vocal ) association
	4. Visual-motor )
	5. Vocal ) encoding
	6. Motor )
B. Automatic	7. Grammatical ) closure
	8. Auditory )
	9. Visual )
	10. Sound Blending
	11. Auditory-vocal ) sequential memory
	12. Visual-motor )
	13. Auditory-vocal automatic

FIGURE 3.

A MODEL OF THE PSYCHOLINGUISTIC ABILITIES AS MEASURED  
BY THE ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES

to organize and relate visual or auditory symbols in a meaningful way. This process is explained by Kirk and McCarthy as an association ability. "Association is the ability required to manipulate linguistic symbols internally. It is a central process elicited by decoding and which in turn elicits expressive processes (17, 403)." The third, the expressive process is the ability a person manifests in communicating his thoughts and ideas to others, by words or gestures.

The two levels of organization which the test purports to measure are the representative level and the automatic-sequential level. The representative level of language organization within the individual is described by Kirk and McCarthy as: ". . . mediating activities requiring the meaning or significance of auditory or vocal symbols (17, 403)." At this cognitive level the complex processes of decoding, association and encoding occur.

The automatic-sequential level of organization is less complicated. "Activities requiring the retention of symbol sequences and automatic habit chains are mediated at this level (17, 403)." The subtests at this level are whole level tests and do not attempt to separate decoding, association and encoding. The ITPA does not attempt to measure psycholinguistic abilities at the reflexive level of organization.

The channels of communication in the psycholinguistic model are discernible from Figure 3. Input includes the reception of auditory and visual stimuli and output includes either vocal or gestural expression. The auditory-vocal and visual-motor channels are a synthesis of the three processes in two modalities.



### Definition of Psycholinguistic Terms

The subtests of the ITPA may be described as follows:

(a) Auditory reception measures the subject's ability to comprehend stimulation by sound. The child responds with a "yes" or "no", or by a gesture to a question asked of him.

(b) Visual reception tests the subject's ability to comprehend stimulation from visually presented materials. In this test the child is presented with a stimulus picture and he indicates his choice of the meaning from four optional answer pictures.

(c) Auditory-vocal Association is essentially an analogies test of increasing difficulty. The auditory perception and the vocal response abilities are kept to a minimum.

(d) Visual-motor Association tests this process by having the subject point to his choice of a correct picture from four possible pictures which could be associated with a stimulus picture.

(e) In the Vocal Encoding test, the subject is presented with a common stimulus object such as a ball, and he is asked to enumerate as many separate concepts relating to the stimulus as he is capable of enumerating.

(f) In Motor Encoding, the subject is shown a stimulus picture and he must indicate that he understands the appropriate use of the stimulus picture by making appropriate gestures.

(g) The Auditory-vocal Automatic test is essentially a grammar test of increasing difficulty. Stimulus pictures are shown of the subject, while the child completes the sentence associated with the picture.

(h) The Auditory-vocal Sequential test is a digit repetition test presented verbally at the rate of two digits per second. The child is allowed two trials with each sequence of numbers.

(i) In the Visual-motor Sequential test the child is required to reproduce a sequence of geometric designs presented by using rectangular chips which are then removed from sight.

(j) The Grammatic Closure test uses a stimulus picture and a verbal description of the stimulus. The child must complete a sentence using the oral and visual clues. The examiner may say "This horse is big (points to a horse) and this horse is the \_\_\_\_\_" (pointing to the biggest horse).

(k) In the Visual Closure test the subject is presented with a scene wherein specific objects are partially hidden behind non-meaningful objects. The subject has thirty seconds to find as many fishes, saws, shoes or puppies in the scene as he is able to find.

(l) In the Auditory Closure test the subject must complete a word after hearing only part of the word. The examiner may say "--ype--ter." The child then fills in the missing parts by saying "typewriter."

(m) In the Sound Blending test the subject is presented with discrete sounds at one-half second intervals. He must synthesize a meaningful word from these sounds.

### Statistical Characteristics of the ITPA

The ITPA was standardized on seven hundred children selected at random from a midwestern population in the United States of America. They had no obvious linguistic anomalies at the time of testing. The standardization tested children at half-year intervals from the age of two years six months through nine years of age inclusive. The sample included an equal number of boys and girls. The raw score means and standard deviations for the seven and one-half year old subjects by sex and subtest may be found in Appendix A. That table also indicates that at each age level the scores of boys and girls on each subtest were in close agreement as indicated by the results of the t-tests reported.

Although some tests favored boys (visual decoding and vocal encoding) and others favored girls (visual-motor sequencing, visual-motor association and auditory decoding) the battery as a whole did not markedly favor either sex, or at best, favors girls slightly (8, 25).

### Reliability

McCarthy and Kirk commented on the reliability of the ITPA as follows:

The overall internal consistency estimates are comparable with other instruments of this type. The estimated by age groups are lower, of course, but the reader will appreciate the severe effect of restricted range and N upon these figures. Although it is difficult to discern a pattern among these figures, there does seem to be some tendency for the best consistency to occur for subjects in the middle of the age range (8, 28).

### Validity

The data reported by McCarthy and Olson in Appendix B indicate that the Illinois Test of Psycholinguistic Abilities has a correlation with other accepted measures of achievement which range from a high of .50 to a low of .13. These correlations although not high are mostly significant at the .01 level. The Predictive validity or retest correlations with these same measures have a range from .46 to -.04. These correlations were significant at the .01 level, with the exception of the lowest two correlations, which were between ITPA scores and a mean-length-of-response score and a sentence complexity score.

In their discussion of diagnostic validity McCarthy and Olson (9) attempted to demonstrate that teacher ranking of students' abilities and the abilities measured by the ITPA subtests correlate above a chance level. They were unsuccessful in this demonstration and attributed this failure to faulty design of the research and homogeneity of the sample involved. They also attempted to determine whether ITPA profiles would differentiate among normal, cerebral palsied, trainable mentally retarded, deaf speech defective and educable retarded children. These children were selected and classified by four experts. Table IV contains the results made by these experts using the ITPA in the classification of ten children in each of the above groups.

TABLE IV

DEGREE OF SUCCESS IN EXPERT CLASSIFICATION OF DEFECT TYPE  
THROUGH INSPECTION OF ITPA PROFILES

	I	II	Expert	III	IV
Correct <sup>a</sup>	36	29		34	28
Incorrect	24	31		26	32
Chi Square	81.12*	43.32*		69.12*	38.88*

\* Significant at or beyond the .05 level.

<sup>a</sup> Number of judgment correct by chance alone = 10.

The data indicated that although the diagnosis of the defective types by the experts was not unequivocal, the correct diagnosis was well beyond the chance level.

#### Summary

The Illinois Test of Psycholinguistic Abilities was developed from a synthesis of Osgood's communication model and Wepman's model of different levels of functioning in the central nervous system. The test evaluates receptive, associative, expressive abilities using concepts, automatic, closure sequencing and memory abilities at the perceptual level.

The test was standardized on 350 boys and 350 girls between the ages of two years six months to nine years. The test reliability and internal consistency are comparable to that of other evaluative instruments in psychology. The subtests appear to evaluate different skills which allow trained personnel to use the test for diagnostic and predictive purposes.

## CHAPTER IV

### THE EXPERIMENTAL DESIGN

#### The Sample

The sample for the study was drawn from the population of seven year old primary-grade Indian and Metis students in northern Saskatchewan in the year 1970. Indian students were defined by their holding a treaty number as recorded in the school registry. Metis students were native children who did not have a treaty number, but were clearly described by the teachers as predominantly Indian in origin and culture.

The schools in this area were classified as rural village, residential and urban. The village at Cumberland House was selected to represent a rural community. The school population attended classes only during the day. The students ate at home and returned home when the school day was completed. The candidates chosen for the study had lived in the community all their lives. They represented the total qualifying population in the school.

Three residential schools were selected to participate in the study because no one school could provide a sufficient number of qualifying candidates to meet the study requirements. The three schools used were at Beauval, Ile-a-la-Crosse and Prince Albert city. The students in these schools all attended classes during the day and then returned to the sleeping dormitories at the school for the evening. Supervised study periods were compulsory at each of the residential schools. The students ate at school, participated in school-organized

extra-curricular activities and became the responsibility of school personnel during their enrollment at the school. The academic life of each student had been spent in the school they were attending at the time of testing. All candidates returned home for Christmas and Easter break when possible, as well as for summer vacation.

The eight city schools participating in the study were randomly selected to represent the public and separate school systems of Prince Albert. The candidates came from a cross-section of the various city districts. Each student attended classes during the day and returned home for lunch and when classes were finished for the day. The students all lived in the city prior to school entrance.

