

A Comparison of Student Performance  
in Partial Immersion and FLES Programs

by

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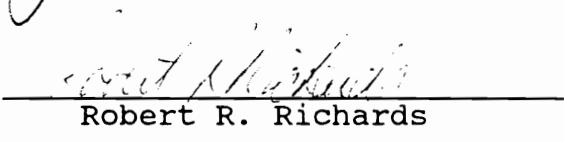
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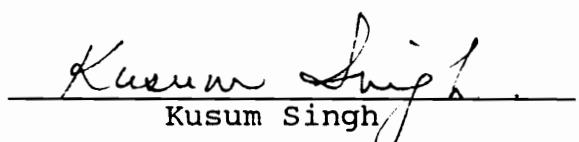
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**(ABSTRACT)**

This study examines student performance in two foreign language programs, partial immersion (content taught through the exclusive use of a second language) and FLES (Foreign Language in the Elementary School). Are students who study math, science, and social studies through a second language hampered when compared with their non-immersion peers? Does intensive study of a second language interfere with native language usage? Is partial immersion more effective than FLES in producing fluency in the second language?

Normal curve equivalent scores of the California Achievement Test (CAT) were used to measure language arts, reading, and math performance. The North Carolina third grade tests for science and social studies were used to measure mastery of state objectives in those subjects. French listening comprehension skills, and in some cases speaking skills, were assessed through the American Association of Teachers of French (AATF) FLES Test. Mental ability was measured using the CTB-McGraw Hill Test of

**Cognitive Skills.** Separate analysis of covariance (ANCOVA) tests were performed for reading, language, math, total battery, science, social studies achievement test response variables. An ANCOVA was also done for French listening skills. A socioeconomic status (SES) Index and IQ scores were used as covariates in all of these tests. Separate analysis of variance (ANOVA) tests were run on each ANCOVA for the purpose of comparison. Number Cruncher Statistical System software was utilized for all computations.

Significant main effects are analyzed.

The analysis of scores for both treatment groups revealed there was no difference due to treatment in language, reading, mathematics, science, or total battery. Achievement of FLES and partial immersion groups was similar. After adjustment for SES and IQ, the immersion group scored significantly less than the FLES group in social studies ( $p < .05$ ). The immersion group scored significantly higher than the FLES group in French listening skills ( $p < .0001$ ).

The results of this study provide data to school districts interested in elementary foreign language programs. It contributes to the growing body of research in immersion as an educational alternative.

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## **DEDICATION**

This dissertation is dedicated with much love to my children, Kelly and Todd, and to my husband, Terry. I appreciate the love, the help at home, and the support I got from all of you. Terry's willingness to care for our children on class nights and during residency from the M.A. through the Ed.D. process speaks to his support for and understanding of my efforts. His love, patience, and emotional support have kept me going through the years. This dissertation is as much his as it is mine.

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## Chapter 1

### Introduction to the Problem

#### Background: Reform and Second Languages

Some educational reform reports suggest more rigorous academic programs, including study of a second language. The first of these reports was written by the President's Commission on Foreign Language and International Studies (1979). It warns,

the hard and brutal fact is that our programs and institutions for education and training for foreign language and international understanding are both currently inadequate and actually falling further behind. This growing deficiency must be corrected if we are to secure our national objectives as we enter the twenty-first century (p. 1).

Business, industry, labor, government, education, and citizen groups provided input for the Commission's report. It blames America's lack of international expertise and proficiency in foreign languages for diminished "capabilities in diplomacy, in foreign trade, and in citizen comprehension of the world in which we live and compete. Americans' unwillingness to learn foreign languages is often viewed by others, not without cause, as arrogance" (p. 6).

The report outlines the decline in the study and use of foreign languages in elementary, secondary, and post-secondary schools, business, and government agencies. It recommends a national course of action. Strategies include emphasis on listening comprehension and speaking skills, early elementary instruction, four years of secondary instruction, and foreign language requirements for college entrance and graduation.

Concern for the decline in the study of foreign languages was noted in the report by the National Commission on Excellence in Education (1983). Study of a second language was listed as a "basic" along with mathematics, natural sciences, English, social studies, and computer sciences for a sound education. Study should begin in the elementary grades according to this report. "We believe it is desirable that students achieve such proficiency because study of a foreign language introduces students to non-English-speaking cultures, heightens awareness and comprehension of one's native tongue, and serves the Nation's needs in commerce, diplomacy, defense, and education" (p. 26).

The National Advisory Board on International Education Programs, in a report to the Secretary of Education (1983), supports the concept that foreign language instruction begin as early as possible. "Local school districts should

provide every student with the opportunity to begin the study of foreign language in the earliest years of formal education and to continue study of the same language until a functionally useful level of measured proficiency has been achieved" (p. 9).

A report by the Twentieth Century Fund (1983), advocates that every student have the opportunity to become proficient in a second language. Proficiency must be a long range goal because of the past lack of emphasis on foreign language study. This lack of emphasis has created a shortage of qualified available teachers in the field. Boyer's report (1983) supports foreign language study for all students, beginning in the elementary schools. Goodlad (1984) includes literature and language (English and others) as one of five "domains" of knowledge for a program of studies.

The United States Department of Education (1986) encourages foreign language instruction at an early age. Bennett (1988) includes foreign language in the outline of knowledge and skills basic to the curriculum for American elementary education. The National School Boards Association (1988) requested that more national effort through research and development in foreign language curriculum be a priority in their statement to the President of the United States. Finally, these views are reiterated

by The College Board (1983). "By learning another language people gain greater insight into the workings of their native language. . . . Knowledge of a foreign language helps students prepare for careers in commerce, international relations, law, science, and the arts" (pp. 27-28).

Background: Gates County's Program

Gates County school district is located in the northeastern corner of North Carolina. An administrative team from the district visited Montgomery County, Maryland, during the 1981-82 school year to observe their elementary foreign language immersion program. In that program, students in kindergarten and first grade attend classes conducted entirely in a foreign language. Children are "immersed" in the language. English is usually introduced for a portion of the day in the second grade (see page 19). Using a Title II grant, Gates County experimented with an immersion program in the summer of 1982. Preschool students from the district attended in the morning, and upcoming first and second graders met in the afternoon. At the end of the six week period, local parents and school officials were impressed with their observations. However, resources were not available to continue the program in the regular school year. Attempts were made to find funds throughout

the 1980's, but North Carolina's educational reform movement actually provided the catalyst needed to revive the program.

North Carolina's Basic Education Plan (BEP) was an eight year funding package to provide schools with funds to expand programs, provide additional support services, and reduce class size. Funding began in 1984-85. Program expansion was outlined in the North Carolina Standard Course of Study. One instructional area which was added was the study of second languages. The North Carolina State Board of Education mandated that students study a second language in grades K-5 and have the opportunity to study that language in grades 6-12. At least one language must be available on a K-12 continuum, but several languages may be offered when resources are sufficient.

The North Carolina Department of Public Instruction, Division of Second Languages, held a conference March 16-17, 1987, to help systems plan for these changes. Hoch and Toussaint, consultants in that division, were responsible for the agenda. Three speakers rekindled school administrators' desires to pursue immersion.

First, Met, Foreign Language Coordinator, Montgomery County Public Schools, Maryland, provided information to assist administrators in determining what language and program type they might consider. This information has also

appeared in several publications before and since that conference (1985, 1987a, 1987b, 1989).

Second, Curtain, Curriculum Specialist, Foreign Languages, Milwaukee Public Schools, also presented at the state conference. Her information regarding elementary second language program planning and implementation were very useful and have been published in several sources (Curtain, 1986; Curtain & Pesola, 1986; Curtain & Rhodes, 1985).

Finally, the biggest part of the puzzle, availability of qualified teachers, was solved by the Chargé de Mission of the Ministry of Education of Belgium, Eliane Levaque. Levaque explained the process by which a system could recruit elementary teachers with native speaking ability from that country.

A team of teachers and administrators visited several immersion programs in Louisiana. According to Levaque, this state recruits from 5 to 90 teachers a year from Belgium. The team made classroom observations in Calcasieu Parish, Prien Lake, Cameroon, and Baton Rouge. They talked with officials from the state department and teachers and principals in the schools. At the end of the visit, the Gates County team was reassured of the quality of the professionals available.

Based on the knowledge gained from these experiences, a program plan was developed in March, 1987. Major decisions regarding the implementation are summarized below.

The target language would be French. This decision was made from questions supplied by Dr. Met at the conference. Gates County High School already had French as a subject for grades 10-12, and the mandate required that at least one language be offered on a continuum, K-12. There are less than 500 students in grades 9-12 in Gates County. There was not enough demand to support a teacher of another language. Via satellite programs, other languages are available. Two students had requested German and five had registered for Spanish. Only one Spanish student registered for the second year. More qualified, elementary-trained teachers were available who spoke French than Spanish or any other language which had been considered. More resources were available, both print and consultative, for designing a quality French immersion program. No subculture existed within the community which might have preferred one language over another. Finally, French was a viable choice at the international level since it is spoken in 32 countries and by our Canadian neighbors.

The goals of the program included the following components:

1. Meet the goals of the second language program as outlined in the Standard Course of Study.
  2. Start a K-1 "Foreign Language in the Elementary School" (FLES; see page 18) program in 1987-88.
  3. Schedule classes with 30 minutes per day.
  4. Use the second language 100% of class time.
  5. Include students of all ability levels.
  6. Prepare content that will be subject-oriented as opposed to language specific instruction (integrated into the curriculum).
  7. Move toward partial immersion as additional resources and personnel are available.
  8. Identify a teacher with native fluency who is certified in elementary education. Contact agencies in April, 1987.
  9. Provide awareness sessions of goals and program for public and staff.
  10. Budget for materials, visits to an immersion program, and consultants.
  11. Start with a small, good program.
  12. Have a K-12 program in place in 4 years, if the BEP funding remains on schedule.
- In 1987-88, Gates County began a FLES program at the two primary schools in the county. Sunbury Elementary and Buckland Elementary schools shared one French teacher.

Children in grades K-2 had the teacher for half of the year each, beginning in October.

Gates County Schools began a partial French immersion program in fall 1988 as an innovative outgrowth of the North Carolina mandate to teach foreign language in the elementary schools. Approximately 50% of the parents at those grade levels volunteered their children to participate. The optional program started with 32 second graders at Sunbury Elementary School and 31 first graders at Buckland Elementary School.

In 1988-89 the regular curriculum was taught in French for one-half day and in English for the other half day in grades one and two at the respective schools. Language arts, reading, writing, and spelling were taught in English during the non-immersion half-day. Science, social studies, and math were taught through the French language. The North Carolina Standard Course of Study was the curriculum used. Students who elected not to participate received 75 minutes per week of French instruction through the regular FLES program offered to all students.

In order to maintain quality instruction in both programs, teachers who were trained in elementary teaching programs were hired. No American elementary teachers were located in the recruitment search who had the fluency and proficiency in the French language and the desire to move to

the area. Since no English is spoken in the immersion classroom, teachers must have near-native fluency. The Association for the Promotion of Education and Training Abroad (APEFE) and the Ministry of Education of Belgium assisted in recruitment and screening of potential candidates. The Director of Curriculum (the conductor of this study) interviewed the twenty finalists in Belgium and made the final selection. Visas were obtained by the school system. H-1 visas can be issued when employing agencies can document that qualified candidates are not available. The credentials of the employees verify their unique professional expertise. The American Consulate helped in the preparation and translation of documents. FLES teachers as well as immersion teachers in the study have the same high degree of proficiency, thereby maintaining the constant of the instructional quality. They are all certified to teach in North Carolina. Helena Anderson Curtain and Jane Misslich served as consultants for two and one-half days of immersion training for FLES and immersion teachers. These teachers also participate in other local and state staff development activities and observations.

The French teacher of the subjects in this study met the same North Carolina certification standards and National Teacher Examination (NTE) requirements as the American teachers. He had ten years of elementary teaching

experience. Nine of those years were in Belgium and one year was in a Louisiana immersion program. After coming to Gates County, he was selected as Teacher of the Year at Sunbury School in 1989-90.

Funds to implement the program were from state, federal, and local sources. As a pilot study, Gates County received \$15,000 from the Division of Second Languages through the State Board of Education in Title II grant assistance for the cost of training, evaluation, and materials. Administrators and teachers visited programs in Milwaukee. Awareness sessions were conducted for parents and educators. Parents of all eligible students were contacted and encouraged to offer this opportunity to their child. Curtain and others conducted immersion training for French teachers. Grant and local money was used to purchase math books and other materials from Canada and France. State allocations were used for positions. Misslich, an outside evaluator from Milwaukee Schools, was contracted with Title II funds for an informal assessment at the end of the first year of the program.

The evaluation report was encouraging. The consultant found that the children

. . . exhibit a great understanding of the conversational French used in an everyday classroom setting. They understand directions. They learn new

concepts and they even "get" the teacher's jokes in French--all more complicated understandings than simple vocabulary words or verb tenses. Most gratifying, however, was the fact that they were taking the large amount of language that they had absorbed throughout the year and somehow organizing that data in their minds and using it to create their own utterances in French. These children are much more proficient in French than their peers who have taken FLES classes. They are well on their way to fluency and ease in speaking French (Misslich, 1989, p. 6).

The consultant further noted that the children maintained their normal reading, language, and spelling skills. "There is no difference in English language development between immersion students and their peers" (Misslich, 1989, p. 7). They made normal progress in mastery of grade level objectives in science, social studies, and math. "The second language is only the tool for learning. . . . The real focus is the subject content, children absorb the language almost unconsciously . . ." (Misslich, 1989, p. 7). Children of all ability levels are included and "have been as successful in an immersion program as they would have been in a traditional English-only program" (Misslich, 1989, p. 8).

The most important endorsement was from the parents. All who remained in the area re-enrolled their children for the second year of the program.

