

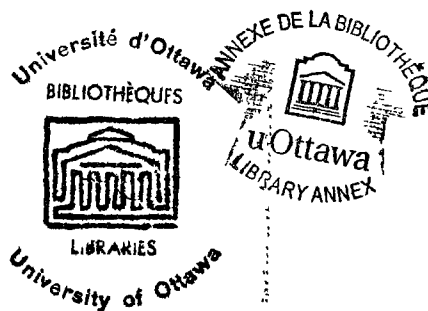
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**THREE TECHNIQUES FOR MEASURING BILINGUALISM:  
A COMPARATIVE STUDY**

by Sister Mary Andrew Hartmann

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Thesis presented to the School of  
Psychology and Education in partial  
fulfillment of the requirements  
for the degree of Doctor of  
Philosophy



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## CURRICULUM STUDIORUM

Sister Mary Andrew, (Eugenie Frances Hartmann)  
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## INTRODUCTION

Never before, in the history of the world have the races of men found themselves in such intimate inter-communication. Two World Wars have left in their wake a mutual knowledge and familiarity between peoples.

Unfolding immigrating policies in lands of the New World have brought thousands of displaced persons to foreign shores.

To University centres are coming, students from remote lands, bent on absorbing knowledge and culture, to return to their native lands with broadened horizons.

Tremendous strides made by technology in methods of travel and communication have delimited space and conquered the time element so that peoples once held apart by miles and months can be in contact in days if not hours. The problem of bilingualism is now of world-wide concern.

Bilingualism, the native-like control of two languages, has, since the turn of the century, generated a great body of research in many disciplines. Educators have concerned themselves with foreign language learning and teaching, with the effects of bilingualism on achievement, its relation to intelligence; anthropologists, are investigating acculturation; linguists examine change and interference of languages in contact; neurologists scrutinize the cortex

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for speech areas and language switching centres; psychologists trace the effects of bilingualism on personality. Investigators ask: What are the correlates, the components, the implications of bilingualism? The reports of these studies form a rich, promising literature - but one rife with contradictions. Meaning must be put into this welter and the disciplines concerned must be co-ordinated.

Three historical events have given impetus to the study of bilingualism, clarifying the crucial aspects and directly research thereto - the International Congress held at Luxembourg in 1928; the second similar International Congress held at Nice in 1932; and the Bilingual Seminar held at the University of Wales in Aberystwyth in August of 1960. Here bilingual experts from all over the world recognized with increasing conviction that the pressing need of the moment to bring order into the chaos of conflicting research is an objective, valid and reliable instrument to measure degrees of bilingualism. Without this there is possible no true comparison of studies. With this, it is suspected that divergent conclusions might reach a rapprochement.

It is as a first step towards devising such an instrument that the present study is undertaken. To measure bilingualism it must first be made known what are its

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components. This investigation proposes to look into two possible ones: Verbal Memory and Verbal Reasoning. In measuring them are we measuring bilingualism? What are the relations of these variables with intelligence? What are the relations of each of these three factors with bilingualism and with each other?

## CHAPTER I

### BACKGROUND FOR THE PROBLEM

In reviewing the European and American literature in bilingualism in 1959<sup>1</sup> the author noted repeatedly the expressed need for a suitable measuring instrument for the degree of bilingualism. Individual differences in this trait obviously exist. What underlies this difference? Is language aptitude a single language-learning skill? The results of the studies reviewed indicate rather that language is a combination of several skills. The degree of bilingualism therefore, would seem to be dependent on the possession of these skills, supported by sufficient motivation and favorable opportunity for language learning.

To arrive at an instrument for measuring the degree of bilingualism one could logically start by isolating these skills and establishing a relationship between each skill and the degree of bilingualism. Since no adequate instrument for measuring bilingualism has yet been agreed upon, one is faced with an impasse.

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1 Sister Mary Andrew Hartmann, "Variables Considered in the Measurement of Bilingualism: A Review of the Literature", Revue de l'Université d'Ottawa, Vol. 31, No. 1, 1961, p. 56-79.

Haugen<sup>2</sup>, in discussing the question of "how bilingual a person is" suggests two approaches:

1. His proficiency in each language may be measured independently, and then compared with that of monolinguals in each, or with other bilinguals like himself.

2. The measure in each language may be compared and a bilingual quotient derived, a procedure recommended by Weinreich.<sup>3</sup>

The use of these methods is unfortunately thwarted by the fact that as Carroll<sup>4</sup> says, "a great lag exists in all foreign language measurement". Moreover, the testing of relative skills in two languages poses additional problems, notably that of equating the tests as to difficulty, from one language to the other.

It was felt that if language mastery could be measured through skills which are independent of any specific language, a measure of bilingualism might be possible. These attempts have been reviewed by the author<sup>5</sup>.

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2 Einar Haugen, Bilingualism in the Americas: A Bibliography and Research Guide, Tuscaloosa, University of Alabama Press, 1956, p. 75.

3 Uriel Weinreich, Languages in Contact, Findings and Problems, New York, Linguistic Circle of New York, No. 1, Passim, 1953, p. 63, footnote 1.

4 John B. Carroll, The Study of Language, Cambridge, Harvard University Press, 1953, p. 195.

5 Op. cit.

What are these skills combining to form language mastery? Several studies have provided possible answers. They are the following:

In 1938, Thurstone, in studying intelligence, subjected fifty-six psychological tests to factor analysis, arriving at seven primary mental abilities, including word fluency, (speed in manipulating single or isolated words), and rote memory (facility in memorizing words, numbers and letters). He thus identified dimensions of the differences in people's ability to use language.

A more direct attempt to identify dimensions of the differences in individual's ability to use language was made in 1941 by John Carroll<sup>6</sup> when, through factor analysis, he attempted to explore the domain of speech and language behaviour by means of Thurstone's results. Starting with Thurstone's Memory, Verbal and Word Fluency factors, Carroll, by factor analysis of forty-two tests of verbal ability, isolated seven factors: verbal ability, fluency of expression, ideational fluency, naming ability, smoothness of spontaneous speech, speed of articulatory movement and language learning potential.

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<sup>6</sup> John B. Carroll, "A Factor Analysis of Verbal Abilities", Psychometrika, Vol. 6, 1941, p. 279-307.

In 1953, Carroll<sup>7</sup> devised a battery testing mimicry span, imitation, native speech style, rote memory, fluency and phonetic discrimination for their prognostic powers.

In 1955, Carroll and Sapon<sup>8</sup> speculated on tests needed to demonstrate an individual's language learning potential. Using eighty airmen who volunteered for a five day trial course in spoken Mandarin, success in which would allow them to attend a full course in Chinese in a civilian University, the experimenters administered in February 1954 four one-hour batteries of new experimental tests at the outset of the trial course. The criterion variable, academic grades assigned by the course instructors at the end of the course, yielded a multiple  $r$  of .75. A cross validation of the study of eighty-eight airmen in June 1954 yielded an  $r$  of .84. It appears that success in a trial language course is highly predictable from an one-hour battery of tests. However, one may attribute high validity to intense motivation or to the fact that instructors taught strictly, making no attempt to salvage poor students. There emerged from this battery eleven factors considered significant, including:

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7 John B. Carroll, The Study of Language, Cambridge, Harvard University Press, 1953, 249p.

8 John B. Carroll and Stanley M. Sapon, "Prediction of Success in a Work-Sample Course in Mandarin Chinese", The American Psychologist, Vol. 10, 1955, p. 492-3.

verbal knowledge, sound-symbol association ability, immediate rote memory for foreign language vocabulary, grammatical sensitivity and inductive learning of artificial language structure. A partial list of factors which Carroll felt should be investigated included tests of ability to develop meanings inductively. The rote memory factor appeared to be of particular promise.

Since verbal memory was a factor identified by Thurstone and Carroll as a dimension of the difference in people's ability to use language, the question arises: Does the individual with the greater degree of bilingualism demonstrate facility for verbal memory? This might be rephrased by asking: what is the relationship between degree of bilingualism and verbal memory? Is verbal memory one of the skills accounting for language proficiency?

To investigate this poses another problem: how to measure the degree of bilingualism? To date, the literature supports the assumption that the best available measurement is the bilingual background questionnaire of the Hoffman type.

In Spain interest in the verbal memory technique as a means of measuring degree of bilingualism had already appeared in the literature.

In 1929 Galí undertook in Barcelona a study of the mental disorder brought about by bilingualism as practised

in the schools at this time where children from Castalonian homes were being taught exclusively in Castilian. Gali and his wife employed an Immediate Verbal Memory technique, considering various age groups. He proceeded in the following manner:

From the current vocabulary of children, two series of ten words were chosen, one in Catalan, the other in Spanish. He attempted to arrive at as perfect a parallelism between the lists as possible.

The Catalan series: wood, curtain, lantern, hammer, pear-tree, ink, pencil string.

The Spanish series: iron, blind, candle, nail, apple-tree, brick, fog, varnish wire.

The test was administered twice with one day intervening: first the Catalan, and next the Spanish series. Each series was read three times in succession with a fixed interval between each word. The pupils were asked to write the words they could remember. The number of Catalan and Spanish words retained by the same child being different, measured the child's degree of familiarity with each language. Although Gali was not concerned with this, it was felt that one could measure the degree of bilingualism by comparing the number of words recalled in each language. Gali considered, rather, the various age groups and concluded

there was no correlation between the number of Catalan and Spanish words retained by children of each class.

In reporting this research to the Sixth World Conference of the New Education Fellowship held at Nice, France in July 1932, Pierre Bovet<sup>9</sup> raised the possibility of Gali's technique being used as an index of bilingualism and its relation established with that of the bilingual background questionnaire, such as the one devised by Prescott. It was strongly felt by those attending the Conference that his method was uniquely suitable for this purpose.

In the report prepared by Bovet<sup>10</sup> for the Commission of Bilingualism appears the following conclusion to the discussion of Gali's bilingual study in Spain:

On pourrait mesurer le degre de familiarite de l'enfant avec chacune des langues par le nombre des mots retenus dans un experience de ce genre. Et mettre ensuite cet indice de bilinguisme en rapport avec celui que revelerait un questionnaire comme celui de Prescott. Mais, comme nous l'avons dit, M. Gali n'a pas porte son effort dans cette direction.

It is in response to this stimulating suggestion that the present study was launched. It does just that:

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<sup>9</sup> Pierre Bovet, "Bilingualism and Education", Report of the Sixth World Conference of the New Education Fellowship, Nice, 1932, P. 290.

<sup>10</sup> Op. cit.

measures the degree of bilingualism by the number of words recalled in an experiment of Verbal Memory like Galil's, and sets this index of bilingualism in relation to that obtained by the Hoffman Bilingual Schedule.

The following hypothesis is subjected to testing:  
There is no statistically significant relationship between scores on a bilingual background questionnaire and scores on a test of verbal memory.