The following criteria were used together as a basis for selection of all candidates:

(a) the students must have had his seventh birthday by January 1st, 1970, but his age must not exceed seven years eleven months before the completion of the study;

(b) the candidate must not have exhibited any gross loss of hearing or vision;

(c) the children selected must not have manifested grossly abnormal emotional, psychological or social behavior;

(d) the ratio of boys to girls from each school was kept as even as possible;

(e) the students selected had to be of Indian or Metis origin, as shown on the school records.

(f) The Colored Ravens Progressive Matricies Test in book form was administered to qualifying second grade students in the schools

chosen for the study. Those who attained a stanine rating of four, five or six as established by MacArthur (16), were the final candidates for the study.

#### The Reasons for the Sample Selection

ITPA raw scores correlate closely with mental age and social class at this age level. Deutsch reports:

In our research at the Institute for Developmental Studies, it is in the first grade that we usually see the smallest differences between socio-economic or racial groups in intellectual, language and some conceptual measures and in the later grades that we find the greatest differences in favor of the more socially privileged group (11, 16).

This information prompted investigation at the level where cultural differences would present the least bias.

The students who were attending school for their second year were used for a number of reasons. The students just entering school at the grade one level, particularly those in residential school, were separated from their parents and their more familiar home environment for sustained periods of time. This could be an unsettling experience, and it was reasoned that such experiences could distort the experimental results. Students attending grade two or in school for the second year should have been more acclimatized to the school setting. They had had more time to adjust to school procedures and routine, and consequently, they were more familiar with testing experiences, meeting adults outside the home, concentrating for longer periods of time and, what was most important, they had had wider experiences in acquiring and using the English language. It was reasoned that this levelling of experiences would provide a more uniform research sample and would contribute to a more valid research project.

Most of the research which had been carried out to date involved children of pre-school age or in the first year of school. There was a definite need for data involving children above this level.

#### Data Collection

The Illinois Test of Psycholinguistic Abilities (ITPA) was administered by two Educational Psychologists with training at the post-graduate level in Educational Psychology to each student in the sample. The testing was done in a private room screened from any distracting sights, and equipped to keep out any unnecessary interruptions. Only the examiner and the examinee were present. A fan was used to screen out distracting noises where it was felt such a precaution was necessary.

Testing procedures followed the prescribed, standardized format established for the ITPA as did the scoring and interpretation of the protocols. All testing was carried out during the morning, between the hours of nine o'clock and twelve o'clock. There was at least a one day interval between the administration of the Raven's test and the ITPA to compensate for any fatigue or other disturbing effects which could have resulted from too much testing within a short period of time. All testing was completed within one month from the administration of the Raven's test. The testing of the students proceeded by school, to ensure that the students from each school were tested under as similar conditions as possible, and that bias resulting from having two different test administrators would be equalized by having both administrators work on the same sub sample during the same days.



In summary, 48 Indian and Metis students seven years of age were selected for the study. These children were chosen from rural, residential and urban schools. Teacher reports, Public Health Nurse assessments of hearing and vision and the Ravens Colored Progressive Matricies were used to identify children with average abilities and behavior. These students were administered the Illinois Test of Psycholinguistic Abilities to assess their psycholinguistic development.

## CHAPTER V

### DATA ANALYSIS

The administration of the ITPA to forty-eight candidates yielded raw scores for each subtest of the ITPA, as well as a total test raw score. The raw scores were transformed to scaled scores utilizing the tables in the test manual. The standardization scaled scores have a mean of 36 and a standard deviation of 6 for each subtest at all age levels. The scaled scores for each subtest of the ITPA were then analyzed to yield means and standard deviations for the total sample, for each school type and for each sex.

#### Chronological Age and Psycholinguistic Age

Table V indicates that the total sample and the females in the study had a chronological age (C.A.) range of 84 to 95 months. The mean age of the total sample and the females was 89 and 88.5 months respectively. The males in the study had a slightly more restricted age range of 84 to 93 months with a mean of 89.4 months. The data indicated that the mean psycholinguistic age in months for the total sample and for each sex separately is below the corresponding mean chronological age by approximately eighteen months.

The mean psycholinguistic age for both the rural and residential schools was approximately one year behind that for the city schools.

TABLE V  
 CHRONOLOGICAL AGES AND PSYCHOLINGUISTIC  
 AGES OF SUBJECTS IN MONTHS

	Chronological Age			Psycholinguistic Age	
	Number	Range	Mean	Mean	Standard Deviation
Total Sample	48	84-95	89.0	71.27	10.31
Boys	27	84-93	89.4	72.22	9.60
Girls	21	84-95	88.5	70.04	11.28

Mean Scores and Standard Deviations

Table VI presents the mean raw scores and standard deviations for each ITPA subtest for the total sample, for each sex and for each school type. The raw score difference between rural and residential schools is not large. The largest discrepancies are seen when rural and residential schools are compared to city schools. The city schools candidates attained consistently higher raw scores than the other two school types, and the standard deviations are generally smaller.

Table VII presents the mean scaled scores and standard deviations for each ITPA subtest, as well as the sum of the scaled scores and psycholinguistic ages for the total sample, each sex and each school type. The data in Table VIII are represented in graphic form to allow readers to more fully appreciate the psycholinguistic profile of skills and abilities which emerged from the research project. These profiles are presented in Figures 4 and 5. The profiles represent the mean psycholinguistic scores of all children in the study of each sex and

TABLE VI  
 PSYCHOLINGUISTIC AGES BY SCHOOL TYPE AND SEX

		Psycholinguistic Age		
		Number	Mean	Standard Deviation
School Type I Rural	Total	17	66.59	9.06
	Boys	9	70.11	7.42
	Girls	8	62.63	9.53
School Type II Residential	Total	15	67.33	9.93
	Boys	8	65.13	8.84
	Girls	7	69.86	9.86
School Type III City	Total	16	79.94	6.64
	Boys	10	79.80	6.60
	Girls	6	80.17	7.33

each type of school attended. The profiles indicate a pattern of slightly superior automatic-sequential skills as compared to the representational level of development. The associative and expressive skills appear to be more depressed than receptive abilities in the cognitive areas of development for all parameters. The profiles for the sample and sexes were very similar, indeed, they merged together at various points on the graph. The profiles representing the three school types are also similar.

The study investigated the significance of differences at the .05 level between the mean scales scores on each subtest of the ITPA for

TABLE VII

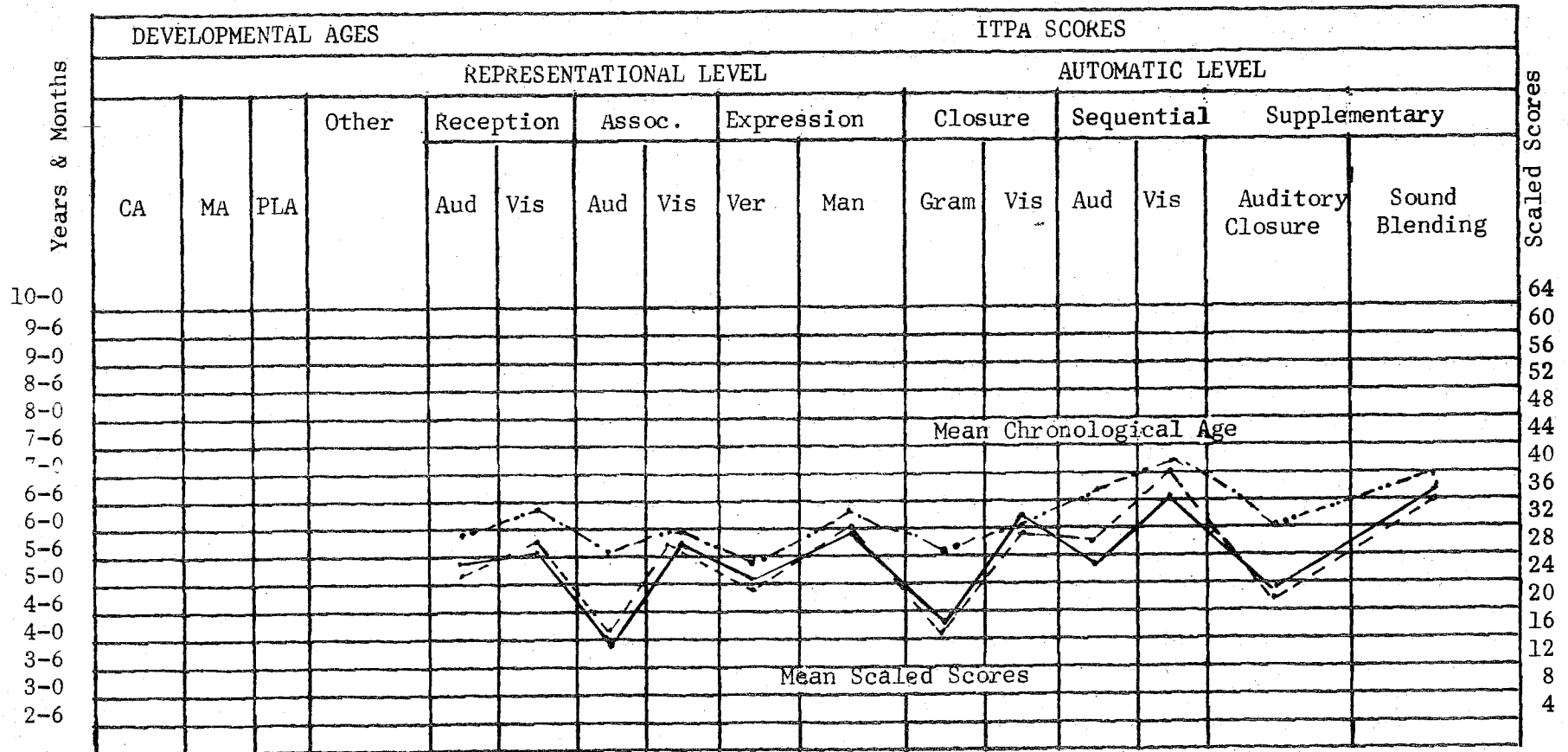
RAW SCORES ON EACH ITPA SUBTEST FOR THE TOTAL SAMPLE,  
EACH SCHOOL TYPE AND EACH SEX