#### Purpose of the Study

The purpose of this study was to provide a comparison of the relative effectiveness in four areas of academic achievement of a partial immersion and FLES program. Elementary foreign language programs are now a part of the North Carolina Basic Education Plan. Gates County has a FLES (Foreign Language in the Elementary School) program. North Carolina districts that have begun their programs have some variation of this type. FLES classes in the state currently range from 10 minutes to 50 minutes each session and meet from once a week to five times per week. Gates County also has the first partial immersion program in the state. The typical partial immersion program involves a teacher conducting classes in a foreign language for at least half the school day, every day. These classes are content based. Gates County's partial immersion classes include all subjects except reading and language arts. Teachers must have near native fluency because no English is spoken in the classroom.

The third grade at a K-3 school was the focus of this two year study. Half of the children (28) participated in

the immersion program and half of the children (29) participated in the FLES program in 1988-89 through 1989-90.

Much effort on the part of two central office administrators, two principals, and the teachers have gone into these programs. Grant funds have gone toward purchasing textbooks and materials, training staff, and evaluating options. This study serves as part of the administrative decision-making process regarding the advantages and disadvantages of each.

#### Research Questions

The following research questions were addressed by this study:

1. Are there differences in achievement between partial immersion and FLES groups as measured by the California Achievement Test (CAT) for language, reading, mathematics, and total battery?
2. Are there differences in achievement between partial immersion and FLES groups as measured by the North Carolina achievement tests for social studies and science?
3. Are there differences in achievement between partial immersion and FLES groups as measured by the American Association of Teachers of French (AATF) FLES Test?

### Significance of the Study

The program has served as a demonstration site and has had many visitors from school systems and universities across the state. Teachers, administrators, and classroom video segments have been featured on nationally televised staff development programs. The state department and some systems throughout North Carolina are interested in the early results of the program. It is a very timely study due to the recent recommendations for school reform.

The project is an opportunity to contribute to a growing body of research regarding elementary second language study. There are some unique features about Gates County which make the research especially interesting.

With a K-12 student population of 1,640, Gates County may be the only program in a small, rural system in the United States. The program is the first of its kind in North Carolina. There were 46 immersion or partial immersion programs listed by the Center for Applied Linguistics in the 1989 publication. Certainly few, if any, of these districts are as resource poor as Gates County. In fact, were it not for the unique situation which the BEP affords the district, it could not fund this program either. To have both FLES and partial immersion options in a district of this category is extremely unusual. In the

majority of the research, only one option is available within each district, even in the large systems.

Programs in large metropolitan areas can offer the option to parents and expect to attract mostly students from upper socioeconomic levels. In contrast, of the less than 10,000 inhabitants in Gates County, the majority are employed outside of the county, mostly in Virginia. The school system is the largest in-county employer with 200 employees. Fifty percent of the students receive free or reduced breakfast and lunch. Federal Title II funds were used to help pilot the program last year because the over-all population is sixty percent minority and serves an under-represented group. The population composition in the lower grades, including the group in this study, is fifty percent black and fifty percent white, due to in-migration. Other studies have yielded somewhat murky results. Children were often from upper and upper middle class families; consequently, one might predict that their performance on standardized tests would surpass students who did not elect to participate in the program. Most of these programs were located in areas having many resources and generous funding. Some were magnet schools. Many parents were from a large professional population. Others were from areas where there was some exposure to a second language in the subculture of the community. Their gains in the second language may have

been inflated. These areas have some pool of possible teacher candidates from which to select their staff.

The students in Gates County's population afford a unique opportunity for an experimental study. The small, rural setting offers students who are, for the most part, originally from the area, often for many generations. No parents in the system would be defined as professionals except educators and a registered nurse. There are no doctors living in the school district. There are two attorneys, father and son, and no children from that family are attending at the time of this study. There is no institution of higher education in the district. This homogeneous group rules out subcultures and exposure to a second language. Unfortunately, it also rules out the possibility of having a pool of qualified teaching candidates for any second language. None of the students come from homes where another language is spoken. The school attendance area covers the eastern half of the county. All students in this grade level were given the opportunity to participate, and there is a wide range of ability within the group.

### Definitions

**Second language** is a language which is not native to the student. The term is frequently used in lieu of foreign language.

**Target language** is the language chosen as the second language. It is the medium through which instruction is conducted.

Three types of elementary programs used in the United States are FLEX, FLES, and immersion:

FLEX stands for "Foreign Language Exploratory." According to Curtain and Pesola (1986a), programs range from three weeks to a year. It consists of exploring foreign cultures or experiencing learning of one or several languages at an introductory level. Three types of programs fall into this category. One type, a general language course, is an orientation to the nature of language. It does not include speaking a language. The second type, a language potpourri or single language offering, provides opportunities for speaking a foreign language. The former offers several languages in a sequential program. The latter offers a limited experience with one language. Both are intended to give students a chance to experience a language or languages before selecting a language which they would continue. The third type, auxiliary language

programs, are programs scheduled outside the regular school day. FLEX programs are not a part of this study.

**FLES** stands for "Foreign Language in the Elementary School." Curtain and Pesola (1986a) describe these programs as having a "functional proficiency in the second language as their goal" (p. 3). Sessions typically are from 20 minutes to more than one hour for one to five days per week. "FLES programs are part of a long sequence of language study and lead to continuing courses at the secondary level" (p. 3). FLES is one of the programs compared in this study.

**Immersion** is the total use of the target language in a regular classroom. Full immersion means that students remain in the program all day and study all subjects in the second language. Partial immersion is no less than half a day in the target language. Usually the half that is in the first language is the reading/language arts block which is taught in the native language. Early immersion refers to programs which begin in the primary grades, usually kindergarten. It is the focus of this study. Delayed immersion describes programs which start in approximately fourth grade and late immersion describes those which begin in seventh or eighth grade or as late as high school.

### Limitations

The design of the research is quasi-experimental because participation in the program was not based on random assignment. Awareness sessions were held and parents were contacted individually to encourage as much participation as possible; however, participation was an optional decision for the parents. Due to the non-traditional aspects of the program, random assignment would not have been a popular approach. Moreover, exceptional children participated in FLES but not immersion.

Only the 1989-90 third grade at Sunbury Elementary School was used in the study. A recent mandate by the North Carolina legislature prohibits the standardized testing of students prior to the third grade. The state testing program was changed accordingly. This change eliminated the 1989-90 second grade at Buckland Elementary School from the study. They will be included in the longitudinal study if the program continues.

The population size was affected by several factors. Due to the exclusion of the second grade group from the state testing program, the group is smaller than the researcher would have preferred. This change in test regulations occurred after the program was planned. The two-year program was also affected by mortality, as shown in Table 1. Both groups had students who moved out of the

Table 1  
Attrition of Subjects Over  
the Two Year Period of the Study

Year	Immersion	Group	FLES
1988-89	32		33
1989-90	28		29

district. In addition, four children who began the program were later identified as mentally handicapped and were exempt from testing. They were provided FLES instruction, but no scores were available for analysis. Of the 32 original partial immersion subjects, 28 remained in the school at the end of the study. Twenty-nine of the original 33 students remained in the FLES program at the end of 1989-90.

The subjects used for test data started in immersion in the second grade instead of in kindergarten or first grade as recommended by past studies. Local politics governed this issue. Again, in the longitudinal study, other groups will have started at an earlier age.

#### Organization of the Study

This report is divided into five chapters. The research problem is introduced in Chapter 1. Background information on the revival of an interest in foreign language study, especially at the elementary level, is included. The formation of the program which is the focus of this study is described. The purpose, significance, definitions, limitations, and organizational structure conclude the first chapter.

A review of the literature is summarized in Chapter 2. Theory foundation of language learning by young children,

models for immersion programs, and similar research studies are explored.

The methodology used in the study is described in Chapter 3. The sample population, treatment conditions, and instruments are defined. The research design, data collection, and analysis procedures are explained.

The results of the study are reported in Chapter 4. Data are analyzed and illustrated with tables.

The summary of findings and conclusions of the research are provided in Chapter 5. Implications for practice and recommendations for further study are included.

## **Chapter 2**

### **Review of the Literature**

#### Introduction

The history surrounding the start of immersion programs is contained in this chapter. It explores theories and hypotheses related to the acquisition of a foreign language by young children. It outlines models for designing an immersion program from the perspective of leading authorities in the field. It includes studies from similar programs in Canada and the United States. The literature reviewed relates directly to the study and impacted on Gates County's program design for both partial immersion and FLES.

#### History

Foreign language instruction has been a part of America's educational history. Curtain (1988) reminds readers that early schools included Latin in the curriculum. Immigrants often continued to use their languages in their communities and their schools. German immigration in 1830 and 1848 resulted in both private and parochial schools conducted by German-speaking teachers. Likewise, French and Spanish schools grew in other communities. Even though these schools were often the targets of criticism, it was not until World War I that most elementary instruction in

foreign languages was eliminated. Public sentiment was strong against anything which seemed un-American.

Before the 1960s, most foreign language instruction was conducted in the same manner as Latin and Greek (Curtain, 1988). That is, emphasis was placed on reading, grammar, and translation. An exception was the "Cleveland Plan," developed by Emile de Sauze for elementary students from 1918 through 1949. Select students received all instruction in the foreign language. Reading and writing did not begin until grade six.

Spanish language elementary programs made a comeback in the 1940s (Curtain, 1988) with the interest in Latin America. Sputnik raised concern with the lack of information afforded to a monolingual America. "The United States could have known about the development of the Russian satellite had American scientists been regular readers of Russian journals" (Curtain, 1988, p. 14). Languages, math, and science were funded in the passage of the National Defense Education Act of 1958 as a result. Training teachers in Russian, German, French, and Spanish for both elementary and secondary teaching was included in the package.

### The St. Lambert Experiment

The St. Lambert, Canada, program began as a grass-roots push for bilingual education from middle class parents in that Montreal suburb. Many parents were interested in their children's developing bilingual skills. Existing programs in the high schools and elementary schools did not produce the desired proficiency. Some sought conversations with faculty from McGill University, including Wallace E. Lambert and Richard Tucker (1972). As a result, some parents of both English and French speaking homes were encouraged to place their children in a school which used the other language as the primary language of instruction. As interest grew, however, this solution could not accommodate an entire class. Consequently, a group of English-speaking parents suggested that their children be used as experimental subjects. They convinced their school authorities to take this first step.

The pilot experimental class was compared with two control English classes and one control French class. Group members were comparable in IQ and components of socioeconomic status. "An analysis of covariance procedure" . . . was used "to adjust each of the end-of-year test scores for any initial differences among children in IQ or socioeconomic status" (Lambert & Tucker, 1972, p. 14).

The first year of the longitudinal study, 1965-66, the children were placed in a two-hour per day kindergarten program. Two teachers from France taught the morning and afternoon groups exclusively in French. This same technique was used the following year in the first grade.

At the end of the first grade, test results showed that the experimental group fell behind in reading their native English, as would be expected when they had not yet studied that area. On the other hand, their English speaking, listening comprehension, and word association skills were equivalent to their English control counterparts. Their French speaking skills lagged behind the French control group after the first grade. The experimental group did just as well as the control groups in mathematic skills even though those skills were taught in French.

The following year, the pilot experimental group and a new follow-up experimental group continued in the French program. One English control group of 26 first graders were housed in the same school as the experimental group. The second English control group of 28 were in a middle class section in Montreal. The French control class of 25 first graders were in a French-Canadian Catholic school in St. Lambert. The follow-up experimental class was actually two classes. One class of 25 and another of 13 were in separate English-language schools but had French-speaking teachers.

As might be expected, the English reading skills of the experimental follow-up group still lagged behind those English control students who studied reading. However, the scores of between the twentieth and fortieth percentile seemed to indicate some transfer of the French reading skills to their native English. Clearly no native language development was retarded by the exposure to the second language. Their linguistic ability in the target language progressed dramatically. They performed as well in math as their counterparts. Intelligence was neither retarded nor enhanced by the second language.

By the second grade, some groups experienced subject mortality due to moving families. Most of this attrition occurred in the control groups. The English language was used with the experimental group for 40% of the instruction, including English reading, music, art, physical education, and library.

The experimental groups scored as well as the control groups on all native language tests except spelling by the end of the second grade. Spelling was still above the 70th percentile on nationally normed tests. In the use of the second language, the experimental groups were at the same level as their French counterparts in French word knowledge, word discrimination, and reading. They still scored significantly lower on the picture vocabulary test and, for

one group, on listening comprehension. Although not yet nativelike in their oral use of French when retelling a story, their language was still described as remarkable. On the other hand, when asked to create their own stories, the experimental group did as well as the native French control group on overall expression, enunciation, liaison, and rhythm and intonation. The experimental group scored as well as the control groups on problem arithmetic and significantly better on the computational arithmetic. The follow-up group scored significantly higher than the control groups on intelligence. The researchers did not feel that this finding could be generalized as a trend at that time, however.

By the end of grade 3, both experimental groups scored as well as their English control groups, except for rules of punctuation. French listening skills and picture vocabulary were equal to their French counterparts. On another vocabulary test they lagged only 6 vocabulary items behind the native French. They had achieved nativelike sound production, but still had not mastered native control of the language. As in previous years, the experimental groups scored as well in math as their counterparts. Both experimental groups scored higher on subtests of the IQ tests which dealt with mental flexibility and the same as the control groups on other tests.

When the pilot experimental group entered fourth grade at St. Lambert school in 1969-70, many classes from kindergarten through grade 4 were studying mainly through French. By the end of that year, the experimental groups scored as well as their English counterparts on all the language arts and reading achievement subtests.

On the Test de Rendement en Francais (French language), the pilot experimental group performed better than half of the French control students. They still lagged approximately 7 items behind the French on one of the vocabulary subtests. The French controls rated significantly higher on grammar, expression, enunciation, liaison, and rhythm and intonation. Still, the experimental group placed above the neutral point in all areas. On items created by the students, the experimental groups used a wider variety of nouns and verbs. They seemed to have absorbed much of the teacher talk but were limited in their exposure to peer talk in the target language.

