

THE UNIVERSITY OF MANITOBA

BILINGUALISM, SOCIOECONOMIC STATUS, INTELLIGENCE AND
SCHOLASTIC ACHIEVEMENT OF SOME
FRANCO-MANITOBAN STUDENTS

by

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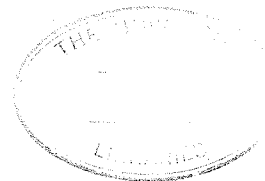
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AN ABSTRACT

The purpose of this study was to obtain more insight into the French-English bilingualism of Franco-Manitoban students and to study the intellectual and academic characteristics associated with the different types of bilinguals. As well, it was deemed appropriate to probe into other (personal and demographic) factors: school grade level, sex, socioeconomic status, proximity of residence to the city, use of each language and exposure to each language, in an attempt to circumscribe those factors which determine whether an individual belongs to one type of bilingualism or to another.

A questionnaire was devised and administered by the writer to a random sample of 185 Grade 4 and Grade 8 Franco-Manitoban students of Seine River School Division.

The first and foremost finding of the study was the absence of subjects who could be classified as bilinguals with a French dominance on the basis of their results on the Word Association Test and on the Word Detection Test; indeed, all subjects showed an English dominance; some a low English dominance and others a high English dominance.

A significant difference was found between socioeconomic status and types of bilingualism with subjects of high SES being more linguistically assimilated. According to expectations also, subjects of high SES obtained better results on scholastic achievement measures and on tests of verbal intelligence and non-verbal intelligence than middle SES subjects and middle SES subjects obtained better results than low SES subjects.

With respect to type of bilingualism, neither scholastic achievement nor verbal or non-verbal intelligence were found to be statistically significant. Unexpectedly, however, the bilinguals with a low English dominance scored slightly better than their counterparts on scholastic achievement and verbal intelligence. With respect to non-verbal intelligence, the bilinguals with a high English dominance surpassed the bilinguals with a low English dominance.

As far as the other variables of sex, school grade levels and geographic regions were concerned, it was found that boys were more assimilated than girls, Grade 4 students were more assimilated than Grade 8 students, and subjects living in closer proximity to the city were more assimilated than those living further away.

With respect to the use of the two respective languages by the students and to the exposure of the students to these languages outside of the classroom situation, the observations provided some explanation for the large incidence of bilinguals with an English dominance. Less than half of the students reported that they themselves spoke French at home from 75% to 100% of the time, 74% indicated that their television set was turned on the French channel less than 25% of the time, and over half of the students reported that they spoke French less than 25% of the time during recess at school and with their friends outside of school.

The observations and the conclusions of this study raise other questions, however, which certainly warrant further research. More sophisticated and more diversified measures of the degree of bilingualism of a broader cross section of Franco-Manitoban students from across the province would undoubtedly enable one to produce a more accurate description and hence a better comprehension of the population studied.

The nature and the extent of the influence of television are probably underestimated or at least not recognized fully as a factor of linguistic assimilation. More research is likewise needed to differentiate the types of bilinguals with respect to different domains (e.g. home, school, playground); and finally, a re-testing operation with the same subjects after a few years have elapsed would produce valuable information relative to the acceleration or the deceleration of the assimilation process.

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CHAPTER I

INTRODUCTION

Bilingualism and multilingualism in school children have generated considerable concern on the part of educators. Researchers have explored the field in various ways and have reached different conclusions. Several investigators have concluded from their studies that bilingualism has a detrimental effect on intellectual functioning and scholastic achievement. Other investigations have found little or no influence of bilingualism on intelligence and scholastic achievement. Finally, a third group of studies have been encountered which indicated that bilingualism correlated positively with intelligence and scholastic achievement.

Regardless of which conclusions are correct, the fact remains that there are bilinguals in schools, for whom the best possible programmes should be developed. It appears logical to examine this group carefully to see if it is not itself composed of various subgroups of intellectual capacity, scholastic achievement, socio-economic status, etc. Then results will likely emerge indicating various kinds of relationships between bilingualism and the other variables. Hopefully, this will shed light on the whole issue.

Finally, it is believed that while the monolingual-bilingual differentiation may be a worthwhile avenue of investigation, so is the bilingual sphere itself. An attempt will be made here to identify the various types of bilingualism within the student population and then to determine whether any significant differences exist between

these types of bilingualism and such other factors as scholastic achievement, verbal and non-verbal intelligence, socioeconomic status, etc.

I. SIGNIFICANCE OF THE STUDY

Bilingualism or policies favoring bilingualism seem to be enjoying accrued popularity in Canada. Indeed, our federal government is promoting bilingualism at an unprecedented rate. Also, our provincial government has recently enacted Bill 113 permitting a wide latitude in the kinds of bilingual programmes that may be established. English and French are now recognized as "languages of instruction"¹ and other languages may now be taught as subjects in the schools of Manitoba. Ironically, while governments are traditionally known to account for much of the cultural lag in society, the Manitoba Government, with its permissive legislation in the area of languages of instruction, may have taken a step which school personnel may not be prepared to follow. As pointed out earlier, a considerable amount of research has been carried out in the broad field of bilingualism on the international scene and an increasingly large number of studies have appeared on the national scene, but no thorough or scientific study has ever focussed its attention on the bilingualism of the French-English bilinguals of Manitoba and on the educational implications of such bilinguals being plunged into bilingual educational programmes.

¹Bill 113, an Act to Amend the Public Schools Act of Manitoba (2). (Assented to July 16, 1970).

Therefore, before embarking into bilingual educational programmes of considerable scope in our province, it seems appropriate, indeed imperative that a research mechanism be established to work on two fronts. First of all, it appears logical that other experiments and existing research be carefully reviewed in order to avoid the pitfalls experienced elsewhere. Secondly, but of equal importance, more information is required relative to both the environmental and personal factors which characterize the student population involved. Dominance in either of the two languages, for example, as opposed to balanced bilingualism appears to be an important a priori consideration to the planning of curricula and to the decision of the respective doses of instruction to be administered in each of the two languages.

Enlightened decision-making at both the curriculum planning and administrative levels rests upon the availability of such information. If bilingual educational programmes are devised and established without due consideration of these factors, such programmes may not attain the degree of success that is hoped of them; indeed, they may seriously jeopardize the academic progress of the students for whom they are intended.

II. STATEMENT OF THE PROBLEM

The object of this study then, is to determine the types of bilingualism and the dominant language of the Franco-Manitoban students of Grades 4 and 8 of Seine River School Division. As well, it is hoped that relationships may be established between the types of bilingualism of the subjects and the other variables. More speci-

fically, this study will attempt to answer the following questions:

- 1) What percentage of the sample of Seine River Franco-Manitoban students of Grades 4 and 8 can be classified as "balanced bilinguals"? What percentage can be classified as bilinguals with a French dominance? What percentage can be classified as bilinguals with an English dominance?
- 2) Is there a relationship between type of bilingualism and socioeconomic status?
- 3) What is the relationship between type of bilingualism and socioeconomic status on measured scholastic achievement?
- 4) What is the relationship between type of bilingualism and socioeconomic status on measured verbal intelligence?
- 5) What is the relationship between type of bilingualism and socioeconomic status on measured non-verbal intelligence?
- 6) Is there a relationship between school grade level and type of bilingualism?
- 7) Is there a relationship between the geographic regions where the subjects reside and their type of bilingualism?
- 8) Is there a relationship between the sex of the subjects and their type of bilingualism?

III. THE HYPOTHESES

In order to establish a relationship between type of bilingualism and the other variables mentioned earlier, the following null hypotheses were formulated and were tested:

1. For students of different socioeconomic level, there is no significant difference in their type of bilingualism.

2. For students of different school grade levels (Grade 4 and Grade 8), of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of scholastic achievement.

3. For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of verbal intelligence.

4. For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of non-verbal intelligence.

5. For students of different regions within the school division, there is no significant difference in their type of bilingualism.

6. For students of different regions within the school division, there is no significant difference in their type of bilingualism.

7. For boys and girls, there is no significant difference in their type of bilingualism.

IV. THEORETICAL ASSUMPTIONS

1) It was assumed that the Franco-Manitoban students of the Seine River School Division, even those with a French language dominance, were sufficiently proficient in the English language to obtain valid results on the Lorge-Thorndike test of intelligence and on the Canadian Test of Basic Skills, both administered in English.

2) It was also assumed that Grade 4 students have a sufficiently long attention span to deliver maximum output on the battery of tests of bilingualism, to obtain valid results.

V. DELIMITATIONS

The present research topic was originally very ambitious in depth and in scope of population size to be studied. However, because of problems of time and cost, circumscription became necessary. Consequently, the following delimitations must be noted:

1) The sample studied will be restricted to those students of Grades 4 and 8 enrolled in the schools of Seine River School Division. These two grade levels have been selected because they represent the lower and the upper limits respectively for which scholastic achievement and intellectual ability scores are available.

2) One ultimate concern of this study is the application of Bill 113 in the schools of Manitoba. However, although the provisions of this Bill allow all students in the province to avail themselves of a bilingual education, indications are that in the foreseeable future, the majority of students who will enroll in such French-English bilingual programmes will be students whose mother tongue is French and who have maintained a reasonable command of the French language. It is felt that if these students are to have maintained a reasonable command of the French language they would have to be from families where the parents speak French at home at least 75 percent of the time. The sample will, therefore, be restricted to subjects who satisfy the above conditions. No attempt will be made to compare bilinguals with monolinguals.

3) One measure only of intelligence, the Lorge-Thorndike Intelligence Test result will be considered since it is the only one uniformly administered throughout the school division. It does, however, produce a verbal score and a non-verbal score.

VI. DEFINITION OF TERMS

Franco-Manitoban Student

Subjects for the sample were selected among all those students in the designated grade level of a given school who had been identified by the principal and/or teacher as students whose parents probably spoke French at home "most of the time". All students so identified by the school authorities will henceforth be referred to as Franco-Manitoban students for the purpose of this study. Whether their parents did speak French at home most of the time was, of course, verified further in the students' questionnaires. Those who indicated that their parents spoke French at home less than 75 percent of the time (there were nine such cases) were discarded,

Socioeconomic Status

Socioeconomic status was established from Part III of the questionnaire. Part III of the questionnaire is a modern adaptation of Sewell's "Family Socioeconomic Scale" (Short Form). Three levels of socioeconomic status were established in the following manner: the top third of the subjects were considered as belonging to the high socioeconomic level, the middle third were classified as the middle socioeconomic level and the bottom third as the low socioeconomic level. (See Appendix C for a Discussion of Sewell's SES Scale).

Language Dominance

It is suggested by G. L. Tan¹ that bilingualism and monolingualism may be thought of as opposite extremes of a continuum. This study

¹G.L. Tan, "Bilingual education and its inherent problems, with special reference to Burma", Unpublished Doctoral Dissertation, University of California, 1947, cited in Natalie T. Darcy's "Bilingualism and the measurement of intelligence: review of a decade of research, The Journal of Genetic Psychology, 1963, Vol. 103, p. 259.

attempted to identify three distinct groups within the continuum. More specifically, reference will be made to balanced bilinguals (subjects scoring from -15 to +15 on the Word Association Test and on the Word Detection Test combined), bilinguals with an English dominance (subjects scoring less than -15 on the Word Association Test and on the Word Detection Test combined), and bilinguals with a French dominance (subjects scoring more than +15 on the Word Association Test and on the Word Detection Test combined). When it was discovered that no subjects with a French dominance emerged from the sample, the groups were merged into two categories: bilinguals with a low English dominance (subjects scoring -15 and upwards on the Word Association Test and on the Word Detection Test combined), and bilinguals with a high English dominance (subjects scoring -16 and downwards on the Word Association Test and on the Word Detection Test combined).

Seine River School Division

Seine River School Division is situated in the south-eastern corner of the Province of Manitoba. It extends some 80 miles, encompassing the French-speaking communities of St. Norbert, St. Adolphe, Ile-des-Chênes, Lorette, Ste. Anne, Richer, La Broquerie and Woodridge. The student population of the division is approximately 4,000, of which approximately two-thirds are French-speaking.

CHAPTER II

REVIEW OF RELATED LITERATURE

While there is a dearth of literature and research pertaining to bilingualism in Manitoba, it is very abundant on the national and international scene. An attempt will be made in this chapter to cover the wide scope of these writings by dealing with a representative sample of them.

The greater portion of the research and hence of the discussion in this chapter, focusses on the relation between bilingualism and intelligence. The greater emphasis on intelligence as a factor of bilingualism appears justifiable because of its all-encompassing nature; for example, it is widely accepted as a prime determinant of scholastic achievement. With respect to SES, its inclusion is primarily intended as a control variable; as will be pointed out in this review, many investigators in the field have failed to take it into account and thereby invalidated their results to a certain extent.

I. PROBLEMS IN RESEARCH WITH BILINGUALISM

While the studies dealing with the relation between bilingualism, intelligence and scholastic achievement are numerous, no conclusive statement can be made nor can any agreement be reached because many of the findings are contradictory. These contradictions are due in no small measure to the fact that many of the problems involved in the research of this particular field are very difficult to isolate and identify. Moreover, it has been difficult to arrive at a consensus on the tools or measurement devices that would facilitate a standard

identification of the various factors involved.

Therefore, before presenting these various representative studies, it seems pertinent to give a brief overview of some of the complicating factors involved in this field of research.

Divergent Definitions

The term "bilingualism" itself is defined differently by various researchers. Bloomfield¹, for example, defined bilingualism as "a native-like control over two languages", while Leopold² contended that bilingualism is present even when one language is spoken better than the other, as long as both are regularly used as media of discourse.

O'Doherty³ made another differentiation; he distinguished between the bilingual who has mastered two languages as media of social intercourse and the pseudo-bilingual who, technically, may be considered to have some knowledge of a second language but who, in practice, may not have mastered either language. Finally, Tan⁴ suggested that bilingualism and monolingualism may be thought of as opposite extremes of a continuum with a continuum for each aspect of language. He added that most people do not attain perfect achievement in all aspects of the vernacular, and that it is rare for bilinguists to approach this goal in two languages.

¹L. Bloomfield, Language, New York: Holt, 1933, p. 56.

²W. F. Leopold, "Speech Development of Bilingual Child: A Linguistic Record", Chicago: Northwestern University, 1939, p. 6.

³E. F. O'Doherty, "Bilingualism: Educational aspects", Advanc. Sci., 1958, Vol. 56, p. 285.

⁴G. L. Tan, loc. cit.

Determining Degrees of Bilingualism

The difficulty of measuring the degrees of bilingualism tended to be ignored by the early investigators of the problem of determining the effect of bilingualism on measured intelligence. Obviously then, in the analysis of each of the studies, if subjects were grouped together regardless of whether their respective degrees of bilingualism were situated at either end of the continuum of which O'Doherty speaks, then the results could not have been very significant. This incongruency was discovered, however, by more recent researchers and an attempt has been made in most recent studies to measure objectively the degrees of bilingualism of the subjects studied. This will be discussed at length in the closer examination of the various representative studies selected for discussion in this paper.