Subtest	Total Sample		Boys		Girls		Rural		Residential		City	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Number	48		27		21		17		15		16	
Auditory Decode	21.83	7.51	21.70	8.61	22.00	6.00	20.94	4.74	18.73	6.34	25.69	9.43
Visual Decode	20.21	5.32	20.66	5.17	19.62	5.58	18.18	4.71	19.07	5.39	23.44	4.56
Auditory Association	16.50	6.97	17.48	6.78	15.24	7.17	12.76	6.39	14.27	6.43	22.56	3.18
Visual Association	20.92	3.88	21.41	3.82	20.29	3.96	20.35	4.40	20.80	3.00	21.63	4.15
Verbal Expression	13.67	4.42	14.22	4.32	12.95	4.54	12.59	4.54	11.27	2.66	17.06	3.62
Manual Expression	22.04	4.97	23.26	4.18	20.48	5.54	21.00	5.91	21.60	3.64	23.56	4.90
Grammatical Closure	12.21	6.68	12.89	6.96	11.33	6.36	10.00	5.97	9.07	6.10	17.50	4.66
Visual Closure	21.67	4.03	22.30	3.80	20.86	4.26	22.35	4.11	20.73	3.63	21.81	4.37
Auditory Memory	21.88	8.35	21.52	7.07	22.33	9.92	17.06	5.90	20.27	6.88	28.50	7.83
Visual Memory	21.13	3.61	20.48	3.51	21.95	3.65	19.76	3.17	21.80	3.91	21.94	3.55
Auditory Closure	15.31	4.92	15.22	4.07	15.43	5.95	13.88	4.15	13.07	5.05	18.94	3.51
Sound Blending	18.96	7.80	17.70	8.44	20.57	6.73	18.82	6.76	17.20	8.99	20.75	7.73

TABLE VIII  
 SCALED SCORES ON EACH ITPA SUBTEST, THE SUM OF THE SCALED SCORES AND THE  
 MEAN PSYCHOLINGUISTIC AGE BY TOTAL SAMPLE, SCHOOL TYPE AND SEX

	Total Sample		Boys		Girls		Rural		Residential		City	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Auditory												
Decode	28.08	6.73	27.78	7.41	28.48	5.89	27.65	4.29	25.27	6.11	31.19	8.30
Visual												
Decode	31.65	5.96	32.22	5.66	30.90	6.38	29.41	5.57	30.53	5.38	35.06	5.20
Auditory												
Association	20.69	10.54	22.04	9.89	18.95	11.31	15.41	10.45	17.47	9.48	29.31	5.17
Visual												
Association	30.77	5.76	31.41	5.83	29.95	5.71	30.24	6.81	30.60	4.03	31.50	6.21
Verbal												
Expression	25.13	3.25	25.48	3.08	224.67	3.48	24.59	3.48	23.33	1.91	27.38	2.80
Manual												
Expression	32.71	5.76	34.00	5.07	31.05	6.27	31.76	7.10	32.20	3.91	34.19	5.67
Grammatic												
Closure	21.63	9.75	22.52	9.96	20.48	9.60	18.88	9.26	17.00	8.78	28.88	6.98
Visual												
Closure	32.82	5.07	33.44	4.91	32.05	5.28	34.00	5.35	31.73	3.97	32.63	5.69
Auditory												
Memory	32.08	7.35	31.67	6.11	32.62	8.82	27.82	5.07	30.67	5.97	37.94	7.04
Visual												
Memory	39.23	6.49	38.30	6.43	40.43	6.53	36.53	5.68	40.07	6.84	41.31	6.36
Auditory												
Closure	26.23	8.57	25.93	7.02	26.62	10.40	23.88	7.60	22.47	8.48	32.25	6.51
Sound												
Blending	38.21	8.34	36.78	8.99	40.05	7.23	38.82	7.22	36.00	9.31	39.63	8.61
Sum of Scaled												
Scores	294.80	45.00	298.59	39.76	289.57	51.54	276.29	46.03	279.73	38.77	328.13	29.73
Psycholinguistic												
Age in Months	71.27	10.30	72.22	9.60	70.05	11.28	66.59	9.06	67.33	9.93	79.94	6.64





Rural \_\_\_\_\_  
 Residential - - - - -  
 City - . . . . .

FIGURE 5

PROFILE OF ABILITIES BY SCHOOL TYPE



- (a) all males and all females,
- (b) each school type,
- (c) the interaction of each school type and sex.

### Statistical Procedures

The study was designed as a comparative research project; therefore, standard inferential statistics were used to analyze the data. The method was a multivariate analysis with repeated measures as described by Jones from Cattell (5, 244-266).

The main effect for sex over all subtests yielded an F-value of 1.15 which, with 12 and 31 degrees of freedom, was not significant at the .05 level. No F-value for a subtest was significant in itself. These statistics are found in Table IX. Apparently for the population studied, boys as a group do not differ from girls as a group on the variables studied.

An inspection of Table X indicates a test for the equality of mean scaled scores between school types led to the rejection of the null hypothesis when an F-value of 3.35 was found with 24 and 62 degrees of freedom. It was concluded from the subtest-by-subtest analysis that the mean scaled scores of both residential and urban schools were larger than the mean scaled scores of rural schools on the visual decode, auditory association, auditory memory and visual memory subtests. Similarly, the mean scaled scores of urban schools were superior to those of residential schools on the auditory decode, visual decode, auditory association, verbal expression, grammatic closure, auditory memory and auditory closure subtests.

Table XI indicates that the null hypothesis was rejected on a test for the total interaction between school types and sex.

TABLE IX

## THE EQUALITY OF MALE AND FEMALE MEAN SCALED SCORES

	Mean Scores		Main Effect	
	Male	Female	F-Values	Significant
Auditory Decode	21.78	28.48	.35	NS
Visual Decode	32.22	30.90	.30	NS
Auditory Association	22.04	18.95	.65	NS
Visual Association	31.41	29.95	.78	NS
Verbal Expression	25.48	24.67	.45	NS
Manual Expression	34.00	31.05	.15	NS
Grammatic Closure	22.52	20.48	.21	NS
Visual Closure	33.44	32.05	.05	NS
Auditory Memory	31.67	32.62	.06	NS
Visual Memory	38.30	40.43	.80	NS
Auditory Closure	25.93	26.62	.45	NS
Sound Blending	36.78	40.05	.01	NS

TABLE X

## A TEST FOR THE EQUALITY OF MEAN SCALE SCORES BY SCHOOL

	Mean Scores			Main Effect		Simple Effect		
	rural	resdntl.	urban	F-value	Signif.	rur - res	rur - urb	res - urb
Auditory Decode	27.65	25.27	31.19	3.47	*	NS	NS	*
Visual Decode	29.41	30.53	35.06	4.64	*	*	*	*
Auditory Association	15.41	17.47	29.31	12.55	*	*	*	*
Visual Association	30.24	30.60	31.50	.24	NS	NS	NS	NS
Verbal Expression	24.59	23.33	27.37	8.87	*	NS	NS	*
Manual Expression	31.76	32.20	34.19	.94	NS	NS	NS	NS
Grammatic Closure	18.88	17.00	28.87	8.92	*	NS	NS	*
Verbal Closure	34.00	31.73	32.62	.91	NS	NS	NS	NS
Auditory Memory	27.82	30.67	37.94	13.56	*	*	*	*
Visual Memory	36.53	40.07	41.31	2.66	NS	*	*	NS
Auditory Closure	23.88	22.47	32.25	7.95	*	NS	NS	*
Sound Blending	38.82	36.00	39.62	.80	NS	NS	NS	NS