Since among both Thurstone and Carroll's factors, "comprehension" appeared, it was considered promising to include a study of that factor at the same time. This leads to a second hypothesis:

"There is no statistically significant relationship between scores on the bilingual background questionnaire and scores on a test of speed of verbal comprehension".

We will now proceed to report the study.

## CHAPTER II

### BILINGUAL BACKGROUND QUESTIONNAIRES IN THE LITERATURE

To test the hypotheses evolving from the discussion reported in Chapter I, tools were necessary to measure bilingual background as well as performance in verbal memory and speed of comprehension. This Chapter will justify the selection of the bilingual background questionnaire finally decided upon for this experiment.

A critical review was made of all studies in bilingualism using a background questionnaire of any type.

As far back as 1924 a background questionnaire appears in the literature when May Bere,<sup>1</sup> studying the relation between the language spoken in the home and ratings on the Stanford-Binet and the Pintner-Paterson verbal and performance test, administered a questionnaire of eleven items dealing with the language spoken, written and read in the home. Thirteen other items established the social and economic background. The subjects were ten year old boys, 100 of each, - Hungarians, Jews and Italians. The questionnaire located them along a continuum in five groups;

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<sup>1</sup> May Bere, A Comparative Study of the Mental Capacity of Children for Foreign Parentage, New York, Bureau of Publications, Teachers' College, Columbia University, 1924, IX - 105p.

(a) only foreign language spoken in the home; (b) foreign language predominates; (c) foreign language to parents, English to brothers and sisters; (d) parents speak foreign language to each other but English to children; (e) only English used. She concluded that the increase in the use of English is accompanied by an increase in mental age on both intelligence tests for each nationality. It must be noted that her sub-groups were small and she did not control the socio-economic status factor.

In 1927 Mead<sup>2</sup> compared 276 Italian children with 160 American children of grades six to ten as to the effect of linguistic disability, expressed in the language spoken in the home, upon group intelligence test scores obtained on the Otis Advanced Intelligence Examination, Form A. The Italians were divided into four groups according to the language spoken by the father and mother, i.e., (a) only English, (b) chiefly English, (c) chiefly foreign language, (d) only foreign language. The author concluded that verbal intelligence test scores made by foreign children are subject to vitiation by the foreign language factor, the mean index of brightness increasing steadily with the amount of

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2 M. Mead, "Group Intelligence Tests and Linguistic Disability among Italian children", School and Society, No. 24, April 16, 1927, p. 465-8.

English spoken at home.

In 1928 Decroly,<sup>3</sup> working with forty-seven boys and forty-nine girls aged eight to fifteen, from professional classes, studied the effect of heredity and home environment upon school achievement using a background questionnaire similar to Bere's. It was to be answered by parents or instructors. Additional questions were used such as: "Until what age did the child hear only one language?" "Is the child gifted in his mother tongue?" The scholastic standing and the intelligence was reported by the teacher. It was found that changing languages or bilingualism was more detrimental to boys than to girls and that it handicapped superiorly endowed children much less than those inferior in intelligence.

A more precise measurement of the extent of bilingual background was devised in 1928 by Murdock, Madden and Berg,<sup>4</sup> in their study of the relation between intelligence and the amount of English spoken in the homes of Jewish foreign-born parents, in New York. A questionnaire of

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3 P. Bovet, "Bilinguisme et Education", New Era in Home and School, Vol. 14, No. 7, July, 1933, p. 161-3.

4 K.A. Murdock, D. Madden and N.L. Berg, "A Study of the Relations between Intelligence and the Acquisition of English", Twenty-seventh Yearbook of the National Society of Education, Part I, Bloomington, Illinois, Public School Publishing Company, 1928, p. 343-353.

fifteen items dealing with the language spoken to one another by the child, parents and other children in the family was administered to 149 Jewish girls of grade seven. It classified them into nine categories ranging from "all Jewish spoken" to "all English spoken". The proportion between the number of individuals in the family speaking mostly English and the total number in the home was also taken into account in establishing the degree of bilingual background. A correlation was arrived at between the Language questionnaire and the Otis Intelligence Test, the Thorndike Word Knowledge Test and the Intelligence Test (a non-verbal mental test). The investigators concluded that "in the case of Jewish families living in New York City who have been in the United States at least three years, inherited mental ability is to some degrees at least reflected in the extent to which a family speaks English in the home". "Standard verbal tests when applied to Jewish children of foreign-born parentage who have reached Grade 7A in school are valid measures of intelligence".

In the same year, Meyhoffer<sup>5</sup> sent to parents of sixty-one pupils in the International School of Geneva a

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<sup>5</sup> M. Meyhoffer, Le Bilinguisme et l'Education, Luxembourg, Bureau Internationale d'Education, 1928, p. 297.

questionnaire similar to that of Decroly requesting detailed information from the parent and teacher on the child's language background, time and method of learning the foreign language. Twenty-one countries and sixteen languages represented. This study was designed to evaluate the enriching effect on children of multi-linguism. He concluded that "multi-linguism is a sure source of intellectual, moral and social enrichment of the child".

In 1928 Verheyen divided a group of 123 boys and ninety-four girls, age thirteen to fourteen, into five groups according to the extent of bilingual background arrived at by a questionnaire. This report<sup>6</sup> was presented at the International Conference of Bilingualism at Luxembourg in 1928. The author found that when he related degree of bilingualism with scores on a vocabulary test, the less bilingual students were superior.

In 1928 Andrews<sup>7</sup> used the extent to which English was used in the home to divide 306 high school freshman into four groups. Using the knowledge of the vocabulary appearing in the mathematics text and the Otis Intelligence Test scores,

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<sup>6</sup> Conference Internationale sur le Bilinguisme, Luxembourg, 1928, "Le Bilinguisme et l'Education", Genève Bureau International d'Education, 1928, p. 300.

<sup>7</sup> F.E. Andrews, "The Handicap of a Limited Vocabulary", Chicago Schools Journal, December 28, p. 128-30.

the author concluded that language handicap was not sufficient to cause students from foreign language homes to succeed less well in mathematics. The vocabulary handicaps were due to the fact that English was not heard in the home. The author claimed this factor as explanation of the difference among the various national groups and also among the I.Q.'s.

In 1929 Brunner,<sup>8</sup> working with 1,987 children in four representative rural counties compared "ruralness of parents" with "foreignness of parents". He arrived at the latter categories by means of three classifications: (a) both parents born in United States, (b) one parent born in United States and one abroad, (c) both parents born abroad. The I.Q.'s decreased in proportion to foreignness of parents. Later follow-up studies led the author to conclude that the ability to speak English rather than racial intelligence was the determining factor.

In 1932, in New York City, Klineberg,<sup>9</sup> used a background questionnaire to divide 100 ten year old Italian girls into five groups from "only English speaking" to "only Italian speaking". Using the 1916 Binet she found a statistically

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<sup>8</sup> Edmund Brunner, Immigrant Farmers and Their Children, Doubleday, Doran, Garden City, N.Y., 1929, 89 p.

<sup>9</sup> M. Klineberg, "Bilingualism and Intelligence in Ten-year old Italian Girls", Unpublished Master's Thesis, Columbia University, New York, 1932, (No pagination).

significant superiority in I.Q. for the monoglots. She attributes the inferior performance of the bilinguals to "the mental conflict arising out of bilingualism". Her questionnaire failed to distinguish true monoglots from lower degree bilinguals. Moreover, the sample in each of the five groups was small. The study failed to control the factor of language facility of the various groups; so that the significance of the differences she found is questionable.

At the Congress of New Education in Nice, July 1932, Daniel A. Prescott<sup>10</sup> presented his report concerning research done at Rutgers University, New Jersey on the psychological aspects of the language habits of 12,270 school children nine years and over. Of concern here is his method of determining, objectively, degrees and varieties of bilingualism. Prescott's questionnaire consisted of twenty-one items, fourteen of which were concerned with the language spoken by the child, the parents, and the siblings; the rest dealt with the language employed in reading, writing, church services, and social affairs. The response to an item consisted in naming the language usually used in the given situation. One point was given for each response that indicated a foreign language.

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<sup>10</sup> Daniel A. Prescott, "Progress Report of Research Dealing with Bilingualism", The Report of the Congress of New Education, Nice, New Education Fellowship, 1932, 300p.

The total number of points was the score indicating the degree of bilingualism. The items called for a dichotomous response, so that there was no provision for differentiation as to the degree of bilingualism for each situation referred to in a given item. The International Commission named at Luxembourg and completed at Nice recommended Prescott's questionnaire as a way of measuring bilingualism. He drew attention to the fact that account must be taken of cases of absence of brothers, sisters or parents, which would diminish the number of questions functioning and hence lower the score. Pierre Bovet, at the same conference suggested that the raw score be replaced by the percentage of the responses effectively given which reveal the influence of a foreign language. However, Prescott did not determine the reliability and validity of each item nor of the whole questionnaire.

Ladd<sup>11</sup>, in 1933 at Columbia University, while investigating reading achievement of English speaking children as compared to foreign-speaking, divided 315 subjects into three groups on the basis of two questions:

1. Do your father and mother usually speak English when they talk to each other?
2. Do your father and mother usually speak English to you?

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11 M.R. Ladd, The Relation of Social, Economic and Personality Characteristics to Reading Ability, New York, Bureau of Publications, Columbia University, 1933, 100p.

The three groups were composed of: (a) those who spoke and heard English in the home; (b) those who spoke English but heard their parents speak a foreign language; and (c) those who spoke and heard a foreign language at home. The subjects were from Grades 3B to 5B of various nationalities, Jewish predominating. She concluded that the mean reading age declined, as the groups became more foreign, chronological and non-language mental age being held constant.

In 1934, Frits and Rankin,<sup>12</sup> in Kansas, studied 201 junior high school pupils, divided into English-speaking and usually foreign speaking by a questionnaire. The Otis Self Administering Test of Mental Ability, the New Stanford Achievement Test and the Sims Socio-Economic Score Card showed a greater advantage for the English speaking group in the English language section than in the other aspects of the battery, and a higher rating in intelligence and socio-economic status. The authors concluded that children speaking foreign languages suffer handicaps.

Hoffman,<sup>13</sup> in outlining his research in 1934 at Teachers' College, Columbia, professed the basic purpose of

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12 R.A. Frits, and M.K. Rankin, "The English Handicap of Junior High School Pupils from Foreign Speaking Homes, and Remedial Suggestion," Journal of Educational Research, 27, 1934, p. 412-21.