Types of Intelligence Tests Used

The instruments used for measuring the intelligence of bilingual subjects are almost as numerous as the number of studies themselves. As well, the results achieved have shown comparable variance. Early investigators tended to use only verbal tests of intelligence of a group type. The reliability of such tests has been questioned and it has since been accepted that if such tests are used, while their results may contain valuable indications, they certainly must not be used indiscriminately but rather very cautiously. Furthermore, with respect to bilingual subjects, it has been clearly demonstrated that the results of intelligence tests can be even more delusive. Consequently, the practice of administering solely verbal intelligence tests has more recently been supplanted. The other extreme, however, of using only non-verbal tests of intelligence can be said to be an equally

questionable practice. Darcy⁵ suggests that the most promising method of appraising the intelligence of the bilingual child lies in the consideration of both verbal and non-verbal tests of intelligence, preferably of the individual type.

Isolation from Other Environmental Factors

Possibly the most crucial yet a fairly frequent problem of the earlier investigations was the failure of the investigators to isolate the bilingual influence from other environmental factors. Such factors as the socioeconomic and cultural backgrounds, and the degree of identification and/or similarity with persons of both language groups may all be more significant factors and hence bear greater effects upon the measurement of intelligence than bilingualism per se.

Relation of Language to Conceptual Thinking

It is widely accepted that language is necessary in the formation of concepts. Consequently, if a bilingual child, and even more so, a "pseudo-bilingual child", is administered an intelligence test in a language of which his knowledge is imperfect, it seems reasonable to assume that the child's score would be depressed. This has not always been taken into account by early investigators.

Having examined some of the more common problems faced by the student of the effects of bilingualism on the measurement of intelligence, a representative number of studies which have succumbed as well as a representative number of more recent studies which have attempted to evade the above-noted pitfalls will be reviewed.

⁵Natalie T. Darcy, "The effect of bilingualism upon the measurement of intelligence of children of preschool age," in Journal of Educational Psychology, 1940, Vol. 37, p. 28.

II. EARLIER RESEARCH

As early as the 1920's, psychologists, linguists and educators became interested in bilingualism and its effects on intelligence and scholastic achievement. As would be expected, however, many of the pioneer investigators in this field became entangled in a much broader problem than that which they had set out to study. Although these studies lacked the scientific rigor which is expected nowadays, it is interesting to follow the development and refinement of the research techniques used. An attempt will be made to outline this gradual process as evidenced through a sample of representative studies. For purposes of division in this chapter, studies conducted from the 1920's to the 1950's will be classified as EARLIER RESEARCH, while studies conducted from the 1950's on will appear under the topic: RECENT RESEARCH. The early 1950's have been selected as a dividing point because it does correspond to a real turning-point in the degree of sophistication with which investigations were handled.

Negative Relation Between Bilingualism and Intelligence

A further sub-division seems to be warranted in this section. Indeed, a considerable number of studies arriving at the conclusion that there is a negative relation between bilingualism and intelligence found that this was so as evidenced by the results of monolinguals and bilinguals, with monolinguals scoring higher on both verbal and non-verbal tests. On the other hand, a substantial number reported that monolinguals scored better than bilinguals on verbal tests, but that bilinguals scored better or as well as monolinguals on performance or

non-verbal tests. The studies falling in the first category will be reviewed first, followed by those of the second category.

In 1923, Saer⁶ conducted a series of experimental investigations to determine the effect of bilingualism on the measurement of intelligence. The sample included 1,400 children from five rural and two urban districts in Wales. Welsh was the mother tongue in six of these districts; the rural children learned English at school while in the case of the urban children, English was the language of their play activities as well as the language spoken at school. The seventh district was one where English was the mother tongue. The 1916 Stanford-Binet Scale was administered to all subjects. These tests were translated into the Welsh language for those whose mother tongue was Welsh in order to satisfy the assumption that the mother tongue is the best oral medium by which a just estimate of a child's mental capacity can be gained. The results on the tests were as follows:

Urban bilingual group -- median I.Q.: 100

Urban monoglot group -- median I.Q.: 99

Rural bilingual group -- median I.Q.: 86

Rural monoglot group -- median I.Q.: 96

Although information had been obtained concerning the socioeconomic backgrounds, home language and age of each child, no attempt was made to match monoglots to bilingualists with respect to these factors. The single most outstanding observation was the significant inferiority of the rural bilingualists and that this inferiority became consistently greater each year, from 7 to 11 years of age. A vocabulary test administered on the same group of children led Saer to the conclusion

⁶D. J. Saer, "Effect of Bilingualism on Intelligence", British Journal of Psychology, 1923, Vol. 14, pp. 25-38.

that "mental confusion" occurs more often in the bilingual child than in the monoglots. Another test administered to 939 college students in Wales revealed that the monolingual students showed a "considerable superiority" over the bilingual students from the rural districts of Wales. However, the difference in the measurement of intelligence between monolingual and bilingual students from urban areas was found to be "inconsiderable". As a result, Saer stated that the difference seemed to be of a permanent nature since it was seen to persist in students throughout their university years.

Saer's general conclusion was that children who became bilingual at an early age, by learning the second language during their play and in contact with other children, have an advantage over those who learn the second language at school.

An important consideration must be kept in mind, however, in analyzing Saer's results and his conclusions: the Stanford-Binet Scale was translated into the Welsh language for the children who spoke Welsh at home. However, it must be realized that the translation of a standardized test is not the equivalent of the test in the language in which it was originally standardized.

In the same year (1923) Colvin and Allen⁷ reported an investigation of 50 children of native parentage and 50 children of Italian parentage who were attending grades 5 through 8 in the public schools of Providence, Rhode Island. All subjects were given the National Intelligence Test and the 1916 Stanford-Binet Scale. The results were as follows:

⁷S. S. Colvin and R. D. Allen, "Mental Tests and Linguistic Ability", Journal of Educational Psychology, 1923, Vol. 14, pp. 1-20.

	Stanford-Binet Test	National Intelligence Test
American group	92	85
Italian group	91	76

These results indicated that the children in both groups had a tendency to be rated lower in I.Q. by the National Intelligence Test than by the 1916 Stanford-Binet Scale; furthermore, this difference was greater for the Italian group. The authors concluded that an individual test constitutes a more accurate measure of intelligence than a group test.

Assessing the weight which is to be given to the linguistic factor when viewing intelligence test results they state that:

"while verbal ability may raise intelligence scores in some instances above the level of the actual intelligence of the person examined, its most marked effect is noted under the condition when the lack of such a facility unduly lowers such scores".⁸

A decade later (1932) Pintner⁹ administered the Pintner Language and Non-Language tests to monolingual and bilingual groups in each of three schools in New York City. No definite conclusions could be made; in one school monolinguals were superior on both tests while in another they were inferior, and in the third there was no difference between the groups. Even had the results shown any trend or consistency, their reliability would have to be qualified as doubtful since there was no control for socioeconomic class and bilingualism was determined by looking at the child's name.

⁸Colvin and Allen, op. cit., p. 3.

⁹R. Pintner, "The influence of language background on intelligence tests", Journal of Social Psychology, 1932, Vol. 3, pp. 235-240.

A series of other studies in the 1920's found that monolingual American groups performed better than children with various foreign backgrounds on intelligence tests. These are the studies of Graham¹⁰ (1925), Mead¹¹ (1927), and Wang¹² (1926).

Having examined studies that indicated superiority of monolinguals over bilinguals on both verbal and non-verbal intelligence tests, attention must also be given to the studies reporting that while monolinguals have the edge over bilinguals on verbal tests, the latter score as well or better than the former on non-verbal or performance tests.

One of the first studies to report such a finding was that of Barke¹³. His objective was to compare the general intelligence of pupils in certain bilingual and monolingual schools in South Wales. All 697 candidates (395 bilinguals, 302 monolinguals) were administered the Pintner Non-Language Intelligence Test and the Northumberland Standardized Test. The Northumberland Test, which is a verbal test of intelligence, was used chiefly as a check upon the non-verbal test. The results indicated:

¹⁰V. T. Graham, "The Intelligence of Italian and Jewish Children in the Health Clinic of the Massachusetts Division of Mental Hygiene", Journal of Abnormal Psychology, 1925, Vol. 20, pp. 371-376.

¹¹Margaret Mead, "Group intelligence and linguistic disability among Italian children", Sch. & Soc., 1927, pp. 465-468.

¹²S. L. Wang, "A demonstration of the language difficulty involved in comparing racial groups by means of verbal intelligence tests", Journal of Applied Psychology, 1926, Vol. 10, pp. 102-106.

¹³E. M. Barke, "A study of the comparative intelligence of the children in certain bilingual and monoglot schools in South Wales", British Journal of Educational Psychology, 1933, Vol. 3, pp. 237-250.

	Northumberland Test	Pintner N-L Test
Monolinguals	+ .8 of a year	
Bilinguals		+ .44 of a year

In drawing his conclusions, Barke advocated the use of the non-verbal test of intelligence when testing bilingual subjects; he said:

"All that can be claimed is that we have here an indication that bilingual children will not prove inferior to monoglots (with a similar social environment) in an improved intelligence test from which the linguistic element is excluded... It is indicated that under conditions of bilingualism, intelligence tests of a non-verbal nature should be used in preference or in addition to those in which success is conditioned by linguistic ability."¹⁴

Seidl¹⁵ also produced a rather well-controlled study in this category. His purpose was to determine the effect of bilingualism on the estimates of intelligence obtained on verbal and non-verbal tests. The 1916 Stanford-Binet Scale was used as the verbal test of intelligence and the Arthur Point Scale of Performance Tests as the non-verbal counterpart. A significant innovation in Seidl's study was to match his 240 subjects on sex and age. Unfortunately, this was not done in terms of the socioeconomic status; as a matter of fact, the median of parental occupations for the monolingual group fell in the Skilled Labor classification of the Good Enough Revision of the Barr-Taussig Scale, while the median of parental occupations for the bilingual group was in the Semi-skilled Labor classification of the same

¹⁴A. M. Barke, op. cit., pp. 249-250.

¹⁵J. C. Seidl, "The effect of bilingualism on the measurement of intelligence", Unpublished Ph.D. Thesis, New York: Fordham University, 1937, cited by Natalie T. Darcy, "A review of the literature on the effects of bilingualism upon the measurement of intelligence", Journal of Genetic Psychology, 1953, Vol. 82, p. 34.

scale. This lacuna must be taken into account when the results are studied. At any rate, an analysis of Seidl's results can be illustrated in the following manner:

<u>Average I.Q.</u>	Stanford-Binet Scale (V)	Arthur Scale (NV)
monoglots	96.25	96.21
bilinguists	91.61	100.41

A conclusion drawn by Peal and Lambert¹⁶ relative to the above cited studies and others demonstrating the detrimental effects of bilingualism, is that the studies lacked important controls.

They state:

"...the weight of evidence...seems to support the contention that there is no significant difference between monolinguals and bilinguals on non-verbal intelligence, but the bilinguals are likely to be handicapped on verbal intelligence measures."

No Relation Between Bilingualism and Intelligence

A number of studies aiming to establish a relation between bilingualism and intelligence reached the conclusion that there was no significant relation. Darsie's¹⁷ study of Japanese and American children in 1926 is one such example. On some tests, the Japanese subjects were inferior while on others the Americans were inferior. Serious limitations to the reliability of this study result from the fact that the social class of these two groups was not compared and no measure of bilingualism was used.

¹⁶Elizabeth Peal and Wallace E. Lambert, "The Relation of Bilingualism to Intelligence", Psychological Monographs: General and Applied, Whole No. 546, 1962, p. 4.

¹⁷M. L. Darsie, "The mental capacity of American-born Japanese children", Comp. Psychol. Monog., 1926, Vol. 3, pp. 1-18.

Several other studies accumulated similar inconclusive evidence: Arthur¹⁸ 1937, Bere¹⁹ 1924, Feingold²⁰ 1924, and Hirsch²¹ 1926. However, they lacked too many important controls to be considered reliable; this is also the opinion of Peal and Lambert²².

The best controlled study in this category is that conducted by Hill²³ in 1936 with Italian-American children. Bilingualism was determined by means of a questionnaire, tests and information by the teacher. Furthermore, the two groups were matched on sex, age, I.Q., socioeconomic class and mental age. Hill found no reliable differences in scores on verbal, non-verbal and performances between the Italian children who spoke Italian at home and Italian children who heard and spoke English at home. It must be noted, however, that since the language groups had been matched with respect to mental age, significant differences in intelligence test scores between the language groups, could not be expected. It is of interest, however, that

¹⁸G. Arthur, "The predictive value of the Kuhlmann-Binet Scale for a partially Americanized school population", Journal of Applied Psychology, 1937, Vol. 21, pp. 359-364.

¹⁹M. Bere, "A Comparative study of the mental capacity of children of foreign parentage", New York: Teachers College, Columbia University, 1924, p. 105.

²⁰C. A. Feingold, "Intelligence of first generation of immigrant groups", J. Educ. and Psychology, 1924, Vol. 15, pp. 65-82.

²¹N. D. Hirsch, "A Study of nation-racial mental differences", Genet. Psychol. Monog., 1926, Vol. 1, pp. 231-407.

²²Peal and Lambert, op. cit., p. 4.

²³H. S. Hill, "Correlation between I.Q.'s of bilinguals at different ages on different intelligence tests", Sch. and Soc., 1936, Vol. 44, pp. 59-90.

no reliable differences were found between the results which were achieved on the verbal and the non-verbal intelligence tests by the bilingual and monolingual groups.

It can be concluded that the reliability of the studies finding no significant relation between bilingualism and intelligence can be questioned since many of them lacked too many important controls and consequently may have failed to verify that which they had intended to verify.

Positive Relation Between Bilingualism and Intelligence

Finally, among the earlier research, although in a very definite minority, there are two noteworthy studies whose conclusions indicated a positive relation between bilingualism and intelligence. The first is that conducted by Davies and Hughes²⁴ in 1927. A large sample of 1894 Jewish and non-Jewish children, ranging in age from 8 to 14 years were given the Northumberland Standardized Test in Intelligence, English and Arithmetic. The information given relative to the control of variables was:

"the three schools in which the study was made, were chosen in an attempt to rule out differences due to variations in school teaching and home training, except in so far as these latter are due to racial customs and traditions."²⁵

The authors concluded that the superiority of the Jewish children was definitely marked. The Jewish group was found to be one year ahead of the non-Jewish group in intelligence and arithmetic, and one and a half years ahead of the non-Jewish group in English.

²⁴J. Davies and H. G. Hughes, "An investigation into the comparative intelligence and attainments of Jewish and non-Jewish school children", British Journal of Psychology, 1927, Vol. 18, pp. 134-146.

²⁵Ibid., pp. 135.

The validity of these results is certainly questionable, however, since no measure of bilingualism was used, assuming that the Jewish children were bilingual. Other controls such as age, sex, and social class were also absent.

A second study indicating a positive relation between bilingualism and intelligence is that conducted by Stark²⁶ in 1940 in Dublin. The Dawson Mental Tests (group intelligence tests) were administered to 271 bilinguals and to 271 monoglots who ranged in age from 10 to 12 years. The bilinguals were administered an Irish translation of the Dawson Mental Tests, Form B. This translated version was found to have a correlation of .84 -.02 with the English form of the test. A difference in mean score of five points, in favor of the monoglots, was found at ages 11 and 12. The differences in mean score between the two language groups at earlier ages were found to be negligible. When the Form A of the test was administered in English to 104 monoglots and 65 bilinguals, who had been selected at random from the original language groups who had received the Form B, a comparison of mean scores showed the bilinguals at age 10 to be superior to the monoglots of the same age by 13 points. At age 11, the difference was seven points in favor of the bilinguals.