\* - significant differences at .05 level

NS - not significant

rur - rural schools

res - residential schools

urb - urban schools

TABLE XI

SIGNIFICANCE OF TOTAL INTERACTION BETWEEN SCHOOL TYPES AND SEX

	Total Subtest	Sex ( $S_1 \cdot S_2$ )	Sex ( $S_1 \cdot S_2$ )	Sex ( $S_2 \cdot S_3$ )
Auditory Decode	N.S.	N.S.	N.S.	N.S.
Visual Decode	N.S.	N.S.	N.S.	N.S.
Auditory Association	N.S.	N.S.	*	N.S.
Visual Association	*	*	*	N.S.
Verbal Expression	N.S.	N.S.	N.S.	N.S.
Manual Expression	*	*	*	*
Grammatic Closure	N.S.	N.S.	N.S.	N.S.
Visual Closure	*	N.S.	N.S.	*
Auditory Memory	*	*	*	N.S.
Visual Memory	N.S.	N.S.	N.S.	N.S.
Auditory Closure	N.S.	N.S.	N.S.	N.S.
Sound Blending	N.S.	N.S.	N.S.	N.S.
Total	*	N.S.	N.S.	N.S.

\* - Significant differences at the .05 level

NS - Not significant

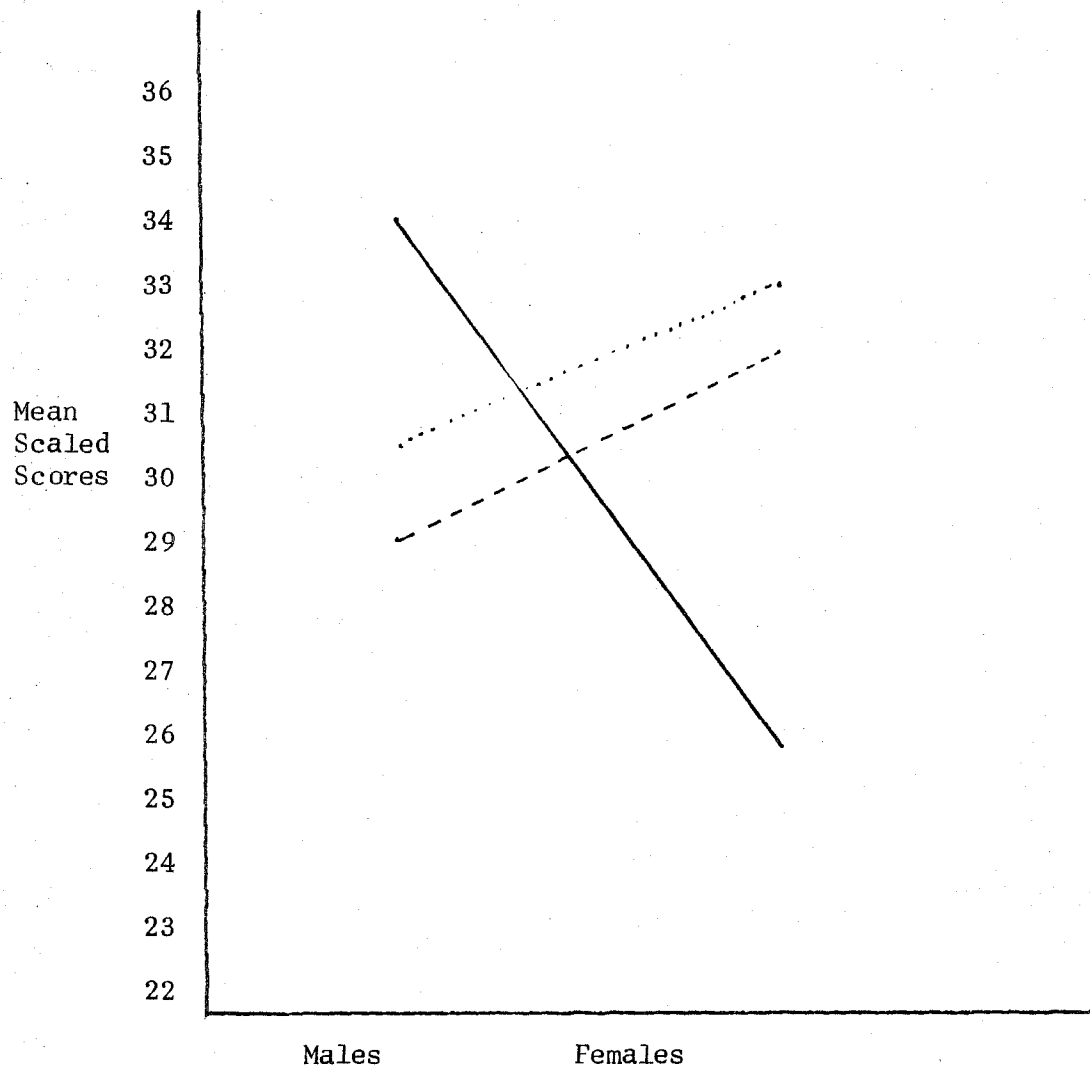
 $S_1$  - Rural school $S_2$  - Residential school $S_3$  - Urban school

The observed F-value was 1.83 with 24 and 62 degrees of freedom.

Inspection of Figure 6 indicates that whereas females in both residential and urban schools achieved higher mean scores on the visual association subtest than males, in the rural schools the females' mean score was much lower than the males. Inspection of Figure 7 indicates that the same pattern of interaction held for the manual expression subtest.

Figure 8 represents the interaction pattern for the auditory memory subtest between school types and sex. The pattern of interaction in the auditory memory subtest was the same as for visual association and manual expression except for the fact that there were larger differences between residential and urban scores.

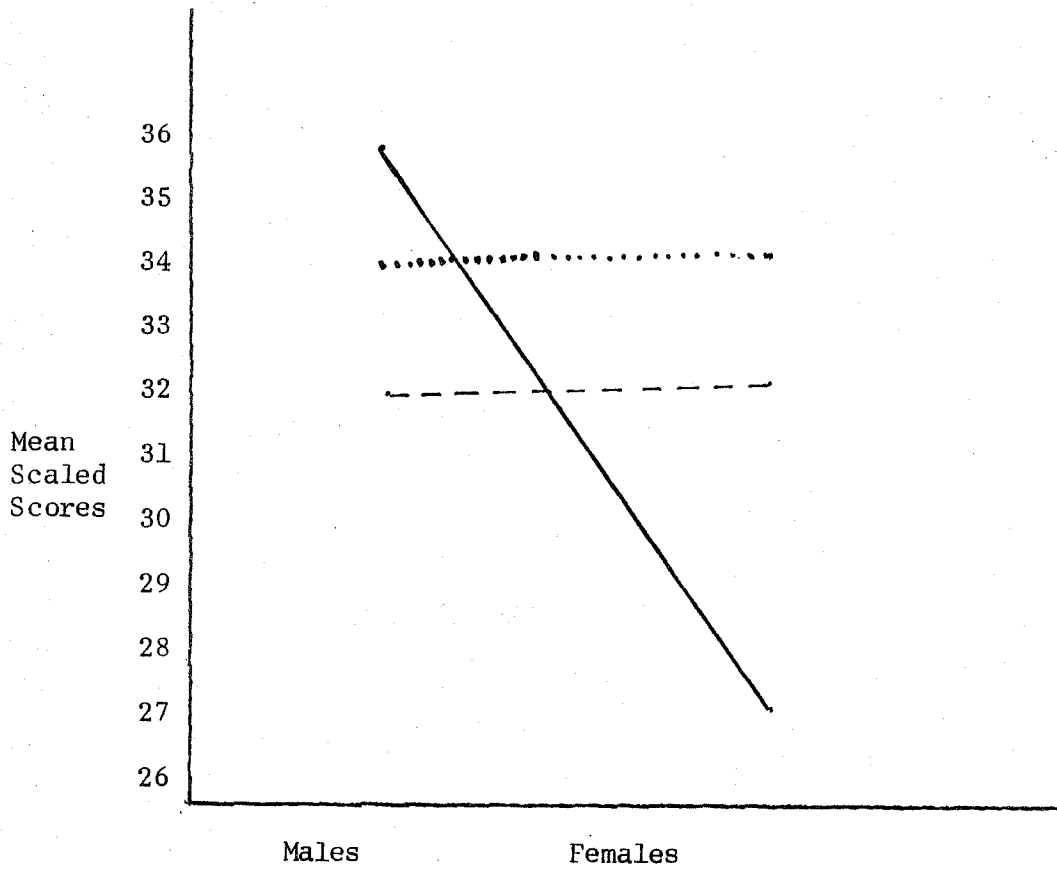
The interaction pattern for the visual closure subtest is presented in Figure 9. Interestingly the mean scaled scores for females in both rural and residential schools are lower on this subtest than are those for their male counterparts. The pattern for urban schools is similar to that found in previous sub-tests.