The experimental group outscored the English groups on all parts of the math tests, even though the test was in English and all of their instruction had been delivered in French. They also scored higher than the French control students on all sections of the French math test. Lambert and Tucker (1972) summarized, "There is no question then that the Experimental pupils are able to process

mathematical notions with great skill in either English or French" (p. 150). The differences on subsections of intelligence tests were determined to be chance occurrences because they varied slightly from year to year.

The five year assessment determined that there was no retardation of English language skills to children participating in a program using a second language for the medium of instruction. Their math skills were at least comparable to their counterparts. In addition, they acquired remarkable second language skills, though not nativelike. They were able to communicate comfortably with French-speaking people by the end of grades four and five. Moreover, the children themselves chose to remain in the program when offered an all-English alternative, illustrating their positive views of the program. By contrast, the English control students, who had had a little French instruction, felt that they had received too much French!

#### Theory Foundation

Asher (1969, 1977) noted that children's bodies are actively engaged in the learning process. Much of what they hear is in the form of a command. Many of their responses describe the activities in which they are engaged. Consequently, Asher supports the use of the Total Physical

Response. This model recommends that students listen to a language before they are required to produce it. Students practice responding to demands which require physical activity. Eventually, they have an opportunity to assume the teacher's role and give commands orally.

McLaughlin (1978) discussed the acquisition of a second language in children. A language is "acquired" naturally, by experiencing its usage, in early childhood. It is "learned" later through formal instruction. Children can "acquire" several languages simultaneously until one language is mastered, at about age three. After that period, another language is "learned."

Children of all nationalities learn language skills in the same order. First, they listen, then speak, read, and write. Universally, they listen for about a year before producing words. They have been hearing sentences, yet they begin by trying words. Their active vocabulary is more limited than their passive vocabulary. They understand much more of what they hear than they produce. This pattern is repeated when a child learns a second language. "This suggests that there is a unity of process that characterizes all language acquisition, whether of a first or second language, at all ages" (McLaughlin, 1978, p. 200). Ervin-Tripp (1974) and Dulay and Burt (1974) noted that

children go through trial and error in learning a second language just as they did while learning their first.

Lateralization, assigning certain functions to specific areas of the brain, has been used to explain why it seems so easy for children to learn a second language. In 1973, Krashen believed lateralization was complete at approximately five years of age. Before that point, more "plasticity" enabled the acquisition of one or more languages. In addition, the pre-puberty ability of children to learn another language without an accent is due to physical development. Speech muscles develop until puberty. By 1978, Krashen's studies indicated that perhaps children appear to learn a second language more quickly than adults because less vocabulary is necessary for a seven year old to communicate than an adult. While a child will seem fluent with a 50,000 word vocabulary and can communicate easily with his age peers, an educated adult would need a vocabulary of over 200,000 words to form more complexed sentences and ideas.

#### Language Acquisition Hypotheses

By 1983, Krashen and Terrell synthesized the theories and hypotheses related to the natural approach and language acquisition. The authors note "that the hypotheses presented here are well supported by empirical data and are

thusfar unblemished by damaging counter examples" (p. 25).

They identify five hypotheses:

1. The Acquisition-Learning Hypothesis

Acquisition is defined as "picking up" the language through natural communication in normal situations.

Learning a language is "knowing the rules" and "having a conscious knowledge about grammar" (p. 18). This learning is only useful as a Monitor, an editor. This Monitor is limited to conditions in which the user has time to analyze what has been spoken or written, as in a prepared speech or essay. In order to diagnose if something has been communicated correctly, the subject must know the rules. In the course of normal conversation, more attention is usually paid to what is being said, not how it is being said.

2. The Natural Order Hypothesis

This hypothesis states that the language learner will acquire the language in a predictable order. It "does not state that every acquirer will acquire grammatical structures in the exact same order. It states rather that, in general, certain structures tend to be acquired early and to be acquired late" (p. 28). Some structures tend to be acquired in groups. In English, an example of an early acquired language pattern is the use of s to form plural, as "four balls." Third person singular subject-verb agreement

is typically acquired late, as in the sentence, "He goes to work every day at nine" (p. 28).

This phenomenon is not limited to native language acquisition. According to Krashen and Terrell, it can be observed, with some variations, in English as a second language students and other students studying a second language. Adults also exhibit this natural order when acquiring another language under natural communication conditions, as opposed to formal grammar learning.

### 3. The Monitor Hypothesis

This hypothesis notes that speech originates through acquired language, that which has been "picked up" in natural conversation. Therein lies the key to fluency production. Formal knowledge, that which is conscious learning of the language, is limited in usefulness to editing, as a Monitor. In order to use the Monitor, the subject must have enough time, must focus on form, and must be aware of the rules which apply. The hypothesis, however, "does not say that acquisition is unavailable for self-correction. We often self-correct, or edit, using acquisition, in both first and in second languages. What the Monitor hypothesis claims is that conscious learning has only this function, that it is not used to initiate production in a second language" (p. 31).

#### 4. The Input Hypothesis

This hypothesis explains that subjects "acquire (not learn) language by understanding input that is a little beyond our [the subjects] current level of (acquired) competence" (p. 32). Through context and sensory input, the subject can move from "stage i to stage i + 1" (p. 32). The goal of the teacher is to be sure that students understand what is being communicated. The first language is learned in this manner through the "caretaker" (as a parent). This caretaker simplifies speech when talking to children. The motivation is to be understood. The topic concerns the present. A similar situation occurs when one must communicate with a non-native speaker. The person assuming the role associated with the "caretaker," the communicator, may need to resort to "foreigner talk" (p. 34) which is modified for the purpose of being understood. "Teacher talk is foreigner talk in the second language classroom" (p. 34).

The early stage of informal second language acquisition includes a "silent period" (p. 35). During this time, speech is optional on the part of the subjects. They do not have to speak until they are ready.

#### 5. The Affective Filter Hypothesis

This hypothesis suggests that attitude relates directly to the acquisition of a second language. An atmosphere with a low anxiety level is most conducive to language

acquisition. "Performers with optimal attitudes have a lower affective filter" (p. 38). This attitude encourages subjects to interact and to absorb more input. "It is precisely this initial lack of pressure to produce in the second language, coupled with the acceptance of the home language, which helps maintain a low affective filter for the learners" (Schinke-Llano, 1990, p. 223).

#### Bilingual Proficiency Theory Development

Cummins and Swain (1986) analyzed a large number of second language studies conducted since 1960, including their own. One repeated observation which intrigued them was the fact that bilingual children performed significantly higher on measures of cognitive ability than their monolingual counterparts. Findings seemed to indicate that bilingual children were more aware of the "arbitrary nature of word-referent relationships" (p. 31), more analytical in their orientation to language, and "more sensitive to feedback clues" (p. 20).

In trying to develop a theory along these lines, these researchers note that there is much disagreement regarding the nature of "language proficiency." Many facets of communication skills may be related, but to develop a construct of language proficiency which does not measure test-taking skills or cognitive skills is difficult.

Cummins and Swain give examples from present-day cases to illustrate the problem. Students with English as a second language have often been referred for remedial programs after a few months to two years in English schools. In the classroom setting and on the playground, the children may be described as communicating with other students through the English language. Academically, however, they are having difficulty. Psychological reports will indicate that they scored in the normal range on non-verbal measures but scored much lower on the verbal area. The psychologists are assuming that the children's ability to communicate orally transfers to the ability to read and understand the test in English. The interpretation of the verbal scores may be accurate, or they may be measures of a lack of English proficiency. These students would be better served if the tests had been administered in their native language. "During the first half of this century, the inappropriate use of psychological tests with linguistic and cultural minority students has served both to reinforce educators' misconceptions about the detrimental consequences of bilingualism and to justify the active eradication of students' first language" (p. 183).

In successful immersion programs, students demonstrate in the first year or two that they have developed listening skills. They soon can communicate on a simple level with

their peers and their teacher in the target language. However, it takes five years or more before they can read, write, and understand more complex ideas. This developmental progression can be observed in all children. In longitudinal studies done by Cummins, Swain and others, students have reached native ability in listening and reading skills but not in oral and writing skills. The more opportunities for exposure and use of the second language, the closer to nativelike ability they come. Just the school atmosphere alone is not enough to produce this proficiency.

The lack of construct validity of language proficiency and a theoretical framework plague Cummins, Swain, and others interested in second language acquisition and learning. They suggested

that the development of cognitive academic, literacy-related aspects of second language proficiency were primarily dependent on attributes of the learner, whereas the development of other aspects of language proficiency were relatively more dependent on the opportunities for input and use that the learners had in their second language. [This] interdependence hypothesis . . . now proposes that those aspects of language which are interdependent across languages are those aspects which are relatively more dependent on

attributes of the learner than on second language input and use for their development (p. 205).

Their second hypothesis, the "attribute/input" hypothesis, attempts to meld learner attributes and second language input with two views of language proficiency. This argument states that

within cognitively demanding, context-reduced situations, grammatical, discourse and sociolinguistic proficiency are as much dependent on learner attributes as on L2 [second language] input and use for their development. Within cognitively undemanding, context-embedded situations, on the other hand, the development of grammatical skills is relatively more dependent on L2 input and use than are discourse and sociolinguistic skills (p. 206).

#### Models for the Program

The kindergarten in St. Lambert, Quebec, was the first public school program in recent years (Curtain, 1988). It began when English-speaking parents expressed concern that the French programs were not producing the fluency necessary for children to comprehend French in their bilingual society. This need for bilingual communication caused the immersion programs to begin and spread throughout Canada. It began in Protestant and Catholic schools in the Greater

Montreal area (Lambert & Tucker, 1972). As the results of the McGill studies became more widely known, programs following the St. Lambert model sprang up in Ontario, New Brunswick, and the United States. In Ottawa, 90% of the children in English Catholic schools attend French immersion kindergartens. Visitors have come from as far away as the Philippines.

The first program in the United States was started in 1971 in Culver City, California (De Lorenzo & Gladstein, 1984). Professors at the University of California at Los Angeles helped start the program in 1971 after visiting the St. Lambert Elementary School. The goal of the program was to teach a minority group's language to English natives. Lincoln Howe School started a Spanish immersion program based on the St. Lambert model.

In 1974, French total immersion began in Montgomery County, Maryland (Curtain, 1988). That same year, partial immersion in French, Spanish, and German started in Cincinnati, Ohio. Plattsburgh, New York, implemented French total immersion in 1975. The German portion of Milwaukee Public Schools' immersion program began in 1977, the same year that San Diego Schools started Spanish. In 1987, thirty programs in the United States served approximately 10,000 students. Canadian immersion programs now serve more than 170,000 students. Genesee (1985) notes that immersion

programs are now available in all Canadian provinces and territories.

Cohan and Swain (1976) described the characteristics of quality enrichment elementary second language programs. The most important trait is total use of the second language as soon as possible. They recommend using only the second language beginning in kindergarten and first grade. The students start reading instruction in the second language before they begin reading in their native tongue. Other qualities noted in the Canadian and United States models include teachers who have native fluency and teach the language in context. The first language is not used in the classroom. Participation in the program is voluntary.

The same program characteristics are evident in the Canadian experimental model at St. Lambert (Lambert & Tucker, 1972) and the El Marino model at Culver City, California (Cohen, 1974). Both programs met objectives of the instructional program without regression in achievement. Students learned the second language through the content. Moreover, immersion students learned the native language reading skills later and still mastered those skills at the level of their peers in the traditional program.

Krashen and Terrell (1983) summarized their guidelines to the Natural Approach, one usually found in immersion programs:

1. "The goal of the Natural Approach is communication skills. . . .
2. Comprehension precedes production. . . .
3. Production emerges. . . .
4. Acquisition activities are central. . . .
5. Lower the affective filter" (p. 58).

According to Curtain and Pesola (1988), students participating in the Milwaukee French, German, and Spanish immersion programs from kindergarten through fifth grade can communicate in the second language commensurate with their ability. They comprehend, speak, read, and write on topics which are developmentally appropriate. They perform as well as or better than their non-immersion peers in English reading and language. They develop an appreciation of other cultures while acquiring a proficiency in the second language and English. Their fluency is sufficient to enable them to study course content beyond the fifth grade through both languages.

The program in the Milwaukee schools operates by the eleven principles listed by Curtain and Pesola (1988):

1. "Communication motivates all language use" (p. 81). Many opportunities are available for students to communicate. They are encouraged to use the words and phrases with which they are already familiar in the target language.

2. "There is natural use of oral language" (p. 81).

The natural language acquisition stages are considered. All normal classroom management is handled in the target language. This routine helps establish a context for understanding. A period for listening is provided at the beginning when children are not required to speak.

3. "Language is a tool of instruction, and not just the object of instruction" (p. 82). The language is the medium of instruction from the first day. Only when children have amassed enough language do they begin to study the structure of the language. The second language becomes an object of instruction then, just as the study of language arts begins in the first language.

4. "Subject content is taught in the target language" (p. 83). Teaching even one subject in the target language can multiply the efforts of a FLES program. Partial and total immersion programs make use of this principle many times over.

5. "The sequence of grammar instruction follows the developmental sequence of the elementary school language arts curriculum, or may be dictated by communication needs" (p. 83). The structure of the target language is integrated into the curriculum. Children are taught new expressions as they are needed in the daily lessons.

6. "Error correction is minimal and focuses on errors of meaning rather than on error form" (p. 83). Students are not interrupted for corrections. If certain error patterns occur frequently, classroom activities are designed to address that need. Corrections focus on meaning rather than form. The teacher models correct usage and helps children individually with problems.

7. "Use of the native language is kept clearly separated from use of the target language" (p. 84). Many Canadian programs have two different teachers, one for French and one for English. In the United States, most classes have one teacher who teaches both English and the target language. "Evidence from bilingual classrooms in the United States reinforces the idea that a clear division between the use of the native language and the use of the target language results in significantly improved second language acquisition" (p. 84).

8. "Reading instruction begins with previously mastered oral language" (p. 85). Reading is based on things within the experience of the students. This principle is evident in both the native language and second language learning. Reading is "a natural reinforcement of the spoken word" (p. 85).

