Evidence of the influence of French on the English spelling of French immersion students.

Lucille M. St. Pierre
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EVIDENCE OF THE INFLUENCE OF FRENCH
ON THE ENGLISH SPELLING
OF FRENCH IMMERSION STUDENTS

by

Lucille M. St.Pierre

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through the Faculty of Education
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ABSTRACT

To investigate the influence of French language literacy experience on English spelling, a spelling dictation comprised of words of varying frequency including phonemes common to both languages was administered to 127 subjects in grades 3 and 6 of an Early French Immersion program. In accord with expectations, the results revealed that the French interference evident at the grade 3 level for low and non-frequency words was greatly reduced at the grade 6 level. In addition, the results showed no difference in the students' performance attributable to gender.
DEDICATION

This thesis is dedicated to my late mother, Marguerite Charron-Renaud (1921-1983). Her unconditional love and devotion instilled in me the self-confidence and desire to attain my greatest aspirations. My mother was my first and most treasured teacher; she allowed me the freedom and security to be "un enfant choyé", truly loved and respected. The child I was permitted to be has evolved into the fulfilled person I am today.

I would also like to dedicate this work to my friend and colleague Nancy Huneau (1950 - 1990). Her effervescent joy of teaching greatly influenced me and affirmed my philosophy of education. I will always remember her as an exceptional model of a truly dedicated teacher.
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I would also like to express my indebtedness to the Essex County Board of Education for their interest in the research project and their permission for allowing the study to take place in their French Immersion program.

My thanks is also extended to my sister Michelle for her willingness to take on the formidable task of secretary, despite her full-time commitments of family and work. Thanks to my sister Rachelle as well, for her support and assistance in bringing this project to fulfilment. I would also like to express my appreciation to my sister Sue, who gave me the opportunity to work on this thesis by caring for my children on numerous occasions.

I would be remiss if I did not take this opportunity to express my gratitude to my family. I am thankful to my
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Chapter 1- Introduction
French Immersion studies related to English language skills

French Immersion education has created a concern about first language (English) competence due to the exclusive use of French as the school language for Kindergarten through grade 3 (Lambert & Tucker, 1972). Research to assess English language abilities was done primarily through the administration of standardized tests such as the Metropolitan Achievement Tests, The Canadian tests of Basic Skills, or The Peabody Picture Vocabulary Test (Lambert & Tucker, 1972; Barik & Swain, 1976; Barik & Swain, 1977). The French Immersion students' scores were compared to regular English program students' scores in an attempt to determine if the French Immersion program was hindering the development of English language competencies such as listening, speaking, reading, word knowledge and spelling.

Of all areas tested, spelling was most significantly affected. The French Immersion students' scores for spelling were below the scores of their English peers initially, at grade two through four levels, but reached parity by grade 5 or 6. This was referred to as the lag in spelling (Lambert & Tucker, 1972; Barik & Swain, 1976; Barik & Swain, 1977).

English Spelling development

Young children's spelling has been an area of research interest. Read (1975, 1986) examined the early spelling attempts of English-speaking children and discovered phonemic patterns which did not appear in conventional English
spelling. These unorthodox patterns were found in various children's spelling and were called "creative spelling". Read postulated that young children create personal sound-letter relationships and use these to spell words. There seems to be some universality about these patterns.

Since French Immersion students initially learn the literacy skills of writing and reading in French at school, one wonders if the unorthodox early attempts at English spelling are different than for English program students. Perhaps a universal English inventive spelling based on French orthographic patterns exists for students schooled in French.

English spelling has also been presented as a process which involves more than phoneme-grapheme match-ups. Goswami (1988) and Goswami & Bryant (1990) refer to intra-syllabic units of onset and rime, which will be discussed in the literature review. They state that children are making connections between sounds and whole sequences of letters. There is evidence that children spell new words by analogy to known words (Frith, 1980; Zutell, 1980; Campbell, 1985).

Perhaps students in French Immersion programs develop intra-syllabic spelling units based on known French words and spell English words by analogy of these French words (e.g., spell the English word "suit" as "soute", based on analogy to the French word "toute").

**Sex Differences in Spelling**

In the area of spelling, research has shown sex
differences in favour of girls (Manolakes, 1975; Yarborough & Johnson, 1980; Lum & Morton, 1984; Morton, 1985; Allred, 1990). These studies used standardized spelling tests or preinstructional spelling lists. It is possible that sex differences occur in inventive spelling as well.

Given the evidence regarding a quantitative lag in English spelling for French Immersion students and the qualitative analysis of children's spelling showing specific patterns for English spelling, a qualitative study of the English spelling of French Immersion students is a worthwhile undertaking. Perhaps the quantitative lag is related to alternate French patterns which occur in French Immersion students' attempts to spell in English.

Statement of the Problem:

The initial purpose of this study was to analyze the English spelling of specific words with targeted phonemes to determine if French influence error patterns existed. An English dictation was made up by the researcher to investigate possible French influence errors of thirteen specific English phonemes at three different frequency levels. The study involved all grade 3 and grade 6 French Immersion students in the Essex County Board of Education. The subjects completed a brief questionnaire about their literacy skills, then wrote a French and English dictation. These dictations were scored for spelling accuracy, accurate orthographic representation of the targeted phonemes and error analysis.
The hypotheses tested were that there would be significant differences between the two grades and males and females in terms of French influence errors in the English dictation.

Limitations of the Study:

No IQ scores were recorded for the students who participated in this study and therefore it was not possible to determine if the students were homogeneous as to IQ, nor was it possible to determine the effect of IQ on individual performances. It is possible that any significant differences found between grades or genders could have been related to IQ.

Thomas' (1974) Canadian frequency word list was used to designate the frequency of the English spelling words as high or low. Since this list was developed for anglophone students in regular English programs, the frequency levels may not apply for French Immersion students, particularly for the grade 3 subjects in this study who have not had any formal English Language Arts instruction at school.

Summary:

Many of the research studies conducted to date on the English spelling abilities of French Immersion students have focused on standardized test results, and are of a quantitative nature. Studies involving students in other forms of bilingual education (Spanish-English; Dutch-French) have indicated that spelling errors based on one language's influence on the other occur. This study has attempted to
determine the influence of French on the English spelling abilities of French Immersion students by constructing an instrument where predicted elements of influence of French on English spelling can be tested.
Chapter 2 - Personal Interest

My interest in the area of spelling in English for French Immersion students was generated by my classroom experiences. I taught a grade 4 class which had never had English Language Arts instruction at school. Because these students were able to write effectively in French and came from English-speaking homes and already exhibited an extensive oral competence in English, the production of written texts in English seemed feasible.

While reading personal journal entries written in English by my students, I realized that many of them were using French orthography in their attempts at English spelling. Certain patterns became obvious: "touday" for "today", "cho" for "show".

As a master's level course assignment, I dictated Gentry's list of words (Temple, Nathan, Burris & Temple, 1988, p. 105 - 106) to this same grade 4 class to assess their individual stage in English spelling development. Once again, I was surprised by the obvious influence of French on how my students spelled in English. I had a group of grade 4 students in a regular English program perform Gentry's spelling stage test and analyzed the results. Although there were some similarities in spelling strategies between the French Immersion and English students, there were patterns emerging among the French Immersion students' spelling which
indicated a strong influence of French. Certain English phonemes were being represented with French orthographic patterns by French Immersion students. Such was not the case for the same grade level students in the English program.

This research project deals with some of my questions about the influence of French on the English spelling of French Immersion students. It may also answer some questions that parents and educators have regarding this matter.

Parents of French Immersion students may be concerned about the lag in English language skills and be further upset by the obvious French elements found in their children's English writing. They need to understand why this occurs and that it is a temporary phenomenon, as will be demonstrated later in this text.

Teachers, especially at the grade levels where students are introduced to English Language Arts instruction, need to be aware of the influence of French on English spelling and understand the process which the students are working through in differentiating the two languages.