rural school \_\_\_\_\_  
residential school - - - - -  
urban school ······

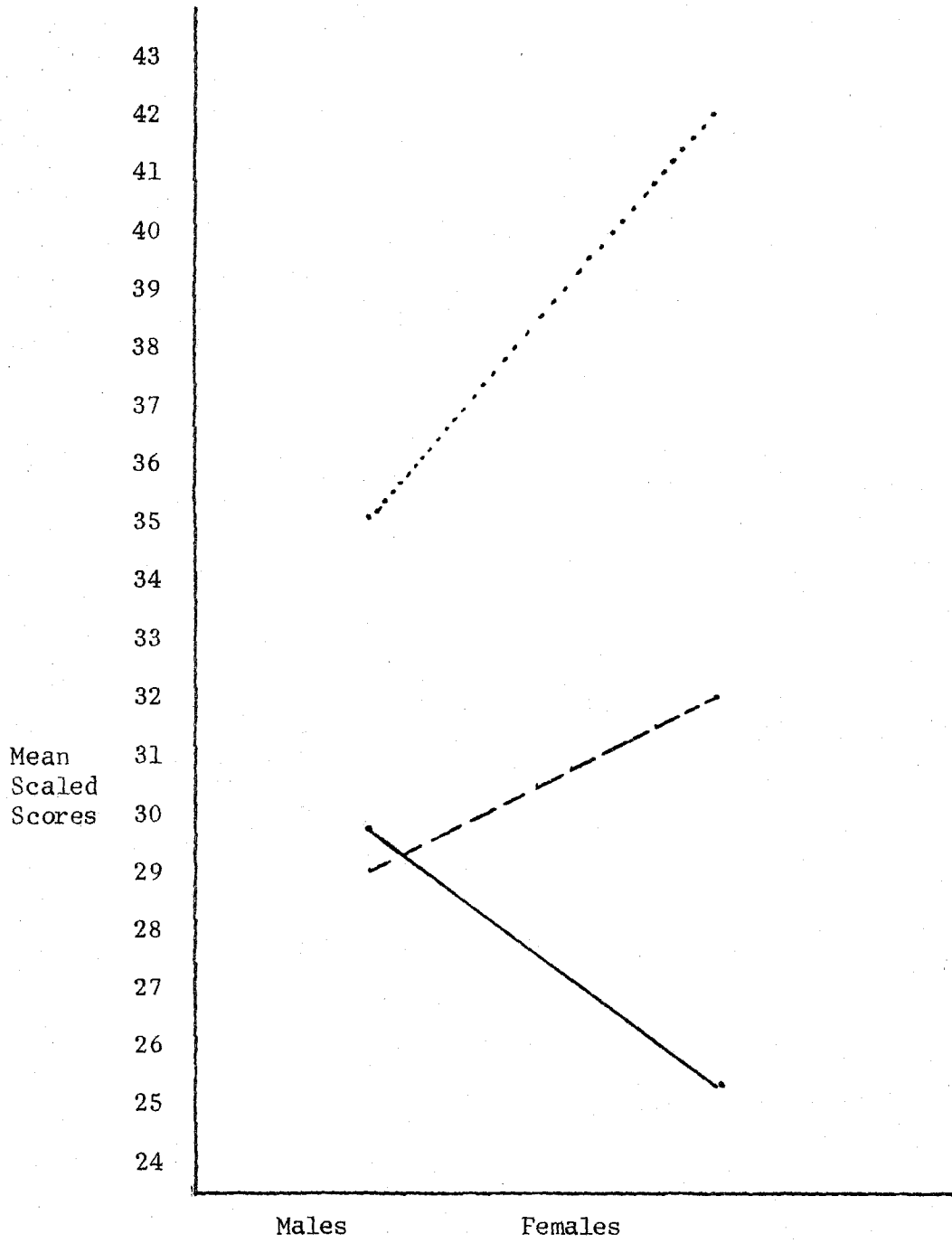
FIGURE 6

VISUAL ASSOCIATION INTERACTION PATTERN



rural school \_\_\_\_\_  
residential school - - - - -  
urban school . . . . .

FIGURE 7  
MANUAL EXPRESSION INTERACTION PATTERN

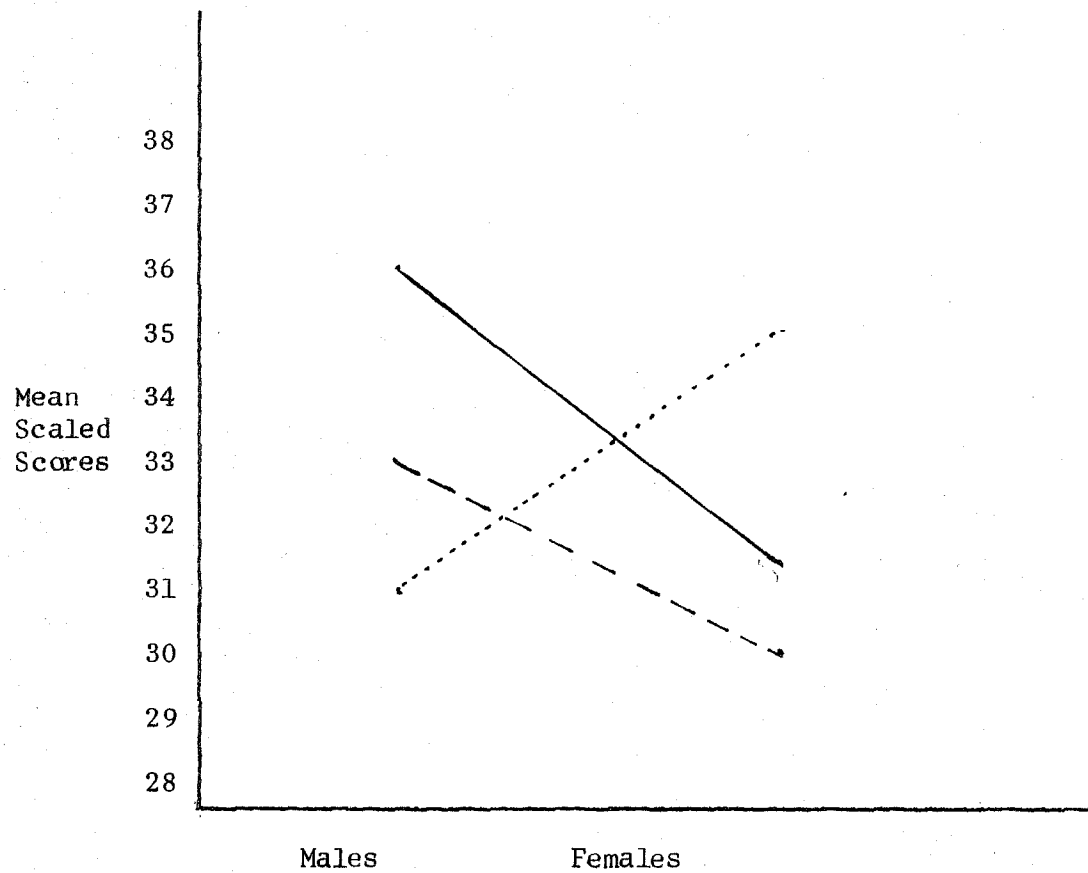


rural school \_\_\_\_\_  
residential school - - - - -  
urban school .....  
.

FIGURE 8

AUDITORY MEMORY INTERACTION PATTERN





rural schools \_\_\_\_\_  
residential school - - - - -  
urban school .....  
\_\_\_\_\_

FIGURE 9

VISUAL CLOSURE INTERACTION PATTERN

## CHAPTER VI

### CONCLUSIONS AND IMPLICATIONS

#### The Total Study

Lower automatic-sequential level scores on the ITPA were reported by Kass (29), McLeod (19) and Ragland (1) as characteristic of children who experience reading difficulties. The representational level in the psycholinguistic model presented on page 47 contains low mean scaled scores for the total sample, males and females in the auditory decode, auditory association and verbal expressive subtests. Hepburn (26), Hyatt (28) and McLeod (19) collectively suggested that low scores on these subtests could be indicative of poor reading abilities. The subjects in this study did not have lower scores in the automatic-sequential level than in the representational level of tasks.