13 Moses Hoffman, The Measurement of Bilingual background, New York Teachers' College, Columbia University, 1934, p.2.

his study to be an attempt at constructing "a reliable and valid instrument for measuring quantitatively the extent of bilingual background". The instrument he designed was intended for use primarily with elementary and junior high school pupils. He defined bilingual as "the amount of foreign language in relation or in proportion to English". If the foreign language background of the individual exceeds his English language background he is highly bilingual; if the English exceeds the foreign language background he is bilingual to a small degree. His object was not to measure the extent to which the pupil knows or uses more than one language but to get a measure of the general bilingual background or environment to which the child is exposed or subjected.

The Hoffman Bilingual Schedule requires the written answers to fourteen questions including thirty-seven items designed to bring out the extent of bilingual background through the language usage in the informant's home. There are eighteen items concerned with speech, six with reading, three with writing, one with thinking, and nine with letters received, lectures and theatres attended, radio programs followed and books used in the home. One third of the Schedule deals with the informants' own language usage, the rest with that of his family. Each question offers a selection as to degree, the informant being required to choose between five answers:

"never, sometimes, often, mostly", and "always", scored respectfully zero, one, two, three and four. The total score of all the questions answered is divided by the number of items attempted, scores may range from zero to forty. Since Hoffman was interested in an all-over score, he added together heterogeneous elements, although the instrument could be broken down into informative areas, e.g., the informant's own language habits, his family's recreational linguistic pattern, etc.

Hoffman's Schedule has been repeatedly used in research although, admittedly, informants who understand but do not speak the language may obtain a high score. The questions concerning activities outside the home seem to be tapping an area remote from those dealing with the immediate family background and fail to include a full profile of the child's activities with a measure of language function in each, yet the Schedule served Hoffman's purpose and fills at least until a better instrument can be devised, the need to researchers requiring a quantified bilingual measuring instrument.

Schiller,<sup>14</sup> in 1933, grouped 395 New York Jewish elementary school pupils on the configuration of the answers to ten items relative to the amount of bilingualism

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<sup>14</sup> E. Schiller, "Verbal, Numerical and Spatial Abilities of Young Children", Archives of Psychology, No. 161, New York, Columbia University, 1934.

in the home, into "mostly English-speaking" or "mostly Yiddish-speaking". The method was neither quantitative nor objective. Insignificant differences in favor of the English-speaking group were found. The same questionnaire was used by Halpern<sup>15</sup> in her study of bilingualism and intelligence, with one hundred ten year old New York Jewish girls, divided into four groups on its basis. After administering the Stanford-Binet and Pintner-Paterson Performance Scale, she found no definite trend nor difference in the four groups and concluded, Jewish girls of the social status tested do not suffer from a language handicap.

In 1935 in New York Joseph Zubin<sup>16</sup> devised an objective test in bilingualism which in addition to background questions similar to Prescott's and Hoffman's tested knowledge of common household expressions in Italian and Yiddish. Each foreign expression taken from idioms and phrases used in the home and also found in the primers of the two languages is followed by three choices in English. The task is to select the English phrase corresponding to the foreign expression.

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15 F. Halpern, "The Intelligence of Bilingual Jewish Girls Measured by the Stanford-Binet and Pintner-Paterson Performance Test", Unpublished Master's Thesis, Columbia University, New York, 1933, 105p.

16 Joseph Zubin, "An Objective Test of Bilingualism", A paper read before the A.A.A.S., St. Louis, Mo., Dec. 1935, (no pagination).

<sup>17</sup>  
 H.S. Hill, 1935, attempted to determine ability to use and understand Italian by a questionnaire and by tests of comprehension of spoken Italian and of Italian word meaning. He studied the effect of bilingualism on the scores of a battery of intelligence tests in a group of Italian children divided into two categories by questionnaire: those who heard and spoke Italian in the home and those who spoke English. He equated thirty-six children in the two groups in grade one and three, and fifty children in grade six as to age, sex, educational, and socio-economic environment, mental age, and I.Q. He found no statistically significant difference between the groups on the mental tests. As the original equation of the two groups was made on mental tests, a selective factor made it unlikely that any significant difference would appear later when the battery was applied.

<sup>18</sup>  
 In 1937 at Columbia University, Seth Arsenian, in one of the most comprehensive studies in this field investigated bilingualism, as expressed by degree of bilingual background, in relation to age, sex socio-economic status, age-grade

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17 H.S. Hill, "The Effect of Bilingualism on the Measured Intelligence of Elementary School Children of Italian Parentage", J. Exper. Ed., Vol. 5, 1936, p. 75-8.

18 Seth Arsenian, Bilingualism and Mental Development, A Study of the Intelligence and Social Background of Bilingual Children in New York City, New York, Teachers' College, Columbia University, 1937, 111-164p.

status and length of residence of parents in United States; and in relation also to the mental development and ability of children from nine to fourteen years of age. His main population was 1152 Italian and 1196 Jewish native-born children. Other racial groups in smaller numbers were considered.

Hoffman's Bilingual Schedule, developed in the same city for a similar population was administered together with a Socio-Economic Questionnaire adapted from the Sims Score Card. The results were correlated with the scores of two non-language tests of mental ability, the Pintner and the Spearman Visual Perception. The summary of his conclusions serves as a survey of the various aspects of adjustment of immigrants to life in America. He found no significant correlation between bilingual background and intelligence even with the socio-economic factor held constant.

Maderah Smith,<sup>19</sup> of the University of Hawaii, used a scale similar to Hoffman's, to classify bilingual pre-school children of non-American ancestry in 1939. Three years later she followed this up by a further study using, in addition to the Hoffman Schedule, questions relative to the type of

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<sup>19</sup> Maderah Smith, "Some Light on the Problem of Bilingualism as Found from a Study of the Progress in Mastery of English among Pre-school Children of Non-American Ancestry in Hawaii", Journal of Genetic Psychology, Vol. 11, No. 9, May 1939, p. 284.

language used in the home, altered to suit older students. One of these questions, due to an unfortunate position on the page, was over-looked by many of the college students in the research project.

In 1942 Dorothy Speerl<sup>20</sup> modified the Hoffman Schedule in exploring the emotional factors which result at the college level from the experience of having been brought up through childhood in a bilingual environment. On testing 101 college freshmen according to various symptoms of maladjustment, she concluded it was higher frequencies and intensity of family conflicts in bilingual homes and not the child's mental conflict resulting from speaking two languages which produce maladjustment.

Natalie Darcy<sup>21</sup> in 1953, studying the performance of bilingual Puerto Rican children for intelligence used as well as an interview, the bilingual background from the child's cumulative record cards and a questionnaire dealing with the language spoken in the home.

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20 Dorothy Speerl, "Bilinguality and Emotional Adjustment", Journal of Abnormal and Social Psychology, No. 38, 1946, p. 37-57.

21 Natalie Darcy, "Performance of Bilingual Puerto Rican Children on Verbal and Non-Language Tests of Intelligence", Journal of Genetic Psychology, No. 82, 1953, p. 21-57.

The same year at Georgetown University, William Morgan<sup>22</sup> using the psychological approach, gave students a battery of verbal tests to which he added a questionnaire eliciting personal history in an attempt to predict foreign language achievement. He concluded that the non-intellectual factors increased the predictive validity and he presented the hypothesis that, beyond a certain point, intellectual capacities show a law of diminishing returns in language learning.

Granville Johnson,<sup>23</sup> working with thirty Spanish boys, nine to twelve years old, familiar with English, used the Hoffman Schedule along with a reaction-time technique. He measured the number of English words an individual could recall in five minutes, and compared it with the number of Spanish words he recalled in the same length of time. These results yielded little correlation with those obtained by using the hoffman schedule.

In 1954, Lionel Desjarlais, of the University of Ottawa Bilingual Teachers' College, in studying the effect of bilingualism on the knowledge of vocabulary in the primary

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22 William Morgan, "A Clinical Approach to Foreign Language Achievement", Georgetown University Monograph Series, No. 4, Washington, D.C., 1953, p. 15-21.

23 Granville Johnson, "Bilingualism as Measured by a Reaction-time Technique and the Relationship between a Language and Non-language Intelligence quotient", Journal of Genetic Psychology, No. 82, 1953, p. 3-7.

school, used the Hoffman Schedule, modified slightly, to determine the degree of bilingualism in the population studied. In his report<sup>24</sup> of research, Desjarlais calls attention to the Hoffman Schedule from the aspect of the serious work of standardization that accompanied it, its tested validity, the quantitative measure of family bilingualism it yields, and its consequent superiority to the various existing techniques for measuring bilingualism which he reviewed before selecting this one. In his study, Desjarlais modified the Hoffman Schedule by eliminating certain items which appeared too vague, or ambiguous. These items were: 1c, 1d, 1f, 2c, 2d, 2f, 9, 10, 11, and 12. Numbers 6, 7, 8, and 13 he modified slightly. Because he believed that religion and language are intimately linked, he added an item dealing with vocal prayer. He also included a question on "friends", reasoning that the latter have a decided influence on the spoken language. Lest the changes he had made in the original Schedule might have destroyed the high statistical qualities attributed to the Hoffman Schedule, Desjarlais put his revised form through a standardization procedure. He established a new reliability coefficient of .92 and validity coefficient of .75. With its efficiency being assured he

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24 Lionel Desjarlais, "Le Bilinguisme et la Connaissance du Vocabulaire à l'école primaire", Unpublished Ph.D. Thesis, presented to the University of Ottawa, Ottawa, 1954, 107p.

administered the Schedule to 767 children of Grades Five and Eight, in a representative sample of the bilingual Separate Schools of Ottawa. By cutting his distribution of scores on the Hoffman Schedule at four points he divided his population into five groups which he matched for age, grade, socio-economic status, verbal and non-verbal intelligence. Using three French and two English vocabulary tests, he found significant differences "between the performance of bilinguals and monolinguals on the various vocabulary levels". He concluded that at the primary level, bilinguals are somewhat behind the monolinguals in both English and French vocabulary.

From this review of the literature it was felt that the instrument most suitable for the present project would be the Hoffman Bilingual Background Schedule with certain changes rendering it more currently applicable.

The final revision of the Hoffman Bilingual Schedule was used, with several additions and a few modifications.

On page one, there was added to the questions dealing with personal data, "age as of July 1, 1960".

"Years in U.S." was changed to "Years in Canada".

In the upper right hand corner, the three lines

Total	.....
Ans'd	.....
Score	.....



within the entire population. Bilingual studies of nationalities other than French and English, the subject of the present one, may now be carried out.

Since it was felt that a distinction should be made between maternal and paternal grandparents, Hoffman's two items were extended to four, qualified by the two distinguishing words. This principle was carried out throughout Question one and two.

At the end of Question fourteen, there were added to the Hoffman revision six questions concerning areas of living felt to have bearing on the bilingual background of a modern child.