Educators need to understand where the child is in terms of development in order to create and implement meaningful learning experiences. The results of this research will assist in the understanding of early attempts at spelling in English for French Immersion students and can impact on curriculum development.
Chapter 3 - Literature Review

Spelling

Spelling involves many mental and physical processes. Hodges (1981) stated that "the ability to spell is a highly complex and active intellectual accomplishment, and not... a low-order memory task" (p.9). Stubbs (1980) indicated that "an alphabetic writing system requires not only tacit, unconscious knowledge, but analytic knowledge, such as the ability to segment the sound continuum" (p.9) and then to represent it appropriately.

Because the English language is based on many other languages and not on one single phonemic system, it is a mixed system, "based on several different organizing principles" (p.66) and so spelling requires much understanding and effort.

The complexity of English spelling, particularly in comparison to more phonetically regular orthographic systems such as Italian or Spanish, has led to many calls for spelling to be simplified. Pitman and St.John (1969) attempted to simplify the spelling process and proposed a new teaching alphabet to more appropriately represent English phonemes, to replace the current English orthographic system where there are "793 different ways of representing the 40 phonemes" (p.53). Although many attempts at spelling reform have been proposed, the complex English orthographic system remains.
Spelling, then, continues to challenge our intellectual capacities.

Hodges (1981) proposed that "spelling errors provide valuable information about the mental processes of young learners, information that correctly spelled words cannot reveal" (p. 9). Spelling has therefore been an area of interest in research for many years.

**English spelling—Inventive to conventional spelling**

Early attempts at learning to spell offer a window on the spelling process. Frith (1980) proposed that "spelling in alphabetical scripts essentially means representing speech sounds. Thus spelling is visible phonology" (p. 2).

Correct spelling, especially in English, depends on other factors besides sound. Frith indicated that there are sound as well as visual factors involved in the spelling process. Young children often attempt to write in an effort to communicate. Their early approximations of the written word are based on their understanding of sound and letter match-ups and reflect the strategies they use to spell. Children apply their knowledge of the sound structure of the language in order to spell.

Read (1975) examined the writing of thirty preschoolers who showed awareness of letters and sounds. The children created their own spellings based on their understanding of what letters meant or represented. The way in which the children categorized speech sounds initially appeared to be
based on the individual's perception, then the researcher discovered patterns which beginning spellers used, far different from the standard spelling patterns. Read referred to this as "invented spelling". These findings indicate that from a very early age, children are able to break down a word into phonetic segments and represent them with perceived graphemes. Read stated that "Learning to spell is not a matter of memorizing words, but a developmental process that culminates in a much greater understanding of English spelling than simple relationships between speech sounds and their graphic representations".

Read (1986) also dealt with the universality of the process of learning to spell. He indicated that children's first attempts in spelling are based on the speech sounds and relationships among speech sounds. He proposed that "children's beginning spelling is essentially phonetic" (p. 1) and that "phoneme-by-phoneme encoding is the major spelling strategy in both the primary and early elementary years" (p. 122). Learning to spell in one language is somehow different from learning to spell in another language. This is because "it is almost never the case that two languages have the same phonemic systems, although certain systems of vowels, and less commonly, consonants, do appear in more than one language"(p. 77).

Read (1986) summarized a study of native French-speaking children learning to spell in French done by Gill in 1980 in
Montreal (p.86 - 90). Results of this study confirm the phonological basis for invented spelling. There was "little indication... of the nasal omission which is such a salient and robust phenomenon in children’s spelling of English" (p.87). Since early French spelling attempts were qualitatively different than early English spelling attempts, exposure to French could lead to alternate English invented spelling for French Immersion students. This finding indicated that there are differences in learning to spell based on the native language of the learner. There is also evidence for the effects of regional dialect on spelling (p.63). The pronunciation and phonology of a language hence affect the way it is encoded inventively in spelling.

Other researchers who have investigated the development of invented spelling are Gentry(1978) and Beers(1980). Gentry outlined a five-stage progressive spelling process. The first stage is deviant. The child strings together letters in an attempt to represent a word but there is no evidence of a phonetic base, eg. IMMPMPH. The next stage is that of prephonetic spelling, which occurs when a child attempts to represent phonemes in words with letters. An example would be AT for "eighty". There is an omission of letters or sounds. The following stage is that of the phonetic spelling. The child is more aware of sounds and letter match-ups. Examples include CHRP for "chirp" and PRD for "purred". The next stage is the transitional spelling. The child’s spelling begins to
change because of the exposure to standard spelling through reading. The spelled words look more like standard English words, yet there is still evidence of invented or created spelling. Examples would be DRAGUN for "dragon", TIPE for "type", and TRUBAL for "trouble". The final stage is that of the correct spelling. At this stage of development, the child remembers the standard English spelling and reproduces it. The entire word is spelled correctly.

Beers (1980) also indicated that there was a sequence for invented spelling which appears constant for most early spellers. The process, therefore, is somehow universal (p.96). "Children internalize information about spoken and written words, organize that information, construct tentative rules based on that information, and apply these rules to the spelling of words" (p.36).

In a related study, Zutell (1978) underlined three factors which influence how children attempt to spell. Firstly, he noted that although English orthography is irregular and arbitrary, how children view the system affects their spelling. Children begin by organizing the orthography system, typically by matching sounds to letters according to a personal understanding of the system.

Secondly, the young child learns to spell by making sense of the writing system. Young children appear to have an intuitive perception of English sounds and letters and use the known strategies to communicate in the written mode.
The last factor which influences how the child learns to spell is how they learn language, oral and written. Children do not learn oral language simply through imitating models. They process language and construct rules which are temporary, constantly being applied and revised. Analysis of young children's spelling errors indicates that they apply the strategies whereby they learned oral language to their learning of written language. The child constructs a hypothesis about how a word is written based on his understanding of how language works, uses this to spell creatively, and modifies spelling along the way as he learns more about the written language.

Another study revealing the constructive nature of children's spelling is that of Ferreiro and Teberosky (1982) who delineated a developmental progression of writing which showed a conscious attempt at representing sound with letters. As children matured, more sophisticated hypotheses about spelling were applied, and children's writing approached standard spelling.

The researchers defined five levels of development. The first two levels were characterized by the reproduction of typical features of adult cursive or block letter writing. Level three involved "assigning a sound value to each of the letters that compose a piece of writing" (p.197); children were attempting to transpose syllables of verbal language into text by way of individual letters. The next level showed a
"passage from the syllabic to the alphabetic hypothesis" (p.204). Children had no permanent visual image of a word but represented words with more than one letter for each syllable. The fifth and final level was characterized by alphabetic writing. The children showed an understanding of the fact that "each written character responds to a sound value smaller than a syllable" (p.209). Children at this level "systematically analyze the phonemes of the words they are writing" (p.209).

Wood (1982) also attempted to describe the process of moving from an invented speller to a standard speller. He proposed that invented spelling involves a "phonetic spelling of words representing their composite sounds as heard (and pronounced) by the child" (p.708). This includes the ability to break words up into parts (phonic segmentation) by isolating the separate speech sounds, then attempting to encode these separate sounds with matching letters, based on the knowledge of the sounds they represent.

Wood that the young speller is progressing by constructing rules, testing hypotheses, and then revising rules about sound and letter match-ups. "As inventive spellers engage in experiences with standard print--particularly as formal reading instruction is begun--their concept of orthography is gradually modified, and this is reflected in their writing"(p.715). There appears to be a
shift from sound to visual memory of words which leads the child to standard spelling forms.

A number of studies have focused on the actual strategies children use as they move through the shift Wood described (Barron, 1980; Zutell, 1980; Nolen & McCarltn, 1984). Barron (1980) outlined two major strategies for spelling: a phonological strategy which involves "applying sound-to-spelling rules without consulting the word's corresponding visual-orthographic entry in the lexicon" (p.205), and a visual-orthographic strategy where the student is able to "retrieve visual-orthographic information stored in the lexicon in order to produce a spelling" (p.205). When faced with the spelling of a word which follows a regular orthographic pattern, either strategy may be applied successfully, however, "only the visual-orthographic strategy would appear to be successful in spelling irregular words" (p.205).