Stark's conclusion was that children of "innate verbal facility" may find early bilingualism an asset to their mental development. However, the criticism raised against many investigations is again valid in this case; aside from selecting subjects of the same age range

²⁶W. A. Stark, "The effect of bilingualism on general intelligence: an investigation carried out in certain Dublin primary schools", British Journal of Educational Psychology, 1940, Vol. 10, pp. 78-79.

who attended schools in the same city, variables such as socioeconomic status, sex and degrees of bilingualism, which might have affected the results were not adequately controlled.

III. RECENT RESEARCH

Investigators interested in the area of the relation between bilingualism, intelligence and scholastic achievement in the 1950's and 1960's were becoming more and more aware of the pitfalls inherent to this area of research because of the numerous studies conducted in the preceding thirty years. By the early 1950's, it had become known that a research design must take into account such factors as age, sex, socioeconomic status and degree of bilingualism. Consequently, the majority of studies conducted since the early 1950's have at least attempted to make provisions for these factors.

A representative number of these studies will be reviewed in the same order as their earlier counterparts of the previous section.

Negative Relation Between Bilingualism and Intelligence

After surveying studies done prior to 1951, Jones and Stewart²⁷ concluded that bilingual and monolingual groups differed little in non-verbal intelligence and that monolinguals were usually superior in verbal intelligence tests. They, therefore, based the design of their experiment on these conclusions. A verbal test and a non-verbal test were given to monolingual and bilingual groups in rural districts. The two groups were equated statistically, by the analysis of covariance, on non-verbal I.Q. and the differences between them on verbal I.Q. were then noted:

²⁷W. R. Jones and W. A. Stewart, "Bilingualism and verbal intelligence", British Journal of Psychology, 1951, Vol. 4, pp. 3-8.

"It was therefore concluded that the bilingual children were significantly inferior to the monolingual children, even after full allowance has been made for the initial difference in the non-verbal intelligence tests."²⁸

That the bilinguals' scores on the verbal test be low is understandable because they worked with tests translated into Welsh that were not standardized. However, this would not account for the difference in non-verbal I.Q. Jones admitted later, however, that the differences may have reflected more occupational variations than linguistic variations. James went so far as to say of Jones' complete work that it:

"...has drawn attention to the influence of socio-economic factors in comparisons between groups of monolingual and bilingual children and has emphasized the importance of such factors in the correct interpretation of test results."²⁹

A more recent Welsh study, which assessed linguistic background by means of a questionnaire, and compared this assessment with teachers' ratings was conducted by Lewis.³⁰ The results indicated that the mean scores of the subjects increased as the Welshness of background decreased. The mean score of the children who spoke no Welsh was one which corresponded to eight I.Q. points higher than the mean score of those who came from homes where only Welsh was spoken. Jones, who had himself been criticized on this point, lodged the criticism that Lewis had given inadequate treatment to socioeconomic class.

²⁸Jones and Stewart, op. cit., pp. 7.

²⁹C. B. E. James, "Bilingualism in Wales: An aspect of semantic organization", Educational Research, 1960, Vol. 2, pp. 130.

³⁰D. G. Lewis, "Bilingualism and non-verbal intelligence: A further study of test results", British Journal of Psychology, 1959, Vol. 29, pp. 17-22.

Another study, that conducted by Levinson,³¹ compared the performance of bilingual and monolingual native-born Jewish pre-school children of traditional parentage on four intelligence tests to determine the test or test items which would be most suitable for appraising the intelligence of the bilinguals. Both groups were classified as to fathers' occupations according to the U.S. census data. The results indicated that there was no correlation between intelligence and socioeconomic background in either group. The monoglots surpassed the bilinguals on the verbal tests of intelligence and on one of the three performance tests.

No Relation Between Bilingualism and Intelligence

Among the recent studies of the effect of bilingualism on intelligence reporting insignificant relation is that of Kolaska.³² The study involved 237 bilingual Polish-American high school and college students. Four independent variables: bilingual background, socioeconomic status, bilingual achievement and the level of intelligence were noted and evaluated. The dependent variable was the performance on the L subtest of the A.C.E. Psychological Examination. Neither socioeconomic status nor degrees of bilingualism influenced performance on the test and those individuals who were highly bilingual did neither better nor more poorly than those who were moderately bilingual. The author concluded that, at the high school or

³¹B. M. Levinson, "A comparison of the performance of bilingual and monolingual native-born Jewish preschool children of traditional parentage on four intelligence tests", Journal of Clinical Psychology, 1959, Vol. 15, pp. 74-76.

³²B. J. Kolaska, "The relation between bilingualism and performance on a linguistic intelligence test", Dissertation Abstract, 1954, Vol. 54, pp. 2396.

college level, neither aspect of bilingualism seemed to influence performance on a linguistic type of intelligence test. Thus study is particularly interesting because few investigators have attempted such controlled studies of the question of bilingualism and its effects on intelligence tests of a linguistic type at the higher educational levels.

Positive Relation Between Bilingualism and Intelligence

All of the studies examined so far were conducted in foreign countries; none of them in Canada even though Canada is officially bilingual and even though bilingualism has been a concern of many in Canada for many years. In 1962, Elizabeth Peal and Wallace E. Lambert of McGill University decided that it was time to fill the gap; they developed a very comprehensive and carefully thought out research design which they administered to all of the ten-year-old children of six French schools under the jurisdiction of the Catholic School Commission of Montreal. As enunciated in their objectives, their intentions were:

"to examine more extensively the effects of bilingualism on the intellectual functioning of children and to explore the relations between bilingualism, school achievement, and students' attitudes to the second language community."³³

This paper, interested primarily in the effects of bilingualism on intellectual functioning and scholastic ability, will examine only that part of Peal and Lambert's study dealing with these aspects.

Because of the results of previous studies in this field, it was predicted that the two groups of subjects, monolinguals and bi-

³³Peal and Lambert, op. cit., p. 7.

linguals, should not differ significantly on non-verbal I.Q., but that they should differ on verbal I.Q. as measured by intelligence tests standardized in the native language of both the monolinguals and bilinguals; the monolinguals being expected to perform significantly better than the bilinguals on the verbal tests. The groups were matched on socioeconomic class, sex, and age. Several measures of degree of bilingualism were employed to determine objectively the bilingualism of each subject. Also, a wide variety of intelligence tests were used so as to measure the different types of intelligence and to verify the hypothesis that the structure of intellect might be different for the two groups of subjects. This was, in effect, an attempt to investigate not only the quantitative effect of bilingualism on intelligence, but, as well, the very nature of such an effect.

The first hypothesis, that the two groups would not differ significantly on non-verbal I.Q. was not supported. The bilingual group performed significantly better on the Raven Progressive Matrices. and the Lavoie-Laurendeau Non-verbal I.Q., and on most of the subtests of the non-verbal type. The bilinguals also scored significantly higher than the monolinguals on the Lavoie-Laurendeau Verbal I.Q.; this is in direct contradiction to the original projection. The groups performed differentially on subtests of intelligence, as was expected. On certain subtests of the non-verbal type there were no significant differences between the groups, while on others, both verbal and non-verbal, the bilinguals performed better in differing amounts. However, on none of the subtests did the monolinguals exceed the bilinguals.

IV. BILINGUALISM AND SCHOLASTIC ACHIEVEMENT

The results of studies of the effects of bilingualism on scholastic achievement are probably as varied and contradictory as have been demonstrated to be those of the effects of bilingualism on intelligence. Here again, a review of a representative sample will suffice to illustrate this point.

In 1957, Carrow administered the California Achievement Test of problem arithmetic to both bilinguals (Spanish-English) and unilinguals (Spanish) in Texas and found a highly significant difference in favor of the unilinguals.³⁴

Macnamara³⁵ conducted a study in Ireland in the early 1960's involving 2,000 primary school children. He found a retardation of about eleven months (arithmetic age) in school achievement in problem arithmetic when arithmetic was taught in Irish to native English speakers.

Another particularly interesting study is that of Professor William F. Mackey³⁶ involving the students of the John F. Kennedy Schule in Berlin. This school accepted both unilingual German children and unilingual English-speaking children of families stationed in Berlin. In this study, the Iowa Achievement Test was administered at the end of every second year starting from the third grade. The overall results indicated that the American pupils in the school did

³⁴Sister Mary Arthur Carrow, "Linguistic Functioning of Bilingual and Monolingual Children", Journal of Speech and Hearing Disorders, XXII (1957), pp. 371-380.

³⁵J. Macnamara, Bilingualism and Primary Education, Edinburgh University Press, 1966, p. 126.

³⁶W. F. Mackey, Bilingual Education in a Binational School, Rowley, Massachusetts: Newbury House Publishers, 1972, p. 76.

as well as 65 percent of the comparable American pupils in the United States--the average percentile of the American pupils was 65. German pupils of the same school did as well as 45 percent to 50 percent of the pupils in the United States when tested by the same instrument, that is, the Iowa Achievement Test administered in English.

Welsh researches have produced abundantly in the area of bilingualism; admittedly, more with respect to intelligence, nevertheless, some throw indirect light upon the study of bilingualism in relation to scholastic achievement.

In Jones'³⁷ 1952 study concerned with the language handicap of Welsh-speaking children in an English verbal intelligence test, some useful information was provided concerning the reading ability of bilingual children in their second language. Jones used Schonell's Graded Reading Vocabulary Test for measuring the children's mechanical word pronouncing ability, and the Watts-Vernon Silent Reading Test to assess their knowledge of word meanings and comprehension of sentences and paragraphs. It was found that there was a steady rise in reading age in English as one passed from lower to higher levels of initial non-verbal mental ability--a 3.7-year difference between the 60 I.Q. category and the 120 I.Q. category. In a further investigation, Jones found a highly significant difference in English Reading (Comprehension) between monoglot and bilingual groups, aged ten to twelve, of the same levels of non-verbal intelligence. Upon extending the analysis even further into the area of the rural-urban differen-

³⁷W. R. Jones, Bilingualism in Welsh Education, Cardiff, University of Wales Press, 1966, pp. 117-145.

tiation and into the area of the results of the Welsh children in English Reading and of English children in Welsh Reading, Jones concluded:

"It, therefore, appeared that differences in English attainment between English and Welsh groups of equal intelligence and of similar social status were more significant in rural areas than in urban areas, whereas exactly the reverse was true in the case of the corresponding differences in Welsh Reading Comprehension. It was also evident from the results that the performance of the Welsh group in English as a second language was vastly superior to that of the English group in Welsh as a second language. These findings clearly illustrate the extent to which an adequate degree of supporting linguistic background may contribute to success in the acquisition of a second language."³⁸

Probably the most comprehensive and the most revealing evaluation of the effect of bilingualism on scholastic achievement is that undertaken by a McGill team on the children of the St. Lambert experiment. This experiment involved English-speaking children at the Kindergarten and Grade I levels where French was the language of instruction. In Grade II, English instruction was introduced through English Language Arts with French remaining the main language of instruction. While each new group of students entering the program was evaluated on a yearly basis, it will suffice for the present purposes to cite only the results of the first group of students at the end of their Grade IV with respect to their development of skills in their home language--English, with respect to their progress with French and with respect to their competence in the non-language subject matter taught via the French language--mathematics. The experimental pupils demons-

trated that they were able to read, write, speak, understand and use English as competently as the English control group. For example, the adjusted means of the experimental pupils were even slightly higher than the English control group in the following sub-sections of the Metropolitan Achievement Test: Word Knowledge, Word Discrimination and Reading.

If the above strike as being unexpected findings, the results of the experimental children on their competence in French are even more so. Indeed, it was demonstrated by their results on the Test de Rendement en Français that they as a class performed better than approximately one-half of the French-speaking pupils at their grade level in the normative sample. Also, the Experimental and French control groups were found to perform equally well on the test of Listening Comprehension. Finally, the experimental class was not significantly below the French control class on the French version of the Peabody Picture Vocabulary Test.

Finally, with respect to achievement in mathematics (the non-language subject taught via the French language), the results were also most positive. There were no significant differences among the groups on Computational Skills or Problem Solving as measured by the Metropolitan Test. To place these results in the proper perspective, it must be reiterated that the Metropolitan Test is an English instrument and that the experimental group had received all of their instruction in mathematics through French. On the Lorge-Thorndike measure, also administered in English, the experimental group scored better than the English control group. Finally, on the Test de Rendement en Calcul, they scored better than approximately 50 percent of the Grade 4 French pupils in Greater Montreal.

Lambert and Tucker conclude their research with the reassuring comment:

"After five years, we are satisfied that the Experimental program has resulted in no native language or subject matter (i.e. arithmetic) deficit or retardation of any sort, nor is there any cognitive retardation attributable to participation in the program."³⁹

Another noteworthy study is that conducted by Barik, Swain and McTavish with French immersion classes at Allenby Public School in Toronto. The Allenby program was modeled after the one in St. Lambert discussed earlier. There is one important difference, however, between the St. Lambert and the Allenby experiments; St. Lambert is a suburb of Montreal, therefore, it is situated in a bilingual milieu, whereas Allenby Public School in Toronto is located in a unilingual English environment.

The French immersion program at Allenby was started in September, 1971, with two kindergarten classes. The following year, the program was continued at the kindergarten level and it was extended to Grade I. The plan calls for English Language Arts to be introduced in Grade II on the basis of one hour per day and to increase gradually the amount of English instruction subsequently until approximately half of the curriculum is taught in French and half in English. The testing program at the kindergarten level included the Metropolitan Reading Test (Form A), the Stanford Early School Achievement Test (Level I) and a French Comprehension Test. The results of this testing program carried out in the Spring, 1973, reveal that at the end of the kindergarten year of an immersion program, the pupils "are as ready

³⁹W. E. Lambert and G. R. Tucker, Bilingual Education of Children--The St. Lambert Experiment, Newbury House Publications, Inc., 1972, p. 152.

to enter an English grade one as are pupils who have attended an English kindergarten, as far as numerical and English pre-reading skills are concerned".⁴⁰ Furthermore, with respect to French comprehension, the immersion group's results were compared with the results of English classes on an English version of the same test. It was found that the kindergarten children in the French immersion program could understand simple short stories in French as well as their counterparts in the regular program did in English.

The testing program also included those students who had completed their second year in the immersion program. The Metropolitan Achievement Test (Primary I Battery, Form A), a French Comprehension Test, Grade One Level, the Test de Rendement en Français (Grade 1 Level, 1971-72 edition), and the Test de Rendement en Mathématiques (Grade 1 Level, 1971-72 edition) were administered.

The results from these tests were found to be equally positive; the pupils in the French immersion program at the end of grade one were found to stand between the 40th and 60th percentiles, suggesting that transfer of reading skills to English occurred even without formal reading instruction in English and it is the contention of the researchers that this slight lag will disappear once formal reading instruction in English is introduced.

It was further found that these pupils in the French immersion program at the end of grade one had mastered as much mathematical knowledge via French as the pupils attending a regular English program had

⁴⁰H. C. Barik, M. Swain and K. McTavish, "Immersion Classes in an English Setting: One Way for Les Anglais to Learn French", Working Papers on Bilingualism, Bilingual Education Project, OISE, Issue No. 2, March 1974, pp. 38-59.

via English, and could transfer this knowledge from French to English. With respect to French comprehension, although not attaining the proficiency of native French-speaking peers, these pupils had achieved a level far superior to the English-speaking counterparts who receive 20-40 minutes per day of instruction in French as a second language.