The questions were:

15. Are T.V. programs in a language other than English listened to in your home?
16. (a) Does your grandfather live with you?  
(b) Does your grandmother live with you?
17. (a) Do you say your prayers in a language other than English?  
(b) Do you say family prayers in a language other than English?
18. Do you attend a church in which the sermons are delivered in a language other than English?
19. Do you speak with your playmates in any language other than English?
20. Do you use, when telephoning, any language other than English?

The column: "Name the language" was provided, with all these questions, and one of the four answers. Never, sometimes,

often, always, was to be circled as in the rest of the schedule. The Bilingual Background Questionnaire was accompanied by a sheet with directions for administration and scoring. (See Appendix), outlining the exact procedure to be followed by all administrators, with the explanations to be made to the pupils. There was provided also a mimeographed form for tabulating the results. (See Appendix).

The forty-nine scorable items made it possible to have a range of scores on the questionnaire from zero to 400.

Because the modification of the Heffman Bilingual Background Schedule, made for this study, so closely approximated those devised by Desjarlais for his research, it was felt that there would be no significant error in accepting the reliability and validity of the instrument established by his re-standardization procedure.

The administration of this questionnaire, thus adapted, formed the first step in the present project.

## CHAPTER III

### THE TOOLS OF RESEARCH

The bilingual background questionnaire having been chosen, it was now required to devise instruments measuring verbal memory and speed of comprehension. This chapter deals with the procedure leading to the development of these tests.

#### I. THE VERBAL MEMORY TEST

The Immediate Verbal Memory technique devised in Barcelona by Gali<sup>1</sup> for Catalan and Spanish speaking children provided the structural model for our test. French and English word lists, equivalent in difficulty had to be prepared. The selection of the words to compose these lists posed a serious problem.

A solution was suggested by the Introduction<sup>2</sup> to a research project completed by Dr. L. Dayhaw of the University of Ottawa which resulted in his Carte de vocabulaire:

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1 A. Gali, "Comment mesurer l'influence du bilinguisme", in Bilinguisme et Éducation, Luxembourg, Bureau International d'Éducation, 1928, p. 289-300.

2 Lawrence T. Dayhaw, Une échelle de vocabulaire, Montreal, Institute Pédagogique Saint-Georges, 1941, p. 4.

Une liste de trente-deux mots, voilà le résultat le plus tangible de plusieurs années de travail. Elle se présente comme une échelle objective de vocabulaire pour examens individuels. Elle est surtout destinée à s'intégrer dans l'épreuve globale Stanford-Binet pour les gens de langue française. Peut-être pourra-t-elle servir aussi de test indépendant de vocabulaire.

These "plusieurs années de travail" represent years spent by Dr. Dayhaw and his twenty trained assistants in one of the most meticulous pieces of research in this field.

Two vocabulary scales already existed and were part of the French editions of the Binet Intelligence Test. The first was a list of seventy-five words devised in 1929 by Edouard Claparède<sup>3</sup> from the University of Geneva and revised in 1932 by Delvaux<sup>4</sup> in Brussels. The second was a scale of 100 words, composed by de Bellefeuille<sup>5</sup> in Montreal the following year. Since data, concerning the research was lacking for both these lists, Dr. Dayhaw undertook his study to remedy these deficiencies, and provide a

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3 Edouard Claparède, Comment diagnostiquer les aptitudes chez les écoliers, Paris, Ernest Flammarion, 1929, p. 131, cited by Lawrence Dayhaw, Op. cit., p. 4.

4 A. Delvaux, Contrôle de la Stanford Revision de Terman, Bruxelles, Maurice Lamertin, 1932, (no pagination), cited by Lawrence T. Dayhaw, Op. cit., p. 4.

5 Gaston Lefebvre de Bellefeuille, Manuel de Technique Psychométrique, Editions Beauchemin, Montreal, 1933, (no pagination), cited by Lawrence Dayhaw, Op. cit., p. 4.

vocabulary test that could be integrated into the Stanford-Binet for the French population.

Using the already existing two lists and adding twenty-five words borrowed and translated from the Terman vocabulary tests, Dr. Dayhaw launched a long and scholarly study, a model of careful research as to sampling procedures and control of error-producing factors. A carefully calibrated scale of thirty-two words was finally achieved which seems admirably suited to the needs of the present study. This will be illustrated by reproducing Dr. Dayhaw's description of his research.<sup>6</sup>

#### Le Barème de Cotation

Pour passer avec succès l'épreuve de vocabulaire à un niveau quelconque de l'échelle Stanford-Binet, l'enfant doit répondre de façon satisfaisante à un nombre déterminé de mots. Voici ce barème suivant le niveau mental.

Le total de mots compris	Le niveau correspondant de l'échelle Stanford-Binet
5 - 7	6 ans
8 - 10	8 ans
11 - 13	10 ans
14 - 16	12 ans
17 - 19	14 ans
20 - 22	adulte moyen
23 - 25	adulte supérieur I
26 - 28	adulte supérieur II
29 et plus	adulte supérieur III

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<sup>6</sup> Lawrence Dayhaw, Op. cit., p. 48.

By using Dr. Dayhaw's Carte de vocabulaire (see Appendix) together with the vocabulary scale in the Stanford-Binet for English population, a verbal memory test could be devised of an English and French vocabulary list as nearly equivated as seems possible.

In order to eliminate the possibility of word difficulty playing a part in the verbal memory test the difficulty level was set for just under twelve years, which is approximately the minimum age of the individuals used in the present study. The first fifteen words of the Carte de vocabulaire formed the French Verbal Memory Test and fifteen English words from the corresponding age level - sixth to twelfth year - were selected to form the English Verbal Memory Test.

The two lists are:

**French Verbal Memory Test**

1. Orange
2. marteau
3. jaser
4. flacon
5. gencive
6. liseur
7. mars
8. canif
9. année
10. achever
11. réfléchir
12. moyen
13. héritage
14. libraire
15. berne

**English Verbal Memory Test**

1. Key
2. glass
3. bed
4. dress
5. bird
6. slipper
7. mosquito
8. wood
9. sparrow
10. door
11. meat
12. pity
13. curiosity
14. surprise
15. compare

These two lists formed the Verbal Memory Test used in the present research.

Tests of Verbal Memory having thus been devised, it was necessary to establish statistically the equivalence as to difficulty of the French and English sections. To do so, a pilot study was undertaken, a description of which follows. The Grade Eight pupils of St. Pierre's School were selected among all the bilingual classes of the Ottawa Separate Schools because in the opinion of experts among the Ottawa Bilingual Teachers' College staff and the Separate School Inspectors of Ottawa this group is the most completely bilingual in the Ottawa Separate School system.

To these thirty-one pupils were administered, by Dr. Lionel Desjarlais of the Ottawa Bilingual Teachers' College staff the three techniques described in the Chapter, i.e. the Bilingual Background Questionnaire, the Verbal Memory Test and the Speed of Comprehension Test. The scores were then subjected to statistical analysis.

To establish the equivalence in difficulty of the French and English lists in the Verbal Memory Test, the ten pupils obtaining the scores closest to the mean on the Bilingual Background Questionnaire were selected, as being representative of the group.

Mean scores on the French and English lists for this group were obtained and the difference tested for significance

by means of small sample statistics.<sup>7</sup> The analysis yielded a t-score of 2.12 which was not found to be significant at the  $p = .01$  level.

The two lists of stimulus words were, therefore, considered to be of equal degree of difficulty.

At this point a question arose: Do the French words serve merely as nonsense syllables recalled regardless of the degree of bilingual background? If this were so, there should be no statistically significant difference between scores made by children with a bilingual background and those with none.

To answer this question a pilot study was undertaken as follows:

Two groups were selected, one having bilingual background, the other having none.

For Group I the ten pupils clustering closest to the mean on the Bilingual Background Questionnaire were used. A Verbal Memory quotient for each pupil was derived by dividing the English into the French score on the Verbal Memory Test and multiplying each ratio by 100.

For Group II, the Bilingual Background Questionnaire was administered to a class of thirty-one Grade VI children at Corpus

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<sup>7</sup> Lawrence T. Dayhaw, Manuel de Statistique, Editions de l'Université d'Ottawa, 1958, p. 359 and p. 364.

TABLE I. Significance of the difference between means of the English and French Verbal Memory Tests for the bilingual students in the Pilot Study. (N = 10)

Tests	Mean	$\sum (D - M_D)^2$	$M_D$	t
English	11.8			
		65.6	1.8	2.117
French	10.0			

Christi School and therefore not involved in the main project. The ten pupils who received a score of 0.00 on the Questionnaire formed the group having no bilingual background. To these were given the English and French Verbal Memory Tests. A Verbal Memory quotient was computed for each pupil.

The t test formula for small samples<sup>§</sup> was used to test the significance of the difference between the means of Group I and Group II. As p was greater than .001, the null hypothesis which led to this pilot study was rejected. We therefore can assume that the French words in the list are not simple nonsense words for a bilingual group.

## II. SPEED OF COMPREHENSION TEST

In composing a test of speed of comprehension, we considered the work done in this field by Shevenell, Lionel and Paul at the University of Ottawa in 1947. This research culminated in the Shevenell-Lionel-Paul Test de Lecture Rapide.

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§ Lawrence Dayhaw, Op. cit., p. 361.

TABLE II. Significance of the difference between means of the French Verbal Memory Test for the bilingual and monolingual groups in the Pilot Study. (N = 10)

Groups	Mean	$\sum(X-M)^2$	Difference	t
Bilingual	86.1	4683		
			66.5	8.9
Monolingual	19.6	630		

The report<sup>9</sup> of research states that the test imitates the Chapman-Cook<sup>10</sup> and the Greene<sup>11</sup> Speed of Reading Tests which are both psychometric and diagnostic instruments. The title is justified by the fact that the test considers two factors: intelligence which grasps the meaning of the text and speed with which the intelligence understands such a text. The first is considered as a constant factor since the items of the test are of approximately equal difficulty for pupils in Grade V. The second factor, speed, is a variable, and is the factor one is measuring.

There are two forms, A and B, of the Test, each consisting of forty paragraphs of thirty words, in two sentences. In the second sentence is a word which spoils the meaning of the paragraph, and can be discovered only when one has read the whole paragraph, for each sentence, taken separately has meaning. It is only by comparing the two sentences that the subject can find the incorrect word which he is to cross out.

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9 Frère Jean-Lionel, Une Présentation et une Etude Statistique du Test de Lecture Rapide et Intelligente, unpublished Master's Thesis, University of Ottawa, 1947, 59 p.

10 J.C. Chapman, "A Speed of Reading Cross-Out Test", Journal of Educational Research, Vol. 8, No. 5, p. 389.

11 E.B. Greene, "Michigan Speed of Reading Test", Journal of Educational Research, p. 283 - 288.

The authors took great care to use a vocabulary well within the reach of a normal child in Grade V, dealing with familiar and interesting subjects of home and school, current events, personal experiences, war, history, animals, insects, birds, sports, games and occupations. No subject goes beyond the knowledge and interest of pupils.