Barron investigated the spelling strategies of 48 students in grades 4 through 6. The students were equally divided into two reading proficiency groups (good, poor), based on standardized reading test scores. There was no significant difference between the two groups on non-verbal IQ scores. The researcher investigated the spelling strategies of the subjects to see if reading proficiency affected the type of spelling strategy applied.
The subjects were asked to spell 10 regular words, which conformed to spelling-to-sound rules, and 10 irregular words, which were exceptions to the spelling-to-sound rules, such as having silent letters. These words were at similar frequency levels and were of similar length.

Barron found that both groups used predominantly a phonological strategy in spelling the regular words. There were significant differences found between good and poor readers when asked to spell the irregular words ($F(1,46)=7.36, p < .01$). The poor readers were more likely to rely on phonological strategies, and consequently made more spelling errors (15.6% more), whereas the good readers were more likely to use a visual-orthographic as well as a phonological strategy in spelling.

Barron proposed two possible reasons for these differences: perhaps the poor readers have an inadequate number of visual-orthographic entries in their lexicon, or that the visual-orthographic strategy, which involves checking the spelled word, fails to operate.

Zutell (1980) investigated the spelling strategies of 60 children, 15 in each of grade 1 through 4, to determine if more complex words altered the spelling strategies that the children applied. Two 18 word spelling lists were constructed including low-frequency and high-frequency words containing each of five word patterns. Piagetian tasks were also developed and administered to the children to determine any
correlation between spelling strategies and cognitive development.

Zutell found that high-frequency words were often spelled correctly, while low-frequency words with the same linguistic patterns were often misspelled. This suggested that the children applied sound strategies when faced with infrequent or unfamiliar words, but used print strategies to spell words that were more familiar. He concluded that as grade level increased, more sophisticated strategies were applied (analogy, print). The overall spelling scores increased, as expected, as the grade level increased. "Familiarity and experience were factors in the way the children approached the spelling of these words" (p. 62). With relation to the cognitive development, the researcher found that "performance on the decentration battery and level of spelling strategies...were significantly correlated" (p. 63). The development of spelling proficiency seems to involve "both cognitive and linguistic processes and is not simply a matter of drill work or memorization" (p. 64).

A study which corroborated Wood's account of the shift in spelling strategies is that done by Nolen and McCartin (1984). They investigated the spelling errors of 221 students in grades 1 through 5 on the Wide Range Achievement Test to determine the underlying spelling strategies used. Errors were classified as either sound-based (e.g., "xplan" for "explain", "bot" for "boat") which involved a phonemic or
speech-sound strategy, or print-based (e.g., "explane" for "explain", or errors involving letter insertions, omissions, or ordering). When the data was analyzed it was determined that the easy words involved errors based on print for all grade levels. The more difficult words, however, caused a greater difference in strategy amongst the students in the study. The younger students in grades 1 through 4 relied on sound-based strategies to deal with these unfamiliar or more complex words. The grade 5 students applied print-based strategies to spell these words. Nolen and McCartin concluded that there is a "gradual shift to mental visualization of known words" for the older students (p. 153). They tend to apply "analogical reasoning" to spell difficult words, whereas the younger children attempt to isolate the sounds in the word and represent these sounds with appropriate letters (p. 157).

Peters (1985) proposed that three factors are predictive of a child's ability to "catch" spelling, postulating that spelling is readily acquired through becoming literate. Verbal ability, visual perception of word form and perceptuo-motor ability are all elements which can best indicate how well a child will become a speller.

Verbal ability, particularly reading aloud, involves auditory analysis and articulation, which are integral components of spelling. Visual perception of word form is related to a child's ability to reconstitute a word based on memory. Spelling involves coding graphemically, from visual
material stored in memory. Perceptuo-motor ability involves the level of development in the child's handwriting.

Peters, in an initial book published in the 1940's, was one of the first to state that spelling is a visual skill acquired and developed by the young child because of literacy experiences. Further work led to the theory that children who have "caught" spelling have been "sensitised to the coding of English, through developing forms of imagery and serial reconstructions,...and become accustomed to the probability of letter sequences occurring" (p.37). Children who have not "caught" spelling can be led to spell through instruction, but spelling instruction is not necessary for all children.

Anderson (1985) synthesized the research findings in the area of spelling development. She outlined research in the area of children's spelling errors and strategies and made up three broad stages: young children who use letters to invent words before they understand the relationship between sound and letters; an intermediate stage where children use phonetic and linguistic knowledge, a system of hypotheses that they applied to written words, and the advanced stage, where spellers use lexical information rather than phonemic strategies.

**Phoneme Awareness in Spelling**

Since spelling involves using graphemes to represent phonemes, phoneme awareness is necessary in order to spell. Bradley and Bryant (1985) investigated the role of phoneme
awareness in reading and spelling proficiency. Their longitudinal study entailed 400 4 and 5-year-old children who were tested on their ability to detect rhyme and alliteration. The researchers followed their progress in reading and spelling over the next three years and report on the results based on the 368 children who completed the project.

Bradley and Bryant postulate that "rhyme and alliteration must involve an explicit, conscious understanding of the phonological segments in words" (p.5). When children were trained to categorize words either by sound (rhyme, alliteration) or by conceptual category, the researchers found that sound categorization had a more powerful effect on reading and spelling skills.

The children were divided into two groups: those who were in nursery schools and those who attended primary school. Pretests involved assessing Sound Categorization in First Sound condition (alliteration) and Middle and End Sound conditions (rhyme). This resulted in a total score. The children's educational competence in reading, spelling and mathematics were also measured three years later.

The total score for Sound Categorization was related to the child's reading, spelling, and mathematical levels at the end of the project. There was a high correlation between the child's total Sound Categorization score and reading (Nursery group-.52,.57;Primary group-.47,.45) and for spelling
In order to investigate the relationship further, a Stepwise Multiple Regression analysis was done. After controlling for verbal ability, intelligence, age and memory, the children’s Sound Categorization scores accounted for 6.24% of the variance for the Nursery group and 4.56% of the variance for the Primary Group for the Neale Reading Age; 9.84% for Nursery and 4.06% for Primary for the Schonell Reading Age. For the Schonell Spelling Age, Sound Categorization accounted for 8.10% of the variance for the Nursery group and 5.59% for the Primary group. The mathematics scores showed that Sound Categorization accounted for 1.36% of the variance for the Nursery group and 3.89% for the Primary group.

The study showed that the sound categorization skills were meaningful with reference to reading and spelling levels three years later, even when variables of intelligence and linguistic ability had been removed.

The second part of the study dealt with training in Sound Categorization. The experimental group were trained to group pictures by sound category (e.g. cat, mat, hat, rat, bat), while the control group had the same amount of experience categorizing pictures, but did so by category (e.g. Things found inside, Things found outside), not by sound. The researchers devised a study involving 65 children who were
divided into four groups: Experimental(1)-trained on sound categorization only; Experimental(2)-trained on sound categorization and given experience with plastic letters; Control(3)-trained on conceptual categorization; and Control(4)-no training. The students were distributed by sex, age group (Nursery/ Primary), and there were no significant differences in their initial Sound Categorization scores. The training lasted for two years and started in the second year of the program.

The results of the training research showed that the group trained to categorize sounds only (Group 1) performed better in reading and in spelling than the group who categorized by concept (Group 3): (IQ-(1)-97.15 mths, (3)-102.34 mths; Schonell Reading age- (1)-92.23 mths, (3)-88.48 mths; Neale Reading age- (1)-93.47 mths, (3)89.09 mths; Spelling-(1)-85.97 mths, (3)-81.76 mths; Math-(1)-91.27, (3)-87.99).