9. "Literacy skills are transferred from the language in which they first are learned to the next language. In

early total immersion programs students learn to read first in the target language" (p. 85).

10. "Culture is an integral component of language learning" (p. 85). Culture is very evident in the Canadian programs, probably due to Canadian heritage. In the United States, an opportunity exists for providing a multicultural environment in the second language classroom.

11. "The second language atmosphere permeates the classroom and the school" (p. 86). Attractive use of walls, ceiling, and halls can be found in any good elementary school. This same principle applies to the second language setting.

#### Teacher Characteristics and Preparation

The Center for Applied Linguistics recommended qualifications and certification requirements for teachers of bilingual programs at a conference they sponsored in 1974. Above all, these teachers should meet the same rigorous standards as all other subject area teachers. They should have a thorough knowledge of theory and application of bilingual education. They should demonstrate a sincere interest in educating children regardless of the cultural heritage and background of the children. They should be able to communicate effectively in the children's native language so that parents can discuss concerns. They should

be fluent in the target language and well-prepared in the content areas which they teach. Their professional and academic training should originate in a well-designed teacher preparation program. Sensitivity and cultural awareness are attributes which should be evident. They need a wide array of instructional methods, curriculum ideas, and assessment tools. Finally, they should be adept at improving school-community relations. There is probably no program in the schools which requires more family involvement than a second language program.

At a second language conference in Raleigh, North Carolina, on March 17, 1987, Dr. Met enumerated priorities for teacher preparation and selection. Elementary foreign language teachers must like children and understand them. They must be familiar with teacher effectiveness research and classroom management. They should provide a healthy classroom atmosphere. They must understand elementary curriculum and select activities which are developmentally appropriate for the children. They should use a holistic, integrated, content-based approach to learning. These teachers should teach second language reading and writing to students who are learning first language skills. They must be able to use the target language fluently and share the target culture through children's literature and experiences.

Glisan and Phillips (1988) described an innovative program which would prepare elementary teachers for immersion or partial immersion programs. The design included a methodology course on teaching content through a second language and an international studies course, both to be offered during the school year. The methodology course was developed and taught by Met and Curtain during the grant-funded pilot. In addition, two intensive summer courses included immersion experiences for the prospective teachers to improve their oral proficiency. An internship and study abroad were part of that package. Students must receive a proficiency level rating of "Intermediate High" before doing their practice teaching as part of quality assurance. The number of foreign language credit hours would vary, depending on the number of courses it would take each individual candidate to reach that proficiency rating.

#### Teacher Strategies

Curtain and Pesola (1988) outlined strategies which teachers should employ in immersion classrooms. These strategies can often be utilized in the FLES lessons as well.

1. Body language, gestures, facial expressions, and pantomime give contextual clues to the entry-level student and for new input. Manipulatives, realia, props, and

visuals provide concrete referents. This practice ties the language to its meaning.

2. Oral and written language should be paired with hands-on experiences for children. Language acquisition in the first and second languages are enhanced through this practice.

3. In the beginning of the program, teachers must modify their language in order to make it more easily understood. They must talk slower; use short, simple sentences; repeat and reword ideas; and select controlled vocabulary.

4. Teachers can select essential words and phrases needed to function during the normal school day. These selections can become "passwords" for students to use to leave the room or perform some task. When the word or phrase of the day is successfully used or repeated, the reward follows, thus providing motivation and reward for its use.

5. Teachers must constantly monitor students to check for understanding. Interaction through individualized questions, observation of nonverbal responses and other techniques are essential in all classrooms to monitor comprehension.

6. The whole-language or language-experience approach is used for reading instruction. Teachers can begin by

having children tell their own experiences and teachers writing the experiences in the target language.

7. The same practices which are found in good elementary classrooms should be evident in immersion classrooms. Elementary methodology and pedagogy should permeate immersion programs.

#### Similar Studies

##### Ottawa and Carlton School Districts

One school in the Ottawa, Canada, district began an immersion program in 1969. The program expanded in 1970-71. Reports from programs in fifteen Ottawa and three Carlton schools were published by Merrill Swain and Henri Barik (1976) covering a five year period. Results were similar to those found by Lambert.

In 1972, 200 first grade French immersion students were compared with 225 first grade English students who studied the French language for 20-30 minutes per day. Analysis of variance was used for the comparisons. In IQ, the groups were equal. On the three sections of the English reading achievement test, the English group scored in the 70th percentile. The immersion students, who had studied French reading rather than English, scored in the 40th percentile. This significant difference was expected, and some transfer

of reading skills seemed evident to the researchers. The immersion group scored higher on the math achievement, but not at a significant level. In French comprehension, the immersion students had near perfect scores, indicating the need to develop a more discriminating test for them in the future. As expected, the non-immersion students did not perform as well in this area, but they did average 56%, a very respectable score in light of the exposure to the target language. In addition, the immersion students were given another French test, the Test de Rendement en Francais, which was normed for native French students. The immersion students scored at the 50th percentile, which seemed adequate to the researchers.

A much larger kindergarten population was available for research that same year. For that reason, only half of the immersion students from each class and half of the children from each control regular class were tested. These students were randomly selected. The 275 immersion students were from 20 classes and the 325 control children were from 21 regular classes. Immersion classes were conducted totally in French, and regular classes had 20-30 minutes of French instruction daily. Researchers found a significant difference in IQ, the immersion group being the higher by 6.2 points. Many teachers felt that this difference was due to the enriching nature of the program; however, no concrete

evidence could support this notion. Swain and Barik decided to pre-test the next group of kindergartners for IQ.

On readiness and achievement measures, the immersion group scored significantly higher. After the researchers used age and IQ as covariates, the differences disappeared, with one exception. The immersion group still scored significantly higher on aural comprehension. The immersion students obviously were not hampered by the fact that all of the tests were administered in English, not their medium of instruction. As expected, even using analysis of covariance, the immersion students scored significantly higher on the French comprehension test.

In 1973, the kindergarten and first grade results were nearly identical to the 1972 results for those grade levels. The groups that continued the immersion program in the second grade still out-performed their non-immersion peers in French. They performed as well as their peers in math skills and English language, except for spelling. No signs of mental or cognitive retardation were evident.

In 1974, studies were reported for grades 1-3. The first grade results matched those of the previous years. The second grade results were similar to the 1973 results, with one additional notation. They also showed satisfactory progress in French reading. The third grade immersion students performed as well as their non-immersion peers in

math, cognitive development, and all aspects of English language and reading, except spelling. French reading and listening comprehension far exceeded their English peers, but was not nativelike.

In 1974-75, grades 2-4 were reported. Kindergarten and first grade were not tested because the districts had requested three years of study at those levels. The immersion programs did continue to provide all instruction in French in grades K-2. Grades 2-4 had one hour of English language arts for students in the French immersion program. The English students in those grades continued to receive 20-30 minutes of French instruction daily.

In grade 2, immersion students were equal to their peers in cognitive development, math, and all English skills except spelling. They were clearly superior in their French skills.

In grade 3, cognitive development of both groups was the same. The immersion students were behind their peers in several English skills and in math skills requiring reading English problems. Their scores were still in the range appropriate for their grade level, however. They exceeded their English peers in French skills. Their French reading and listening skills were satisfactory but not equal to their Canadian French-speaking peers. "They also do well in

comparison with native French-speakers in Belgium on a reading test in French" (p. 98).

At the end on grade 4, immersion children had a higher level of IQ than the students in the regular program. They performed as well as their peers in all aspects of English language, reading, and math, including the English reading of math problems. They did not match Canadian French-speaking peers in some aspects of French achievement, but performed well. They also "compare quite well with native French-speaking pupils in Belgium in several tasks associated with reading" (p. 99).

Swain and Barik (1976) cautioned readers that proportionally more students in the immersion programs in their study were from middle and upper-middle-class families. They stressed that this fact does not imply that the program would not work for other students. In fact, they noted that immersion programs started in working-class areas of Montreal were having positive results. Their caution was simply for the interpretation of the "experimental" aspect of the study if readers tried to generalize the results to other populations.

Cummins and Swain (1986) report follow-up studies of these students after grades 6 and 8. Since grade 4, there were no lags by the immersion group in achievement in any area. "From grade 4 on, the immersion students are

outperforming the comparison students on several of the English and work-study skills which have been tested" (pp. 59, 62). Since grade 4 the mean IQ score of the immersion group was significantly higher than the non-immersion group. The groups were the same in science and math performance. Their conclusion was "that it is possible . . . to develop a considerable degree of bilingualism among majority language students. The programmes may be radical in nature, but they appear to lead to a degree of bilingualism not found with other FSL [French as a Second Language] programmes, while having no long term detrimental effects. . . . Indeed there are indications that the cumulative effects of the bilingual programme may at least have positive effects on the development of first language skills" (p. 79).

#### The Culver City Immersion Program

The first immersion program in the United States began in 1971 in Culver City, California. Genesee (1985) noted that parents volunteered their children to participate in order to provide an enriching, cultural experience and to develop second language skills. Although a range of socioeconomic levels were represented, the majority of students were from middle class, English-speaking families.

The University of California, Los Angeles (UCLA) worked with the school district to conduct comprehensive

longitudinal program evaluation. While students were in kindergarten and first grade, they did not have English instruction. During that period, their English language development lagged. One year after receiving English instruction, they performed as well as their control counterparts. From grade two on, both English and Spanish were used as the medium for instruction, but they were never mixed within the same class period.

Their Spanish language assessment "has indicated that they attain high levels of functional language proficiency. . . . [However,] it is unlikely that second language learners would ever achieve total native-like mastery of the target language as long as their learning is restricted to the school setting" (Genesee, 1985, p. 546).

#### The Montgomery County Program

Four Corners Elementary School was the site of the Montgomery County, Maryland, immersion program, which began in 1974. Genesee reported that, except for physical education and music, all instruction was taught through French from kindergarten through grade 2. Unlike Culver City, English instruction was not introduced until grade 3.

Comparisons were made with native-speaking French students in Canada to assess French language and math skills. Most of the Maryland students scored in the above

average range in both areas. English language proficiency was compared with children from the same school. Immersion students' scores were equal to non-immersion students, except for spelling and punctuation. Genesee (1985) pointed out that these students as a group were above average in cognitive ability, having scored at the 77th percentile on the quantitative subtest and 83rd on the verbal subtest. The two areas where a lag was noted were similar to those found in the Canadian programs. Longitudinal studies seemed to indicate that those errors may self-correct over time.

Genesee (1985) summarized the results of these first two American programs:

[These] projects attest to the effectiveness of second language immersion programs in U.S. communities that lack either a local presence of the target language or national political recognition of the target language. The participating students achieved noteworthy levels of target language proficiency at no expense to their native language development or academic achievement. . . . Immersion programs present an alternative to FLES programs . . . that is cost- and pedagogically effective. . . (p. 548).

### Cincinnati's Magnet Partial Immersion Program

In 1974, Cincinnati Public Schools began the first immersion program in a magnet school setting. Genesee (1985) explained the magnet school approach allowed students from working class and black subgroups to participate. Many of the students "speak a nonstandard or minority dialect, namely black English, in addition to being from a minority ethnic group" (p. 549). Genesee, Holobow, Lambert, Met, and Gastright designed a longitudinal evaluation design for the program.

In addition to the St. Lambert experiment in Canada, McGill University in Montreal, Quebec, Canada, has been involved in other immersion projects. The Language Research Group at McGill University collaborated with public schools in Cincinnati in the first longitudinal study of a partial immersion program in the United States (Holobow, unpublished).

The study assessed the impact of a French program on children in grades K-3 from different social and ethnic backgrounds. It included student progress on academic achievement, English, and French. Students in this study received language arts, reading, and math in English for half of the day and French language arts, handwriting, math, social studies, science, art, and music in French for the other half. Two control schools matched with this magnet

school utilized only traditional English instruction. Subjects were matched by race and socioeconomic background.

Holobow reported that in English and math, students in both programs performed the same within their respective social classes--middle class whites, middle class blacks, working class whites, and working class blacks.

Socioeconomic status yielded significant effects. As for ethnicity, whites scored higher on English in grades K-1, but no effects were evident at the end of grades 2 and 3. White students scored higher in math in grades 1, 2, and 3. However, there was no difference in any of the groups due to program type. Student scores were comparable within their own social status and ethnic groups. No group suffered as a result of the program.

The French assessment yielded somewhat different data. There were significant differences favoring the middle class immersion students over the working class immersion students but no differences due to ethnicity. By the end of the fourth year of the study, immersion students had assimilated the language well enough to master science content through the French language comparable to their non-immersion peers.

The "Total and Partial Immersion Programs in the U.S. Elementary Schools, 1989" report from the Center for Applied Linguistics reported that the Cincinnati Public Schools program served 3,651 students that year, the largest second

language program currently in the United States. The report further indicted that this figure included six partial immersion magnet schools, four curriculum integrated elementary schools, and one curriculum integrated middle school.

#### Plattsburgh, New York

Plattsburgh, New York, began a French immersion program in 1975. Peter Hornby (1980) reported that 18 kindergarten and grade 1 students and a comparable control group started with a wide battery of instruments for pre and post test results. The Wechsler Intelligence Scale for Children (WISC), verbal and nonverbal sections; the Carrow English Language Skills; the Goldman-Firstoe-Woodcock Test for Auditory Discrimination; the Wide Range Achievement Test for math, reading, and spelling; the Purdue Self-Concept Scale for Children; and Plattsburgh School and Cultural Attitude Survey were administered.

The analysis of covariance on the pre and post test data for both groups showed no detrimental effects on the immersion students. "In fact, scores on the nonverbal . . . [WISC] revealed that these children were significantly outperforming the comparison group at the end of the year" (Hornby, 1980, p. 109). The immersion students also took the French Comprehension Test which was designed and used by

Ontario to assess its programs. The Plattsburgh students "scored better than their counterparts in traditional French classes in Montreal and Ottawa, and, in general, compare favorably with kindergarten and first grade students in other immersion programs in Montreal, Ottawa, and Toronto" (p. 110).