The Test was standardized on 416 pupils of Grades Five, Six, Seven and Eight, in five Ottawa Bilingual Schools.

By using equivalent forms, a reliability coefficient of .91 was obtained. A validity coefficient of .95 was arrived at when the results on the test were correlated with the total time taken to complete the test. Item validity was determined by the Kelly technique. Curves closely resembling the normal were obtained with both forms of the Test.

The Test de Lecture Rapide et Intelligente was used as a starting point. Since the difficulty level of this Test had been established within the scope of the Grade Five of the Ottawa Bilingual Schools, it was felt that vocabulary would be well below the difficulty level of the pupils used in the present research.

The authors of the Test had established a correlation between the time taken by 139 subjects to complete the entire test of forty items, and the results obtained after five minutes of reading. Correlation of .82 and .89 were obtained

for Grade Seven and Grade Eight. These high coefficients seemed to justify using a shortened version of the Test.

In the construction of the Test de Lecture Rapide et Intelligente, the items were made of equivalent difficulty. Item validity for both forms had been established.

Using Form B of the Shevenell-Lionel-Paul Test de Lecture Rapide et Intelligente, the odd numbered items from one to nineteen were selected to form the French Speed of Comprehension Test; the even numbered paragraphs from two to twenty, translated into English and anglicized, formed the English Speed of Comprehension Test.

It now remained to establish statistically the equivalence as to difficulty of the English and French Speed of Comprehension tests.

The French and English Speed of Comprehension tests were administered in a pilot study, to the Grade Eight pupils of St. Pierre's School, as described above at the time of equating the word lists of the Verbal Memory Tests.

Identical means of 7.16 on the total group of thirty-one subjects were obtained. However, the same procedure of establishing statistical equivalence was maintained as for the Verbal Memory lists. Only the scores of the ten individuals falling closest to the mean on the Bilingual Background Questionnaire were considered. The difference of the means of these

TABLE III. Significance of the difference between means of the English and French Speed of Comprehension Tests for the bilingual group in the Pilot Study. (N = 10)

Tests	Mean	$\sum (D-M_D)^2$	Difference	t
English	7.4			
		28.9	.1	.17
French	7.3			

scores was tested for significance by the t-test technique.<sup>12</sup> The difference between these means was not found to be significant at  $p = .01$  level. The English and French tests of Speed of Comprehension were thereafter considered as equivalent in difficulty and were adopted with the tests of Verbal Memory as the tools for the research.

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12 Lawrence Dayhaw, Op. cit., p. 359, and p. 364.

## CHAPTER IV

### THE RESEARCH PROCEDURE

The tests having been evolved, it remained to choose and describe the population, administer the techniques, and select the statistical devices for analysing the results. This chapter deals with these aspects of the research.

#### I. POPULATION

The investigation began with a survey of the distribution by sex and age, in years and months, of the children of the entire Ottawa Inspectorate Division Two, under the sanction of Dr. F.J. McDonald, Inspector of Separate Schools. A mimeographed form was sent to every principal in the nineteen English-speaking Separate Schools of the Division, whereon was tabulated the data requested. The results of this survey enabled the investigator to locate the population within the range of three grades which offered the largest number of pupils. This proved to be Grades Six, Seven and Eight. These were therefore selected for the study. It was felt that this age group was especially suitable in the light of the particular technique of Verbal Memory about to be applied, since as Haugen<sup>1</sup> suggests:

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<sup>1</sup> Einar Haugen, Bilingualism in the Americas, Alabama University of Alabama Press, 1956, p. 73.

The adult can solve intellectual problems more readily than the child but he has less taste for rote memorisation of the kind that is inevitable and even enjoyable in childhood.

And again:

Individual differences in language command result from differences in the age of learning, childhood being typically a period of memorisation of rote patterns, adulthood one of emphasis on the content of language.<sup>2</sup>

Childhood, prior to the consolidation of personality by puberty is the most adaptable period for rote memory activities, and consequently the research group is thus admirably suited.

In order to establish the optimum time limit for each technique in the battery, pilot studies were carried out on populations not involved in the research. First the entire battery was administered to one Grade VII student from Corpus Christi School, known to be equally well-versed in English as in French. Tentative time limits were thereby derived. The battery was then administered to a Grade VI class in the same school, during which administration the time limits were confirmed or at times slightly modified, and the final limits for each technique established.

The Bilingual Background Questionnaire was administered, during the same week, in nineteen schools to 2,056 pupils,

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<sup>2</sup> Op. cit., p. 85.

by seventy-one class-room teachers of Grade Six, Seven and Eight, who had received uniform instruction in the standardized procedure of administration decided upon. The questionnaires were scored, according to a standardized system, by the teachers who administered them, and were checked by the nineteen principals. The marks were entered by name of candidate on tabulation sheets distributed for that purpose. The completed questionnaires were separated into categories according to the language other than English, where one such language was indicated. All the questionnaires earning a bilingual background score higher than zero were re-scored by the investigator. Only those involving a bilingual combination of French and English were considered for this study. The scores ranged from zero to 3.08, with a possible total score on the questionnaire of 4.00.

A cutting score of .90 was established. The degree of bilingualism represented by a score on the Questionnaire of less than .90 would indicate monolingualism and thus render impossible the use of the other techniques required by the research design.

A group of fifty-four boys and fifty-seven girls emerged, of which the population for the rest of the investigation was to be composed. The distribution of the sexes by grade fell as portrayed in Table IV.

TABLE IV. Sexes distributed by grade in the experimental group. (N = 111)

	Grade VI	Grade VII	Grade VIII	Total
Boys	20	20	14	54
Girls	13	21	23	57
Total	33	41	37	111

Because learning capacity was considered a variable that should be controlled, a test of this factor was considered necessary. The one selected was the Dominion Group Test of Learning Capacity,<sup>3</sup> part of a battery of general intelligence tests extending from kindergarten to adult level prepared by the Department of Educational Research, Ontario College of Education. It is of omnibus type consisting of seventy-five items including arithmetic, opposites, analogies, number sequence, classification, reasoning and spatial relations. The items are the final selection from a much larger number tried out experimentally on twenty-five hundred Ontario school children. The results from 3,300 rural and urban pupils were used in the final standardization of the test. The raw score is converted into an Intelligence Quotient. The table of mental age equivalents was revised in 1952 after an extensive experimental testing program carried out in Ontario schools in May, 1951, in order to equate the mental age equivalents of the series of three tests composing the battery, Junior, Intermediate, and Intermediate Omnibus. This made it possible in the present study to use the Junior form with the sampling at Grade Six level and the Intermediate Omnibus with those in Grade Seven and Eight.

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<sup>3</sup> Department of Educational Research, Group Test of Learning Capacity. Manual of Directions, Ontario College of Education, Toronto, 1950, 9 p.

Principals of the schools involved in this study were called in to the Richelieu Guidance Centres in September where they were given a short Course in Psychometrics by the Professor of Educational and Psychological Measurement at the School of Psychology and Education of the University of Ottawa. They received a specific instruction in the administration of the Dominion Group Test used in this study. The Test was administered to the principals as a demonstration and they scored their own copies under the direction of the instructor. These individuals administered to the pupils of their schools, involved in the study, the Dominion Group Test according to the standardized procedure, scored the copies and listed the results on tabulated forms within a six week period from the termination of their training in Psychometrics, and a few weeks prior to the present research project. The scores furnished the individual intelligence quotients used in the present study.

With the research population thus identified, the investigator proceeded with the main research, i.e. the administration of the tests of Verbal Memory and Speed of Comprehension. A description of this phase now follows.

## II. ADMINISTRATION OF THE VERBAL MEMORY TEST

Two sheets<sup>4</sup> were prepared for each child, one with the list of fifteen French stimulus words, the other with the

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<sup>4</sup> See Appendix.

TABLE V. Range, Mean and Standard Deviation on the Bilingual Background Questionnaire and the Dominion Test of Learning Capacity for the Experimental Group.

Test	Range	Mean	Sigma	N
B.B.Q.	.90 - 3.08	142.62	16.26	111
D.T.L.C.	60 - 124	95.80	15.39	109

fifteen English words composing the test. Provision was made for recording name, school, grade, age and order of administration. To control practice effect, half the population, selected by randomization, took the English Verbal Memory Test first, the other half taking the French. All the French Verbal Memory Tests were administered and scored by Mrs. Helen McAskill, Supervisor of French in the Ottawa Separate Schools, all the English Verbal Memory Tests by the author. Stop watches were used to control the time, the optimum time-allowance having been established by the pilot studies. All the tests were administered within a two week period. The examiners worked at the same time, in separate rooms, taking school by school.

Each child, tested individually, alone with the examiner, in a quiet room, was given the following instruction: "I will read you a list of words three times. Listen carefully while I read, when I finish, I want you to say for me as many of the words as you can remember. The order doesn't matter".

Each list was read clearly to the child by the examiner, at a rate of one word every two seconds, and fifteen seconds between each reading. The child was given forty-five seconds to recall as many words as he could. These were numbered consecutively on his copy of the word list as he said them. It was felt that the order of recall would provide data for an

independent study. The child's score was the total number of words recalled. Each child had a separate score in English and French.

### III. ADMINISTRATION OF THE SPEED OF COMPREHENSION TEST

A parallel procedure to that of the Verbal Memory Tests was maintained for the administration of the Speed of Comprehension Test in French and English. Order of administration of the French and English was again randomized so that half of the pupils received the French first, and half the English. Moreover, since both the Verbal Memory and the Speed of Comprehension techniques were given during one testing period, it was possible to control any fatigue effect by randomizing the order in which they were administered, half the pupils taking the Verbal Memory Tests first, the other half the Speed of Comprehension.

Again all the French Speed of Comprehension Tests were conducted by the Supervisor of French, the English by the author. Time had again been controlled by the optimum intervals resulting from the pilot studies. Stop watches kept this factor standardized.

The Speed of Comprehension Tests was administered to the subjects gathered in a group in a class-room. Rapport was established by explaining that they were being asked to share in an experiment that had no connection with their school work,

but for which their help was needed, because of their special ability in knowing two languages. The author then wrote on the blackboard:

1. Mary bought a little white puppy at the market. When her mother saw her coming in the house, carrying the little white cat, she told her not to come in.

2. When the man tried to lift the big suitcase, it was too heavy. "How can I lift a suitcase that is so light?" he asked.