The children who received experience with the plastic letters in addition to the sound categorization training (Group 2) outperformed the students who received only sound categorization training (Group 1) in reading and in spelling: (IQ-101.23 mths; Schonell Reading age - 96.96 mths; Neale Reading age - 99.77 mths; Spelling - 98.81 mths; Math - 91.09).

Bradley and Bryant's study established a causal link between a preschool skill (Sound Categorization) and eventual
reading and spelling performance. It also showed, through regression analysis, that sound categorization ability is a predictor of success in reading and spelling, independent of intelligence. The training part of the study provided educational strategies for assisting young children in reading and spelling.

Another study which found a connection between phonological awareness and spelling was that done by Cataldo and Ellis (1988) who tested 40 children between 4 and 5 years of age over a three year period to determine the significant variables which contributed to the growth of literacy. The subjects were tested individually in reading, spelling of real and nonsense words, phoneme segmentation, auditory categorization, letter-sound knowledge, short-term memory and full IQ.

Two tests of phonological awareness were administered. One involved implicit awareness -- the child was presented four words orally, and had to determine which word did not belong based on initial, medial, or final sound. The second test of phonological awareness involved explicit awareness -- the child was asked to segment 3-letter words (e.g. cat) into two parts (C-VC) (e.g. c- -at), or three parts (C-V-C) (e.g. c- -a- -t).

Although implicit and explicit awareness skills were both important in the initial stage of spelling development, where the child must determine the sound properties of words
(implicit) and the basic parts of the word (explicit), the implicit phonemic awareness became less important at later stages of spelling development. The next stage in spelling requires a more analytic approach. The child must match segments of the word with a stream of logical letter patterns. Spelling is "now approached principally through an analytical phonological strategy" (p.101). Then, in the final stage of standard spelling, explicit phonological awareness had become the dominant factor in spelling development.

In the spelling of nonsense words, which requires segmentation and representation of such segments without previous exposure to the word, explicit phonological awareness is dominant as the child must apply an analytical strategy. The child must draw on previous experience with print to solve the problem at hand.

Ball and Blachman (1991) defined phoneme awareness as the "ability to recognize that a spoken word consists of a sequence of individual sounds" (51). The researchers evaluated the effects of training in phonemic segmentation and instruction in letter names and letter sounds on the reading and writing of kindergarten children. One hundred and fifty-one (151) students from six kindergarten classes at three different schools were initially involved, and of these, 89 were randomly selected and placed into three different groups after initial pretesting, to ensure equal distribution to the groups based on gender and Peabody Picture Vocabulary Test.
analytical and print-oriented strategy when approaching more advanced stages of spelling development.

**Spelling by Analogy**

Spelling involves more than simple sound-letter match-ups. Frith (1980) postulated three stages in the spelling process. The first step is "correct analysis of speech sounds... approximate phonemes" (p.502). A second stage involves converting phonemes into possible graphemes (e.g. /i/ = e, ee, ea, y) and thirdly, selecting the "conventionally correct graphemes out of all the phonetically plausible graphemes" (p.502).

Frith's study involved 29 12-year-old subjects who were equally divided into three groups based on Schonell reading and spelling quotients (1) - good readers, good spellers; (2) - good readers, poor spellers; (3) - poor readers, poor spellers). The subjects were asked to spell real words to determine whether or not there were differences in their spelling strategies. Spelling errors were analyzed and it was determined that although the second and third groups made the same number of errors, "they showed a different pattern in terms of error types" (p.499). The good readers, poor spellers made more phonetic errors ($t=4.24, p < .01$) and fewer non-phonetic errors ($t=3.40, p < .01$). The poor readers, poor spellers "showed an almost equal proportion of phonetic and non-phonetic errors" (p.499). Frith determined that this was due to the third group encountering "problems at an earlier...
stage of the spelling process...possibly at the phoneme stage" (p.503).

The subjects were also asked to spell 20 nonsense words which were based on real English words (e.g. "zatest" based on "latest"). The good readers, good spellers produced 93% phonetically acceptable spelling; the good readers, poor spellers 85%; and the poor readers, poor spellers produced only 67%. The first two groups showed no difficulty applying phoneme-to-grapheme rules. It also demonstrated that spelling involved more than this; also "taking into account the letter sequences of the presumed base word" (p.501-502).

There is evidence, then, of good spellers relying on analogy to spell unknown words. It could be that the poor spellers also attempt to use analogy to spell such words, but may recognize an analogous base word and not know how to spell it, and so apply the misspelling to the nonsense word.

Another study which underlines the use of analogy is that done by Campbell (1985) who tested 43 English children in the 9 to 11-year-old range as well as 20 adult undergraduate students. The subjects were asked to write only nonwords (nonsense words) from a list of words given orally. Some priming effect was given, e.g. "brain" or "crane" prior to hearing the nonsense word /prein/. Depending on which priming word was used, the child and adult subjects spelled the nonword as an analogy to the primed word. If they heard "crane", they wrote the nonsense word as "prane", if they heard
"brain", they wrote the nonsense word as "prain". The study showed "little evidence of the use of a simple, alexical rule-based system in writing nonwords to dictation" (p.143).

Dictation of nonwords or nonsense words is an appropriate method to test children’s application of analogy in spelling. Marsh, Friedman, Welch and Desberg (1980) attempted to determine if spelling by analogy was a strategy used by children in spelling by developing pseudowords.

The researchers found evidence of analogy strategies in spelling in their study. Subjects included 20 Grade 2 students, 30 Grade 5 students and 30 college students, all who were reading and spelling at appropriate grade levels. In order to determine the influence of analogy strategies in spelling, the subjects were asked to write a series of pseudowords based on English orthographic patterns, for example /jes n/, which is an analogy to "nation". The patterns of the words involved CVC (consonant-vowel-consonant), CVCe (consonant-long vowel-consonent-silent e), and the c-rule for /k/, depending on the location of the sound in the word (c,k or ck).

There was an overall grade effect in favour of the older students [$\chi^2(2,77)=27.65, p < .001$], indicating more spellings by analogy to known words. This overall increase indicated a developmental progression in the various strategies applied in spelling. "The more experienced subject may switch from a phonemic encoding strategy in spelling unfamiliar words to a
strategy based on analogy with known words in visual memory" (p.346). The use of the analogy strategy is based on the availability of analogue words. This shift occurred between grade 2 and grade 5. "It apparently takes a number of years of experience with reading and spelling to build up a sufficient visual store" (p.353).

The results of the study indicated "that children start out with a simple sequential phonemic encoding strategy in spelling; they later develop a hierarchical encoding strategy involving the use of rules; they finally develop a strategy of spelling unknown words by analogy to the spellings of already known words" (p.351).

Goswami (1988) tested the use of analogies in spelling with a group of sixteen 7-year-olds. He found that more analogies were made between the ends of words (rimes) than between the beginnings of words (onsets) (p. 26). There is evidence that even young children retrieve from lexical memory whole words and orthographic sequences from words (e.g. -eak).  

Goswami and Bryant (1990) discuss evidence of more than sound-letter strategies occurring in early attempts at spelling. As children become more effective readers, they add other codes to spelling besides the phonological code. One additional code is orthographic knowledge. An example is the addition of -s to "bug" (and not -z) to form the word "bugs" (p. 53). Another strategy relies on visual memory, whereby
the child recognizes the words as a pattern or remembers it as a sequence of letters (p. 46).

There is strong evidence of an onset-rime division (p. 51). The child sees the initial letter as the onset and the vowel and final consonant sound as the rime. For the word "beak", "b-" is the onset and "-eak" is the rime. When spelling, children use analogies which are inferences that the spelling pattern which represents the rime in one word will represent it in another word as well (p. 68). This knowledge empowers children as spellers. "They can use the spelling pattern in one word to work out the sound of another word with the same spelling sequence, and to decide how to spell a word which rhymes with a word that they know how to spell already" (p. 78).