As a professor of psychology, Hornby brought several future research questions to the reader's attention. Most results on immersion deal with group scores. What are the implications for individual learner differences? Are there any predictors of success in the immersion classroom? Few incentives exist to encourage Americans to be bilingual. What factors motivate U.S. parents to offer immersion to their children? What teacher variables contribute to the program's success?

#### The San Diego Bilingual Immersion Program

Bilingual immersion programs began in San Diego, California, in 1975 (Genesee, 1985). Limited English proficient or nonproficient students enter a bilingual program with native-speaking English students. In San Diego, schools are located in areas with a large Spanish-speaking population. The program is voluntary. Approximately 40% of the students are English-speaking and 60%, Spanish-speaking.

Spanish is used from preschool to grade 2. English is taught for 20, 30, and 60 minutes per day in preschool, kindergarten, and grades 1-3, respectively. By grades 4-6, half of the instruction is in Spanish and half in English. The languages are not mixed within any class period.

This is a marked departure from the "concurrent method" of instruction that was commonly used in many early bilingual education programs. According to this [concurrent] strategy, both English and the non-English language would be used interchangeably . . . and in some cases . . . translations . . . were even provided. It is now generally believed that this approach engenders confusion or inattention to the language in which the students are not proficient and is, therefore, counterproductive (Genesee, 1985, p. 554).

The high level of proficiency in Spanish was needed to expedite transfer of language skills from Spanish to English.

The results of the annual evaluations were inconclusive because English-speaking and Spanish-speaking scores were combined. However, as a group, the initial scores in English were below grade level at the beginning of the project. By the end of grade 6, they were proficient in English and scored one year above grade level in English reading and math. Spanish reading was 5 months below grade

level for students starting in kindergarten, but 2 years above grade level for students starting in grade 1. Both groups were above grade level at the end of grade 5 and 6 on math tests administered in Spanish.

Uvalde, Texas: Project Follow Through

Uvalde, Texas, is a small town about 40 miles from Mexico. As part of the U.S. Department of Education's Project Follow Through, a structured immersion approach was used with Hispanic children as early as 1968 (Gersten, 1984; Gersten, Woodward, & Moore, 1988). The federal compensatory program was for students in grades 1-3 from a low socioeconomic level. Many spoke only Spanish or were limited proficiency English. Approximately 85% qualified for free lunch. All of the children who fit these conditions were served in the program; consequently, there were no local groups who could serve as a comparison group. "The measure of the program's effectiveness with these students is in the weight of the data--its consistency across cohorts over 11 years" (Gersten, 1984, p. 8).

Students included in the study were those who completed the three year program. The Comprehensive Test of Basic Skills, the Metropolitan Achievement Tests, and the Wide Range Achievement Test scores were used. Over the eleven year period, achievement levels were at or near grade level

in math and written language. Oral reading was above grade level and reading vocabulary and comprehension fell in the 28th to the 31st percentile. This range was above typical scores for other low income Hispanics in the neighboring communities.

As students in the project entered grade 4, they had difficulty learning new material in the regular classroom. The researchers suggested that the immersion program be continued in grades 4-6 so that new material would be introduced in a manner which the children would understand.

When the groups who began in the program finished grade 12, they were compared with similar students from the district who began school the two years before the project, 1966 and 1967. Mortality rates ranged from 41.6% to 60.7% in the four groups from grades 1-12. Of the students who remained in the community, the students in the project were more likely to graduate, were retained less frequently, and were more likely to exhibit better school attendance (less than 10 absences per year).

Gersten, Woodward, and Moore (1988) used this information to challenge those people who claim that immersion will work only with middle class students. Positive results were noted with low income Hispanic children.

### Milwaukee Public Schools

Milwaukee Public Schools (1987) system has three magnet total immersion schools, one for French, one for Spanish, and one for German. Their first immersion program began in 1977. Their on-going evaluation shows that students begin in kindergarten and grade one with ability levels comparable to the national sample--23% high, 54% average, and 23% low. Using the Iowa Test of Basic Skills for vocabulary and reading on students who receive no English instruction until second grade, all students initially lag behind the national average. Their scores improve each year, and by the fourth grade, with no attrition of students, scores are all average or above--48% high, and 52% average.

Milwaukee's immersion students consistently score well above city-wide and national averages in standardized tests in English language arts and mathematics. . . .

Students . . . are achieving at or above ability level. . . . [They] are performing much better on achievement tests administered in English than are students in English-only programs. Students test scores are increasing grade by grade (Curtain & Pesola, 1988, p. 78).

### Spanish Immersion in Urem, Utah

In 1979, Cherry Hill began a Spanish immersion program with 16 second graders and 11 first graders who were volunteered on a first come, first serve basis. The following year, another full first grade class began. At the end of 1981, the MAT-SEA-CAL test indicated that the second/third grade class was functional in Spanish and the first grade was nearly functional. The CTB Espanol Test revealed that the first grade students could read and do math.

The second grade studied all subjects in Spanish and began English instruction in the spring. Their parents read English to them at home throughout the program. During this second year, many of the students made the transfer from reading Spanish to reading English on their own. The district SOBAR test in English and math was administered in late spring. The group scored as well as the other three classes of English-speaking students in the school. Some students were 1 year above grade level in reading and math in Spanish by the end of the year. Social studies and science were assessed through teacher grades on material covered in class.

The third year of the program, the first and second grades performed much the same as the classes of the previous year. The third/fourth grade class experienced

some set back. They were below grade level in Spanish reading, and English reading comprehension and total reading. All other tests were at or above grade level. An outside evaluator, Dr. David D. Williams, suggested "a carefully controlled experimental study in which students [sic] aptitude for languages, their IQ, their socioeconomic status and other variables be used either as controlling variables or as covariates in estimating what their performance would be if they were always taught in one language or the other" (Howe, 1983, p. 596).

#### Louisiana

Rafferty's Louisiana study (1986) compared students across the state in third, fourth, and fifth grade FLES classes with students who had no foreign language instruction. Students coming from homes where English was not the first language and students repeating a grade were excluded from the study. A database of students by race, grade level, gender, second language participation, and Basic Skills raw scores was compiled. Foreign language and no foreign language students were matched for race, gender, and grade level. They were statistically equated by academic level using their previous year's Basic Skills test scores. A four-way factorial analysis of covariance ( $2 \times 2 \times 3 \times 2$ ) was designed with 550 subjects randomly selected

for each cell, making a total of 13,200 students in the study.

Third, fourth, and fifth graders who studied a foreign language scored significantly higher on the Basic Skills Language Arts test than students who did not. On the Basic Skills Math test results, foreign language students also showed significant gains over their no foreign language counterparts by the fifth grade.

#### British Columbia

Shapson and Day (1982) reported the results of a longitudinal study of the Coquitlam School District in the Vancouver area of British Columbia. (The 1976 census indicated that only 4% of the population in that area used French.) The two cohort groups who began in the first year of the immersion program in 1973 served as subjects of the study.

A quasi-experimental design was employed, using analysis of covariance for comparisons of immersion and regular English students. The cognitive abilities test results from the first year were used as a covariate. As in previous studies sited herein, there was an initial lag in first language scores in the immersion classes. By the end of the fourth grade, however, there were no significant differences in the groups in reading, language, or math.

French language and comprehension gains were also similar to other studies. Scores were higher than other French bilingual or elementary foreign language programs. Scores ranged in the 24th-39th percentile on native French norms. As students changed French instructional time from 75% in grade 3 to 50% in grades 4-6, they experienced a decline in French scores.

Day and Shapson (1987) also reported on oral proficiency skills of children in British Columbia. One hundred ten (110) immersion students from 11 schools and 25 French students from Montreal were randomly selected for the study. The method used was similar to the Lambert and Tucker (1972) story retelling task. In addition, the children were also involved in discussion to elicit peer to peer conversation.

As a group, the immersion students organized their thoughts well enough to demonstrate understanding. Their contributions were similar to that of the French children. Their pronunciation and speech were smooth enough to seem effortless. The major difference between the immersion and French students was in fluency. This last skill was described as one that, on a "continuum of communication tasks, is more context-embedded and in which participants can actively negotiate meaning, than in the retelling task, which is more context-reduced and requires greater

linguistic elaboration" (p. 255). This assessment seems to support Cummins' interdependence and attribute/input hypotheses.

#### Ontario Math Evaluation

A study conducted by Fu and Edwards (1984) involved a two year evaluation of a new math program in Ontario, Canada. It included English and French immersion students in grades 3, 6, and 9. A total of 56 English classes and 14 French immersion classes were in the program. Differences in the program were not significant in grade 3. In grades 6 and 9, the immersion students' math scores were equal or superior to the non-immersion students. "The French immersion pupils tend to surpass their English program peers in mathematical achievement" (p. 18).

#### Winnipeg Program Alternatives

A much more elaborate study was conducted in Winnipeg, Canada. Foidart (1981) authored the final report sponsored by the Manitoba Department of Education evaluating their French immersion programs. Both IQ and socioeconomic status were used as covariates. The study assessed early and late immersion and total and partial immersion programs.

Immersion students performed as well as, or better than, the national norms in math and English skills. No

retardation in achievement was evident. French skills were strongest in the early total immersion groups. Their French proficiency did not match that of French natives, however.

#### Retention of Second Language Skills

Snow, Padilla, and Campbell (1988) conducted a follow-up study of retention of the second language. The 38 students had participated in an elementary Spanish immersion program for seven years. They ranged from grades 7-11. Twenty students from a sixth grade immersion class were also a part of the study to provide a baseline. Comparisons were made in the attitudes of students and parents toward the program and opportunities to use Spanish. Although some loss of second language proficiency was evident after formal instruction ceased, the difference was not significant until the subjects were in high school.

At the high school level, some losses were detected in listening, speaking, reading, and writing. The greatest losses were in the production skills. Students from homes where the use of a second language was more valued retained more of the language. They tended to have more opportunities for using the language after formal instruction ended.

### FLES, Partial Immersion, Immersion, and All-French

Rhodes and Snow (1984), researchers from the Center for Applied Linguistics, worked with UCLA to compare foreign language achievement of elementary students in FLES, partial immersion, and immersion, and high school students. Partial immersion in this study included schools with as little as 70 minutes a day in foreign language instruction. The study included 382 elementary students--105 FLES, 98 partial immersion, and 179 immersion. Tracy Gray and others (1984) in another document which reports the same project, explained that "the 98 partial immersion students included all the students in the United States who have been involved in some type of partial immersion for at least five years" (p. 15). One criteria for inclusion in the study was participation in a program for at least five years.

The Modern Language Association Cooperative Foreign Language Exam (1963) for both French and Spanish was used. This test was designed for high school students originally. It measures listening, speaking, reading, and writing.

As might be expected, the more time devoted to foreign language study, the better the results. French immersion students of 4-6 years out-scored FLES students of 7-9 years. These students also scored higher in listening than 80% of the high school students who took the test in 1963. Elementary students also ranked in the 99th percentile in

speaking and 77th percentile in reading when compared with high school students. In the elementary FLES group, 14% of the high school students scored lower.

On the Spanish version of the test, results were also available for partial immersion. Immersion students out-performed FLES in listening, reading, and writing by more than two to one. Significant differences existed between FLES and partial immersion on listening and speaking. Immersion students out-performed partial immersion in listening, speaking, and writing. Immersion students scored higher than 70% of the high school students in all skills. Partial immersion and FLES students also compared favorably against high school performance in speaking.

In a later article on the same study by Campbell, Gray, Rhodes, and Snow (1985), differences among schools was also analyzed. A nested analysis of variance used program and school within program as the two factors. "The significant differences within the French programs are attributed to several factors. Data collected during a series of site visits to the individual schools revealed variation in terms of program longevity, articulation between grades, and rate of teacher turnover" (p. 51).

Genesee, Holobow, Lambert, and Chartrand (1989) ran a series of experiments which compared control French groups

with English students attending all-French, early total immersion, and delayed immersion programs.

The all-French schools were established in French-speaking areas and staffed by French-speaking teachers and administrators. An English teacher taught English language arts for 30 minutes per day, beginning in grade 4. All other instruction in and operation of the school was conducted in French. French-speaking children also attended these schools.

The early immersion schools were typical of others described herein. English students attended schools in which most staff were English-speaking. English was the language of business conducted in the schools and the medium of instruction for all but the immersion classes. Students attending the school were from English-speaking homes. French was the medium of instruction for 100% of the time through grade 2. In grade 3, English language arts was introduced and was the medium of instruction for 40% of the time. By grade 4, English was used for 60% of the instructional day.

The delayed immersion program began in grade 4. Students participated in French as a second language program from kindergarten through grade 3. In grade 4, 60% of the instruction was in French. By grade 6, 50% was in French.

The study involved students in grade 5. There were pilot and follow-up groups in each case to test results over a two year period. The pilot group showed no significant differences for ability, so analysis of variance was used. The follow-up group did show significant differences for ability, so analysis of covariance was used with ability as the covariate. Tests were conducted in English for language, vocabulary, reading comprehension, spelling; math concepts, application, computation. In French they were conducted for language, reading comprehension, spelling, vocabulary, listening, speaking, writing, and math.

Although there were fluctuations from one test to another, generally there were no significant differences between the early immersion programs and the all-French programs. Both groups performed as well as the French control groups on several subtests. Some production subtests showed lower scores for the non-native groups. The delayed immersion groups did not score as well as the other groups in French language skills.

Genesee and the other researchers (1989) made the following conclusions:

The anglophone students in the all-French schools were able to function effectively in French at the appropriate grade level. . . . They had attained parity in their development of English for academic

purposes . . . in a relatively short period of time and with minimal formal instruction in English. . . .

[R]esults indicate that native-like competence in the language of instruction is not absolutely necessary for age-appropriate academic development. . . . [S]imply extending the amount of exposure to the target language has limited payoffs in the absence of extended opportunities for peer interaction in the target language (p. 262).