At the same time, the French examiner wrote on the other half of the blackboard:

1. Marie a cassé sa plume. Quand sa mère a vu le crayon cassé, sa mère lui en a donné un autre.

2. Paul a perdu sa belle montre. Il était alors bien triste quand il l'a trouvée.

The two examiners alternated in giving the following instructions, depending on whether the group was taking the English or French Speed of Comprehension Test first. In the case of English first, the author pointed to the first English paragraph and said: "Here is an English paragraph with two sentences. In the second one there is a word that does not make sense. It spoils the paragraph. Listen carefully while I read the sentences and tell me the word that does not make sense." The paragraph was then read. A child who did

not raise his hand was always called on for the answer. In every case he was able to give it, when asked: "Why does it not make sense?" The explanation being given and repeated by the examiner, the word was crossed out with four vertical lines. The same procedure was followed with the second example. The French examiner then said: "Now, I have two French paragraphs over here." The same procedure was followed. The author then said: "I am going to give you a sheet of paper with fifteen paragraphs like these. I want you to find the word in the second sentence of each paragraph that does not belong and that spoils the paragraph. Cross it out. work as quickly as you can." Each child was provided with a sheet of paper,<sup>5</sup> blank side up, on which the fifteen French or English sentences appeared. Two sharpened pencils and an eraser were supplied. At a signal, all turned over the sheet and began. The examiners timed with stop watches a two minute interval. The pencils were laid down at a signal, and the papers collected. The same procedure followed for the other half of the test, French or English. The papers were scored by the examiners, each individual receiving a separate mark in French and English, one point for each misused word correctly crossed out.

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5 See Appendix.

A discrepancy score in Verbal Memory was obtained for each individual by subtracting the French Verbal Memory score from the corresponding English one. A similar procedure yielded discrepancy scores for Speed of Comprehension.

#### IV. THE SELECTION OF STATISTICAL TECHNIQUES

As the hypotheses refer to the presence or absence of relationships between the variables, correlational techniques were chosen for the statistical analysis of the data.

The Pearson  $r$  technique was selected to check the relationship between each of the variables taken in pairs. The combination were as follows:

Bilingual Background with Verbal Memory  
Discrepancy

Bilingual Background with Speed of  
Comprehension Discrepancy

Bilingual Background with Learning Capacity

Verbal Memory Discrepancy with Speed of  
Comprehension Discrepancy

Verbal Memory Discrepancy with Learning Capacity

Speed of Comprehension Discrepancy with  
Learning Capacity

In order to establish whether Learning Capacity could explain the intercorrelations of the other variables, it was necessary to compute two partial correlations,

partialling out Learning Capacity and yielding partial r's for:

Bilingual Background correlated with Verbal Memory Discrepancy partialling out Learning Capacity.

Bilingual Background correlated with Speed of Comprehension partialling out Learning Capacity.

In the advent of the Pearson and partial coefficients being significant, a multiple R of these variables with Bilingual Background would be computed.

The description and discussion of these correlational procedures will be presented in the next chapter.

## CHAPTER V

### STATISTICAL ANALYSIS AND DISCUSSION OF RESULTS

The assumption had been made that the measure of bilingualism obtained through the Bilingual Background Questionnaire was related to the two measures of bilingualism derived by considering the size of the discrepancy between French and English forms of the Verbal Memory and Speed of Comprehension Tests.

In analysing the results, all distributions were compared through the correlational techniques. This chapter will present the discussion of these data.

To check the hypotheses the intercorrelations of all three techniques will first be considered. Since the question arose of the possibility of learning capacity playing a role, the relation of this variable with the three techniques will be discussed.

The correlation indices were significant but low; the possibility of raising the size by combining the techniques was investigated. The results of the two techniques in combination, correlated with the Bilingual Background questionnaire will be treated in the present chapter. Finally, Chapter V will present relationships and trends in general, and discuss their significance.

I. INTERCORRELATION OF VARIABLES

Scores on the Bilingual Background Questionnaire, Verbal Memory Discrepancy, Speed of Comprehension Discrepancy and Learning Capacity were correlated by pairs. The Pearson  $r$  coefficients are presented in Table VI. Three of these six correlation indices proved to be significant at  $p = .05$ .

Bilingual Background with Verbal Memory Discrepancy  
 Bilingual Background with Speed of Comprehension  
 Discrepancy  
 Speed of Comprehension Discrepancy with Learning  
 Capacity

Though the correlations were low, the trends were evident, and the relationships established.

Since the assumptions for using this technique are linearity and homoscedasticity, the Eta coefficient was computed for each statistically significant relationship, and the  $F$  test for linearity applied. The difference between the coefficient of correlation and the correlation ratio was not found to be significant in any case. The relationships were, therefore, assumed to be linear. A summary of these findings is presented in Table VII.

II. LEARNING CAPACITY

Arsenian<sup>1</sup> had shown that little relationship existed

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<sup>1</sup> Seth Arsenian, Bilingualism and Mental Development, New York, Bureau of Publications, Columbia University, 1937, p. 152.

TABLE VI. Intercorrelations of Scores on the Bilingual Background Questionnaire, Verbal Memory Discrepancy, Speed of Comprehension Discrepancy and Learning Capacity. (N = 106). \*

	B.B.Q.	V.M.D.	S.C.D.	L.C.
Bilingual Background	1.00	-.21	-.19	.117
Verbal Memory Discrepancy		1.00	.119	-.02
Speed of Comprehension Discrepancy			1.00	.27
Learning Capacity				1.00

\* r must be .18 to be significant by the t test. (p = .05)

between bilingual background and intelligence. As the new tools used in this research might be insignificant relationship with intelligence it was decided to introduce measure of learning capacity to provide a means of partialling out this variable in the intercorrelations of the Bilingual background Questionnaire with Verbal Memory Discrepancy and Speed of Comprehension discrepancy.

The data in Table VI and Table VII show that the present study corroborates Arsenian's findings. With the Bilingual Background Questionnaire as a measure of degree of bilingualism, no statistically significant relationship was found to exist between Bilingual Background and Learning Capacity. Arsenian, using the same questionnaire as a measure of degree of bilingualism and the Pintner Non-Language Intelligence Test, and the Spearman Visual Perception Test, in non-language form, as measures of intellectual ability, found "practically no relationship, expressed in the Pearson  $r$ , between bilingualism and intelligence for each of five experimental groups"<sup>2</sup>. Arsenian's thirty-four correlation coefficients varied between the limits of  $-.217$  and  $-.118$ . The  $r$  of  $-.117$  between Bilingual Background and Learning Capacity obtained in the present study lies within the

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2 Seth Arsenian, Op. cit.

TABLE VII. F Ratios to Test Non-linearity of Inter-correlations between measures of Bilingual Background, (1) Verbal Memory Discrepancy, (2) Speed of Comprehension Discrepancy, and (3) Learning Capacity. (N = 106) \*

	r	F
r 12	-.21	.604
r 13	-.19	.96
r 34	-.27	2.01

\* F to be significant ( $p = .05$ ) must be 2.21.

r 12 Bilingual Background with Verbal Memory Discrepancy

r 13 Bilingual Background with Speed of Comprehension  
Discrepancy

r 34 Speed of Comprehension Discrepancy with Learning  
Capacity.

limits of this distribution of  $r$ 's found by Arsenian and thus would corroborate his findings. The relationship expressed by  $E_{ta}$ , between bilingualism and intelligence was slightly higher but still insignificant in Arsenian's study, corrected  $E_{tas}$  ranging from .042 to .143. The  $E_{tas}$  computed from the data of the present study were found to be .063 and .140.

The correlation between Verbal Memory Discrepancy and Learning Capacity was  $-.02$ . Factor M (rote memory), of Thurstone Primary Mental Abilities, which he describes as a facility in memorizing words, numbers, letters and other materials, when correlated with school grades showed no significant correlation.<sup>3</sup> The Verbal Memory Test used in the present study resembled tests of the mental ability labelled Factor M. The Dominion Test of Learning Capacity is based on abilities developed in the school situation, and is therefore, predominantly one of school achievement or aptitude. It is not surprising that no statistically significant correlation was found between scores on the two instruments. Moreover, the word lists, consisting of unrelated words, offered only a latent structure. Though

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<sup>3</sup> D.J. Shaw, "A Study of the Relationships between Thurstone Primary Mental Abilities and High School Achievement", Journal of Educational Psychology, 40, p. 239-40.

each individual word was in itself meaningful, it was taken out of a vague, general structure or cluster of associations. It is conceivable that some of these associations surrounding one word, for example "mosquito", may have linked with other associations elicited by the following word, in this case "wood". However, the list offered no over-all structure, no single thought, nor unit. The task called for a memorization of individual details. The Dominion Test of Learning Capacity, on the other hand, was based on the ability to grasp general structure, meaning, insight, and relationships. It had been established by research<sup>4</sup> that meaningful, highly structured material is easier to grasp, easier to learn and easier to remember. Moreover, the memory is more lasting. Rote memory, as elicited in the Verbal Memory Test, is relatively independent of reasoning and learning, as reflected in the test of Learning Capacity. Merely to repeat the words once without error does not indicate a memory of it in the sense of probable accurate retention. Learning Capacity, on the other hand, implies a previous development and utilization of the pupil's powers rather than an amount of knowledge committed to memory. It is logical - not rote-memory, understanding rather than mechanical repetition.

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<sup>4</sup> J.A. McKeach, Psychology of Human Reasoning, New York, Longmans, 1942, p. 157-160.

As Kelly<sup>5</sup> expresses it:

One may have a good rote memory without understanding, since words rather than ideas are memorized. This type of memory requires little mental activity. It is quite a common thing to find a feeble-minded person with a good rote memory but such a person never has a good logical memory.

The lack of relationship between rote memory for English and French words and the capacity for school learning, evident in this study is, then understandable.

Similarly, the  $r$  of .119, between Speed of Comprehension Discrepancy and Verbal Memory Discrepancy likewise offers no surprise. Verbal Memory is a specific ability in which individuals are known to differ widely. Scheerer, Rothman and Goldstein<sup>6</sup> report a study in which is demonstrated the discrepancy between general level of ability and skill in some single area, specifically a memory function.

The relationship between Learning Capacity and Speed of Comprehension Discrepancy required consideration. One of the hypotheses explaining the  $r$  of .27, significant at  $p = .05$ , could be that both tests called for comprehension of meaningful material, with the presence of speed as

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<sup>5</sup> William Kelly, Educational Psychology, Milwaukee, Bruce, 1946, p. 94.

<sup>6</sup> M. Scheerer, E. Rothman and K. Goldstein, "A Case of Idiot Savant: an Experimental Study of Personality Organization", Psychological Monographs, 58, No. 4, p. 111-63.

a variable.

The lowness of the correlation coefficient could stem from the nature of a discrepancy score: if each of the components, French Speed of Comprehension and English Speed of Comprehension, correlated highly with Learning Capacity because of some common factor, for example, the high degree of reasoning power called forth by all three, the discrepancy distribution, upon being correlated likewise with Learning Capacity would yield a low coefficient.