There is evidence then that older children and adults base their spelling of nonwords by analogy to known English words. This appears to be a more complex stage or level of spelling than simple phoneme-grapheme matching.

Spelling—Language One and Language Two

Read (1986) referred to the differences between languages and that since languages have different orthographic systems, learning to spell in two different languages involves an awareness of the sound-grapheme correspondence in each. This ability to discriminate between the two languages involves a process of differentiation.
The differentiation of languages by the bilingual child was addressed by Arnberg (1987). She indicated three stages in the process of separating two languages. In the first stage, known as "language mixing", the children's oral language is a combination of both languages within the same utterance. This begins before the children are aware of having two languages in their environment. Children may simply acknowledge different labels for the same object. Certain labels may be more imbedded in one language than the other, depending on the language of the related experience. The reasons for code-mixing may be due to a lack of vocabulary in the language of discourse, or that the experience or knowledge was in only one language and so the concepts are more readily conveyed in one language. This phenomenon may also occur when the children are attempting to clarify a misunderstanding, to underline a statement, or to exclude someone from the conversation. An example would be "Give me les ciseaux (scissors), I need to coupe (cut) this papier (paper)" (Kindergarten utterance - French Immersion student - personal experience).

A second stage is code-switching, where children consciously move from one language to the other. Factors which trigger code-switching are social setting, motivation, and the language related to expertise.

The third phenomenon is "interference". This refers to an involuntary influence of one language on the other which
occurs after children are aware of having two languages. Interference seems to be more prevalent when the two languages are out of balance. This phenomenon is common and gradually becomes less frequent, and may eventually disappear as children learn to separate and differentiate between the two languages. For example "Tu regardes très bien." - direct English translation of "You look very good." (syntactical) Another example "Canceller" - direct English translation of "Cancel". (lexical) This interference or mutual influence may be seen in the writing process, just as in the oral language.

Cummins and Swain (1986) proposed that the literacy-related aspects of a bilingual's proficiency in Language One and Language Two are seen as common or interdependent across languages, and that experience with either language can promote development of the proficiency underlying both languages. They use this hypothesis to reevaluate research findings of the English language skills of French Immersion students.

Results from Early Partial Immersion research indicated that the English language skills of those students were inferior to those of students in a regular English program. Cummins and Swain interpret this to mean that by teaching literacy skills in both languages (French and English) at the same time, "the interfering and competing linguistic features cause confusion, and it takes a period of time for this confusion to sort itself out" (p.41).
They conclude that it is preferable to teach the literacy-related skills directly in only one language. Their argument is supported by their integration of Early French Immersion research. They consolidate the results of various studies (Andrew, Lapkin & Swain, 1979; Barik & Swain, 1975, 1977, 1978; Swain & Barik, 1976, 1977) and determine the levels of probability related to spelling achievement on the Canadian Test of Basic Skills.

For Cohort 1, a group of French Immersion students who started in the fall of 1970 and received literacy-related instruction only in French for the first two years, their spelling scores were worse than their English program peers at Grade 3 ($p < .05$), but were better than their peers at Grade 6 ($p < .01$), Grade 7 ($p < .05$) and Grade 8 ($p < .01$). For the second cohort, who began in the fall of 1971 and followed the same program, spelling scores were also inferior to English program peers at Grade 3 ($p < .001$). The third cohort, who began in the fall of 1972, showed similar patterns of inferiority at Grade 2 ($p < .05$), but by grade 6 there were no significant differences between the French Immersion and English program students.

Cummins and Swain conclude that "no benefit derives from introducing English and French literacy training at the same time. It would appear preferable to learn these skills (literacy-related) in one language first" (p.43). Once the literacy-related skills, such as spelling, are well-
established there will be "transfer readily and rapidly to the other language, provided it is mastered, even possibly without explicit instruction" (p.41).

The influence of French on English spelling causing interference errors appears to be a temporary phenomenon which will be extinguished once more English experience is gained.

Fagan and Hayden (1988) found evidence of influence of one language on the other. They investigated the writing of ten grade five children who had been in French Immersion since grade one. Beginning in grade two, these students were given instruction in English for one hour each day. The students wrote compositions in both French and English. These compositions were analyzed to determine length, composing time, pausing, rereading, revisions, mechanics, spelling, and other elements.

Spelling was rated by categories, according to the stage of spelling (phonetic, phonetic-vowel variation, partially-phonetic, non-phonetic) and for French two additional categories: accents, gender agreement.

The error analysis indicated that the children were basically spelling on a phonetic basis. There were practically no errors that were non-phonetic. "These writers are in a sense like beginning writers in the use of invented spelling" (p. 662). The researchers deemed that any French influence on the spelling in English was negligible.
The authors concluded that when compositions in English and French were compared on 22 different features, differences across languages occurred on eight of these features and the majority of features were similar across languages. In the spelling feature, the largest category of spelling errors in both languages was phonetic, the other most prominent categories of spelling errors differed by language.

Fagan and Eagen (1990) also looked at the English writing of 12 young children, six males and six females, in a total French Immersion grade three class. They were given a battery of tests and were deemed to be non-readers at the beginning of grade one. While writing in English, at the grade 3 level, there was evidence of French orthographic structure. Some examples included "barques" for "barks", "chopine" for "shopping", "taque" for "take" and "parc" for "park".

Cashion and Eagan (1990) made a three-year longitudinal study of twelve English-speaking children enrolled in French Immersion grade 1. The two criteria for subject selection were that they be of average intellectual ability and that none could read and write English. Creative writing attempts in both languages were collected and analyzed quantitatively and qualitatively from grade 1 through grade 3.

Although the children received no formal teaching in reading and writing in English, by the end of the third year 11 of the 12 children could read with 75% or more
comprehension and less than 10% error in word recognition from a third or fourth grade level text.

The writing investigation showed that the children were writing in English, as well as in French, from the outset of the study. The children wrote before being able to read. "The only transfer from French to English seemed to be a bit of phonics related to some consonant sounds" (p. 38). The transfer of English syntax to French writing was quite evident, but the spelling influence seemed to be from French to English.

It is the children's second language (French) which influences how they spell in their first language (English). Studies of spelling in two languages other than French and English also report influences of one language on the other. In these studies, it appears that the child's first language bears the influence on the second language.

Hudelson (1984) investigated young Spanish children's attempts at invented spelling in English. The researcher noted that because of exposure to English print in their environment, they could read and write in English without formal instruction. Hudelson found that they applied Spanish orthographic patterns in their attempts to spell English words (e.g. "mi" for "me", "jaus" for "house"). The researcher concluded that these transfers of strategies were "a necessary part of second language development and that they are critical to language growth" (p. 235).
Edelsky (1986) studied the in-class writing in Spanish and in English of nine grade 1, nine grade 2 and eight grade 3 students in a Spanish-English bilingual program. She analyzed the spelling attempts of the children and noted that there was evidence of Spanish influence in the children's English spelling. Spelling inventions in the first pieces in English were often based on Spanish orthography (p. 70). The children applied what they knew about language, albeit Spanish, to spell in English. Once they developed a sense of English orthography (grade 2), through sight and sound, "children used phonetic features of English as they had done at first in inventing Spanish spellings. The application of Spanish orthography dwindled considerably" (p. 100).

By grade 3, with more knowledge and understanding about the English written system, the students abandoned the use of Spanish orthography and concentrated on English grapho-phonemic relationships to spell in English.

Zutell and Allen (1988) examined the effect of Spanish on the spelling strategies in English for young native Spanish speakers. They administered a test of twenty words in English to 108 Spanish-speaking children in grades 2 through 4 in a bilingual (English-Spanish) program. These test words included four words in each of five phoneme categories predicted to have influence, based on contrastive analysis of Spanish and English letter-name/sound relationships. The categories of phonemes were (1) long vowel e, (2) long vowel
a, (3) initial consonant y, (4) initial blend s and (5) initial consonant h. The researchers predicted misspellings for each of these categories e.g., long vowel e: correct spelling (seat), predicted misspelling (sit). The researchers wanted "to discover what effect Spanish pronunciation and spelling have on children's English spelling strategies" (p. 333).