The subtest which researchers suggest as the best predictor of reading difficulties is the visual-motor sequencing subtest. The subjects in this study appeared to have strengths rather than weaknesses in this area. This seemed to be part of a generalized strength in the visual-motor channel as compared to the auditory-vocal channel. It must be remembered however, that these areas of strength still remain considerably underdeveloped when compared to chronological expectation. In summary, therefore, the data suggest that the subjects in the study could be expected to have difficulty in learning to read as well as other children of their age but their profile of psycholinguistic strength and weaknesses does not correspond to the pattern predicted for reading disability cases.

The mean psycholinguistic age of the sample as reported in Table V on page 43 was approximately eighteen months below the mean chronological age. This finding is consistent with the literature dealing with the culturally disadvantaged. It may be concluded that the children in the study sample had not developed the psycholinguistic skills measured by the ITPA to the same degree as children in the standardization sample. This would imply that the early learning experiences of the children in the study are different from those of children in the standardization sample. Messino's (30) study dealing with test ecology suggests that this discrepancy is a logical outcome of different testing locales and cultures. If psycholinguistic factors are caused in reading it is important to identify the pattern of psycholinguistic development particular to the native culture in Northern Saskatchewan. Knowledge such as this would allow educators to adjust the curriculum to meet the needs of native children in the beginning years of school.

The psycholinguistic scores obtained in this study imply that native children require psycholinguistic experiences similar to those advocated by Passow (10), Bereiter and Engleman (2), Blank and Solomon (13), Newton (21), McCarthy (4), Hutchens (27) and others reported in Chapter II. For example McCarthy (4) Brooks (24) and McArthur (35) suggested that greater emphasis on the use of gestures and visual presentations would assist native children in learning. Other learning should be delayed until students have increased their psycholinguistic skills or the language of instruction should be the more developed native language of the students.

It may be that community based schools could exploit local resources to provide a more basic education for native children.

Curricula should be built on the philosophy that children learn best when they proceed from the known to the unknown in the learning process. This appears to be in opposition to current practise in much of the learning experiences of the young Northern Saskatchewan native child who is forced to begin with the unknown rather than the known. At present, his behavioral responses must be modified and a new language learned immediately upon entry to school.

### Sex

An inspection of the data reported by sex on page 50 allows us to conclude that the girls in the sample did not achieve greater mean scores on the ITPA than the boys, contrary to expectations set by McCarthy (4) and Passow (10). Apparently, girls are not more psycholinguistically prepared for school than boys. Educators may infer that special measures are not necessary to teach boys as compared to girls. Either the development of the skills measured by the ITPA are not differentially influenced by the sex role learned in Northern Indian and Metis communities or, as Hyatt (28) has suggested, the educational experiences prior to the age of eight years have a compensating effect on this development.

If any superiority in psycholinguistic age emerged it would appear to favor males. The examiners were male and may have established better rapport with the males than with the females.

### School Type

The mean psycholinguistic age of the urban school sample was superior to that of the rural and residential samples. Messino (30) has suggested that factors in the urban environment contribute to greater

psycholinguistic development of city children. The pattern of stimulation in the urban environment allows the native child to learn the measured psycholinguistic behaviors at an earlier age. The culture in the city is predominantly English-speaking; therefore, native children would have more need and opportunity to imitate English-speaking adults or older children. In addition, access to television, the cinema, libraries and more sophisticated educational aids may assist the urban child to learn English earlier and better, ultimately raising the achievement level of urban school children in the ITPA.

The differential development of psycholinguistic abilities according to school type suggested by Table X on page 51 indicates that children in residential schools achieved higher mean scaled scores than children in the rural sample on the visual decode, auditory association, auditory memory and visual memory subtests. It may be concluded that the residential school sample developed superior skills in these particular areas. This would imply that some factor in the residential school environment encourages the development of these particular skills more than in the rural environment. This is not consistent with the suggestions that institutional life depresses language development, as stated by McCarthy (4) and Ralph (22). The residential superiority may be due to additional supervised study periods. The children in the residential schools are more often under supervision and in the company of adults or older children who may serve as ready language models. The residential schools are given more encouragement to speak English. They are away from home and therefore do not receive the familial and community support to practise their native language as much as rural children.

The residential school staff may be somewhat more experienced in teaching native children and may be less transient than rural staff. In addition, if one considers the additional persons who daily interact with residential school children, the adult to student ratio is considerably above that for rural children populations, and therefore residential children may have more opportunity to learn English.

The rural school children may experience a more chaotic, unstructured and noisier environment. Such environments do not encourage the development of short term memory skills, auditory association or visual decoding. Such environments do not force youngsters to interact as much with adult models during non-school hours. It is possible that these conditions are detrimental to the development of some psycholinguistic abilities. Passow (10), Blank and Solomon (12), Newton (21), Ralph (22), and others have suggested that such an environment is the underlying cause of language impoverishment.

An inspection of Table X page 51 indicated that urban school children achieve superior mean scale scores when compared to residential school children on the auditory and visual decode, auditory association, verbal expression, grammatic closure, auditory memory, and auditory closure subtests. It may be concluded that the urban school subjects are superior to the residential school sample in these psycholinguistic areas. This implies that the urban environment is more effective in the development of these skills than is the residential environment. An explanation for this may be found on pages 59 to 61 of this chapter.

It may be concluded that the type of school a native child attended and the sex of the student caused a difference in achievement on the visual association, manual expression and auditory memory subtests.

This difference did not appear, however, between residential and urban schools. Figures 6, 7, and 8 indicate that differences on these subtests may be attributed to differences in the achievement of the males and females in the rural school. Rural males in the sample achieved better than the rural females on each of the stated subtests. This is the opposite of the pattern of male and female achievement on the subtests in residential and urban schools. The rural female mean scores are below the female mean scores in the residential and urban schools.

The examiner has learned recently that a small band of natives had lived on the periphery of the Indian Reserve near the rural school. This group of natives moved into the settlement at a later date than the majority of other residents, and therefore these may have had different cultural experiences. The author has learned that several of the girls in the rural sample may have been born into these families. The rural girls may represent a particular group whose psycholinguistic skills are different from other children due to cultural or familial experiences. This may account for their lower achievement.

The boys in the rural, male sub-sample may unconsciously be practising these particular skills during their extra-curricular activities. These children live in an environment more related to hunting and gathering skills than do children in rural or residential schools. Their activities may not therefore be as supervised as that of their peers in the other schools.

The lowest achievement on the visual closure subtest reported in Figure 9, page 57, was for urban boys. The highest achievement on this subtest was for urban girls. It is suggested that the urban sub-sample has incorporated many of the characteristics of the predominant city

culture. This culture may emphasize more competition, racial discrimination, and academic achievement. It is possible that males feel these factors more keenly than girls; however the boys have been unable to compete as successfully as the girls. The males may therefore have been reluctant to practise this particular skill, which is important in the development of reading abilities, or to try as diligently as the girls on the test.

It is possible that the females have not felt this stress, and they have therefore been able to develop better visual closure skills, or they may have tried harder during the test administration.

#### Limiting Factors

The testers in the study could not speak the native language and it is possible that rapport with the examinees may have been improved if both the examiner and examinee were able to converse.

A comparable native edition of the test does not exist; therefore, cultural differences within the test itself may have interfered with a true measure of psycholinguistic abilities. It may be that the psycholinguistic abilities required during the learning of Cree, the native language of most of the children in this study, are quite different from those acquired during the learning of English.

#### Contributions Made By The Study

The study indicated to the author that the ordering of some of the questions in the ITPA could be improved. This would make the test itself more valid for the chronological age level used in the study. The examiner became aware that candidates would encounter difficulty on several consecutive items early in different subtests, only to enjoy



easy success with later items which supposedly were more difficult.

The study provided educators with additional norming information previously unavailable. As a result of this study, educators may compare the test protocols of students in different Northern schools with a standard more relevant to their culture.

This investigation identified differential patterns of psycholinguistic development which occur in young Indian and Metis children who attend three different school types in Northern Saskatchewan. This should be of value to educators who plan lessons to teach native children how to speak, read and write English. It is perhaps now more possible to understand why native youngsters do not seem to adjust to school as quickly as their peers in a white southern environment.

The present study provided information which may be of value to persons who design instruments to evaluate psychological and linguistic factors in different cultures. A greater emphasis should be placed on the development of culturally unbiased evaluative techniques and equipment. Non-meaningful materials and tasks should be devised to measure the different abilities on the ITPA. These should be presented non-verbally to eliminate language inadequacies. Perhaps tapes, pictures of motion picture aids could be used in the administration of such a test.