V. THEORETICAL CONSIDERATIONS

Having examined a substantial number of representative statistical studies dealing with the effect of bilingualism on intelligence and scholastic achievement from as early as the 1920's to the most recent, a discussion of the theoretical considerations underlying these studies is warranted.

To summarize briefly, it can be said that the majority of investigations found that bilinguals generally achieved lower scores on verbal intelligence tests whereas the difference on non-verbal tests was generally insignificant. What would explain this apparent detrimental effect? With respect to scholastic achievement, the results appear to be very contradictory. Is there any explanation that might account for this phenomenon?

Negative Effects of Bilingualism

Few of the psychologists who have studied this problem have attempted any explanation beyond rather vague references to a "language handicap" or "mental confusion". Other adherents of the theory that bilingualism has detrimental effects on intelligence and scholastic achievement contend that any individual who speaks two or more languages will experience interference due to the contact between them.

One such theorist is Weinreich.⁴¹ He claims that a bilingual's speech in each language will be different than it would have been had he only learned one language. He attributes the language handicap of bilinguals to "interlingual interference".

J. Vernon Jensen⁴² supports this view by stating that bilingualism for a child is an additional mental burden. Tending to think in one language and to speak in another, the bilingual child may become mentally uncertain and confused, "particularly if he has only a superficial knowledge of one language or if he is not of superior intellectual ability". He adds that the bilingual child will tend to learn only by imitation and rote, that he will frequently suffer mental fatigue, and that his originality of thought will be impaired.

Another seemingly more scientific theory stems from the hypothesis that bilingualism might affect the very structure of intellect. If a large proportion of an individual's intellectual ability is acquired through experience and its transfer from one situation to another, then the very structure of intellect would vary from one individual to another. Evidently, the developmental process for monolinguals and bilinguals is different with respect to language and the learning of abilities depends greatly on language. Therefore, bilinguals could have different and more complex contexts for learning than monolinguals; hence their lower scores on tests of intelligence.

The retardation of bilinguals in scholastic achievement can only be explained as a result of the confusion and complexity inherent

⁴¹U. Weinreich, Languages in Contact, New York, Linguistic Circle of New York, 1953.

⁴²J. Vernon Jensen, "Effects of Childhood Bilingualism", Elementary English, Vol. 39, February 1962, pp. 132-143.

to bilingualism itself. The theorists who contend that bilingualism becomes a mental burden in itself and produces confusion simply proceed to state that, as a result, bilingual children will learn less academic content and will probably suffer even more handicap in the testing situation where interpretation and genuine understanding are most important requirements to success.

Positive Effects of Bilingualism

Notwithstanding the majority of the evidence, possibly because they consider it unreliable in view of their lack of control of other variables, there are theorists who contend that positive effects of bilingualism on intelligence and scholastic achievement do exist. Peal and Lambert report that several writers, assuming a lack of identity between language and thought, suggest that the learning of two languages from childhood has favorable effects on the thinking process and hence on scholastic achievement. After extensive observations of the mental development of his own child, Leopold felt that the bilingual child learns early to separate the sound of a word from its referent. He writes:

"I attribute this attitude of detachment from words confidently to the bilingualism. Constantly hearing the same things referred to by different words from two languages, she had her attention drawn to essentials, to content instead of form".⁴³

S. J. Evans of Wales also argues that the:

"teaching of Welsh along with English does what the efficient study of any two languages must do: it frees the mind from the tyranny of words. It is extremely difficult for a monoglot to dissociate thought from words, but he who can express his ideas in two languages is emancipated".⁴⁴

⁴³Leopold, op. cit., p. 186.

⁴⁴S. J. Evans, "Address of the Conference of Headmasters of Grammar Schools", Wales, 1953, p. 43, cited by Peal and Lambert, op. cit., p. 5.

Peal and Lambert conclude that these arguments lend credibility to the idea that the type of benefit that comes from bilingualism might not become apparent on standard intelligence tests. It is also their contention that a case could be made for the argument that the studies finding no difference or a deficit for bilinguals were simply using inappropriate measures. Indeed, many investigators have pointed out that much of the misconception linking childhood bilingualism with intellectual impairment originated from low scores on intelligence tests which relied upon language facility, and these authors go on to assert that the use of non-language testing materials shows that the bilingual child is not necessarily handicapped in intellectual capacity or growth. Also, many of the investigations have not taken into consideration the low socioeconomic level of the children, their rural or urban backgrounds as well as the age and sex factors.

Also, it must be remembered that there were studies that reported a positive relation between bilingualism, intelligence and scholastic achievement. By far the most reliable and the most comprehensive of those cited in this paper, is that of Peal and Lambert conducted in Montreal. The findings of that study have been exposed earlier; however, a closer examination and an interpretation of these results is warranted in this section. In their own interpretation of the results, Peal and Lambert examine the phenomenon that bilinguals scored higher than monolinguals on non-verbal tests from two perspectives. First of all, they wonder whether the more intelligent children, as measured by non-verbal tests of intelligence, are the ones who become bilingual, or whether bilingualism itself has a favorable

effect on non-verbal intelligence. On the other hand, it seems reasonable to assume that it would be the more intelligent children who would pick up the second language and become bilingual. The alternative explanation, that bilingualism may in some way influence non-verbal intelligence, seems equally reasonable, in view of Anastasi's theory about non-verbal tests. She claims that some non-verbal intelligence tests stress spatial and perceptual functions, whereas others stress symbolic manipulation of abstract relations and concepts. A close analysis of Peal and Lambert's non-verbal subtests reveals that while the two groups performed similarly on the spatial-perceptual type of test, the bilinguals performed significantly better on the mental reorganization type. Coming back to Anastasi's nomenclature, it can be said that the bilinguals performed better on the type of non-verbal tests involving "concept-formation or symbolic flexibility". The explanation offered by Peal and Lambert is that people who learn to use two languages have two symbols for every object. They are forced from an early age to conceptualize environmental events in terms of their general properties without reliance on their linguistic symbols. Monolinguals, who may never have been forced to form concepts or abstract ideas, could not be expected to be as agile at concept-formation as the bilinguals and they might appear to be handicapped comparatively.

Bilinguals also performed better on verbal tests; where lies the explanation of this totally unexpected finding? The authors envisage it from two points of view. Firstly, they suggest that the superior performance of the bilinguals on the verbal tests may simply

be a reflection of their overall superior intelligence. They state:

"...it appears that our bilinguals, instead of suffering from "mental confusion" or a "language handicap" are profiting from a language asset".⁴⁵

It may be, however, that their method of choosing the bilingual sample, was a significant factor. Since their test of bilingualism was fairly stringent, those suffering from a "language handicap" may unintentionally have been eliminated; that is, those who had not acquired a relatively large English vocabulary (who may have also been the less intelligent bilinguals) were not considered sufficiently bilingual for the study. As O'Doherty would say, only "genuine bilinguals" as opposed to "pseudo-bilinguals" may have been included. At any rate, it appears that the genuine bilingual, having mastered both languages, is clearly in an advantageous position intellectually.

The alternative explanation for the superior performance of bilinguals on verbal tests lies in the theory that the bilinguals, having a more extended vocabulary would benefit from the overlap of English and French vocabularies. The bilingual would actually be helped when functioning in either language by the positive transfer derived from the other.

In summary, the theorists who defend bilingualism as having positive effects on intelligence and scholastic achievement agree that bilinguals, because of their training in two languages, have become better at concept formation and abstract thinking. Likewise, because bilinguals have acquired experience in switching from one language to another, they will more easily solve problems which involve a multi-dimensional approach; that is, they have more

⁴⁵Peal and Lambert, op. cit., p. 11.

flexibility in thinking.

Finally, this chapter has considered and evaluated critically a great number of theoretical statements and a wide variety of studies. Because of the problems involved in the research of this field (measurement of intelligence, measurement of scholastic achievement, measurement of bilingualism, isolation from factors such as socio-economic status, age, sex, the rural-urban differentiation, etc.), many of the studies cannot be considered absolutely reliable. Furthermore, the conclusions are often contradictory.

Nevertheless, the majority of studies concur on the fact that bilinguals are at a disadvantage when verbal intelligence tests are involved; consequently, their scores are usually depressed. On the other hand, when intelligence tests of a non-verbal type are used, the differences between bilinguals and monolinguals are generally insignificant. With respect to scholastic achievement, if the bilingual subjects have not attained a reasonable degree of competence in either or both of their languages, the usual instruments for measuring scholastic achievement will indicate lower results. If the bilingual subjects have attained a functional competence in either or both languages, comparative and even superior results of scholastic achievement are likely to emerge.

Finally, it can be said that while existing research is not all significant, there is a tremendous amount. Most investigators have opened up new avenues to be explored further or verified by other means.

Inspired by this research, the following study will concentrate on a unique group of bilinguals (Franco-Manitoban students); unique, because they originate from basically French-speaking families and their schooling has been carried out primarily in the English language; their immediate environment is French, but the broader societal environment is very much English. The important variables, as established through the review: bilingualism and type of bilinguals, verbal and non-verbal intelligence, scholastic achievement and socio-economic status, will be scrutinized with respect to this population. Furthermore, so as to avoid the pitfalls of previous studies, this study will include such other variables as school grade level, sex and residence in geographic terms. In order to provide even further insight, an attempt will be made to discover the extent of use of each of the two languages by the subjects in different domains as well as their exposure to each language in different settings.

CHAPTER III
RESEARCH PROCEDURES

Subjects

A stratified random sampling procedure of the proportional type was used to select a 50 percent sample from the population consisting of Grade 4 and Grade 8 Franco-Manitoban students of Seine River School Division. Table I gives the numeric breakdown per grade per school.

TABLE I
PER GRADE PER SCHOOL NUMERIC BREAKDOWN OF SUBJECTS

School	Grade	Total student population	Franco-Manitoban students	Sample 50%
St. Norbert	4	104	28	14
St. Norbert	8	61	30	15
Ste. Anne	4	89	69	34
Ste. Anne	8	70	52	26
Richer	4	30	19	10
Lorette	4	32	20	10
Lorette	8	72	33	17
Ile-des-Chênes	4	37	20	10
La Broquerie	4	34	22	11
La Broquerie	8	41	28	14
Woodridge	4	20	9	5
St. Adolphe	4	25	17	9
St. Adolphe	8	29	19	10
Total	4	371	204	103
	8	273	162	82
Total		644	366	185

The Questionnaire

The randomly-selected sample was administered a questionnaire consisting of five major parts (see Appendix A).

Part I sought particular details of the subject answering the questionnaire solely for identification purposes: age, grade, sex, etc.

Part II surveyed the proportional amounts of English and French to which the students were exposed, as well as the proportional amounts which they themselves used both at home and at school, and both with parents and peers. The decisive question for purposes of determining the suitability of the subject for this study was the first question of Part II. Those students who completed the following statement with either of the two first alternatives were rejected from the sample:

At home, my parents speak French _____

- a) sometimes (0-25%)
- b) about half of the time (25%-75%)
- c) most of the time (75%-100%)

There was a total of nine such cases; these are not included in the sample nor do they form part of the figures in the last two columns of TABLE I. The rationale for this decision rests with the definition of a Franco-Manitoban student stated earlier.

Part III was a modern adaptation of Sewell's "Family Socio-economic Scale" (Short Form). The purpose of this part was to establish in what bracket of socioeconomic status each subject would be classified.

Part IV consisted of a Word Association Test. This test of bilingualism is based on an association fluency technique developed by Lambert in 1962 to make the technique appropriate for use with children in a group setting. French and English words were presented

alternately and the children were asked to write down as many words as they could think of in the same language as the stimulus; words which seemed to "go with" or "belong with" the stimulus word. An interval of 60 seconds was allowed for association to each word. For each subject, the sum of the associations to all the French words were calculated (NF). The same was done for the associations to the English words (NE). The two sums were used to form a balance score:

$$\text{Balance score: } \frac{\text{NF} - \text{NE} \times 100}{\text{NF} + \text{NE}}$$

A zero score would indicate perfect balance between the two languages, a plus score would mean French dominance, and a minus score English dominance.

Part V, the final part of the questionnaire, consisted of a Word Detection Test. This test was developed by Lambert and his associates in 1959 for use in a group setting. It is assumed here that bilingualism will express itself in the facility of finding short embedded English and French words in a series of letters such as DANSONODEND. The subjects were given 1½ minutes to work on each. Approximately equal numbers of English and French words are embedded in each group of letters. A balance was obtained here, similar to the one described above.

Administering the Questionnaire

Upon making arrangements with the superintendent and the principals of the schools, the writer was allowed to meet the subjects for the purpose of administering the questionnaire in group settings in the respective schools during school hours.

In administering the questionnaire to the students, all instructions were given first in French and then repeated in English.

Procedures for Collecting Data

The students' scores of verbal and non-verbal intelligence (Lorge-Thorndike) and the student's scholastic achievement results (Canadian Tests of Basic Skills) were secured from the students' cumulative records. These scores and the answers to the questionnaire were tabulated and collected in a code book.

Treatment of the Data

The students' results on the Word Association Test and on the Word Detection Test were first processed separately through the formula indicated earlier to produce a balanced score. A zero score on these tests would mean perfect balance, a positive score would mean French dominance and a negative score would mean English dominance. The number of subjects falling into each score range for each test is indicated in TABLE II. In order to establish the type of bilingualism of each subject, it was necessary then to merge each student's score on the Word Association Test and on the Word Detection Test into one combined score. Since the Word Association Test was more lengthy and hence probably more reliable than the Word Detection Test, each student's combined score was determined by placing him/her at a point on the number scale one-third of the distance from his/her result on the Word Association Test and two-thirds of the distance from his/her result on the Word Detection Test. The number of subjects falling into each score range for the Word Association Test and the Word Detection Test combined, appears in TABLE II.

TABLE II
STUDENTS' RESULTS ON TESTS OF BILINGUALISM

Score range	Number of subjects		
	Word Association Test	Word Detection Test	WAT and WDT combined
+5 and up	0	0	0
+5 to +1	2	3	1
0	1	13	3
-1 to -5	23	20	17
-6 to -10	40	20	31
-11 to -15	43	27	46
-16 to -20	30	26	28
-21 to -25	24	27	29
-26 to -30	9	14	19
-31 to -35	7	17	6
-36 to -40	3	7	2
-40 to -45	0	5	3
-46 to -50	2	3	0
-51 to -55	1	2	0
-56 and down	0	0	0

It was then necessary to establish the categories or types of bilinguals from this Table. While it had been anticipated that three groups of bilinguals would emerge in a reasonable distribution, such was not the case. Indeed, of the 185 subjects, only one subject emerged with a positive score (+1), so close to the 0 mark that he had to be considered a balanced bilingual. Therefore, with all subjects falling on the number scale from +1 to -45 on the Word

Association Test and the Word Detection Test combined, it became obvious that for all intents and purposes, there remained only bilinguals with a low English dominance (subjects falling in the negative range, but closest to the zero mark) and subjects with a high English dominance (subjects falling in the negative range and farthest from the zero mark). These categories were established through the following procedure. The number of subjects in each of the possible score ranges were summed up and then divided by two in order to establish two categories of bilinguals. When the total number of subjects was divided by two, 92 or 93 subjects should have been classified in each of the two types of bilingualism. Such an even breakdown was not possible, however, because of the uneven distribution in the various score ranges. TABLE III shows the number of subjects falling into each type of bilingualism. Any student scoring -15 and upwards was classified as a bilingual with a low English dominance and any student scoring -16 and downwards was classified as a bilingual with a high English dominance.