The smallness of the correlation might also be accounted for by the variety in the matter elicited by the task. Speed of Comprehension was in the area of reading solely, whereas comprehension in the Learning Capacity Test was in the areas of arithmetic, opposites, analogies, number sequence, classification, reasoning and spatial relations. This makes possible many variables accounting for the lack of stronger relationship. Factor analytic studies of intelligence<sup>7</sup> have shown these to be unrelated abilities distributed randomly in a population.

### III. THE BILINGUAL BACKGROUND QUESTIONNAIRE AND THE OTHER VARIABLES

Verbal Memory Discrepancy and Speed of Comprehension Discrepancy, when correlated with Bilingual Background, each

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<sup>7</sup> T.G. Thurstone, "Primary Mental Abilities of Children", Educational Psychological Measurement, 1, 1941, p. 105-6.

yielded an  $r$  significant at  $p = .05$ . Both correlations were negative. Hypothetically this negative direction of the correlations could be explained by assuming that the greater the discrepancy between English and French ability as reflected in the size of the discrepancy score, the more imbalance there is between English and French background. The discrepancies were in one direction only, since scores where the French was higher were dropped from the distribution. It could then be said that the greater the discrepancy score, the more limited the French background. It follows that the negative direction of the correlations found in this study would be expected.

The correlation coefficients were significant but low. To account for the latter fact, we must bear in mind the nature of the Bilingual Background Questionnaire as a tool of measurement. Although the Hoffman Schedule is the best of its kind and widely used in the literature, yielding an all-over score, a quantified measure of bilingualism, it must be admitted that this score implies an unwarranted degree of accuracy. The questionnaire makes little distinction between the informer's own activities and those of his environment. No provision is made to discriminate between those who understand but never speak a language, and yet may receive a high score on the basis of bilingual background. The social background of the individual is not adequately measured, nor are

these activities which are beyond the control of the home.

In considering the smallness of the indices of correlation, it must be recalled that for both new techniques, discrepancy scores were used. If two distributions of the original tests, each taken separately with Bilingual Background, correlated highly, then the distribution of discrepancy scores, correlated with that same variable, would necessarily yield a low correlation coefficient.

Since an  $r$  of .27 was obtained between Speed of Comprehension Discrepancy and Learning Capacity, the question arose: Would the relationship of Bilingual Background with Speed of Comprehension be strengthened by holding constant the effect of Learning Capacity?

To answer this question, a partial correlation between Bilingual Background and Speed of Comprehension Discrepancy was computed, partialling out Learning Capacity. A partial  $r$  of -.16 was obtained which proved to be insignificant at  $p = .05$ .

As Learning Capacity and Verbal Memory evidenced no significant relationship in the Pearson  $r$  analysis, no partial correlation was computed for this combination.

Learning Capacity was not found to play a significant part in either combination.

Since both Verbal Memory Discrepancy and Speed of Comprehension Discrepancy when correlated with Bilingual

Background yielded a significant  $r$  at  $p = .05$ , the effect of combining them was studied with a view to increasing the relationship of the new tools with Bilingual Background, by means of the Multiple R technique. An  $R$  of .27 was obtained. This yielded an  $F$  of 3.00 and therefore was significant at the .05 level. (An  $F$  of 3.95 would be required for the .01 level of significance). Of the variance in Bilingual Background, 7.16 percent is accounted for by Verbal Memory Discrepancy and Speed of Comprehension taken together, eliminating from the double consideration what they have in common. The relationship, though significant is low.

#### IV. GENERAL DISCUSSION

The Report<sup>7</sup> prepared by the international experts in bilingualism meeting at the New Educational Fellowship Congress in Geneva raised the question of a possible relationship between background schedules of the Prescott type, and verbal memory techniques, used by other researchers to measure degree of bilingualism. The present study, in attempting to answer the question yielded statistically significant but low correlations, all at the .05 level. This makes it necessary to reject the null hypothesis: There is no statistically significant relationship between scores on a bilingual

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<sup>7</sup> Pierre Bovet, "Bilingualism and Education", in New Era in Home and School, Vol. 14, No. 7, 1933, p. 161-163.

background questionnaire and scores on a test of verbal memory.

The findings also permit us to reject the second hypothesis proposed in this study: There is no statistically significant relationship between scores on a bilingual background questionnaire and scores on a test of verbal comprehension.

Although the trend is apparent, some thought should be given to possible factors reducing what might be a stronger relationship. Foremost is the weakness of the Background Questionnaire as a measure of degree of bilingualism. It is compellingly obvious that a more sensitive instrument to measure the true degree of bilingualism will have to be devised, before the function of the other two techniques as measures of bilingualism can be completely assessed and the trend established by this study exploited. Such a device might be that of a battery of English and French achievement tests administered to a bilingual population and a Bilingual Quotient derived for each person. With these as a measure of degree of bilingualism, the same two techniques could be applied and the resulting relationships determined by correlational techniques. A more stable dependent variable might thus be assured. Neither a bilingual background schedule nor one small test used alone seems feasible for measuring the

degree of bilingualism at the present stage of research in this field.

In lieu of an isolated criterion to measure bilingualism a second approach might be to arrive at a composite score, consisting of the several variables, weighted, which studies in the field of bilingualism have shown to be of significance in determining the degree of bilingualism. These studies reported by Hartmann<sup>§</sup> propose as significant factors, for example, age of language learning, the person from whom the foreign language is learned, the mode of learning: oral, written or read, the motivation, the degree of proficiency obtained, the informant's descent, the use of the language, level of education, social habits, background, his apperceptive capabilities, the prestige of the languages involved, and the linguistic elements. In view of the findings in this study, Verbal Memory and Speed of Comprehension should find a place in such a battery.

#### V. SUMMARY AND CONCLUSIONS

Scores on the Hoffman Bilingual Background Schedule, derived from a population of bilingual children in Grades VI, VII, and VIII of the English Separate Schools of Ottawa were

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§ Sister Mary Andrew Hartmann, "Variables Considered in the Measurement of Bilingualism: A review of the Literature", Revue de l'Universite d'Ottawa, Vol. 31, No. 1, 1961, p. 56-79.

correlated with scores on tests of Verbal Memory and Speed of Comprehension. Significant relationships at the .05 level were obtained when the tests were considered separately and simultaneously. The two null hypotheses were therefore, rejected.

The correlations prevailing were too low to admit of the possibility of the three techniques being used interchangeably as measures of the degree of bilingualism.

The Multiple R suggested the probability of a stronger relationship resulting if the two techniques, Verbal Memory and Speed of Comprehension were used in combination.

The effects of Learning Capacity were not found to be significant.

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**APPENDIX 1**  
**THE BILINGUAL BACKGROUND QUESTIONNAIRE**

## APPENDIX 1

### BILINGUAL BACKGROUND QUESTIONNAIRE

#### Directions for administration

1. There is no time limit.
2. Any amount of help may be given to assist the child in arriving at accurate answers.
3. Difficult terms, e.g. paternal, maternal, should be explained.
4. In the case where a relative is deceased, questions concerning that relative are not to be answered.
5. In the case where there is no brother or sister questions concerning that relative are not to be answered.
6. In deciding which of the five words to circle for each question the child should be helped by the following instructions which should be written on the blackboard:
  - 1) Circle NEVER if the person never does it in a language other than English but does it always in English.
  - 2) Circle SOMETIMES if the person does it less than half of the time in a language other than English.
  - 3) Circle OFTEN if the person does it about half of the time in a language other than English.
  - 4) Circle MOSTLY if the person does it more than half of the time in a language other than English and the rest of the time in English.
  - 5) Circle ALWAYS if the person does it always in a language other than English and never does it in English.

#### Directions for scoring

1. Scores are assigned as follows:

NEVER	0
SOMETIMES	1
OFTEN	2
MOSTLY	3
ALWAYS	4
2. Total the scores for each child.
3. Count the number of questions answered by the child.
4. Divide the total score for each child by the number of questions answered. (Carry to 2 decimal places.)  
Insert the answer to this ratio in the place labelled "Final score".

BILINGUAL BACKGROUND QUESTIONNAIRE

Final score = Total score plus no. of questions answered = .....

NAME ..... BOY or GIRL .....

SCHOOL ..... GRADE .....

DATE OF BIRTH ..... AGE as of JULY 1, 1960 ..... PLACE OF BIRTH.....  
 (yrs.) (mos.)

BIRTHPLACE: Father ..... Mother .....

YEARS IN CANADA: Father ..... Mother .....

NATIONALITY: Father ..... Mother .....

BROTHERS

Name	Age	School	Grade
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

SISTERS

Name	Age	School	Grade
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

## BILINGUAL BACKGROUND QUESTIONNAIRE

Does your FATHER  
 understand English? ..... Your MOTHER .....

Name all other languages  
 your FATHER understands .....

Name all other languages  
 your MOTHER understands .....

Name all languages  
 YOU understand (besides English) .....

(Circle correct answer for the following four questions.)

Have you ever attended a school where the language of  
 instruction was other than English?            Yes.            No.

What grades were you in?    Grade 1 2 3 4 5 6 7 8

How long did you attend this school? 1 2 3 4 5 6 7 8 years

For which of the following reasons did you change to  
 your present school?

- lack of success
- difficulty with the language
- change of residence
- another reason

Directions: Draw a circle around the one word that answers best each of the following questions, naming the language in the space provided.

Do the following speak to you any language other than English?

Name the language

- 1. (a) Father ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) Paternal grandfather ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (d) Paternal grandmother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (e) Maternal grandfather ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (f) Maternal grandmother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (g) Brothers and sisters ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (h) Relatives ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

2. Do you speak to the following any language other than English?

Name the language

- (a) Father ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) Paternal grandfather ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (d) Paternal grandmother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (e) Maternal grandfather ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (f) Maternal grandmother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (g) Brothers and sisters ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (h) Relatives ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

3. Does your FATHER speak to the following any language other than English?

Name the language

- (a) Mother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Brothers and sisters ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

4. Does your MOTHER speak to the following any language other than English?

Name the language

- (a) Father ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Brothers and sisters ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

5. Do your BROTHERS AND SISTERS speak to the following any language other than English?

Name the language

- (a) Father ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

6. Do the following read any newspapers in a language other than English?

Name the language

- (a) Father ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) You (Yourself) ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

Write the names of the newspapers in a language other than English  
 which any of the above read on these lines .....

.....

.....

7. Do the following read any books in a language other than English?

Name the language

- (a) Father                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) You (Yourself)           ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

Write the names of the books in a language other than English  
which any of the above have read this past year on these lines

.....  
.....