#### Summary

The studies which have been conducted indicate some general patterns. Limited or extended exposure to a second language does not appear to be detrimental to the first language skills development of the learner. In total immersion programs, students caught up with their non-immersion peers when they began to study their first language. Nancy Rhodes with the Center for Applied Linguistics monitors the progress of "the 12 districts that offer immersion programs [in the U.S.]. She reports [that] in the second and third grades, immersion students may score lower in English than other students, but by the fifth or sixth grades they score as well [as] or better [than their peers]" (Benderson, 1983, p. 20). Academic performance in other subjects which are taught through the target language

can be equal across programs when the quality of instruction is equitable. A second language can serve as an effective medium of instruction under favorable circumstances.

The acquisition of a second language in a school setting which is not located in an area where the students are constantly surrounded by the second language will probably not produce nativelike speakers in the second language. Young students attending schools that operate 100% in the second language and children attending early total immersion programs stand the best chance of attaining high levels of proficiency. Partial immersion students and delayed immersion students will be less fluent in the target language, but they will be more fluent than children in FLES programs.

Production skills, speaking and writing, are not learned as quickly or retained as long as listening and reading skills. Reading skills seem to transfer from one language to another. Input for acquiring another language should be introduced in a meaningful context.

Most of the research in elementary second language study has been conducted in Canada and with middle and upper-middle class subjects. Almost all studies use immersion and regular classes or immersion and FLES comparisons, not partial immersion.

## **Chapter 3**

### **Methodology**

The methods used in the study are described in this chapter. The population, treatment conditions, and instrumentation are defined. The research design, data collection, and analysis procedures are outlined.

#### Background

The third grade class of 1989-90 at Sunbury Elementary School in Gates County, North Carolina, will serve as the subjects of this study. In 1987-88, all students in this class were in the first grade FLES program for 30 minutes per day from October through January. The French teacher conducted classes in the regular classrooms, allowing the self-contained classroom teachers an opportunity to watch the French classes. In the spring of 1988, immersion awareness sessions were held for parents and guardians of this group. Follow-up calls were made by the principal to those who did not attend these sessions. Half of the parents of that class registered the 32 students who began second grade in the partial immersion program in 1988-89.

### Population

The third grade had 32 students who qualified for free or reduced lunch in 1988-89. Of that number, 13 were in the immersion group. Four mentally handicapped students were exempt from testing and were not included in the data. They did participate in the FLES program, however. Both the immersion and FLES groups lost students who moved during the two year period. Mortality was the same for both groups. Only students who completed the entire two year program were included.

The composition of the students in the two programs by the end of 1989-90 is illustrated in Table 2. The immersion class contained 9 black females, 3 black males, 7 white females, and 9 white males. The FLES class contained 7 black females, 11 black males, 4 white females, and 7 white males. The average IQ score for the entire class was 104. The average of the immersion section was 107.

Parent involvement was more pronounced with the immersion students when compared by PTA membership. Four FLES students and 13 immersion students had parents who joined. No data were available on which of the parents, if any, were active, involved members.

**Table 2**  
**Composition of Sample Population**  
**at the End of the Two Year Study**

Group	Black		White		Total
	Females	Males	Females	Males	
Immersion	9	3	7	9	28
FLES	7	11	4	7	29
Total	16	14	11	16	57

### Treatment

The first year of the partial immersion program, immersion students studied for half the instructional day in English and half the day in French, averaging 180 minutes per week in French. Non-immersion students studied French in the FLES program for 30 minutes every other day. In other words, FLES classes met on Monday, Wednesday, Friday one week and Tuesday, Thursday the following week. The second year of the partial immersion program, immersion students had a slight increase in time spent in the French instruction, averaging 200 minutes per week. FLES students continued to receive 30 minutes every other day. Table 3 illustrates the average time spent in the program by both groups.

Partial immersion students had reading and language arts instruction with an English speaking teacher. After they finished this class each day, they moved to the French speaking teacher's room. There, they studied all their other subjects in French. This instruction included math, social studies, and science. All communication by the French teacher was in the target language. At first, children were encouraged to listen. This activity, coupled with the FLES instruction they had received in the first grade, aided children in accumulating the vocabulary necessary to comprehend what was being said. They were

**Table 3**

**Number Minutes Per Week of French as Subjects  
Progressed Through Grades 2 and 3**

Treatment Group	<b>Grade and Year</b>	
	<b>1988-89</b>	<b>1989-90</b>
Immersion (N=28)	180	200
FLES (N=29)	75	75

encouraged to speak as much as possible, as soon as they had enough vocabulary to be understood.

FLES students continued to have French instruction in the regular classroom. Teachers were equally as fluent in the target language. During the sessions, only the target language was spoken. All other academic subjects were taught by the English speaking teacher.

In order to maintain quality instruction in both programs, teachers who were trained in elementary teaching programs were hired. No American elementary teachers were located in the recruitment search who had the fluency and proficiency in the French language and the desire to move to the area. Since no English is spoken in the immersion classroom, teachers must have near-native fluency. The Association for the Promotion of Education and Training Abroad (APEFE) and the Ministry of Education assisted in recruitment and screening of potential candidates. The Director of Curriculum (the conductor of this study) interviewed the twenty finalists and made the final selection. FLES teachers as well as immersion teachers in the study have the same high degree of proficiency, thereby maintaining the constant of the instructional quality. They are all certified to teach in North Carolina. Curtain and Misslich served as consultants for two and one-half days of immersion training for FLES and immersion teachers. These

teachers also participate in other local and state staff development activities and observations. All teachers have copies of the curriculum.

The French teacher of the immersion subjects in this study met the same North Carolina certification standards and National Teacher Examination (NTE) requirements as the American teachers. He had ten years of elementary teaching experience. Nine of those years were in Belgium and one year was in a Louisiana immersion program. He was selected as Teacher of the Year at Sunbury School in 1989-90.

#### Instruments

In order to prevent testing bias, all instruments were kept secure before the testing sessions. Proctors are used in all state testing situations and were also present during French and aptitude testing.

#### Content Achievement

The California Achievement Test (CAT), a nationally normed instrument, was administered in April, 1990, to all third grade students at Sunbury except mentally handicapped students. Scores in reading, language, mathematics, and total battery were compared. Normal curve equivalent scores were used.

The social studies and science tests were developed by the state and are based on the North Carolina Standard Course of Study objectives for all third grade students in the state. It is the same format as the CAT and is administered during the same week. In the absence of normal curve equivalent scores, the number of correct responses out of 60 were analyzed for both of these subjects.

Content validity for all of these tests was evaluated by both English and French teachers to determine if the test objectives matched those objectives taught in the classrooms. All teachers said that they had taught all of the objectives during the 1989-90 school year.

#### French Fluency

The American Association of Teachers of French (AATF) FLES test was administered to all third grade students in March, 1990. This test is designed annually for elementary students in French second language programs. The listening skills portion is developed at a level that both FLES and immersion students will score at a meaningful level on an interval scale. (The test is designed so that both FLES and immersion student performance can be measured.)

Schools that participate in this test are assigned to divisions based on the students' exposure to the French language. Division 1A includes students in grades 1-3 who

are enrolled in FLES French programs. FLES participants were scored at this level. Division 3 includes students in grades 1-3 who have more than 1,000 hours of French instruction, who have parents who speak French at home, who have lived in a French speaking country, and/or who are in immersion programs. Partial immersion subjects were scored at this level. While this level was designed for students who have been in full immersion programs or who began immersion in kindergarten or first grade, this division most nearly matched the subjects' exposure. Other divisions were designed for FLES or immersion students in grades 4-6.

This test is also the basis for the National French Contest. Students in all divisions take the same listening skills portion. They listen to a tape and respond to 30 multiple choice questions. Students qualify to have their answer sheet mailed in for evaluation if they answer at least 19 correctly. If they earn a score of 23 or higher, they also qualify for the speaking portion of the test. Those students look at a picture provided by the testing center and have two minutes to talk about the picture using complete sentences. If no student at the test site qualifies to speak, the teacher may select the best student in the class and submit a tape of his efforts.

For statistical analysis, only the listening skills portion of this test was used. The number of correct

answers out of 30 were compared. Speaking skills are only scored for the top student from each school site and those students who place in the national competition. Scoring is done at the national level. Scores are reported only for those students who place nationally. The immersion students were compared with students in the 3 division. This level is more rigorous than the 1A division for FLES students. Children in full immersion programs with 1,000 hours of instruction or from French speaking households competed in the 3 division also. Descriptions of speaking skills were included for those students.

#### General Intelligence

The Test of Cognitive Skills published by CTB-McGraw Hill is administered in Gates County each fall to all non-handicapped students in grades 3, 6, and 8. The subjects in this study took the test in November, 1989. This nationally normed group intelligence quotient (IQ) test was used in the analysis to represent student aptitude.

#### Socioeconomic Status

A socioeconomic status (SES) score was developed for use in the analysis. Information obtained from student files, as opposed to questionnaires or interviews, was utilized to minimize reporting errors. The summative scale

included ratings for occupation, education level, and lunch status. In the cases of occupation and education level, the higher rating was used if there were two parents or guardians. This process also equalizes the effect of single parent or guardian households. Lunch status was determined by paid, reduced, or free lunch categories. Since federal tax forms and/or Social Services forms are used to verify income on applications, this item was used as a surrogate measure for income.

Brookover and Erickson (1975) favor occupation ratings as one measure of socioeconomic status. "The system of stratification in America involves several different factors, including race, ethnic identification, occupation, income, education level, place and type of residence, and other related factors" (p. 96). They stress that occupation "is probably the most valid single indicator. . . . Indexes combining occupational level and educational level have sometimes been used as measures of social stratification, but the most widely used method is the rating of occupations" (pp. 96-97).

Hauser and Featherman (1977) describe a series of studies from the 1960s and 1970s in America and Australia which used occupation classifications from census data. These studies "reaffirmed that the relative statuses of occupational categories have remained constant. . . . For

the U.S., . . . (1) the structure of occupational hierarchies is fundamentally socioeconomic, [and] (2) . . . this structure . . . has remained constant (at least) within this century" (p. 9). Due to this stability, either prestige or occupational scales "can be used in . . . comparative analyses as standardized, calibrated measures of the status which accrues to a person owing to his or her incumbency of a particular occupation" (p. 53).

A recent national data collection effort used occupational categories and educational levels as indicators of socioeconomic status of the family in the United States. The National Opinion Research Center's (1980) High School and Beyond 1980 Sophomore Cohort data set was prepared for the Center for Statistics under contract with the U.S. Department of Education. The 1980 data involved 28,240 students in 1015 high schools. The follow-up data included 14,625 subjects. The Data File User's Manual for the second follow-up (1984) contains the occupational classification system and the father's education and mother's education scales which were adapted for this study.

The occupational classification system contains a listing of hundreds of jobs by categories. Using this information, researchers can determine which jobs are of like classification. Broad categories include the following:

1. Professional, technical, and kindred workers
2. Managers and administrators, except farm
3. Sales workers
4. Clerical and kindred workers
5. Craftsmen and kindred workers
6. Operatives, except transport
7. Laborers, except farm
8. Farm and farm managers
9. Farm laborers and farm foremen
10. Service workers, exc. private household
11. Private household workers (Appendix D)

Based on the High School and Beyond data, a coding system was developed for this study. Due to the small sample size and the similarity of most occupations within the sample, the categories were collapsed into the following rating scale:

<u>Category</u>	<u>Code</u>
Unemployed	0
Laborers, household, and kindred workers	1
Operatives, clerical and kindred workers	2
Craftsmen and kindred workers	3
Managers and administrators, except school	4
Professional, including school	5

A similar rating scale was created from the High School and Beyond coding for the education level of the parent or guardian:

<u>Education Level</u>	<u>Code</u>
Less than high school	1
High school graduate	2
Two or less years of college	3
Four years of college	4
More than four years of college	5

Finally, lunch status was ranked from low to high for free, reduced, or paid and was coded as follows:

<u>Lunch Status</u>	<u>Code</u>
Free	1
Reduced	2
Paid	3

To assign an SES index code for a subject, the highest occupation level in the home for one parent or guardian was used for occupation. The highest education code for one parent or guardian was used for education level. These two scores were added to the lunch status code to obtain the SES index. Consequently, the lowest SES index of either group was a 2. One child came from a one parent home in which no one worked, the parent had less than a high school education, and the child received free lunch. The highest SES index possible was 13. This example would have been a

child with a parent who had a professional job, more than 4 years of college, and paid lunch status.

#### Research Design

The subjects in this study were volunteered into the immersion program by their parent or guardian. Since random assignment was not possible, quasi-experimental conditions existed. Furthermore, no pretest was administered to the subjects before the program began because state mandates prohibited standardized testing prior to grade three.

Fortune and Hutson (1984) discuss the process for selecting appropriate designs to measure change under less than true experimental conditions. Without random equivalent groups, *a priori* differences in the groups are being compared as well as the effect of the treatment. By utilizing their "model selection process" (p. 202), the researcher can respond to four questions and discern which method is appropriate:

1. What is the purpose for measuring change? . . .  
compare change across two groups
2. How reliable is the criterion measure in the population? . . . less than .95
3. Are there known mediating variables which predict pretest scores? . . . no

4. If you are not now in a single classification,  
does each group contain 30 or more subjects? . . .  
no (p. 202)

The true score models type was identified as the classification. There are three models in this category. Sample sizes of both groups are approximately equal in this study. "Equality of covariant relationships to the criterion measure across groups" (p. 203) does exist. No pretest was administered. Based on these conditions, analysis of covariance (ANCOVA) was the design selected for this study.

Howell (1987) explains that the use of ANCOVA will adjust the means of the dependent variables and reduce the error term. In addition to the assumption of normality and homogeneity of variance, two other assumptions are made with ANCOVA. "The relationship between Y and the covariate (C) . . . is linear" (p. 531). Homogeneity of regression, that is "regression coefficients are equal across treatments" (p. 531), is also assumed.