TABLE III

NUMBER OF SUBJECTS FOR EACH TYPE OF BILINGUALISM

Type of bilingualism	Score	Number of subjects
Low English dominance	-15 and upwards	98
High English dominance	-16 and downwards	87

The data were also arranged according to socioeconomic status. TABLE IV indicates the distribution for each of the scores from 7 to 22 (with 25 being the highest possible score) on Sewell's Family Socioeconomic Scale (Short Form). Three categories of socioeconomic

status were then established through the following procedure. The number of subjects in each of the possible scores were summed up and then divided by three in order to establish three categories of socioeconomic level. When the total number of subjects were divided by three, 61 or 62 subjects should have been classified in each of the three levels of socioeconomic status. Such an even breakdown was not possible, however, because of the uneven distribution in the

TABLE IV
STUDENTS' SCORES FOR SOCIOECONOMIC STATUS

Score	Number of subjects	Score	Number of subjects
>22	0	14	26
22	1	13	22
21	4	12	13
20	10	11	10
19	13	10	8
18	19	9	4
17	20	8	0
16	16	7	1
15	18	< 7	0

various scores. TABLE V shows the number of subjects per level. Any student who scored between 18 and 22 was classified as belonging to the high socioeconomic level, between 14 and 17 as belonging to the middle level, and between 7 and 13 as belonging to the low level. The data were then arranged according to each level, the high being placed first followed by the middle and then the low.

The three socioeconomic levels (TABLE V) were then sub-divided according to type of bilingualism (TABLE III). TABLE VI shows the total number of subjects in each category according to type of bilingualism and socioeconomic level. The high socioeconomic level had 28 bilinguals with a high English dominance, and 19 bilinguals with a low English dominance. The middle socioeconomic level had 30 bilinguals with a high English dominance and 50 bilinguals with a low English dominance. The low level had 29 bilinguals with a high English dominance and 29 bilinguals with a low English dominance.

TABLE V

NUMBER OF SUBJECTS FOR EACH SOCIOECONOMIC LEVEL

Socioeconomic level	Score	Number of subjects
High	18-22	47
Middle	14-17	80
Low	7-13	58

TABLE VI

NUMBER OF STUDENTS IN TYPES OF BILINGUALISM AND SOCIOECONOMIC STATUS

SES	Type of bilingualism	Total
High	High English dominance	28
	Low English dominance	19
Middle	High English dominance	30
	Low English dominance	50
Low	High English dominance	29
	Low English dominance	29
Total		185

Type of Analysis Performed

The seven null hypotheses formulated earlier were tested in the following fashion. The scores and answers collected in the code book were processed through the Health Sciences Computer Center of the University of Manitoba via SOL (Statistics On-Line).

Hypotheses one, five, six and seven were tested by means of a chi-square (On-Line Statistical Program ST 23); this analysis gives the observed frequency as well as the expected frequency and indicates if there is an overall significant difference between the two.

For hypotheses two, three and four, a factorial analysis of variance with unequal replication in each cell (On-Line Statistical Program ST 44) was performed.

CHAPTER IV

RESULTS OF THE ANALYSIS

I. STATISTICAL ANALYSIS

Socioeconomic Level and Type of Bilingualism

The first hypothesis serves to investigate the relationship between socioeconomic status and types of bilingualism.

Hypothesis I - For students of different socioeconomic level there is no significant difference in their type of bilingualism.

TABLE VII gives the number of subjects in each cell.

TABLE VII
NUMBER OF SUBJECTS ACCORDING TO TYPE OF BILINGUALISM
AND SOCIOECONOMIC LEVEL

TYPE OF BILINGUALISM	Socioeconomic status		
	High	Middle	Low
High English dominance	28	30	29
Low English dominance	19	50	29

A chi-square analysis was performed. The analysis gave the observed frequencies and the expected frequencies as indicated in TABLE VIII.

This analysis revealed a significant difference at the .05 level between socioeconomic status and type of bilingualism. Null hypothesis one is, therefore, rejected.

TABLE VIII
OBSERVED FREQUENCIES AND EXPECTED FREQUENCIES FOR TYPE OF
BILINGUALISM AND SOCIOECONOMIC STATUS

TYPE OF BILINGUALISM		Socioeconomic status		
		High	Middle	Low
High English dominance	OBSERVED	28	30	29
	EXPECTED	22.1	37.6	27.3
Low English dominance	OBSERVED	19	50	29
	EXPECTED	24.9	42.4	30.7

An inspection of TABLE VIII reveals that subjects from the high socioeconomic level are considerably over-represented in the high English dominance category and consequently under-represented in low English dominance. In the low socioeconomic level, there is exactly the same number of subjects (29) falling in each of the language categories. In terms of the observed frequencies with respect to the expected frequencies, the same pattern appears as in the high socioeconomic category although here the difference is a very minimal one. Subjects of middle socioeconomic status differ from the other two levels; they are considerably more numerous in the low English dominance category and while the expected frequencies predicted such an outcome, the difference is considerably greater than anticipated.

Socioeconomic Level, School Grade Level, Type of Bilingualism, and Scholastic Achievement

The second hypothesis deals with the measured level of scholastic achievement of the subjects, taking into consideration their different socioeconomic levels and their types of bilingualism.

Hypothesis 2 - For students of different school grade levels (Grade 4 and Grade 8), of different socioeconomic level and of different type of bilingualism there is no significant difference in their measured level of scholastic achievement.

For this analysis, subjects from Grade 4 and subjects from Grade 8 were first of all processed separately and then joined and processed together through the same analysis.

In the first instance then, socioeconomic status (Factor A) has three levels--high, middle and low. Type of bilingualism (Factor B) has two levels--high English dominance and low English dominance. TABLE IX shows the number of observations in each cell.

TABLE IX
NUMBER OF SUBJECTS (GRADE 4) FOR ANALYSIS ON LEVEL
OF SCHOLASTIC ACHIEVEMENT

TYPE OF BILINGUALISM	Socioeconomic status		
	High	Middle	Low
High English dominance	15	18	19
Low English dominance	10	25	16

TABLE X reveals an interesting pattern with respect to the means of scholastic achievement for each cell. The pattern is as anticipated; the means of scores on scholastic achievement are higher for the high SES subjects (3.592) than for the middle SES subjects (3.328) and higher for the middle SES subjects (3.328) than for the low SES subjects (3.069).

TABLE X

MEANS OF THE EFFECTS OF TYPE OF BILINGUALISM AND SOCIOECONOMIC STATUS
ON SCHOLASTIC ACHIEVEMENT FOR GRADE 4 SUBJECTS

TYPE OF BILINGUALISM	Socioeconomic status			
	High	Middle	Low	Mean
High English dominance	3.460	3.100	3.205	3.242
Low English dominance	3.790	3.492	2.906	3.367
Mean	3.592	3.328	3.069	3.304

Notwithstanding the pattern evolving in TABLE X, TABLE XI shows no significant difference between socioeconomic status and measured level of scholastic achievement; it simply approaches significance at the .05 level.

TABLE XI

ANALYSIS OF VARIANCE ON TYPE OF BILINGUALISM, SOCIOECONOMIC STATUS AND
LEVEL OF SCHOLASTIC ACHIEVEMENT FOR GRADE 4 SUBJECTS

Source of Variation	SS	DF	MS	F
Socioeconomic status (A)	0.327	2	0.163	2.86
Type of bilingualism (B)	0.030	1	0.030	0.52
Interaction (A x B)	0.146	2	0.073	1.28
Error	87.962	97	0.907	
Adjusted Error			0.057	

For Grade 4 subjects, therefore, with respect to socioeconomic status, hypothesis two is accepted. TABLE XI also shows no significant difference between type of bilingualism (Factor B) and measured level of scholastic achievement. With respect to type of bilingualism,

in-so-far as the Grade 4 subjects are concerned, null hypothesis two is, therefore, accepted. Although the analysis revealed no significant difference between type of bilingualism and scholastic achievement, it is interesting to note that the mean of scores on scholastic achievement for subjects of low English dominance was slightly higher (3.367) than that for subjects of high English dominance (3.242).

The interaction effect of socioeconomic status and type of bilingualism on measured level of scholastic achievement for Grade 4 subjects was found not to be significant.

The second analysis with respect to hypothesis two is that involving the 82 Grade 8 subjects of the study. In this instance, socioeconomic level (Factor A) has three levels--high, middle and low. Type of bilingualism (Factor B) has two levels--high English dominance and low English dominance. TABLE XII shows the number of observations in each cell.

TABLE XII
NUMBER OF SUBJECTS (GRADE 8) FOR ANALYSIS ON LEVEL
OF SCHOLASTIC ACHIEVEMENT

TYPE OF BILINGUALISM	Socioeconomic status		
	High	Middle	Low
High English dominance	13	12	10
Low English dominance	9	25	13

The means of scores on scholastic achievement for Grade 8 subjects are recorded in TABLE XIII; approximately the same pattern as for Grade 4 appears; the higher SES groups tending to score higher on scholastic achievement.

TABLE XIII

MEANS OF THE EFFECTS OF TYPE OF BILINGUALISM AND SOCIOECONOMIC STATUS
ON SCHOLASTIC ACHIEVEMENT FOR GRADE 8 SUBJECTS

TYPE OF BILINGUALISM	Socioeconomic status			Mean
	High	Middle	Low	
High English dominance	6.892	6.717	6.450	6.706
Low English dominance	6.744	6.868	6.308	6.689
Mean	6.832	6.819	6.370	6.696

Again, however, while the same pattern appears, TABLE XIV shows no significant difference between socioeconomic status and measured level of scholastic achievement for Grade 8 subjects. With respect to socioeconomic status of Grade 8 subjects, null hypothesis two is, therefore, accepted. TABLE XIV also shows no significant difference between type of bilingualism (Factor B) and measured level of scholastic achievement for the 82 Grade 8 subjects. On this basis, therefore, null hypothesis two of no significant difference between socioeconomic level, type of bilingualism and measured level of scholastic achievement is accepted.

This hypothesis was further verified by combining Grade 4 and Grade 8 subjects. For this analysis, there are, then, three factors. Socioeconomic status (Factor A) has three levels--high,

TABLE XIV
ANALYSIS OF VARIANCE ON TYPE OF BILINGUALISM, SOCIOECONOMIC STATUS AND
LEVEL OF SCHOLASTIC ACHIEVEMENT FOR GRADE 8 SUBJECTS

Source of Variation	SS	DF	MS	F
Socioeconomic status (A)	0.243	2	0.122	1.41
Type of bilingualism (B)	0.003	1	0.003	0.04
Interaction (A x B)	0.029	2	0.015	0.17
Error	80.578	76	1.060	
Adjusted error			0.086	

middle and low. Type of bilingualism (Factor B) has two levels--high English dominance and low English dominance. The third factor, school grade levels (Factor C) has two levels--Grade 4 and Grade 8. TABLE XV gives the number of observations for each cell.

TABLE XV
NUMBER OF SUBJECTS (GRADE 4 AND GRADE 8) FOR ANALYSIS ON LEVEL
OF SCHOLASTIC ACHIEVEMENT

School Grade Level	Type of Bilingualism	Socioeconomic status		
		High	Middle	Low
4	High English dominance	15	18	19
	Low English dominance	10	25	16
8	High English dominance	13	12	10
	Low English dominance	9	25	13

TABLE XVI gives the means of scores on scholastic achievement according to socioeconomic status and types of bilingualism for Grade 4 and Grade 8 subjects. It illustrates that high SES subjects obtain better scores on scholastic achievement than middle SES subjects (5.109 to 4.942) and middle SES subjects obtain higher scores than low SES subjects (4.942 to 4.378). This is the expected pattern and it corroborates the findings stated in the review of the literature.

TABLE XVI

MEANS OF THE EFFECTS OF TYPE OF BILINGUALISM AND SOCIOECONOMIC STATUS ON SCHOLASTIC ACHIEVEMENT FOR GRADE 4 AND GRADE 8 SUBJECTS

TYPE OF BILINGUALISM	Socioeconomic status						Mean
	High		Middle		Low		
	Gr. 4	Gr. 8	Gr. 4	Gr. 8	Gr. 4	Gr. 8	
High English dominance	3.460	6.892	3.100	6.717	3.205	6.450	4.636
Low English dominance	3.790	6.744	3.492	6.868	2.906	6.308	4.960
Mean	5.109		4.942		4.378		4.808

In this case, not only is the pattern consistent, but as indicated in TABLE XVII, the analysis of variance produced significance at the .05 level between socioeconomic status and measured level of scholastic achievement.

In the separate analysis of Grade 4 and Grade 8 subjects, these factors had been found not to be significant although in the case of the analysis of the Grade 4 subjects, they had been found to approach significance at the .05 level.

TABLE XVII
ANALYSIS OF VARIANCE ON TYPE OF BILINGUALISM, SOCIOECONOMIC STATUS
AND LEVEL OF SCHOLASTIC ACHIEVEMENT FOR
GRADE 4 AND GRADE 8 SUBJECTS COMBINED

Source of Variation	SS	DF	MS	F
Socioeconomic status (A)	0.524	2	0.262	3.73*
Type of bilingualism (B)	0.007	1	0.007	0.10
School grade level (C)	33.419	1	33.419	475.53**
Interaction (AXB)	0.124	2	0.062	0.88
Interaction (AXC)	0.046	2	0.023	0.33
Interaction (BXC)	0.026	1	0.026	0.37
Interaction (AXBXC)	0.051	2	0.026	0.37
Error	168.539	173	0.974	
Adjusted error			0.070	

(**significant at the .01 level; *at the .05 level)

Null hypothesis two is, therefore, rejected in-so-far as socioeconomic status and measured level of scholastic achievement are concerned. With respect to type of bilingualism and scholastic achievement, TABLE XVII indicates no significant difference. It is interesting to note, however, from TABLE XVI that the mean of scores on scholastic achievement for students of low English dominance (4.960) is greater than that for students of high English dominance (4.636). The third factor, school grade level is, of course, significant beyond the .01 level with respect to scholastic achievement; the two grades being Grade 4 and Grade 8.

The interaction effect of socioeconomic status and type of bilingualism on scholastic achievement was found not to be significant.

The interaction effect of socioeconomic status and school grade level on scholastic achievement was also found not to be significant nor was the three-way interaction effect of socioeconomic status, type of bilingualism and school grades on measured level of scholastic achievement.

Socioeconomic Level, Type of Bilingualism and Verbal Intelligence

Hypothesis three deals with the effect of socioeconomic status and type of bilingualism on measured level of verbal intelligence.

Hypothesis 3 - For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of verbal intelligence.

TABLE XVIII shows the number of observations in each cell with socioeconomic status (Factor A) having three levels--high, middle and low and types of bilingualism (Factor B) having two levels--high English dominance and low English dominance.

TABLE XVIII

NUMBER OF SUBJECTS FOR ANALYSIS ON VERBAL INTELLIGENCE

TYPE OF BILINGUALISM	Socioeconomic status		
	High	Middle	Low
High English dominance	28	30	29
Low English dominance	19	50	29

TABLE XIX indicates that high SES subjects have a higher level of verbal intelligence (95.213) than middle SES subjects (90.750) and middle SES subjects have a higher level of verbal intelligence (90.750)

than low SES subjects (86.948).