8. Do the following write any letters in a language other than English?

Name the language

- (a) Father                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) You (Yourself)           ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

9. Are letters written in a language other than English received in  
your home?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

10. Do the following attend lectures given in a language other than  
English?

Name the language

- (a) Father                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) You (Yourself)           ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

1. Do the following attend the theatre where plays are given in a language other than English?

Name the language

- (a) Father                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (b) Mother                   ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS
- (c) You (Yourself)           ..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

2. Are radio programmes which are given in a language other than English listened to in your home?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

3. Do you do your thinking in a language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

4. Are there any books in a language other than English in your home?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

5. Are T.V. programmes in a language other than English listened to in your home?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

6. (a) Does your grandfather live with you?

NEVER SOMETIMES OFTEN MOSTLY ALWAYS

(b) Does your grandmother live with you?

NEVER SOMETIMES OFTEN MOSTLY ALWAYS

7. (a) Do you say your own private prayers in a language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

(b) Do you say family prayers in a language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

8. Do you attend a church in which the sermons are delivered in a language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

9. Do you speak with your playmates in any language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

10. Do you use, when telephoning, any language other than English?

Name the language

..... NEVER SOMETIMES OFTEN MOSTLY ALWAYS

**APPENDIX 2**

**SUMMARY SHEET FOR THE ETHNIC SURVEY OF  
THE OTTAWA ENGLISH SEPARATE  
SCHOOLS, DIVISION 2.**

APPENDIX 2

SUMMARY SHEET FOR THE ETHNIC SURVEY OF  
THE OTTAWA ENGLISH SEPARATE  
SCHOOLS, DIVISION 2.

SCHOOL No. 7

PRINCIPAL J.S.C.

S U M M A R Y   S H E E T

ENTER ONLY THE STUDENTS WHO HAVE OBTAINED A SCORE ON THE  
QUESTIONNAIRE HIGHER THAN 0.

	SURNAME	CHRISTIAN NAME	GRADE	DOMINANT LANGUAGE OTHER THAN ENGLISH	SCORE
1.	Albert	Reginald	6	French	153
2.	Fawcett	Raymond	6	French	126
3.	Garcia	Xavier	6	Spanish	333
4.	Giroux	Lauraine	6	French	117
5.	Guibert	Bernard	8	French	108
6.	Kawerninski	Michael	7	Polish	300
7.	Knief	Lesley	8	Hungarian	361
8.	Lalande	Diane	7	French	181
9.	Robichon	George	7	French	116
10.	Szabo	Mantha	7	Hungarian	212
11.	Szyrynski	Barbara	6	Polish	113
12.					
13.					
14.					

**APPENDIX 3**

**SPEED OF COMPREHENSION TEST,  
ENGLISH AND FRENCH FORM.**

### APPENDIX 3

#### SPEED OF COMPREHENSION TEST: ENGLISH

1. In all the exams taken during the school year, Brian came first. So he kept telling his friends that it was very certain he would repeat his grade.
2. About four o'clock yesterday afternoon a car ran over the kitten that Joan loved so much. With tears in her eyes, she had to resign herself to let them bury her little rabbit.
3. The vegetable soup that we had for dinner was certainly not salty enough. And when we had tasted it, we had to ask the person beside us for the sugar.
4. Twelve o'clock struck and dinner had been served when Mother noticed that there was no more bread. She told me to run to the baker's and bring back a cake.
5. The little squirrel, foreseeing a severe winter, is hastening to hoard up provisions. He is picking up great quantities of beautiful little stones which he places carefully in the hollow of a tree.
6. St. Paul, who lived a few years after the death of Our Lord, was filled with zeal in regard to the Christians. Several times he telephoned them to give them good advice.
7. All the pupils in the school agreed in saying that Peter was an obedient child. In fact, he took a real delight in disobeying in even the smallest things.
8. The teacher warned us that we will be writing with ink beginning to-morrow morning. In order not to lose any time, he asked us to buy our pencils to-day, if possible.
9. Gerry's parents stated sadly that he was becoming deaf and deaf. They sent him to the doctor who examined his eyes in order to find out the trouble with them.
10. A young man fell from the roof of a house and broke his arm. He was taken immediately to the hospital where his leg was set in less than an hour.

## SPEED OF COMPREHENSION TEST: FRENCH

1. Comme c'est la fête de notre directeur, nous avons décidé de lui offrir une belle montre en cadeau. Ce soir, l'un de nous se rendra chez le photographe pour l'acheter.
2. Ces petits garçons qui jouaient ensemble sur le bord d'une rivière glissèrent malheureusement dans l'eau. Ils expliquèrent à leur maman, en toute simplicité comment ils avaient brûlé leurs beaux habits.
3. Lucien voulait acheter plusieurs bas de laine pour l'hiver. Il se rendit donc au magasin et demanda au marchand de lui montrer tous les chandails qu'il avait.
4. Gaston préfère les biscuits pour sa collation, après la classe. Sa mère qui n'épargne rien pour lui faire plaisir, ne manque jamais de lui mettre des oranges dans son sac.
5. "Monsieur, vous avez un bel assortiment de chapeaux, j'ose croire que vous pourrez m'en trouver un convenable".  
"Certainement, j'en ai de toutes les grandeurs, mais quel point chaussez-vous?".
6. Roland était désireux de savoir si le cinq février tombait un jeudi cette année. Comme nous étions tous dans l'impossibilité de lui répondre, il alla donc consulter le thermomètre lui-même.
7. Les jours de congé, Jean va souvent à la pêche avec son ami. Samedi dernier, comme celui-ci prenait une belle truite grise, Jean se réjouissait de sortir un gros lièvre.
8. Les pompiers arrivèrent au lieu de l'incendie et trouvèrent plusieurs personnes emprisonnées derrière les murs en flammes. Malheureusement, un jeune homme s'y noya en tentant de sauver un enfant.
9. Monique emploie tous ses moments libres à tricoter un gilet de laine qu'elle donnera à sa maman. Cela lui cause un vif plaisir de raccommoder ainsi pour sa bonne mère.
10. Monsieur Jolicoeur, qui avait strictement défendu à son fils de fumer, trouva des bouts de cigarettes dans les poches de celui-ci. Il l'appela aussitôt pour le féliciter de son action.

**APPENDIX 4**  
**CARTE DE VOCABULAIRE**

APJ ENDIX 4

EXAMEN DE VOCABULAIRE

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Nom et prenom .....  
Date de naissance ..... Age .....  
Adresse .....  
Sexe ..... Profession du pere .....  
Ecole .....  
Classe ..... Date de l'examen .....

1. orange .....
2. marteau .....
3. jaser .....
4. flacon .....
5. gencive .....
6. liseur .....
7. mars .....
8. canif .....
9. année .....
10. achever .....
11. réfléchir .....
12. moyen .....
13. héritage .....
14. libraire .....
15. borne .....
16. trompette .....
17. rugir .....
18. cautionnement .....
19. effondrer .....
20. narrer .....
21. diligence .....
22. houblon .....
23. lutrin .....
24. ocre .....
25. espagnolette .....
26. stéréotypé .....
27. gédiche .....
28. smalah .....
29. bagout .....
30. rescinder .....
31. liteau .....
32. proclitique .....

Nom de l'examineur .....

APPENDIX 5  
ENGLISH AND FRENCH VERBAL MEMORY TESTS

APPENDIX 5

ENGLISH AND FRENCH VERBAL MEMORY TESTS

Name ..... Age .....  
School ..... Grade .....  
Administered: First .....  
Second .....  
Date .....

Word List	Order of Recall
1. Key	.....
2. Glass	.....
3. Bed	.....
4. Dress	.....
5. Bird	.....
6. Slipper	.....
7. Mosquito	.....
8. Wood	.....
9. Sparrow	.....
10. Door	.....
11. Meat	.....
12. Pity	.....
13. Curious	.....
14. Surprise	.....
15. Compare	.....
TOTAL NO. RECALLED .....	

ENGLISH AND FRENCH VERBAL MEMORY TESTS

Name ..... Age .....

School ..... Grade .....

Administered: First .....

                  Second .....

Date .....

Word List	Order of Recall
1. Orange	.....
2. Marteau	.....
3. Jaser	.....
4. Flacon	.....
5. Gencive	.....
6. Liseur	.....
7. Mars	.....
8. Canif	.....
9. Année	.....
10. Achever	.....
11. Réfléchir	.....
12. Moyen	.....
13. Héritage	.....
14. Libraire	.....
15. Borne	.....
TOTAL NO. RECALLED	.....

APPENDIX 6

AN ABSTRACT OF

Three Techniques for Measuring Bilingualism:  
A Comparative Study

## APPENDIX 6

### AN ABSTRACT OF

#### Three Techniques for Measuring Bilingualism: A Comparative Study 1

The Report, prepared by the international experts in bilingualism meeting at the New Education Fellowship Congress in Geneva in 1933, and the factor analytic studies of Thurstone and of Carrell, isolating a verbal memory factor and a speed of comprehension factor, each of which differentiated between the ability of individuals to master language, gave rise to the following hypotheses:

1. There is no statistically significant relationship between scores on a bilingual background questionnaire and scores on a test of verbal memory.

2. There is no statistically significant relationship between scores on a bilingual background questionnaire and scores on a test of speed of comprehension.

An ethnic survey was made of an entire inspectorate in the English Separate Schools of Ottawa, embracing 2056 pupils of Grades VI, VII, and VIII, to whom were administered a modified form of the Hoffman Bilingual Background Schedule.

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1 Sister Mary Andrew Hartmann, Three Techniques for Measuring Bilingualism: A Comparative Study, Doctoral thesis presented to the School of Psychology and Education of the University of Ottawa, Ottawa, 1961, 97 p.

Only those cases involving a bilingual combination of English and French were considered for this research. A cutting score of .90 was established and yielded an experimental group of fifty-four boys and fifty-seven girls, who formed the research sample.

Tests of verbal memory and speed of comprehension were devised in each language. Through pilot studies the equivalence in difficulty of the English and French forms of each technique was established. The optimum time limits for the administration were arrived at through three pilot studies.

The new techniques were then administered in random order to the 111 pupils in the experimental group. To each was given the Dominion Test of Learning Capacity.

Correlation techniques were employed to establish the intercorrelations among the four instruments. Partial correlations were computed for the bilingual background questionnaire scores with those of verbal memory and of speed of comprehension, holding learning capacity constant. A multiple correlation was derived by combining the two new techniques in correlation with bilingual background.

Three of the six correlations were found to be significant at the  $p = .05$  level of significance:

Bilingual background with verbal memory  
Bilingual background with speed of comprehension  
Speed of comprehension with learning capacity.

The two null hypotheses proposed in this study were, therefore, rejected.

The multiple correlations though significant at the  $p = .05$  level, suggested the probability that the two techniques when combined would yield a stronger relationship with bilingual background.

Learning capacity was not found to play a significant role. None of the relationships prevailing would admit of the possibility of the three techniques being used interchangeably as measures of degree of bilingualism. Suggestions for further research are outlined.