The results of the study showed "no significant differences in overall success on the test for children at different grade levels" (p. 335). In the error analysis, it was determined that the more successful spellers differentiated between the Spanish and English systems and that "their English spelling errors showed little Spanish influence" (p. 338).

On the other hand, "some Spanish-speaking children's English spellings were influenced by the effect of Spanish phonology on their pronunciation of English words" (p. 338). It was the less successful children who produced most of the predicted Spanish-influenced errors. It was obvious that their limited understanding of the English orthographic system forced them to apply what they knew about phonology and letters, although Spanish, to their spelling of English words.

Nathenson - Mejia (1989) studied the use of English by native Spanish-speaking first grade students in a bilingual (Spanish-English) program. The concentration of the study was
on the writing process, and more specifically on the invented spellings found in the students' writing. The children demonstrated that they used what they knew about both Spanish and English orthographies in order to write meaningfully in English. Since the children lacked the sense of English phoneme-grapheme match-ups, they found creative ways to use Spanish orthography in order to represent sounds in English: "bee" was written as "bi", for example.

The author concluded by stating that the children "were actively involved in working through the similarities and differences between the two languages" (p. 525). They were more dependent on Spanish for new words in English, although much of their writing used conventional English spellings. The "children used their own pronunciations, and their knowledge of letters and letter/sound correspondences (in both languages) to negotiate spelling in English" (p. 525).

Jaspaert and Lemmens (1990) worked as external evaluators to assess the proficiency in Dutch of a mixed group of students who were first to complete a bicultural primary school curriculum at two grade levels, 4 and 6. One group consisted of native French-speaking Belgian students and the other, a group of Italian-speaking immigrant children. The children from five schools were administered a spelling dictation, as well as other language tests.

The dictation was comprised of nine sentences and a number of unrelated words, which generated three separate
scores. The Italians scored considerably worse than their Belgian counterparts at grade four and at grade 6 on all scores. (Grade 4: Score 1 - Italians 17 errors, Belgians 7 errors; Score 2 - Italians - 4.14 errors, Belgians 2.66 errors). The lag or difference becomes less marked at the grade six level. (Grade 6: Score 1 - Italians - 6.67 errors, Belgians - 2.17 errors; Score 2 - Italians - 2.33 errors, Belgians - 1.67 errors, Score - 3: Italians - 3 errors, Belgians - 0.83 errors).

When the spelling mistakes were analyzed qualitatively, the researchers discovered that "the Italian children do not seem to make typical mistakes" (p. 44). Their errors were different than their Belgian counterparts and, although not stated, could be related to the influence of Italian on the Dutch language. No probability levels were given for the study.

In situations where children have more than one language, (Hudelson, 1984; Cummins and Swain, 1986; Edelsky, 1986; Fagan and Hayden, 1988; Zutell and Allen, 1988; Nathenson-Mejia, 1989; Cashion and Eagan, 1990; Fagan and Eagen, 1990; Jaespart and Lemmens, 1990;) spelling is affected. In the case of Spanish-English and Italian-Dutch research, evidence points out that it is the child's first language which affects how the child spells in the second language. French-Immersion studies mentioned that there was negligible interference of French on English spelling, and very little indication of the
child's first language (English) impacting on the way the child spelled in his second language (French). Studies of other languages indicate that the interference is significant.

**Effect of French Immersion on English Spelling**

The experimental bilingual education program initiated in St. Lambert used teaching through the French language instead of the teaching of the French language. Beginning in Kindergarten, the young students were taught completely in French, thus developing proficiency in the French language while being exposed to the regular Kindergarten program. The curriculum was presented in the second language (French) through grade 1, then in grade 2 English Language Arts was introduced for one hour a day. From grade 3 to grade 5, more English was included in the program so that by grade 5 and 6, the curriculum was being presented equally in French and in English (Lambert & Tucker, 1972).

This initial model of Early French Immersion has been implemented as is, or modified somewhat, by many school boards throughout Canada. This Canadian model has also been used in other countries in an attempt to provide a successful bilingual educational program (Ontario Institute for Studies in Education, 1976).

The number of students enrolled in Immersion programs in Canada has increased from approximately 17,763 in 1976 to 102,168 in 1982 (Stern, 1984). Current estimates for students in French Immersion are 295,350 in 1991-1992 (Commissioner of
Official Languages, 1991), which indicate that the French Immersion program forms an integral part of the Canadian educational profile.

Since the French Immersion program has become such an important aspect of Canadian education, researchers have delved into various aspects related to this educational option. One area of research has been the achievement levels in English for these anglophone students being exposed to French second language literacy instruction in school. From the beginning, a major concern for those interested in the progress of children in French Immersion programs has been their performance in their native language. With reason, it has been asked whether giving hundreds of hours of instructional time to French results in some deterioration of their achievement in English. No evidence of any deterioration in oral performance has been found. In relation to literacy achievement, however, it has been established through studies comparing students in French Immersion programs with counterparts in regular English programs that some lag in performance can be expected in the early years in relation to both reading and writing.

The first research to find evidence of such a lag was the longitudinal study of the pilot class over grades one to four and the follow-up class over grades one to three in the St. Lambert program carried out by Lambert and Tucker (1972). The pilot class consisted of 22 students and was compared to an
English control group of 38 and a French control group of 22. The follow-up class was made up of 38 French Immersion students who were compared to two different English control groups (n=26, n=28) and a French control group of 25. They compared the achievement levels and various aspects of English literacy for the experimental class and two English control groups. At the grade 1 level, the English language test scores for the experimental group were generally below those of the two English control groups. The English Word Knowledge, Word Discrimination, and Reading Skills subtests of The Metropolitan Achievement Test revealed significant differences favouring the English controls. However, the scores also made clear that the experimental group was still making fine progress in English literacy without formal instruction, as they scored at the 50th percentile for the first two subtests in terms of nationwide norms for anglophone first grade students in regular English language programs. In relation to decoding, there was evidence of a stronger lag, for on the Reading Skills subtest the experimental group scored at the 15th percentile.

The lag appeared to exist also in relation to certain aspects of writing. At the end of grade 2, for example, Lambert and Tucker (1972) found the experimental class mean score significantly lower on a spelling subtest than those for both English control groups ($F = 2.48, p < .05$). This lag continued to be evident at the end of grade 3 when the
spelling scores were again lower for the experimental class than for the English controls, but the difference was no longer statistically significant ($F = 0.42$, n.s.). At the end of grade 4 the experimental group's spelling scores had reached parity with the English controls ($F = 0.02$, n.s.). Lambert and Tucker attributed this to a language transfer from one language to the other.

This discovery of a lag in English spelling skills for Early French Immersion students led to further investigations into the spelling and writing processes. Barik and Swain (1976) investigated the achievement levels in English, French and Mathematics for students in French Immersion and in regular English programs. The French Immersion students received all of their instruction in French during Kindergarten and Grade 1. English Language Arts were introduced in February of Grade 2 for 25 minutes each day and this English instruction increased in grade 3, so that the students were taught English Language Arts and Mathematics in English for a total of approximately one-third of the day in English.

There were 41 Grade 1 Immersion students tested along with 42 Grade 1 regular English students; 35 Grade 2 French Immersion students and 50 Grade 2 regular English students; and 36 Grade 3 French Immersion students and 55 Grade 3 regular English language students. The battery of tests involved English language skills, French language skills, and
In addition to the composition, the grade 5 and 6 students also completed an achievement spelling test. The grade 5 Immersion students scored non-significantly higher than the English controls, while the grade 6 students scored non-significantly lower than the English controls. This study outlines a quantitative lag in spelling which eventually disappears as the Immersion student is exposed to more English Language Arts.