TABLE XIX
MEANS OF THE EFFECTS OF SOCIOECONOMIC STATUS
AND TYPE OF BILINGUALISM ON
VERBAL INTELLIGENCE

TYPE OF BILINGUALISM	Socioeconomic status			Mean
	High	Middle	Low	
High English dominance	95.607	88.267	86.552	90.057
Low English dominance	94.632	92.240	87.345	91.255
Mean	95.213	90.750	86.9	90.692

TABLE XX indicates that type of bilingualism is not significant. With respect to type of bilingualism, null hypothesis three must, therefore, be accepted. Examination of TABLE XIX reveals nevertheless that subjects of low English dominance obtained a higher score (91.255) than subjects of high English dominance (90.057) on measured level of verbal intelligence.

TABLE XX
ANALYSIS OF VARIANCE ON SOCIOECONOMIC STATUS, TYPES OF BILINGUALISM
AND VERBAL INTELLIGENCE

Source of Variation	SS	DF	MS	F
Socioeconomic status (A)	67.579	2	33.789	5.49**
Type of bilingualism (B)	2.395	1	2.395	0.39
Interaction (AXB)	6.289	2	3.145	0.51
Error	31393.78	179	175.384	
Adjusted error			6.157	

The interaction effect of socioeconomic status and type of bilingualism on measured level of verbal intelligence was found not to be significant.

The fourth hypothesis is concerned with the effect of socioeconomic status and type of bilingualism on measured level of non-verbal intelligence.

Socioeconomic Level, Type of Bilingualism and Non-Verbal Intelligence

Hypothesis 4 - For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of non-verbal intelligence.

TABLE XX shows the number of observations in each cell. In this analysis, socioeconomic status (Factor A) has three levels--high, middle and low. Types of bilingualism (Factor B) has two levels--high English dominance and low English dominance.

In an identical fashion as the pattern of scores observed for verbal intelligence and SES in TABLE XIX, TABLE XXII shows that high SES subjects have a higher level of non-verbal intelligence (104.745) than middle SES subjects (99.212) and that middle SES subjects in turn have a higher level of non-verbal intelligence (99.212) than low SES subjects (95.879).

TABLE XXI

NUMBER OF SUBJECTS FOR ANALYSIS ON NON-VERBAL INTELLIGENCE

TYPE OF BILINGUALISM	Socioeconomic status		
	High	Middle	Low
High English dominance	28	30	29
Low English dominance	19	50	29

TABLE XXII
 MEANS OF THE EFFECTS OF SOCIOECONOMIC STATUS
 AND TYPE OF BILINGUALISM ON
 NON-VERBAL INTELLIGENCE

TYPE OF BILINGUALISM	Socioeconomic status			Mean
	High	Middle	Low	
High English dominance	104.464	98.567	98.345	100.391
Low English dominance	105.158	99.600	93.414	98.849
Mean	104.745	99.212	95.879	99.573

TABLE XXIII
 ANALYSIS OF VARIANCE ON SOCIOECONOMIC STATUS, TYPES OF BILINGUALISM
 AND NON-VERBAL INTELLIGENCE

Source of Variation	SS	DF	MS	F
Socioeconomic status (A)	81.900	2	40.950	5.68**
Type of bilingualism (B)	1.711	1	1.711	0.24
Interaction (AXB)	11.221	2	5.610	0.78
Error	36760.531	179	205.366	
Adjusted error			7.210	

Socioeconomic status as indicated in TABLE XXIII was found to be significant beyond the .01 level. With respect to socioeconomic status, therefore, hypothesis four must be rejected.

TABLE XXIII indicates that with respect to non-verbal intelligence, type of bilingualism is not significant. As far as type of bilingualism is concerned, therefore, hypothesis four must be accepted. In the case of verbal intelligence, it had been noted that although

type of bilingualism was not significant, the subjects of low English dominance had scored slightly higher than the subjects of high English dominance had scored slightly higher than the subjects of high English dominance. Here, with respect to non-verbal intelligence, it is the opposite which appears; the subjects of high English dominance scored slightly higher (100.391) than the subjects of low English dominance (98.847). This is illustrated in Figure I.

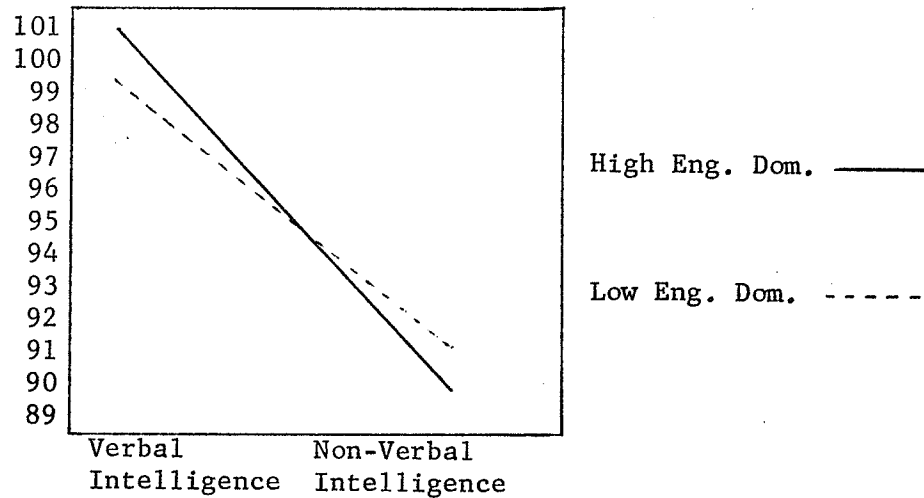


FIGURE I

ILLUSTRATION OF VERBAL INTELLIGENCE AND NON-VERBAL INTELLIGENCE

MEAN SCORES FOR TYPES OF BILINGUALS

School Grade Level and Type of Bilingualism

Hypothesis five was designed to discover whether subjects of either of the two grade levels were significantly over-represented in one or the other of the types of bilingualism.

Hypothesis 5 - For students of different school grade levels (Grade 4 and Grade 8), there is no significant difference in their type of bilingualism.

TABLE XXIV shows the number of observations in each cell.

TABLE XXIV
 NUMBER OF SUBJECTS ACCORDING TO TYPE OF BILINGUALISM
 AND SCHOOL GRADE LEVELS

TYPE OF BILINGUALISM	School Grade Levels	
	Grade 4	Grade 8
High English dominance	52	35
Low English dominance	51	47

A chi-square analysis was performed. The analysis gave the observed frequencies and the expected frequencies as illustrated in TABLE XXV.

TABLE XXV
 OBSERVED FREQUENCIES AND EXPECTED FREQUENCIES FOR TYPE OF BILINGUALISM
 AND SCHOOL GRADE LEVELS

TYPE OF BILINGUALISM		School Grade Levels	
		Grade 4	Grade 8
High English dominance	OBSERVED	52	35
	EXPECTED	48.4	38.6
Low English dominance	OBSERVED	51	47
	EXPECTED	54.6	43.4

This analysis revealed no significant difference between school grade levels and types of bilingualism. Hypothesis five is, therefore, accepted. Indeed, the Grade 4 subjects divided as evenly as was possible into the two types of bilingualism; 51 in the low English dominance type and 52 in the high English dominance type. The Grade 8 subjects, however, were found to be considerably over-represented in the low English dominance type (47) as opposed to 35 in the high English dominance type.

Area of Residence and Type of Bilingualism

Hypothesis six deals with the various geographic regions within the school division and seeks to determine whether one or the other of the two types of bilingualism prevails significantly in any of the said regions.

Hypothesis 6 - For students of different regions within the school division there is no significant difference in their type of bilingualism.

A chi-square analysis was performed to determine whether there was a significant difference between type of bilingualism and the designated geographic regions of the school division. The analysis gave the observed frequencies and the expected frequencies as shown in TABLE XXVI.

TABLE XXVI
OBSERVED FREQUENCIES AND EXPECTED FREQUENCIES FOR GEOGRAPHIC
REGIONS AND TYPE OF BILINGUALISM

TYPE OF BILINGUALISM		St. Norbert & Ile-des-Chenes		Richer & Woodridge & Ste. Anne La Broquerie	
		St. Adolphe	& Lorette	Ste. Anne	La Broquerie
High English dominance	OBSERVED	34	21	25	7
	EXPECTED	22.6	17.4	32.9	14.1
Low English dominance	OBSERVED	14	16	45	23
	EXPECTED	25.4	19.6	37.1	15.9

The chi-square analysis revealed a significant difference beyond the .01 level between types of bilingualism and the geographic regions of the division. Hypothesis six must, therefore, be rejected. It is interesting to note that the closer a region is to the city of Winnipeg, the greater the number of subjects in the high English dominance type and conversely, the further the region is from the city,

the greater the number of subjects in the low English dominance type. Figure II illustrates in a percentage fashion the number of subjects from each region belonging to the two types of bilinguals.

HIGH ENGLISH DOMINANCE		LOW ENGLISH DOMINANCE	
70.8%	St. Norbert and St. Adolphe	29.2%	
56.8%	Ile-des-Chenes and Lorette	43.2%	
35.7%	Richer and Ste. Anne	64.3%	
23.3%	Woodridge and La Broquerie	76.7%	

FIGURE 2

PERCENTAGE DISTRIBUTION FROM REGIONS INTO
THE TWO TYPES OF BILINGUALISM

Sex and Type of Bilingualism

The final hypothesis looks at the sex distribution of the subjects into the two types of bilingualism.

Hypothesis 7 - For boys and girls, there is no significant difference in their type of bilingualism.

A chi-square analysis was performed. It gave the observed frequencies and the expected frequencies as illustrated in TABLE XXVII.

TABLE XXVII
OBSERVED FREQUENCIES AND EXPECTED FREQUENCIES FOR SEX DISTRIBUTION
IN TYPES OF BILINGUALISM

TYPE OF BILINGUALISM		Sex Distribution	
		Males	Females
High English dominance	OBSERVED	51	40
	EXPECTED	42.8	48.2
Low English dominance	OBSERVED	36	58
	EXPECTED	44.2	49.8

The analysis indicated that there exists a significant difference beyond the .05 level between sex distribution and the types of bilingualism of the subjects. Indeed, as further illustrated graphically in Figure 2 in a percentage fashion, the boys divided 58.6 percent in the high English dominance type and 41.4 percent in the low English dominance type. The girls divided almost exactly in the same percentage but in the inverse order of the boys' distribution. The greater number went to the low English dominance type (59.3%) and the difference (40.7%) went to the high English dominance type.

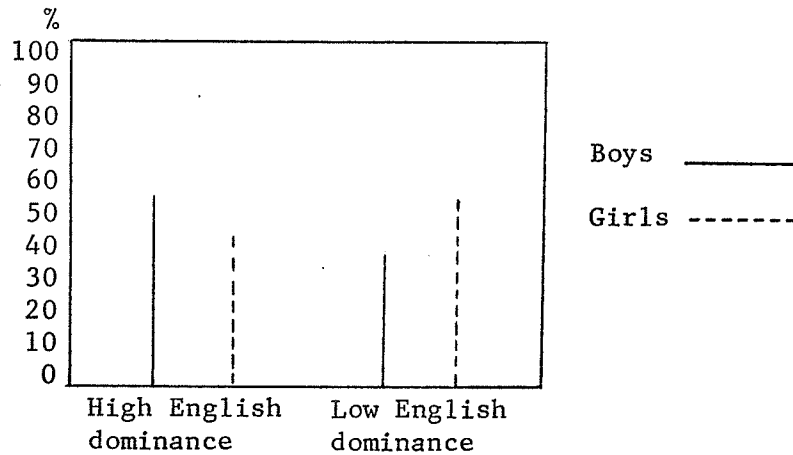


FIGURE 3

PERCENTAGE DISTRIBUTION OF BOYS AND GIRLS INTO
THE TWO TYPES OF BILINGUALISM

II. DESCRIPTIVE ANALYSIS

The students' questionnaire sought information pertaining to the use of the two respective languages by the students and to the exposure of the students to these languages outside of the classroom situation. No hypotheses were formulated in relation to these areas nor was any statistical analysis performed. It is interesting,

nevertheless, to note the answers to these questions expressed as percentage numbers of the population studied.

Language Spoken by Students at Home

Students were asked to estimate the percentage of time they themselves spoke French at home and to choose the appropriate category from the categories listed: 0% - 25% of the time, 25% - 75% of the time and 75% - 100% of the time. The choices were tabulated and the number of responses to each category recorded. TABLE XXVIII summarizes these results.

TABLE XXVIII
PERCENTAGE NUMBER OF SUBJECTS ACCORDING TO PERCENTAGE OF TIME
FRENCH IS SPOKEN AT HOME BY SUBJECTS

	0% - 25%	25% - 75%	75% - 100%
Grade 4	25%	28%	47%
Grade 8	23%	29%	48%
Total	24%	29%	47%

It is rather surprising to realize that very close to 25 percent of the subjects indicated that they spoke French at home less than 25 percent of the time and that another 29 percent spoke French at home between 25 percent and 75 percent of the time when it is considered that all of the subjects kept for the study had themselves responded that their parents spoke French at home from 75 percent to 100 percent of the time. It must thus be concluded that a substantial number of subjects either converse with their parents with the two parties using different languages and/or that they converse in English with other siblings within their families.

Television Viewed by Students

Students were asked to estimate the percentage of time their television set was turned on the French channel and to so indicate by selecting one choice from among the same categories: 0% - 25% of the time, 25% - 75% of the time and 75% - 100% of the time. The answers to this question are summarized in TABLE XXIX.

TABLE XXIX

PERCENTAGE NUMBER OF SUBJECTS ACCORDING TO PERCENTAGE OF TIME
THEIR TELEVISION SET IS TURNED ON THE FRENCH CHANNEL

	0% - 25%	25% - 75%	75% - 100%
Grade 4	70%	20%	10%
Grade 8	78%	17%	5%
Total	74%	19%	7%

Almost three-quarters of the subjects view less than 25 per cent of their television time on the French channel and only 7 per cent of the subjects are exposed to French via television from 75 per cent to 100 percent of the time. When the total impact of television is considered, its influence in shaping the linguistic habits of young people must not be underestimated.

Language Spoken by Students During Recess Time at School

While the family and the media are widely recognized as influences on the behaviour of young people, the peer group's influence must also be acknowledged. For this reason, subjects were asked to estimate the percentage of time they spoke French during recess at

school and with their friends outside of school. The answers to the first question are recorded in TABLE XXX.

TABLE XXX
PERCENTAGE NUMBER OF SUBJECTS ACCORDING TO PERCENTAGE OF TIME
FRENCH IS SPOKEN DURING RECESS AT SCHOOL

	0% - 25%	25% - 75%	75% - 100%
Grade 4	60%	28%	12%
Grade 8	61%	23%	16%
Total	61%	26%	13%

While approximately 60 percent of the subjects responded that they spoke French during recess, less than 25 percent of the time, only 13 percent reported that they spoke French from 75 percent to 100 percent of the time during recess at school. An obvious conclusion to be derived from this set of figures is that the peer group exerts pressure on the individuals with respect to language use and indeed appears to succeed in obtaining that English be the language of communication within the group.

Language Spoken by Students with Friends Outside of School

Subjects were asked to estimate the percentage of time they spoke French with friends outside of school. The answers were tabulated and are recorded in TABLE XXXI.