The covariate is used to act as an equalizer among the subjects of the study. Huck, Cormier, and Bounds (1974) explain that the covariate can be measured by the same instrument. In this case, the instrument serves as the pretest (covariate) and the posttest (dependent variable). "It is possible, however, for the covariate and dependent

variables to be obtained by different measuring instruments. . . . In many studies the dependent variable will be a measure of academic achievement, while the covariate will be a measure of general intelligence" (p. 136).

Above all, ANCOVA appears to be a more rigorous test. For this study, two covariates were used to control for intelligence (IQ) and socioeconomic status (SES). These two factors are strongly correlated to achievement. Dependent variables were total battery, reading, language, math, social studies, and science achievement, and French listening skills. ANCOVA is more suitable for showing program effects.

#### Data Collection

##### Dependent Variables

Achievement tests were machine scored outside of the district and scores were reported on printouts for the school system. Scores for math, reading, language, and total battery were used in the normal curve equivalent form for computation.

Science and social studies tests were machine scored outside of the district and scores were reported on a printout to the system in the form of percentage correct and

number correct out of 60 in each subject area. The number correct score was used for computation.

The AATF FLES test was scored locally to determine which students qualified to have papers submitted to the national office. Those tests that qualified were verified at the national office. The tapes were scored at the national office and scores of national winners were reported to all districts which participated.

#### Covariates

IQ tests were machine scored outside of the district and the results were recorded on a printout. The IQ score was used as a covariate.

The SES index was a composite score based on highest occupation, highest education level, and lunch status. The information on parent or guardian occupation and education was obtained from student records. Lunch status was obtained from school reports.

Both general intelligence and socioeconomic status have been shown repeatedly as predictors related to student achievement. Using both of these scores as covariates reduces the error term. Analysis of covariance was used to control statistically for initial differences found in subjects which might confound differences between the groups.

### Analysis Procedures

Chi-square tests were used to determine if program choice was independent of race and gender. In addition, descriptive statistics and crosstabs were noted for frequencies, means, standard deviations, and percentages.

Separate ANCOVA tests were performed for reading, language, mathematics, total battery, science, social studies achievement test response variables. An ANCOVA was also done for French listening skills. The SES score and IQ scores were used as covariates in all of these analyses. Separate analysis of variance (ANOVA) tests were run on each ANCOVA for the purpose of comparison. Number Cruncher Statistical System software was utilized for all computations. A probability of .05 was selected as the level of significance.

## **Chapter 4**

### **Results**

#### Introduction

The data collected in this study are reported in this chapter. Tables are included. The chapter is organized in four sections:

1. Research Questions
2. Characteristics of the Sample
3. Results of ANCOVA Tests on Achievement
4. Summary

#### Research Questions

The following questions were addressed in this study:

1. Are there differences in achievement between partial immersion and FLES groups as measured by the California Achievement Test (CAT) for language, reading, mathematics, and total battery?
2. Are there differences in achievement between partial immersion and FLES groups as measured by the North Carolina achievement tests for social studies and science?
3. Are there differences in achievement between partial immersion and FLES groups as measured by the American Association of Teachers of French (AATF) FLES Test?

### Characteristics of the Population

The racial and gender make-up of the 57 subjects are illustrated in the contingency tables. These children represent all non-handicapped students in that class who attended Sunbury Elementary School from 1988-89 through 1989-90. Chi-square test results were included as a test of independence to insure that selection of the program was not dependent on race or gender.

The racial composition of the groups is shown in Table 4. The partial immersion group was 42.9% black and 57.1% white. The FLES group was 62.1% black and 37.9% white. Program choice was independent of race ( $\chi^2_{(1)} = 2.1090$ ,  $p = .1464$ ).

Table 5 summarizes the gender of the groups. The immersion group was 42.9% male and 57.1% female. The FLES group was 62.1% male and 37.9% female. Program choice was independent of gender ( $\chi^2_{(1)} = 2.1090$ ,  $p = .1464$ ). The participation in the two programs was unrelated to either race or gender.

The range of scores of socioeconomic status was from 2 to 13, with a mean of 6.6. This SES score was one of two covariates used in analysis of covariance.

The other covariate used was IQ. The individual scores ranged from 76 to 141. The mean of the entire grade was 104.

Table 4

Table of Racial Composition of the Immersion  
and FLES Groups

Race	Immersion	FLES	Total
Black	12 40.0% 42.9% 21.1%	18 60.0% 62.1% 31.6%	30 100.0% 52.6% 52.6%
White	16 59.3% 57.1% 28.1%	11 40.7% 37.9% 19.3%	27 100.0% 47.4% 47.4%
Total	28 49.1% 100.0% 49.1%	29 50.9% 100.0% 50.9%	57 100.0% 100.0% 100.0%
$\chi^2_{(1)} = 2.1090, p = .1464$			

**Table 5**  
**Table of Racial Composition of the**  
**Immersion and FLES Groups**

Gender	Immersion	FLES	Total
<b>Male</b>	12	18	30
	40.0%	60.0%	100.0%
	42.9%	62.1%	52.6%
	21.1%	31.6%	52.6%
<b>Female</b>	16	11	27
	59.3%	40.7%	100.0%
	57.1%	37.9%	47.4%
	28.1%	19.3%	47.4%
<b>Total</b>	28	29	57
	49.1%	50.9%	100.0%
	100.0%	100.0%	100.0%
	49.1%	50.9%	100.0%
$\chi^2_{(1)} = 2.1090, p = .1464$			

### Results of ANCOVA Tests on Achievement

The ANCOVA was used to control statistically for initial differences in the subjects which might confound differences between the groups. The results of the achievement tests administered are summarized below.

#### Language

The CAT language mean and standard error for obtained and adjusted scores of both groups are reported in Table 6. The immersion group averaged 78.93 and the FLES group averaged 66.79. After adjusting for SES and IQ, the immersion group averaged 76.21 and the FLES group averaged 69.41. The results of the ANCOVA are contained in Table 7. There were no significant results for program. Both groups did equally well. There were no adverse effects on English language skills for students in immersion.

#### Reading

The CAT reading mean and standard error for obtained and adjusted scores of both groups are listed in Table 8. The immersion group averaged 61.39 and the FLES group averaged 52.83. After adjusting for SES and IQ, the immersion group averaged 58.99 and the FLES group averaged 55.15. The results of the ANCOVA are summarized in Table 9.

**Table 6**  
**Mean and Adjusted Mean for CAT Language Scores**

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	78.93	3.61	76.21	2.87
FLES	29	66.79	3.55	69.41	2.82

Table 7

Summary of Analysis of Covariance of Immersion  
and FLES Groups for CAT Language, Using SES Index  
and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	596.65	596.65	2.59
Within	53	12224.2	230.65	
Total	56	22206.56		

**Table 8**  
**Mean and Adjusted Mean for CAT Reading Scores**

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	61.39	2.85	58.99	2.08
FLES	29	52.83	2.80	55.15	2.05

Table 9

Summary of Analysis of Covariance of Immersion  
and FLES Groups for CAT Reading, Using SES Index  
and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	189.59	189.59	1.56
Within	53	6449.05	121.68	
Total	56	13537.93		

There were no significant effects for program. The achievement of both groups was similar. There were no adverse effects on English reading skills for students in immersion.

#### Mathematics

The CAT mathematics mean and standard error for obtained and adjusted scores of both groups are recorded in Table 10. The immersion group scored 80.07 and the FLES group scored 70.59. After adjustment for SES and IQ, the scores were 77.60 for the immersion group and 72.97 for the FLES group. The results of the ANCOVA are shown in Table 11. Achievement was not significantly different between the two groups. There were no adverse effects on math skills for the immersion group even though all math instruction was conducted in French.

#### Total Battery

For the purpose of comparison, the CAT total battery scores of the immersion group and the FLES group are illustrated in Tables 12 and 13. The obtained and adjusted mean and standard error of both groups are shown in Table 12. The immersion group averaged 75.54 and the FLES group averaged 63.31. After adjusting for SES and IQ, the immersion group averaged 72.53 and the FLES group averaged

**Table 10**  
**Mean and Adjusted Mean for CAT Mathematics Scores**

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	80.07	3.13	77.60	2.44
FLES	29	70.59	3.08	72.97	2.40

Table 11

Summary of Analysis of Covariance of Immersion  
and FLES Groups for CAT Mathematics, Using SES Index  
and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	276.71	276.71	1.66
Within	53	8821.00	166.43	
Total	56	16404.56		

Table 12  
Mean and Adjusted Mean for CAT Total Battery Scores

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	75.54	3.32	72.53	2.22
FLES	29	63.31	3.26	66.21	2.18

Table 13

Summary of Analysis of Covariance of Immersion  
and FLES Groups for CAT Total Battery, Using SES Index  
and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	514.40	514.40	3.72
Within	53	7335.69	138.41	
Total	56	19118.32		

66.21. The ANCOVA results are shown in Table 13. The probability for the effects of the program was .0592.

### Social Studies

The North Carolina Social Studies Test for grade 3 was used for the results in Tables 14 and 15. The mean and standard error for obtained and adjusted scores of both groups are listed in Table 14. The immersion group scored 39.5 and the FLES group scored 41.86. After adjusting for SES and IQ, the groups scored 38.41 and 42.92, respectively. The ANCOVA results are shown in Table 15. There are significant differences between the performance of the two groups on the social studies test ( $p < .05$ ). The achievement in social studies was significantly lower for the partial immersion group.

### Science

Tables 16 and 17 report the results of the N.C. Science Test. The mean and standard error for each group are in Table 16. The immersion group averaged 37.96 and the FLES group, 38.69. The adjusted scores were 37.01 for immersion and 39.61 for FLES. The results of the ANCOVA are listed in Table 17. After the adjustment for SES and IQ, there were no significant results for program. Achievement was similar for both groups.

**Table 14**  
**Mean and Adjusted Mean for North Carolina  
Social Studies Test Scores**

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	39.50	1.67	38.41	1.28
FLES	29	41.86	1.64	42.92	1.26

Table 15

Summary of Analysis of Covariance of Immersion  
and FLES Groups for North Carolina Social Studies Test,  
Using SES Index and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	262.55	262.55	5.71*
Within	53	2436.03	45.96	
Total	56	4377.93		

\* p < .05

Table 16  
Mean and Adjusted Mean for North Carolina  
Science Test Scores

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	37.96	1.41	37.01	1.13
FLES	29	38.69	1.39	39.61	1.11

Table 17

Summary of Analysis of Covariance of Immersion  
and FLES Groups for North Carolina Science Test,  
Using SES Index and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	87.02	87.02	2.42
Within	53	1906.85	35.98	
Total	56	3078.67		

### French Skills

The American Association of Teachers of French (AATF) FLES Test scores were used as a measure of French listening skills. The mean and standard error for obtained and adjusted scores are shown in Table 18. The immersion group scored 25.18 and the FLES group, 14.79. The ANCOVA adjusted the means with SES and IQ covariates for the immersion students to 25.03 and FLES students to 14.94. The ANCOVA results are reported in Table 19. Program effects were significant ( $p < .0001$ ). The French listening skills were significantly better for the immersion group.

Students in the FLES class were entered in Division 1A for the French contest, a part of the FLES Test. The partial immersion students competed at the Division 3 level. Division 3 includes students who have parents who speak French at home, who have lived in a French speaking country, and/or who are in an immersion program (1,000 hours of French instruction). Consequently, in addition to the comparison with the FLES students at Sunbury Elementary School, the immersion students were compared with French students from 100 schools who took the test throughout the United States. This comparison involved the speaking portion of the test.

Students who scored at least 23 out of a possible 30 points on the listening skills test could participate in the

Table 18

Mean and Adjusted Mean for AATF FLES French Listening Scores

Group	N	Obtained		Adjusted	
		M	SD	M	SD
Immersion	28	25.18	.5252	25.03	.5162
FLES	29	14.79	.5161	14.94	.5072

Table 19

Summary of Analysis of Covariance of Immersion  
and FLES Groups for AATF FLES French Listening Test,  
Using SES Index and IQ As Covariates

SOURCE	df	SS	MS	F
Program	1	1313.88	1313.88	176.13*
Within	53	395.36	7.46	
Total	56	1961.37		

\* p < .0001

speaking test. The speaking portion of the test consists of students viewing a picture designed for the test and talking about the picture for two minutes. Responses should be in complete sentences. Students are recorded and tapes are mailed for scoring. When several students in a class qualify, teachers may select the most able students to participate at this level. Only the scores of winners are reported.

All of the partial immersion students scored in the 24-30 point range, regardless of IQ or SES status. In the FLES group, two students qualified for the speaking test with scores of 23. These two could not elaborate about the pictures using complete sentences in the speaking portion of the test.

Of the partial immersion students in this study, Sunbury Elementary School had the second and third place winners in the immersion category of the National French Contest sponsored by the American Association of Teachers of French. Selection criteria included the 30 item multiple choice listening skills test and the five minute taped speaking skills test. In addition, there were three students who received honorable mention from the same group. No FLES students from the Sunbury group in this study placed at the national level. However, two scores of 23 did qualify those two students to enter the speaking portion of

the test. Although they were not proficient enough to describe pictures in complete sentences for five minutes, they did well in the FLES category. Two students from the Buckland Elementary FLES program in Gates County received honorable mention in that category.

#### Summary

Participation in the two programs was unrelated to either race or gender. Statistically, there was a balance of black, white, male, and female students in both groups.

The ANCOVA results showed no significant difference in the two groups in English language, reading, mathematics, total battery, and science. Achievement of both groups was similar. CAT results for both groups were above the national average. The conductor of this study did not find immersion cases when science was assessed on a standardized test. Some studies used teacher judgment and others did not include science.

Program effects were significant ( $p < .05$ ) for social studies achievement. The FLES group performed better than the immersion group on the North Carolina Social Studies Test. After SES and IQ adjustments were made, the partial immersion group answered 4.51 less questions correctly on a 60 item test. Again, the conductor of this study did not find immersion cases when social studies was assessed on a

standardized test. Some studies used teacher judgment and others did not include social studies.