Genesee (1987) reported The Metropolitan Achievement Test results found by Shapson and Kaufman in a study of French Immersion and English control students at the primary level. The researchers found that at the grade 2 level, the French Immersion students scored significantly lower on a percentile basis (24) than their English control peers (74). The gap narrowed somewhat by grade 3, when English Language Arts were introduced, but the Immersion students still scored significantly lower (Immersion 48, English Control 66). No probability levels were given for this study.

An investigation comparing English writing skills of grade 8 students in an intensive French Immersion program with those of similar regular English program peers was completed by Laing (1988). There were 65 French Immersion students and 95 English language students. Each student was asked to write two types of compositions, one narrative and the other argumentative.
These compositions were compared on three major aspects. Spelling was categorized under surface errors. Analysis of misspelled words indicated that there were no significant differences between the two groups in overall spelling ability. This further supports earlier research where it was found that French Immersion students spell as well as English program students after two or three years of English Language Arts instruction.

Research (Lambert & Tucker, 1972; Barik & Swain, 1976; Genesee & Stanley, 1976; Barik & Swain, 1977; Genesee, 1987) showed that in the specific area of English spelling, French Immersion students initially lag behind English program students in the primary division, but that as French Immersion students receive more English Language Arts instruction the lag is diminished, if not extinguished, usually around the grade 4 level after three years of English Language Arts instruction. All of these investigations are of a quantitative nature. The actual process of spelling or the qualitative nature of spelling are not addressed.

**Sex differences in Spelling**

Maccoby and Jacklin (1974) proposed that for general abilities in intellectual functioning, test results for young children indicated that girls outperform boys. Research findings in the area of spelling ability indicated that females generally had higher scores than boys.

Norman, Clark and Bessemer (1962) screened 5000 grade 6
students in the United States. Children with an IQ greater than 130 formed the subjects of the study, this included 125 males and 90 females. The results from the California Achievement Test indicated that there was a significant difference in favour of girls on the spelling subtest.

Another study which had results indicating more favourable spelling scores for females was completed by Manolakes (1975). A sample of 2329 children in grades 2 through 6 with a 50-word spelling-test derived from the program at each of the grade levels. As well, the child was administered the spelling list at grade level and one grade beyond their present placement.

A comparison of the male and female performances at all grade levels, based on the mean percentage of words correct on spelling lists, indicated that the girls significantly outperformed the boys in both levels of the spelling tests. The differences were greater at the earlier grades (13.43% difference) -- (Gr. 2 - Girls at grade - 82.096, Boys at grade - 68.656; Girls Grade +1 - 57.978, Boys Grade +1 - 44.594). The gap in performance was lessened as the grade level increased (6.46% difference) -- (Gr. 6 - Girls at grade - 82.092, Boys at Grade - 75.631; Girls - Grade +1 - 68.778, Boys -Grade +1 - 62.642). No probability levels were given in this article.

Yarborough and Johnson (1980) compared the spelling subtest results of the Cognitive Abilities Test for 52 females
and 42 males at the grade 7 level. In order to focus on sex differences, the variables of age, socioeconomic levels, readiness test scores and intelligence had been controlled.

The students were tested at the end of six years of schooling. The results indicated that the girls, who scored a mean of 26.81, outperformed the boys who scored a mean of 20.93 ($p < .01$).

Lura & Morton (1984) investigated 36 students in two different grade 2 classes. There were 16 students instructed in one program (Spelling Mastery) and 20 students instructed in a different program (Spelling in Language Arts). The students were administered pretests and posttests to determine gains in spelling and in reading. The spelling was assessed with the spelling subtest of the WRAT (Wide Range Achievement Test) and the Test of Written Spelling (TWS).

The results indicated that the females made greater gains in spelling than males within the respective programs. On the WRAT pretest and posttest scores, the girls scored higher than the boys in both programs ($p < .05$).

Morton (1985) randomly-selected a group of 174 students, 96 females and 78 males, from a variety of rural and urban areas. This involved eight classes at the grade 4 level. The students were administered group spelling tests comprised of a 50-word spelling list. Two males and two females were randomly-selected from each class and administered the WRAT spelling subtest and the Test of Written Spelling.
Overall, the females outperformed the males on the spelling list tests, WRAT spelling subtest and on the TWS. On the spelling lists tests, female test scores (mean = 76.63\%) were substantially higher than the male test scores (mean = 60.97\%) (p < .0001). The difference on the WRAT and TWS were not statistically significant.

Allred (1990) tested the spelling achievement of boys and girls in grades 1 through 6 in six areas of the United States. The sample for the study consisted of 3024 students, 504 subjects (252 boys and 252 girls) at each grade level, based on the random selection of 28 children (14 boys and 14 girls) from each grade in three elementary schools (high-, medium-, and low-achieving) in six different geographical areas.

The subjects were given the CTBS spelling subtest which required students to determine whether words are misspelled and a written spelling test which the researcher had constructed based on the words found on the standardized test. The results for both tests indicated that the girls at all grade levels outperformed the males. The girls identified the correct spelling of a greater number of words than the boys on the CTBS, and substantially more words were spelled correctly by the girls on the WST. The gender differences were found to be consistent in each geographic area and for high-, medium-, and low-achieving schools (p < .001 at grade 1, 2, 4, 5, 6; p < .005 at grade 3).
Research thus indicates that there are sex differences in the area of spelling in favour of girls. The studies looked at standardized test scores in English, first-language spelling. No research has delved into sex differences in invented spelling or in spelling in a second language.

Conclusions:

The literature review leads to three major points related to this thesis.

1. The first is that spelling is a developmental process, whereby the student applies different strategies to encode written language. Initially, learning to spell involves applying knowledge about sounds and letters. More sophisticated strategies are applied later as the child becomes more linguistically competent in recognizing word patterns, and the child begins to draw on visual memory to spell by analogy to known words (Read, 1975; Gentry, 1978; Barron, 1980; Marsh, Friedman, Welch & Desberg, 1980; Wood, 1982; Nolen & McCartin, 1984; Goswami, 1988).

2. Early literacy experiences in a home language other than the school language result in influence of this home language on school-language spelling (Hudelson, 1984; Edelsky, 1986; Zutell & Allen, 1988; Nathenson-Mejia, 1989; Jaspaert & Lemmens, 1990). French Immersion studies have found a lag in English spelling skills for French Immersion students, which may be related to the school-based exposure to French literacy experiences (Lambert & Tucker, 1972; Barik &
Swain. 1976; Genesee & Stanley, 1976; Giles, 1977; Genesee, 1978). Early intense literacy experiences in one language affect spelling patterns in another language. It can be expected that intense literacy experiences in French for anglophone students, such as in the Early French Immersion programs, can lead to application of French phoneme-grapheme patterns to the spelling of English words.

(3) In investigations of gender differences related to spelling, there has been evidence of superior spelling performance by females (Manolakes, 1975; Yarborough & Johnson, 1980; Lum & Morton, 1984; Morton, 1985; Allred, 1990). Although these studies involved anglophone students in regular English programs at the elementary level, it is plausible to expect similar results in an Immersion setting.
Chapter 4 - Hypotheses

There are four main hypotheses that will be investigated.

1. When the children are asked to spell English words, or nonsense words constructed according to English orthographic principles, they will demonstrate a tendency to employ French graphemes to represent the 13 selected phonemes.

The first hypothesis deals with the evident lag in English spelling for French Immersion students. Perhaps the quantitative lag is due to a differentiation process which is occurring in the child's awareness of two languages, French and English.