Here again, over one-half of the subjects indicated that they spoke French less than 25 percent of the time with their friends outside of school; the difference split evenly between the other two categories, 21 percent reporting that they spoke French from 25 percent to 75 percent of the time and 21 percent claiming that they

TABLE XXXI

PERCENTAGE NUMBER OF SUBJECTS ACCORDING TO PERCENTAGE OF TIME
FRENCH IS SPOKEN WITH FRIENDS OUTSIDE OF SCHOOL

	0% - 25%	25% - 75%	75% - 100%
Grade 4	54%	25%	21%
Grade 8	63%	16%	21%
Total	58%	21%	21%

spoke French between 75 percent and 100 percent of the time with their friends outside of school.

As the peer groups have been discovered to be an important influence in establishing English as the language used predominantly among students during recess at school, here again, in the case of the peer group outside of school, it is obvious that it remains a strong agent of anglicization of the individuals who comprise it.

While the figures presented in the descriptive analysis have not been subjected to statistical analysis, they nevertheless constitute an important insight into the population studied. These figures provide valuable information relative to the actual use of the languages by the subjects and to their exposure to these languages, thereby providing further practical information into the nature of the bilingualism of the subjects as well as enabling to determine the reasons underlying language dominance, which will be discussed at length in the next chapter.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

I. SUMMARY

Purpose of the Study

The purpose of this study was to attempt to obtain more insight into the French-English bilingualism of Franco-Manitoban students and to study the intellectual and academic characteristics associated with the different types of bilinguals. As well, it was deemed appropriate to probe into other personal and demographic factors: school grade level, sex, socioeconomic status, proximity of residence to the city, use of each language and exposure to each language, in an attempt to circumscribe those factors which determine whether an individual belongs to one type of bilingualism or to another.

With the advent of Bill 113 in the Province of Manitoba, it is now legally possible to dispense instruction in the French language. As a result, various types of programmes have been instituted in different schools incorporating different doses of French instruction. Oddly enough, changes have been made with very little empirical knowledge of the linguistic, intellectual and academic characteristics of the students for whom these programme changes were intended. Consequently, it was the purpose of this study to examine these factors in the hope that the conclusions might serve the educators, both parents and teachers, as well as their representative decision-making bodies to make better decisions with respect to bilingual education for the Franco-Manitoban student population.

Design of the Study

A questionnaire was administered by the writer to a random sample of one-half of the Franco-Manitoban student population in Grade 4 and Grade 8 of all the schools of Seine River School Division; this produced a total of 185 subjects for the statistical analysis.

The subjects were first divided according to their respective types of bilingualism. It had been anticipated that three groups would emerge; one of balanced bilinguals, one of bilinguals with an English dominance and one of bilinguals with a French dominance. This did not occur; indeed not one single subject could be classified as a bilingual with a French dominance. The two categories which did emerge as a matter of fact and which were so labelled for the purposes of this study, were bilinguals with a low English dominance and bilinguals with a high English dominance. These two categories were then sub-divided according to three levels of socioeconomic status: high, middle and low.

A chi-square analysis was performed on four null hypotheses and a two-way analysis of variance on three other null hypotheses. The chi-square analysis dealt with the socioeconomic status, the school grade levels, the geographic regions and the sexes of the subjects in relation to their type of bilingualism. The two-way analysis of variance hypotheses dealt with the scholastic achievement, the verbal intelligence and the non-verbal intelligence of the subjects in relation with their socioeconomic status and their type of bilingualism.

Major Findings

In this section, the seven null hypotheses will be restated in succession and the pertinent conclusions summarized briefly below each one.

Hypothesis 1 - For students of different socioeconomic level, there is no significant difference in their type of bilingualism.

A significant difference at the .05 level was found between socioeconomic status and type of bilingualism. Null hypothesis one was, therefore, rejected.

Discussion

Subjects from the high socioeconomic level were considerably over-represented in the high English dominance category. From the low socioeconomic level, there were exactly the same number of subjects falling into each of the two types of bilingualism. Subjects from the middle socioeconomic level were more numerous in the low English dominance category.

Hypothesis 2 - For students of different school grade levels (Grade 4 and Grade 8), of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of scholastic achievement.

This hypothesis was tested first with the Grade 4 subjects alone, then with the Grade 8 subjects alone and, finally, with the subjects of both grade levels together. In the first instance, that is, with the Grade 4 subjects, socioeconomic status was found to approach significance at the .05 level with scholastic achievement and there was no significant difference between type of bilingualism and scholastic achievement.

In the case of the analysis with the Grade 8 subjects, neither socioeconomic status nor type of bilingualism were found to be significant with respect to scholastic achievement.

Upon combining subjects from both grade levels, socioeconomic status was found to be significant in relation to scholastic achievement at the .05 level and type of bilingualism was found not to be significant with scholastic achievement. School grade level was, of course, found to be significant with scholastic achievement beyond the .01 level. Null hypothesis two was, therefore, accepted with respect to type of bilingualism, but it was rejected with respect to socioeconomic status as well as with respect to school grade levels.

Discussion

In the three analyses with respect to hypothesis two, the high SES subjects scored higher on scholastic achievement than the middle SES subjects and the middle SES subjects higher than the low SES subjects.

With respect to type of bilingualism, while no significant difference was found in relation to scholastic achievement, the low English dominance group scored slightly higher than the high English dominance group at the Grade 4 level. This order was reversed with the Grade 8 subjects. When both levels were combined, it was again the low English dominance group which obtained the higher mean of scholastic achievement.

Hypothesis 3 - For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of verbal intelligence.

A significant difference beyond the .01 level was found between socioeconomic status and verbal intelligence. With respect

to socioeconomic status, Hypothesis 3 was rejected. Type of bilingualism was found not to be significant; with respect to type of bilingualism, therefore, Hypothesis 3 was accepted.

Discussion.

Students from high SES were found to have a higher verbal intelligence than students from the middle SES and students from the middle SES higher than students from the low SES. With respect to type of bilingualism, the low English dominance group obtained a higher mean of verbal intelligence than the high English dominance group.

Hypothesis 4 - For students of different socioeconomic level and of different type of bilingualism, there is no significant difference in their measured level of non-verbal intelligence.

The analysis of variance revealed a significant difference at the .01 level for socioeconomic status with respect to non-verbal intelligence. On the basis of socioeconomic status, Hypothesis 4 was, therefore, rejected. With respect to type of bilingualism the analysis revealed no significant difference with non-verbal intelligence. In-so-far as type of bilingualism is concerned, therefore, Hypothesis 4 was accepted.

Discussion

In an almost identical fashion as for verbal intelligence, students from the high SES group obtained a higher score of non-verbal intelligence than the middle SES group and the middle SES group a better score than the low SES group. On the other hand, with respect to type of bilingualism, while the low English dominance

group had scored better than the high English dominance group on verbal intelligence; on non-verbal intelligence, it is the high English dominance group which took the edge.

Hypothesis 5 - For students of different school grade levels (Grade 4 and Grade 8), there is no significant difference in their type of bilingualism.

The chi-square analysis for hypothesis 5 revealed no significant difference between school grade levels and types of bilingualism. Hypothesis 5 was, therefore, accepted.

Discussion.

The Grade 4 subjects divided as evenly as was possible into the two types of bilingualism; 51 in the low English dominance type and 52 in the high English dominance type. The Grade 8 subjects, however, divided quite differently, the more numerous group of 47 going to the low English dominance type with the remaining 35 going to the high English dominance type.

Hypothesis 6 - For students of different regions within the school division, there is no significant difference in their type of bilingualism.

The chi-square analysis performed revealed a significant difference beyond the .01 level between types of bilingualism and the geographic regions of the division. Hypothesis six was, therefore, rejected.

Discussion

The region of St. Norbert and St. Adolphe, the one situated the closest to the city of Winnipeg was the region with the highest percentage of subjects belonging to the high English dominance type,

the next closest region to Winnipeg, Ile-des-Chênes and Lorette was the region with the next highest percentage of subjects belonging to the high English dominance type. The third closest region to the city, Richer and Ste. Anne ranked third in terms of its percentage of subjects belonging to the high English dominance type. Finally, the region situated the farthest away from the city, Woodridge and La Broquerie was the region with the lowest percentage of subjects in the high English dominance type.

Hypothesis 7 - For boys and girls, there is no significant difference in their type of bilingualism.

A chi-square analysis was performed. It indicated a significant difference beyond the .05 level between sex and types of bilingualism. Hypothesis 7 was, therefore, rejected.

Discussion

More than half of the boys (close to 60%) were found to be bilinguals with a high English dominance. Conversely, very close to 60 percent of the girls were found to be bilinguals with a low English dominance.

II. CONCLUSIONS AND IMPLICATIONS

Types of Bilingualism of Franco-Manitoban Students

As indicated earlier, it had been anticipated that three groups of bilinguals would emerge from the sample; one of balanced bilinguals, one of bilinguals with an English dominance and one of bilinguals with a French dominance. It must be remembered also that only those subjects whose parents spoke French at home from 75 percent to 100 percent of the time were kept for the study; those subjects indicating that their parents spoke French at home less than 75 percent of the time

were discarded. It was indeed astonishing to find that notwithstanding the fact that the parents of the subjects spoke French at home at least 75 percent of the time, not one single subject could be classified as a bilingual with a French dominance. This is probably the single most important finding of this study!

It is difficult to explain such a phenomenon and since the linguistic distribution of the present study had not been foreseen, the study was not designed to probe into its causes. Nevertheless, it could be attributed to a number of factors among which could probably be included the following: (1) media - especially television; the powerful influence exerted by children's television programs is undeniable and the linguistic aspect is certainly no exception to the rule; (2) peer group influence has probably replaced the family influence on the individual in today's young generation as a prime determinant of behaviour and speaking English for a child from a French-speaking family is perhaps a semi-conscious but nevertheless real way of manifesting a break from the influence of the parents who are French-speaking, and (3) language of instruction in the schools, except for one hour of French instruction, has always been English. Thus, the English language is thrust upon students not only in quantitative terms, but its absolute importance as a factor of scholastic success is readily perceptible to students who quickly adjust in consequence.

A fourth factor which might partly explain the linguistic assimilation of the young generation may rest with the influence of the parents themselves. Many of them may have had difficulty in life and may have rightly or wrongly attributed their difficulty to their lack of fluency in the English language and may hence have instilled in the minds of their children that it is very important for anyone

in Manitoba to become very fluent in English.

Types of Bilingualism and Scholastic Achievement

While there were some studies not in agreement, the majority of those encountered and reported in the review of the literature indicated that bilinguals generally attained lower levels of scholastic achievement than monolinguals. This study did not deal with bilinguals and monolinguals per se; it did, however, analyse results of two distinct types of French-English bilinguals; bilinguals with a low English dominance and bilinguals with a high English dominance. Bilinguals with a low English dominance could be considered the more "genuine" bilinguals as O'Doherty would say and bilinguals with a high English dominance would be closer to being monolinguals.

This study found no significant difference between type of bilingualism and scholastic achievement. Indeed, while it was not statistically significant, the difference that existed was found to be in favour of the low English dominance group with the latter scoring one-third of a year ahead of the high English dominance group in terms of scholastic achievement.

It must be remembered also that the measure of scholastic achievement was the Canadian Test of Basic Skills administered in English to the bilinguals with a low English dominance and to the bilinguals with a high English dominance alike. The results of this study would, therefore, tend to support the results of Peal and Lambert mentioned earlier that the more "genuine" bilinguals having a more extended vocabulary (two symbols for every object) become more agile at concept-formation and hence become better equipped in terms of the tools which assure scholastic success.

Type of Bilingualism and Verbal Intelligence

With respect to verbal intelligence, again with some notable exceptions, the majority of studies contained in the review of the literature concurred that monolinguals tended to obtain better scores (of verbal intelligence) than bilinguals. One might again extrapolate with regards to the French-English bilinguals and assume that the performance of bilinguals with a high English dominance would be superior to that of the bilinguals with a low English dominance. This assumption would seem reasonable for two reasons; first of all, the majority of previous studies encountered point in that direction and, secondly, here again, the measurement device to determine the verbal intelligence of subjects was the Lorge-Thorndike Test of Verbal Intelligence administered in the English language to all subjects.

Interestingly, type of bilingualism was found not to be significant with respect to verbal intelligence. In fact, although not statistically significant, the slight difference put the low English dominance group ahead of the high English dominance group in terms of verbal intelligence. These results again support in a small way, the conclusions of Peal and Lambert quoted in the review of the literature that "genuine" bilinguals having two symbols for every object are forced from an early age to conceptualize events and things in terms of their actual properties rather than to rely on their linguistic symbols. The alternative explanation offered by Peal and Lambert to account for the superior performance of their bilingual group with respect to verbal intelligence may also to a certain extent, be applicable to this study. It is the following: that a "genuine" bilingual would be helped when functioning in either language by the positive transfer derived from the other. If positive transfer there is, or a "language

asset", as Peal and Lambert also refer to it as opposed to the "mental confusion" or "language handicap" of other theorists, then it is reasonable to conclude that "genuine" bilinguals would perform better on verbal intelligence tests.

Type of Bilingualism and Non-Verbal Intelligence

With respect to verbal intelligence, the majority of studies demonstrated rather forcibly that bilinguals were at a disadvantage as opposed to monolinguals. With respect to non-verbal intelligence, the evidence is much more divided and contradictory. Indeed, numerous studies concluded that monolinguals had the edge over bilinguals on verbal intelligence tests and this may be attributed at least partly to the greater familiarity of monolinguals with the language. On non-verbal tests, however, where language is a negligible factor and whenever socioeconomic status, age and other factors were adequately controlled, the results were fairly even.

This study supports this evidence because type of bilingualism was found not to be significant with respect to non-verbal intelligence. Since this study has shown a slight edge for the bilinguals with a low English dominance on the verbal intelligence battery, it had been assumed that perhaps the same phenomenon would occur with respect to non-verbal intelligence. Such was not the case; indeed, the bilinguals with a high English dominance scored approximately 1.5 points higher than the bilinguals with a low English dominance on the Lorge-Thorndike Non-Verbal Intelligence Scale. Since this slight difference is not significant, it can be said to support the bulk of previous studies which indicate little or no difference between bilinguals and monolinguals on non-verbal intelligence.

Type of Bilingualism and School Grade Levels

Since the review of the literature covers bilinguals versus monolinguals, the studies mentioned in it always attempted to control the age factor and hence there is nothing relative to the difference in the types of bilingualism of the subjects on an age or school grade basis. Since this study dealt with Grade 4 and Grade 8 subjects, however, it was possible here to compare the groups in terms of their types of bilingualism. While there was no statistically significant difference between school grade levels and the type of bilingualism of the subjects, it is nevertheless interesting to note that while the Grade 4 subjects divided evenly between the two types of bilingualism, such was not the case for the Grade 8 subjects. Approximately 40 percent were found to be bilinguals with a high English dominance as opposed to 60 percent for the other group. Again, while these figures were not sufficiently pronounced to produce statistical significance, the fact that percentage-wise, fewer subjects of the Grade 8 level were found to be bilinguals with a high English dominance supports the earlier discussion relative to the increasing rate of assimilation of the younger generation. The older Grade 8 subjects seem to be less linguistically assimilated than the younger Grade 4 subjects.