#### Further Research

The present investigation did not provide a measurement of the psycholinguistic patterns of intermediate or senior elementary grade native children. Further investigations should measure the psycholinguistic skills of older children from rural, residential and urban centers in

order to determine if any change occurs in the psycholinguistic skills and abilities presently assessed. If the presently determined patterns do not persist in later grades, what influences operate to alter this development and what alterations do take place? If the present patterns do persist, in the various samples how is school achievement effected in later grades? Further investigations should also explore curriculum and program innovations which could conceivably ameliorate deficiencies in skills manifest in the present study.

A native translation of the test should be developed. This would allow researchers to investigate the development of these psycholinguistic skills in younger children. In addition, native adults should be trained to use the ITPA. This would allow the development of valid norms for schools in Northern Saskatchewan, and thereby provide a more appropriate evaluative service to educators.

It may be of value to analyze the test protocols accruing from the study to determine which questions were mastered most often and which questions contained culturally relevant cues. Investigators may wish to develop alternate verbal and visual cues which would be more culturally relevant but still sample the same abilities. An item analysis would also allow test users to evaluate the ordering of the questions which appear in the ITPA. Could the test itself be improved as a result of such an exercise?

Some effort should be made to investigate a similar native population in Southern Saskatchewan schools. The data could then be compared to the present study data to determine if the native children in Southern Saskatchewan develop different psycholinguistic patterns than the children in this study.

Investigations should be carried out to determine if the psycholinguistic skills measured in the present study are part of the native culture and language. Do the native cultures and languages provide as much practise in the auditory and vocal areas as does English? How may the development of visual and motor skills differ from the development of these skills in the predominant North American culture?

Educators should investigate the relationship between academic achievement and ITPA total scores and subscores. Is the relationship different for different school types?

A comparative study should be made of the test data for the various processes and channels in the ITPA. Such a project may reveal new information on how native children may best learn and how teachers should present their lessons. This would also provide additional direction to curriculum development in primary education in Northern Saskatchewan.

A community based education which could involve the students environment, his own people and heritage may theroretically serve to alleviate some of the problems in Northern education. Such a program based on linguistic, psychological and anthropological principles may prove to be of great value to educators working across cultures in Northern Saskatchewan.

## BIBLIOGRAPHY

## BIBLIOGRAPHY

## BOOKS

1. Bateman, Barbara. The Illinois Test of Psycholinguistic Abilities in Current Research. Institute for Research on Exceptional Children, University of Illinois, June, 1965.
2. Bereiter, C. and Engleman, S. Teaching Disadvantaged Children in the Pre-school. Englewood Cliffs, New Jersey: Prentice Hall Inc., 1966.
3. Bloom, B. S. Compensatory Education for Cultural Deprivation. New York: Holt, Rinehart and Winston, Inc., 1965.
4. Carmichael, L. Manual of Child Psychology. New York: John Wiley and Sons, Inc., 1954.
5. Cattell, R. B. Handbook of Multivariate Experimental Psychology. Chicago: Rand McNally, 1966.
6. Fries, C. C. Linguistics and Reading. New York: Holt, Rinehart and Winston Inc., 1962.
7. Hunt, J. M. Intelligence and Experience. New York: Ronald Press Co., 1961.
8. McCarthy, J. J. and Kirk, S. A. The Construction, Standardization and Statistical Characteristics of the Illinois Test of Psycholinguistic Abilities. Copyright by James J. McCarthy and Samuel A. Kirk, 1963.
9. McCarthy, J. J. and Olson, J. L. Validity Studies on the Illinois Test of Psycholinguistic Abilities, 1964.
10. Passow, H. A. Education in Depressed Areas. New York: Columbia University Teacher's College, 1963.
11. Piaget, J. Language and Thought of the Child. New York: The World Publishing Co., 1965.
12. Vygotsky, L. S. Thought and Language. New York: Wiley and Sons, 1962.

## PERIODICALS

13. Blank, Marion and Solomon, Frances. "A Tutorial Language Program to Develop Abstract Thinking in Socially Disadvantaged Pre-school Children," Child Development, 1968, 39 (2).

14. Goldman, R. and Sanders, J. W. "Cultural Factors and Hearing," Exceptional Children, February, 1969.
15. Hirshoren, A. "A Comparison of the Predictive Validity of the Revised Stanford-Binet Scale and the ITPA," Exceptional Children, March, 1969.
16. MacArthur, R. S. "Assessing Intellectual Potential of Native Canadian Pupils, A Summary," Alberta Journal of Educational Research, Volume XIV, No. 2, 1968.
17. McCarthy, J. J. and Kirk, S. A. "An Approach to Differential Diagnosis," American Journal of Mental Deficiency, Volume 66, 1961 - 1962.
18. McConnel, F., Horton, Kathryn B., and Smith, Bertha R. "Language Development and Cultural Disadvantage," Exceptional Children, April, 1969.
19. McLeod, J. "Some Psycholinguistic Correlates of Reading Disabilities in Young Children," Reading Research Quarterly, Spring, 1967.
20. Newton, Eunice Shaed. "The Culturally Deprived Child in our Verbal Schools," Journal of Negro Education.
21. \_\_\_\_\_. "Verbal Destitution: The Pivotal Barrier to Learning," The Journal of Negro Education.
22. Ralph, Jane Beasley. "Language and Speech Defects in Culturally Disadvantaged Children: Implications for the Speech," Clinician Journal of Speech and Hearing Disorders, Volume 32, 1967.

#### SECONDARY SOURCES

23. Outridge, Margaret. "Psycholinguistic Abilities of Five Children Attending Baroona Opportunity School," as found in Special Schools Bulletin, Queensland, Volume VI, Number 1.

#### UNPUBLISHED REPORTS

24. Brooks, Sally Ann. A Study of Visual Perception in Culturally Disadvantaged Children. Unpublished Master of Science Dissertation, University of Tennessee, Nashville, January, 1968.
25. Frazier, G. E. A Conceptual Paradigm of the Culturally Disadvantaged: An Inquiry into Interrelationships and Consequences with Implications for Education. University Microfilms, Inc., Ann Arbor, Michigan, 1965.

26. Hepburn, A. W. The Performance of Normal Children of Differing Reading Ability on the Illinois Test of Psycholinguistic Abilities. Unpublished Doctoral Dissertation, University of Virginia, 1968.
27. Hutchens, Elizabeth, Glenn. Assisting Culturally Deprived Children to Transfer from Auditory Language Signals to Visual Language Signals in the Reading Process. Unpublished Doctoral Dissertation, University of Virginia, 1968.
28. Hyatt, Grace Louise Stevens. Some Psychological Characteristics Of First Graders Who Have Reading Problems at the End of Second Grade. Unpublished Doctoral Dissertation, University of Oregon, June, 1968.
29. Kass, Corrine, E. Some Psychological Correlates of Severe Reading Disabilities. Unpublished Doctoral Dissertation, University of Illinois, 1962.
30. Messino, J. F. The Environmental Utilization of Psycholinguistic Abilities of Disadvantaged Slow Learners in Relation to the Ecology of Test Intelligence. Unpublished Doctoral Dissertation, University of Rochester, 1967.
31. Sanderson, W. C. Disadvantaged Pupils in Wayne County, North Carolina: Recommended Elementary School Modifications to Meet Their Needs. Unpublished Doctoral Dissertation, Duke University, 1967.

#### GOVERNMENT DOCUMENTS

32. Burkholder, H. "The Teacher and Intercultural Students," Augury, University of Alberta, Edmonton, February, 1969.
33. Handley, J. Indians and Metis of Saskatchewan. Reference Paper No. 2, Education Committee Workshop, Saskatchewan Task Force on Indian-Metis Employment, Saskatoon, May 5, 7, 1969, Dr. Howard Nixon, Chairman.
34. Handley, J. and Kowalchuk, M. Indians and Metis Education Services in Saskatchewan. Reference Paper No. 3, Education Committee Workshop, Saskatchewan Task Force on Indian-Metis Employment, Saskatoon, May 5, 7, 1969, Dr. Howard Nixon, Chairman.
35. MacArthur, R. S. "There is a Difference," Augury, University of Alberta, Edmonton, February, 1969.
36. Renaud, A. Educational Needs of the Indian Metis Population of Saskatchewan. Reference Paper No. 1, Education Committee Workshop, Saskatchewan Task Force on Indian-Metis Employment, Saskatoon, May 5, 7, 1969, Dr. Howard Nixon, Chairman.