Program effects were also significant ( $p < .0001$ ) for French listening skills. The immersion group out performed the FLES group. They answered 10.09 more questions correctly on a 30 item test after scores were adjusted for SES and IQ. These two covariates, however, only adjusted the scores for the immersion group downward by .3 of a question, meaning that SES and IQ contributed very little to the differences in French listen skills for children in either group. Observations of French speaking skills show evidence of fluency and production in the immersion group which surpasses the speaking skills of the FLES group. Immersion students could elaborate in complete sentences for several minutes while FLES students could not.

## **Chapter 5**

### **Summary, Conclusions, and Recommendations**

This chapter contains a brief summary of the research methods and results. A discussion of the conclusions and recommendations for further research finish this section.

#### Summary

#### Sample

The 57 students who completed grade 2 in 1988-89 and 3 in 1989-90 at Sunbury Elementary School were the subjects in this study. After attending awareness sessions, parents were given the choice of immersion or FLES for their children. It was the first immersion program in North Carolina. Twenty-eight students were in the partial immersion group and the remaining 29 were in the FLES group. Handicapped children participated in the FLES classes; however, they were not included in the statistical analysis since their testing program differs from the other students. All of the students in this class had participated in a FLES program in the first grade (1987-88).

The partial immersion students studied English language arts and reading with an English speaking teacher. The rest of the day they studied mathematics, science, and social

studies with their French speaking teacher through the French language only. Art, music, and physical education were conducted by specialists and by the French teacher, depending on the school's schedule.

The FLES students stayed in their self-contained classroom with their English speaking teacher. They had art, music, and physical education by the teacher or specialists according to the same school schedule. In addition, they had the French FLES program taught in their classroom by a specialist for 30 minutes every other day.

#### Data Collection

The California Achievement Test (CAT) was used to measure student performance in language, reading, mathematics, and total battery. The third grade level of the North Carolina Social Studies Test and the North Carolina Science Test were used to measure student performance in these two subjects. The American Association of Teachers of French (AATF) FLES Tests for Divisions 1A and 3 were used to measure student performance in French listening skills. For the most able students, another section was also used to assess French speaking skills.

The research design was quasi-experimental in nature. Since random assignment was not possible, analysis of covariance (ANCOVA) was used to control statistically for

initial differences which might confound the differences between groups.

Two covariates were employed. A socioeconomic status (SES) score was developed based on three criteria: (1) the highest education level of one parent or guardian in the home; (2) the highest occupation code of one parent or guardian in the home; and (3) free/reduced or paid lunch status. A summative score was computed for the SES score used as one covariate.

The second covariate was general intelligence. The Test of Cognitive Skills published by CTB McGraw Hill was administered to the students in November, 1989. The intelligence quotient (IQ) score was used for computations.

#### Data Analysis

Student participation in the two programs was unrelated to race or gender, as shown by chi-square tests ( $\chi^2_{(1)} = 2.1090$ ,  $p = .1464$  for both race and gender). Seven one way ANCOVAs were used to analyze data collected to determine the relative effectiveness in four areas of academic achievement of the two French programs. The data were arranged to correspond with the research questions which follow:

Research Question 1. Are there differences in achievement between partial immersion and FLES groups as

measured by the California Achievement Test (CAT) for language, reading, mathematics, and total battery?

The analysis of CAT scores for both treatment groups revealed, there was no significant difference due to treatment in language, reading, or mathematics when scores were adjusted for SES and IQ. For total battery, program effects were not significant, but the probability was .0592. Achievement of both FLES and immersion groups were similar. Both groups scored above the national average.

Research Question 2. Are there differences in achievement between partial immersion and FLES groups as measured by the North Carolina achievement tests for social studies and science?

The analysis of the North Carolina Social Studies Test data yielded significant results for program effects ( $p < .05$ ). The immersion group scored significantly lower than the FLES group in social studies when scores were adjusted for SES and IQ. The North Carolina Science Test showed no significant effects for program. The immersion and FLES groups performed at a similar level of science achievement.

Research Question 3. Are there differences in achievement between partial immersion and FLES groups as measured by the American Association of Teachers of French (AATF) FLES Test?

The analysis of the AATF FLES Test results showed significant effects for the program ( $p < .0001$ ). The immersion students out performed the FLES students in French listening skills by 10 correct questions out of 30. In addition to the statistical data, the results of the national contest illustrate the immersion students' speaking skills. The second and third place national winners and three honorable mention were from this partial immersion group.

#### Conclusions

The subjects in this partial immersion study were somewhat different from previous studies. Minority students and students of varying levels of ability and socioeconomic status were served through this program. The population was not similar to many of the immersion studies which involved middle and upper middle class students.

Covariate adjustment by SES was marginal on all tests. Covariate adjustment by IQ had a larger determining role for all subjects except French listening skills. Students of all ability levels had similar scores on listening. Study of a second language is possible for students of all ability levels. They can learn a second language in the same manner which they learned their first language.

In one subject, social studies, the program had a significant effect ( $p < .05$ ) on achievement when adjusted for SES and IQ. The immersion group scored 4.5 points lower than the FLES group. On a 60 item test, the partial immersion group answered 4.5 less questions correctly than the FLES group. Social studies achievement has not been noted in other studies except as based on teacher judgment. The students had been in the partial immersion program for two years. An initial drop in academic achievement scores has been reported in other early immersion programs. These programs began in kindergarten and scores began to equal or surpass non-immersion groups by the fourth grade (Lambert & Tucker, 1972; Swain & Barik, 1976; Cummins & Swain, 1986; Genesee, 1985; Holobow, unpublished; Milwaukee Public Schools, 1987; Curtain & Pesola, 1988; Howe, 1983; Shapson & Day, 1982). In fact, these researchers emphasized that longitudinal research is necessary to accurately assess immersion programs. It is somewhat surprising that this initial drop was not evident in other subject areas. Moreover, social studies is a highly language dependent subject. Much of the academic content is expressed through the spoken or written word with pictures, maps, graphs, and other visual media. Students need to develop a broad French vocabulary to understand the lesson. It is also possible that the use of a teacher who is not native American

affected the social studies test results. Some subtle use of words, allusions to American personalities, references to historical events may not be evident to a non-American. If that is the case, some staff development and social studies department planning may be indicated. However, many immersion programs use native speakers. There is no evidence that this factor caused the noted effect.

The study of English was not affected by the study of French. The partial immersion students performed as well as their FLES counterparts. The immersion students scored 12.14 points higher on language, 6.8 after adjustment. In reading, they scored 8.56 points higher, 3.84 after adjustment. Although these differences were not statistically significant, they do serve to show that no retardation or confusion of English skills occurred as a result of the immersion program. By starting partial immersion in the second grade, students had English instruction beginning in kindergarten. This instruction continued throughout the program. Their English reading and language skills achievement did not experience the initial drop noted in all early total immersion programs. Starting a partial immersion program in the second grade may be a consideration for practitioners trying to avoid the drop in initial academic achievement.

Math instruction was delivered to immersion students in the target language only. This group out performed the FLES group by 9.48 points, 4.63 after adjustment. Differences were not statistically significant; however, the immersion program obviously did not retard math skills. Similar results were recorded in several other studies (Swain & Barik, 1976; Curtain & Pesola, 1988; Rafferty, 1986; Shapson & Day, 1982; Fu & Edwards, 1984; Foidart, 1981). Math is an excellent subject to use in early immersion programs because many concrete, hands-on activities, manipulatives, and demonstrations are used. These experiences provide opportunities to enrich second language usage.

The FLES scores for science averaged slightly higher than the immersion group, but not significantly. The FLES class averaged .73 points higher, 2.6 after adjustment. The immersion group was not handicapped by the program for science achievement. As in math, science can often be taught through manipulatives and demonstrations.

Perhaps the most startling results were the AATF FLES Test for French listening skills. One would expect the immersion students to out perform the FLES group in French listening skills, and they did by 10.39, 10.09 after adjustment. What is so interesting is the fact that neither IQ nor SES had a significant impact as covariates on French listening skills. All students' scores in the immersion

group were within a 6 point range. FLES students' scores were within a 12 point range. Students from all SES levels and with varying levels of ability can learn a second language.

The first two years of the partial immersion program have provided a basis for comparison with the FLES program. The half-day delivery of instruction through a second language did not retard the learning of math or science. It did not hamper learning of the students' native English language. The gains in French listening skills and speech production were much greater in the immersion group. While FLES students performed well when compared with other students in FLES programs, they could not elaborate for several minutes using complete sentences. Production of second language speech is a much higher level of proficiency than listening for understanding. The individual student differences in French skills of both groups was not attributable to IQ or SES. Social studies was affected by program. This difference may equalize with time. The longitudinal studies in immersion note this phenomenon and emphasize the importance of following a group through several years. These results are short term in the context of assessing the effectiveness of acquiring second language skills.

From evidence in the study, it is clear that effective elementary second language programs can be developed in any geographic area. Program goals must be well developed and articulated. Planning, recruitment, teacher selection, teacher training, selection of materials, and program models must all be considered.

Another caution from the conductor of the research is necessary. Within the two year time frame of this study, the same immersion teacher worked with those subjects. The purpose of this research was not to study teacher effect. He obviously did an excellent job. Therefore, if this study were to be replicated, the results may be different because of the variable of teacher effect.

Finally, the Hawthorne effect of the studies conducted by Mayo (1933) could have been a factor in this study. However, since both programs were new to the school and district, effects should have been the same for both groups.

#### Recommendations

The unique setting of this study offers a wealth of follow-up opportunities. The students in this study are now continuing their partial immersion program in grade 4 at T. S. Cooper School. A longitudinal study of this group should be conducted as long as the program continues. New groups have started in grades 1 and 2 at both primary schools in

the county, and the current third grade class at Buckland Elementary School will be tested this year for the first time. The only limitation is the lack of resources needed for this type of on-going research.

Can foreign language study be an equalizer? These students performed equally as well, regardless of their socioeconomic status. All of them started at the same level of proficiency in French, zero, and progressed as a group. Advantages or disadvantages outside of school did not seem to effect student performance in French. Most of the studies in immersion have been conducted with upper middle and middle class students (Swain & Barik, 1976; Genesee, 1985), students of high ability (Cummins & Swain, 1986; Genesee, 1985), or magnet schools (Curtain & Pesola, 1988; Milwaukee Public Schools, 1987; Holobow, unpublished). Socioeconomic background did not appear to hinder students in Gates County's foreign language program. This finding is somewhat different from Holobow (unpublished). In that Cincinnati study, middle class students out performed working class students in French. There was no difference due to ethnicity, however. This question is one which would be interesting to follow on a long term basis.

The program effects narrowly missed being significant ( $p = .0592$ ) for CAT total battery. After prolonged exposure to a second language program, is it possible to

significantly improve student performance? Fu and Edwards (1984) found some evidence that math improves with the study of a second language. Moreover, some administrators in the field have expressed an interest in second language study effects on student aptitude. Does the mental flexibility which comes from learning a second language improve performance or divergent thinking in other subjects? This question would be an interesting one to pursue under the right experimental circumstances.

Hornby (1980) and Snow, Padilla, and Campbell (1988) conducted studies on the effects of a second language program and self-concept and attitudes toward the program. This type of study could be conducted in Gates County and at other sites also.

The implications of this and similar immersion studies, such as the one in Uvalde, Texas (Gersten, 1984; Gersten, Woodward & Moore, 1988), could be applied to bilingual/English as a Second Language (ESL) programs in the United States. A shift from a remediation model to an enrichment model could impact on self-concept and attitudes as well as academic achievement. Students in most ESL programs are expected to stop using their own language, implying that the language of their heritage is inferior. As soon as students can communicate in the second language, English, they are expected to read and write in English as well. Production

at this level is a much more difficult skill. ESL students are often tested in English, another handicap. This remediation model can have a negative influence on self-concept. An enrichment model would allow young students to begin learning to read and write in their own native tongue. After two years, they might begin to receive half of their academic instruction in English.

The group in this study is somewhat unusual because it began the partial immersion program in the second grade. Early immersion is typically defined as starting in kindergarten or first grade. These students studied English from the beginning of their school careers. They did not experience the initial drop in English language and reading skills. The slight delay in their starting a second language may have contributed to this phenomenon. The fact that they participate in a partial immersion program, not total immersion, could be another contributing factor. There is some interest now in the comparative effectiveness of early, delayed, and late immersion (Genesee, Holobow, Lambert, & Chartrand, 1989). In 1990-91, new groups began partial immersion in both Gates County primary schools. Buckland started a second grade group. Using Mary Reynolds Babcock Foundation funds, Sunbury was able to start both a first and second grade group. Buckland's first class continues in grade 3 and the subjects of this study continue

in grade 4 at T. S. Cooper Elementary School. What differences will be evident in the performance of the students who begin in the two different grade levels? Is there a most opportune time to begin second language study to provide the most effective results? How much mastery of the first language should occur before a student begins a second language? These are some important questions that ought to be explored in further research.

Snow, Padilla, and Campbell (1988) have begun to study retention rate of students no longer in an immersion program. How long must a program last or should a student remain in a program to produce effective long-term results? This question has long range implications for administrators in Gates County's school district and in any district with a FLES or immersion program.

Much attention has been given to students' learning styles in recent years. Second language studies involve group results. As Hornby (1980) suggested, the individual student performance will be the focus of the future.

Rhodes and Snow (1984) compared FLES, partial immersion, and total immersion programs in the United States. There were very few partial immersion programs available. Gates County can be included in future studies of this nature as long as the program continues.

There are more questions which could be explored than there would ever be time, money, or personnel to handle in a small system like Gates County, North Carolina. If the unique characteristics of the area capture the interest of researchers in the elementary second language field, their expertise would be welcomed.

As the world becomes smaller, American educators need to consider their role in preparing students for future international interaction. The Gates County elementary second language program has grown during the course of this study. Three Belgians, two French, and one American who has studied abroad now teach all K-6 students in either FLES or partial immersion. Administrators will continue to monitor the program. If it is possible for students to learn their academic subjects and acquire a second language at the same time, partial immersion will continue as resources permit.

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