Type of Bilingualism and Geographic Regions

Geographic regions in the sense used in this study are not covered in the review of the literature; the only mention relative to this factor is with regards to criticism for not differentiating between rural and urban subjects in the odd study.

In this study, geographic regions refers to four distinct areas within the Seine River School Division each of which consists of two

schools. The schools are grouped on the basis of their proximity to the city of Winnipeg; the closest region, for example, being St. Norbert and St. Adolphe (5 to 10 miles from Winnipeg), the farthest being Woodridge and La Broquerie (40 to 70 miles from Winnipeg).

A significant difference was found to exist between the geographic regions and the type of bilingualism of their subjects. The region nearest to the city was found to contribute significantly more subjects to the group of bilinguals with a high English dominance. Each successive region, in the order of distance from the city was found to contribute fewer to this group with the farthest region contributing fewest. This pattern was anticipated and the phenomenon could likely be attributed to the assimilating influences of the city exerting, of course, more influence on the subjects living in closest proximity to it.

Type of Bilinguals and Sex

It was found that significantly more boys than girls belonged to the high English dominance category. This greater assimilation of the boys than the girls can perhaps be explained by the fact that boys are more likely to come in contact with a broader environment and hence be exposed more to the assimilating influences of the outside world. On the other hand, girls would tend to stay more within the home and hence the influence of the parents would be stronger on them. Perhaps as well, the peer group phenomenon discussed earlier, would tend to be stronger among boys than among girls.

Socioeconomic Status and Type of Bilingualism

Socioeconomic status was found to be significant with type of bilingualism, high socioeconomic status subjects tending to belong in

a greater number to the high English dominance type. This association can perhaps be explained by developing the factors suggested earlier for the general assimilation of the young generation from French-speaking families. The factors mentioned of the influence of television and of the peer group influence are probably stronger with respect to the subjects of high socioeconomic status although they would definitely remain real factors with subjects of all socioeconomic levels. A complementary explanation might rest with the idea that low socioeconomic status subjects would be mostly from families engaged in small agricultural enterprises, where all the members of the family contribute to the total workload, and often work together, thus diminishing the peer group influence. As well, low socioeconomic status subjects would tend to live further away from the city and thus would escape some of the assimilating influences associated with living in proximity to the city.

Socioeconomic Status and Scholastic Achievement

This analysis revealed as anticipated a positive relation between SES and scholastic achievement; that is, high SES with high scholastic achievement. According to previous studies, and the present study corroborates this view, the positive relation between these factors is likely attributable to greater interest and motivation on the part of high SES parents with respect to scholastic success. This greater interest and motivation of the parents would then transfer onto the children. It is also contended that high SES subjects would have been exposed to a greater variety of educational experiences outside of school.

Socioeconomic Status and Intelligence

The analysis of socioeconomic status with both verbal and non-verbal intelligence produced results of statistical significance. For the same reasons as a positive relation between SES and scholastic achievement was anticipated and obtained, so it was also with respect to SES and intelligence; both verbal and non-verbal.

General Conclusions

The one outstanding finding of this study is undeniably the absence of any bilinguals with a French dominance (as evidenced by the results obtained on the Word Association Test and on the Word Detection Test, cf TABLE II) from a sample of Franco-Manitoban subjects whose parents speak French at home at least 75 percent of the time. The assimilating influences of the English-speaking environment are clearly in evidence upon the children of French-speaking families. As noted earlier, these influences are becoming increasingly powerful because the Grade 4 subjects are more assimilated than the Grade 8 subjects.

Probably rating second in terms of overall importance was the unexpected observation that bilinguals with a low French dominance performed slightly better than the other group on scholastic achievement as well as on verbal intelligence. Since both the Canadian Test of Basic Skills (for scholastic achievement) and the Lorge-Thorndike Intelligence Test (for verbal and non-verbal intelligence) were administered in English, the bilinguals with a high English dominance were expected to perform significantly better. The results being what they are, this study lends support to the theory, discussed earlier, that bilingualism may offer a definite "language asset" and that positive transfer may occur from one language

to the other. It may even be, again as discussed earlier, that having two symbols for every object, the genuine bilinguals learn earlier to conceptualize and to distinguish the properties of an object rather than to rely on their linguistic symbols. Genuine bilingualism would, therefore, be an asset, not only in terms of its cultural benefits but as well in the development of abstract thinking and concept formation, that is in the thought process.

III. SUGGESTIONS FOR FURTHER RESEARCH

This study revealed a number of significant elements with regards to the French-English bilingualism of Franco-Manitoban students. Its conclusions raise other questions, however, that had not been suspected before carrying out this project.

First of all, the unexpected amount of linguistic assimilation could be examined more closely. For example, in this study, the bilingualism of the subjects was determined strictly with written tests; it would be interesting to incorporate an oral measure of bilingualism as well. It would be worthwhile also to test subjects on their facility to produce both French and English answers to stimuli from different "domains". For example, one may find that the subjects would tend to demonstrate high English dominance in school-related areas where the atmosphere has always been primarily English, whereas they might perhaps even demonstrate French dominance in their vocabularies with respect to church or religious areas where French has likely always been the medium of communication and instruction whether in the church, in the home or even at school. With this kind of approach, it may be possible to circumscribe the most potent assimilating influences and

hence discover more scientifically the causes and the particularities of the assimilation process.

This study has attempted to establish relationships between type of bilingualism and numerous other variables; while such relationships were established, more definite and more conclusive relationships appear to exist between these variables and socioeconomic status. Would socioeconomic status be a better predictor of scores on scholastic achievement and intelligence than type of bilingualism? It would be interesting to pursue a study of the Franco-Manitoban student population, a study which would examine more closely the cultural and ethnic attributes of this population along with socioeconomic status. How do these two poles of influence compare and interact?

Since television has been cited as being probably a very important agent of anglicization, it would be worthwhile to carry this investigation further to determine the kind and the depth of its influence. Some kinds of television programs may be discovered to hold an hitherto unknown secret with respect to the acquisition of a second language. Programs of that nature could then even be developed in the French language for Franco-Manitoban students to reinforce their knowledge of French. They could also be made available to English-speaking children to incite them to learn French.

The school has clearly played a significant role with respect to the linguistic assimilation of Franco-Manitoban students. Since the inception of Bill 113, school authorities in French Manitoba have attempted to offer considerably more flexibility in the schools to allow for the use of French as a language of instruction to a much greater degree. Should all the efforts be concentrated in this

area? There may be other factors than the amount of instruction in either language which have not yet been clearly identified and hence whose influence is being neglected. Does the curriculum itself, for example, independently of the language of instruction, hold and transmit biases against minority groups? Does the school exert a discriminating influence against the French language? If so, what is the nature and the extent of this influence?

Since these tests were administered, some schools have instituted programmes where French is the language of instruction for their students. A certain number of students from the sample of this study are now enrolled in such programmes; it would be interesting to investigate after three or four years whether a French language instruction programme has halted or reduced the rate of assimilation as well as of those who were still "genuine" bilinguals at the time that the tests of this study were administered.

Another group of students who would be worthwhile subjects with whom to pursue such a study are those who have registered in Kindergarten three years ago or less and who have had strictly French language instruction; would they demonstrate fewer symptoms of assimilation? Would they even possibly be the first bilinguals with a French dominance of the young generation?

The scope of this study was limited in that it encompassed only students from one of the five major French-English bilingual school divisions of the province. Would the same results have appeared in the other four school divisions? Would the assimilation of the students of the urban school division of St. Boniface have been even more complete?

Finally, more research would be desirable to probe further into the suggestion of Peal and Lambert (that this study corroborates) that bilingualism may play a significant role in the development of the thought process.

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APPENDIX A

STUDENT'S QUESTIONNAIRE

QUESTIONNAIRE DE L'ETUDIANT

3. Notre appareil de télévision se trouve au canal Français

- A. parfois (0-25%) _____
- B. à peu près la moitié du temps (25-75%) _____
- C. la plupart du temps (75-100%) _____

4. En recreation à l'école, je parle Français

- A. parfois (0-25%) _____
- B. à peu près la moitié du temps (25-75%) _____
- C. la plupart du temps (75-100%) _____

5. Avec mes amis, en dehors de l'école, je parle Français

- A. parfois (0-25%) _____
- B. à peu près la moitié du temps (25-75%) _____
- C. la plupart du temps (75-100%) _____

3. Our television is turned on the French channel
- A. sometimes (0-25%) _____
 - B. about half of the time (25-75%) _____
 - C. most of the time (75-100%) _____
4. During recess time at school, I speak French
- A. sometimes (0-25%) _____
 - B. about half of the time (25-75%) _____
 - C. most of the time (75-100%) _____
5. With my friends, outside of school, I speak French
- A. sometimes (0-25%) _____
 - B. about half of the time (25-75%) _____
 - C. most of the time (75-100%) _____

III. STATUT SOCIOECONOMIQUE

1. Chez vous, avez vous:	OUI	NON
(a) facilités de salle de bain à l'intérieur	—	—
(b) cuisinière électrique	—	—
(c) réfrigérateur	—	—
(d) congélateur	—	—
(e) laveuse	—	—
(f) sécheuse	—	—
(g) télévision noir et blanc	—	—
(h) télévision couleur	—	—
(i) moto-neige	—	—
(j) camion	—	—
(k) automobile	—	—
i. 0	—	—
ii. 1	—	—
iii. 2 ou plus	—	—

III. SOCIOECONOMIC STATUS

1. At home, do you have:	YES	NO
(a) indoor bathroom facilities	—	—
(b) electric range	—	—
(c) refrigerator	—	—
(d) freezer	—	—
(e) clothes washer	—	—
(f) clothes dryer	—	—
(g) black and white television	—	—
(h) color television	—	—
(i) snowmobile	—	—
(j) truck	—	—
(k) automobile	—	—
i. 0	—	—
ii. 1	—	—
iii. 2 or more	—	—

2. Votre famille reçoit-elle un journal quotidien?

3. Education du père (années complétées)

(a) moins que la 9^e _____

(b) 9^e à la 12^e _____

(c) 12^e ou plus _____

4. Education de la mère (années complétées)

(a) moins que la 9^e _____

(b) 9^e à la 12^e _____

(c) 12^e ou plus _____

OUI NON

5. Chez-vous, y a-t-il un bureau à écrire?

6. Chez-vous, y a-t-il une encyclopédie?

7. Vos parents ont-ils empruntés des livres d'une
bibliothèque l'an dernier?

8. Avez-vous plus de 100 livres chez-vous?
(4 étagères de 3 pieds)

9. Avez-vous déjà suivi des cours de musique, danse,
natation, en dehors de l'école?

10. Chez-vous, recevez-vous le journal "La Liberté"?

2. Does your family take the daily newspaper? _____

3. Father's education (grades completed)

(a) less than grade 9 _____

(b) from grade 9 to 12 _____

(c) grade 12 or more _____

4. Mother's education (grades completed)

(a) less than grade 9 _____

(b) from grade 9 to 12 _____

(c) grade 12 or more _____

YES NO

5. Is there a writing desk in your home? _____

6. Is there an encyclopedia in your home? _____

7. Did your parents borrow any books from the
library last year? _____

8. Does your family have more than 100 books?
(4 shelves 3 feet long) _____

9. Have you ever had lessons in music, dancing,
swimming, etc., outside of school? _____

10. Is your family subscribed to the newspaper
"La Liberté"? _____

5. GRAND

6. IDEE

21. RICH

Lined writing area for item 21, left column.

Lined writing area for item 21, right column.

22. THOUGHT

Lined writing area for item 22, left column.

Lined writing area for item 22, right column.

25. PETIT

26. TRISTE

27. JEUNE

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Blank lined area for writing.

28. ROUGE

Blank lined area for writing.

Blank lined area for writing.

29. TEMPS

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Blank lined area for notes under 'TEMPS'.

30. ARGENT

Blank lined area for notes under 'ARGENT'.

Blank lined area for notes under 'ARGENT'.

APPENDIX B

TESTS OF BILINGUALISM

The procedure for the administration of these tests is elaborated in Chapter III. The following is a brief rationale for the tests, including the actual words used as stimuli and a comment on the composition of the lists of words.

1. Word Association Test

It seems reasonable to assume that the number of associational responses which a person can produce when given a stimulus word in a particular language, is at least a partial indication of the person's knowledge of that language as well as an indicator of his/her fluency in that language. This technique developed by Lambert was also tested by him. He formulated the following hypothesis, which he tested on both adults and children:

"As bilinguals progress in experience with a particular language, they will give more associational responses to stimulus words in that language."

In both instances, the reliability tests indicated significance at better than the 5 percent level of confidence.

With respect to the actual testing situation, a practice run was executed first consisting of two English and two French words: "school, pays, chaise and narrow", in which the subjects were free to give their associations in either French or English. Then, the stimuli for which responses were compiled were given in the series, eight French followed by sixteen English and, finally, eight French words. This is the familiar a-b-b-a order used to control for the effects of practice and fatigue as a function of time in the experi-

mental session. The French stimulus words, in the order of presentation were: "maison, libre, pauvre, esprit, grand, idée, jour, ami, petit, triste, jeune, rouge, temps, argent, main, juste". The English stimuli were: "large, garden, happy, idea, food, little, sad, dear, honor, child, house, peach, rich, thought, strong, bad".

For each language one half of the stimuli are nouns and one half adjectives. The words were selected from among the most frequently used, as determined by frequency counts in English and French. The nouns fit a category of "concrete" or "abstract" - if the referent of the noun was a touchable or manipulatable thing it was concrete; if not, it was abstract. Thus, the French and English stimuli were equated for part of speech, word-frequency, and abstractness-concreteness.

2. Word Detection Test

The rationale for this test relies on the contention that bilingualism will express itself in the facility of finding embedded English and French words. Lambert, and his associates, conceived it and tried it, predicting that comparative facility in the detection of words would correlate positively with degree of bilingualism. It did: $r = 0.42$, significant beyond the 1 percent level.

The procedure was the following: the subjects were instructed to find English or French words in a series of letters, e.g. DANSONODEND, where "dans, ans, de, en" are meaningful French words, and "no, nod, node, ode, end" are meaningful English words, and "an, son, on" could be meaningful in either language depending upon how they are pronounced. In constructing these stimulus-series of letters, attention was given to the commonality of words embedded,

their number in each language, and their position in the series. After a practice example, where the subjects were instructed to read from left to right, four test-stimuli were presented. The score assigned each subject was the percentage of English words detected minus the percentage of French words detected.

APPENDIX C

DISCUSSION OF SEWELL'S SES SCALE

a) Selection of items: From the long original scale, 14 items were selected through item analysis and then constitute the short form. These items deal mainly with household equipment, housing and education.

b) Validity: The validity of the shortened form was established in that it produced scores in very close agreement with the original scale. Using samples from three states, the new score (short form) was correlated with the original score (long form) for each of the families in each of the separate samples. The results were as follows:

Oklahoma	-	.94
Kansas	-	.95
Louisiana	-	.95

c) Reliability: The only test made of the ability of the short form to produce a consistent measurement was the split-half reliability test. This was done by correlating the scores obtained by dividing the scale into two equal halves, one consisting of the odd-numbered items and the other of the even-numbered items. The resulting corrected coefficients for the three sample groups were as follows:

Oklahoma	-	.81
Kansas	-	.87
Louisiana	-	.81

This compares with the reliability of the original scale which was .80.

The adaptation used in this study ignored family income because it was thought that it might elicit suspicion and hence false results.