**APPENDIX A**



RAW SCORE MEANS AND STANDARD DEVIATIONS OF THE 700 SUBJECTS USED IN THE  
STANDARDIZATION OF ITPA<sup>a</sup> BY AGE, SEX AND TEST

Age Group	Sex	AVAc		VD		ME		AVAn		VMS	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
7-6 <sup>b</sup>	M	16.16	2.53	16.08	2.47	16.80	2.94	20.60	2.29	15.56	3.91
	F	16.64	2.75	14.64	2.68	16.56	3.99	21.20	2.04	18.40	3.93
		VE		AVS		VMA		AD		ITPA Total	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	M	18.96	4.84	23.52	3.55	19.24	4.41	26.04	2.94	172.96	13.40
	F	20.56	5.89	27.48	5.84	20.64	2.81	26.40	4.58	182.52	17.90

- a These figures were computed after the elimination of undesirable items from the battery (i.e., based on the present form of the battery).
- b Each child was tested within two months of his birthday. Therefore, children in the "2-6" group range in age from 2-4 to 2-8, in the "3-0" group from 2-10 to 3-2, and so on.
- c Where an asterisk appears between the male and female means for a given test and age, it means they differ significantly at or beyond the .05 level; two asterisks indicate the difference is at or beyond the .01 level.
- d Where an asterisk appears between the male and female standard deviations for a given test and age, it means they differ significantly at or beyond the .05 level; two asterisks indicate the difference is significant at or beyond the .01 level.

Taken from McCarthy, J. J., and Kirk, S. A. The Construction, Standardization and Statistical Characteristics of the Illinois Test of Psycholinguistic Abilities.

**APPENDIX B**

## APPENDIX B

## RELIABILITY AND VALIDITY DATA

INTERNAL CONSISTENCY COEFFICIENTS FOR THE  
ITPA BY AGE AND TEST

Age Groups	AVAc	VD	ME	ANan	Tests					N
					VMS	VE	AVS	VMA	AD	
2-6 <sup>b</sup>	.66 <sup>a</sup>	.73	.86	.67	.58	.73	.75	.75	.81	50
3-0	.74	.79	.83	.72	.68	.54	.78	.72	.86	50
3-6	.77	.83	.79	.71	.65	.64	.76	.77	.89	50
4-0	.80	.84	.80	.73	.70	.73	.77	.71	.84	50
4-6	.82	.84	.73	.76	.70	.76	.76	.83	.88	50
5-0	.77	.79	.64	.72	.75	.78	.83	.76	.84	50
5-6	.73	.69	.76	.71	.65	.73	.80	.70	.89	50
6-0	.68	.71	.73	.73	.62	.81	.80	.73	.84	50
6-6	.70	.69	.79	.51	.60	.74	.78	.79	.81	50
7-0	.83	.58	.67	.74	.69	.82	.84	.75	.78	50
7-6 & 8-0	.77	.50	.68	.53	.76	.81	.81	.72	.70	100
8-6 & 9-0	.61	.50	.69	.56	.74	.79	.79	.53	.74	100
Overall	.93	.90	.89	.95	.91	.92	.92	.92	.95	700

a. These figures were computed after the elimination of undesirable items from the battery (i.e., based on the present form of the battery).

b. Each child was tested within 2 months of his birthday. Therefore, children in the "2-6" group range in age from 2-4 to 2-8, in the "3-0" group from 2-10 to 3-2, and so on.

Taken from (7, 29) McCarthy, J. J., and Kirk, S. A. The Construction, Standardization and Statistical Characteristics of the Illinois Test of Psycholinguistic Abilities.

APPENDIX B (continued)

TEST-RETEST CORRELATIONS FOR THE ITPA BATTERY

Estimate	Investigator (s)	Type of Subjects	N	Chronological Age	Test Retest Interval
.70	McCarthy and Kirk, 1963	"Normal"	69	6 to 7	3 months
.94	Smith and Mueller, 1963 <sup>a</sup>	Mentally Retarded	29	7 to 10	9 months
.82	Smith, 1962	Mentally Retarded	32	7 to 10	3 months
.95	McCarthy, 1964	Cerebral Palsied	14	5 to 17	3 days

<sup>a</sup> 29 of original 32 Ss involved in Smith's (1962) estimate

Taken from (8, 42) McCarthy, J. J., and Olson, J. L. Validity Studies on the Illinois Test of Psycholinguistic Abilities.

## APPENDIX B (continued)

TEST-RETEST STABILITY COEFFICIENTS FOR ITPA<sup>a</sup> FOR A  
RESTRICTED RANGE<sup>b</sup> WITH FULL RANGE ESTIMATES<sup>c</sup>

Test	Restricted Stability Coefficients	Full Range Estimates
Auditory-Vocal Automatic	.72 <sup>d</sup>	.92
Visual Decoding	.45	.80
Motor Encoding	.49	.73
Auditory Vocal Association	.79	.96
Visual-Motor Sequencing	.18	.86
Vocal Encoding	.37	.73
Auditory-Vocal Sequencing	.86	.95
Visual-Motor Association	.34	.74
Auditory Decoding	.50	.87
ITPA Total	.70	.97

a These figures were computed after the elimination of undesirable items from the battery (i.e., based on the present form of the battery)

b Included 69 children from the 6-0 and 6-6 groups

c Full range estimate made with the following formula:

$$r_{mn} = \frac{1 - \sigma_o^2}{\sigma_n^2}$$

where  $\sigma_o$  = standard deviation of the distribution for which the reliability coefficient is known

$\sigma_n$  = standard deviation of the distribution for which the reliability coefficient is unknown

r &  $r_{mn}$  = reliabilities of the two respective distributions

d Product moment coefficients

Taken from (8) McCarthy, J. J. and Olson, J. L. Validity Studies on the Illinois Test of Psycholinguistic Abilities.

## APPENDIX B (continued)

## SPLIT HALF RELIABILITY COEFFICIENTS FOR THE ITPA

Age Groups	Tests									ITPA TOTAL	N
	AVAc	VD	ME	AVAn	VMS	VE	AVS	VMA	AD		
2-6	.74	.80	.84	.80	.78	.61	.89	.82	.58	.94	50
3-0	.71	.79	.77	.76	.79	.48	.86	.74	.80	.92	50
3-6	.83	.79	.70	.61	.68	.60	.83	.79	.88	.92	50
4-0	.89	.90	.86	.67	.84	.69	.72	.66	.79	.94	50
4-6	.90	.80	.74	.83	.75	.71	.77	.89	.86	.93	50
5-0	.79	.77	.72	.82	.62	.73	.85	.77	.89	.90	50
5-6	.76	.62	.78	.59	.69	.66	.76	.62	.91	.91	50
6-0	.69	.76	.81	.73	.39	.84	.75	.76	.85	.90	50
6-6	.80	.67	.79	.71	.40	.72	.75	.70	.80	.85	50
7-0	.85	.67	.60	.74	.63	.83	.87	.75	.76	.93	50
7-6 & 8-0	.75	.45	.63	.51	.80	.81	.79	.61	.75	.88	100
8-6 & 9-0	.62	.60	.60	.58	.78	.80	.82	.55	.70	.88	100
Overall	.95	.91	.90	.96	.93	.91	.94	.93	.96	.99	100

Taken from (7) McCarthy, J. J., and Kirk, S.A. The Construction, Standardization and Statistical Characteristics of the Illinois Test of Psycholinguistic Abilities.

## APPENDIX B (continued)

CONCURRENT AND PREDICTIVE VALIDITY COEFFICIENTS  
FOR THE ITPA BATTERY

Criterion Test <sup>a</sup>	Test Correlation (Concurrent)	N	Retest Correlation (Predictive)	N
MA	.39 *	85	---	---
St. P. R.	.50 *	85	.39 *	83
St. W. R.	.47 *	85	.42 *	83
St. Sp.	.45 *	85	.36 *	83
Du. W. M.	.34 *	85	.46 *	83
Du. P. M.	.35 *	85	.39 *	83
Raven's	.48 *	85	.43 *	83
D-a-M	.40 *	85	.34 *	83
PPVT	.38 *	83	---	---
M. L. R.	.15	81 N.S.	.16	82 N.S.
S.C.	.13	81 N.S.	-.04	82 N.S.

\* Significant at .01 level. N.S. - not significant

a MA - Binet Mental Age; ST. P. R. - Stanford Achievement, Paragraph Reading Section; ST. W. R. - Standard Achievement, Word Reading Section; St. Sp. - Stanford Achievement, Spelling Section; Du. W. M. - Durrell-Sullivan, Word Meaning Section; Du. P. M. - Durrell-Sullivan Paragraph Meaning Section; Raven's - Raven Progressive Matrices, Sets A-Ab-B; PPVT - Peabody Picture Vocabulary Test; M. L. R. - mean-length-of-response; S. C. - "sentence complexity" score

Taken from (8, 14) McCarthy, James J. and Olson, James L. Validity Studies on the Illinois Test of Psycholinguistic Abilities, 1964.