Since the young children in the French Immersion program under study receive their reading and writing instruction entirely in French until grade 4, their school-based spelling experience is embedded in the French language. Arnberg (1987) has argued convincingly that bilingual children rely on the language most strongly associated with the particular experience at hand. Consequently, given the problem of spelling, matching graphemes with phonemes, the children in this study can be expected to rely on their school spelling experiences. That is to say, when called upon to spell, they will tend to apply French orthographic patterns to represent phonemes.
This tendency should be most evident when the spelling problem involves phonemes common to both languages but represented by different graphemes within their orthographic systems. For example, [i] is common to both French and English and is represented most frequently in English by e, ee or ea, three graphemes never used for this phoneme in French, which relies on i. Eleven such phonemes were selected for study as likely elements of interference based on classroom observation of the writing of English-speaking immersion students: [u], [i], [j], [s], [d] final position, [b] final position, [t] final position, [m] final position, [k] final position, [l] final position, [p] final position. In addition, two other frequently observed patterns of interference were included for testing: [dr] final position which has no exact counterpart in French, and [t] pronunciation of the English past tense marker -ed. The last two patterns can be seen as instances of the children overgeneralizing from French spelling to approximate the English phoneme. The list of predicted elements of interference can be found in Appendix A.

Early French Immersion programs provide early literacy experiences related to sounds and letters. Young students are more likely to be familiar with French phoneme-grapheme match-ups than English ones. Due to the lack of differentiation of the phoneme-grapheme match-ups in French and in English and the obvious imbalance in favour of French,
there will be evidence of French phonemes in the French Immersion students early attempts to spell in English.

2. There will be less evidence of French graphemes being used to represent English sounds at the grade 6 level than at the grade 3 level.

The introduction of English Language Arts into the French Immersion curriculum will assist the child to further differentiate between the French and English orthographic systems. More experience with standard print will establish a greater awareness of English orthography (Zutell, 1978; Wood, 1982). The spelling lag which has been reported in previous research will be evident in this study as well.

3. The students will rely on French graphemes to represent English phonemes more often in low frequency and non-frequency words than in high frequency words.

From previous work (Nolen & McCartin, 1984; Goswami & Bryant, 1990), it is noted that when faced with new, unfamiliar words, children apply known word patterns to spell these unknown words. When French Immersion students are confronted with unfamiliar English words, they will tend to
apply known French orthographic patterns to spell such English words. Because of a reliance on French words as the basis of analogy, it is likely that the targeted English phoneme will be represented with a French grapheme more frequently in less familiar words.

4. There will be evidence of more correct English spelling amongst the females at both grade levels. Males, at both grade 3 and grade 6, will exhibit more French influence errors in their English spelling.

Numerous research studies of spelling at various grade levels have reported sex differences in favour of females (Manolakes, 1975; Yarborough & Johnson, 1980; Lum & Morton, 1984; Morton, 1985; Allred, 1990). It is reasonable then to expect similar results in this study.
Chapter 5 - Procedures

Procedures
There were three steps to collecting the data for this study:
1. a questionnaire on reading experience;
2. a French dictation; and
3. an English dictation.

1. The questionnaire: A questionnaire developed by the researcher asked the subjects to indicate their grade level and gender, to describe their early reading experiences in French and English, to offer an assessment of their current reading proficiency in both languages, and to report which language they use more frequently for leisure time reading. The questionnaire was administered by the researcher during regular class time immediately prior to the dictations. A copy can be found in Appendix B.

2. The French dictation: To determine whether the children had the targeted French phoneme-grapheme relationships in their spelling repertoires, a dictation consisting of 22 words was prepared and administered by the researcher during regular class time. Since two of the 13 targeted features do not exist in French words (\([\partial r]\) in final position and \([t]\) as past tense marker), only the remaining 11 French phonemic
features were included. Each of these was given in two different words; e.g., targeted phoneme [u] was presented in soupe, and boule. In keeping with customary school practice, the words were dictated to the children twice in isolation and then again in a meaningful sentence; J'aime la soupe aux tomates. A copy of the French dictation is reproduced as Appendix C.

3. English dictation: In order to determine the extent to which the children relied on French graphemes to represent the 13 target phonemes in English words, a dictation list of 39 items was developed by the researcher. Each phoneme appears in the list three times in random order: (1) in a common word of high-frequency which the children could reasonably be expected to know ([u] school); (2) in a less common word of lower frequency which the children may or may not have known ([u] loose); and finally (3) in a nonsense word constructed according to an English orthographic pattern, a word which presumably the children would be hearing for the first time ([u] smoot). High-frequency words were drawn from the first 300 words appearing in the word frequency list prepared by Thomas in his study (1974) of Canadian children's writing from grades 1 to 6. The lower frequency words were taken from the 1301-1600 range in Thomas. Five of the 13 nonsense words were taken directly from the Gates-McKillop Diagnostic Reading Test (1962); the other eight were devised to form a plausible
English spelling combination when the targeted features could not be found in the test. The English Dictation word list by frequency and the actual spelling test are included in Appendix D.

Subjects

The subjects for this study consisted of all Grade 3 and Grade 6 students enrolled in the French Immersion program in the three Immersion schools of the Essex County Board of Education. There were 72 grade 3 students; 39 males and 33 females, and 55 grade 6 students; 24 males and 31 females.

The subjects attended three different schools which draw from within and without the community in which they are situated. The socially-homogeneous population may be described as urban, coming from small towns or the outskirts of such.

The students were in an early French Immersion program with 100 percent French instruction from Kindergarten through grade 3. At the grade 4 level, English Language Arts were introduced and made up 20 percent of the day (approximately one hour). At the grade 6 level, the English component accounted for 40 percent of the day (approximately two hours). One hour was devoted to English Language Arts, whereas the other 20 percent was for other subject areas (Physical Education, Family Living, Library, Guidance). Math, Science, Social Studies were all taught in French.

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The rationale for using the grade 3 students is that they had not been exposed to any English Language Arts instruction at school, since the program calls for the introduction of English at the grade 4 level.

The grade 6 students were chosen to determine the influence of English Language Arts instruction on the English spelling performance of French Immersion students. These pupils, having had two years of English instruction, should be beyond the grade 3 students with regard to differentiation of the two languages (French and English) and therefore have less influence of interference of French in their English spelling.

Analysis

Analysis of the English Dictations was done by the researcher to determine if there was any evidence of French in the way the English words were spelled, based on the predicted interference patterns. Results were also statistically analyzed for grade differences and gender differences.

Test procedures of the participating students

The students were asked to complete the questionnaire regarding grade level, gender, language first read, age at beginning to read in French and English and self-assessed reading proficiency in French and English. They were also asked what language they read outside of school.

The questionnaire was followed by the French dictation, then the English dictation for half of the subjects at each
grade level and the English dictation, then the French dictation for the other half of the subjects at each grade level. This was done to balance for priming effect of one language on the other. Unfortunately, the order of dictations was not quoted for analysis.

Coding procedures

The researcher analyzed the French dictation and recorded two overall scores; one for the total number of words spelled correctly, and a second total for the number of French phonemes spelled correctly. For example, if the student wrote "chat", it was counted as "word spelled correctly". If the student wrote "cha", it was counted as "correct phoneme" for the targeted phoneme [s]. Each word in the dictation had a targeted phoneme (see French dictation - list of features and words). Each of the 22 words was also coded individually:
1 = phoneme spelled correctly, word incorrectly spelled;
2 = word spelled correctly; 3 = phoneme and word spelled incorrectly.

The English dictation was also scored on two overall totals; one total referred to the number of words spelled correctly, the second total referred to the total number of French influence errors. Each of the 39 English words had a targeted phoneme. Each word was coded individually as well:
1 = French influence error (e.g. shelter for "shelter", [s] being the targeted phoneme); 2 = words spelled correctly; and
3 = English error (e.g. shellter for "shelter", [s] being the targeted phoneme.

Although other French influence errors may have occurred in a word (e.g. sheltre for "shelter"), only the targeted phoneme was coded if a French influence error occurred. The number of French influence errors recorded for each subject reflect only those specific targeted phonemes. This study does not attempt to report all French influence errors which occur in the English dictations, and so the actual incidence of French influence errors may be greater than is reported in this study.
Chapter 6 - Results

French Influence Errors by Word Frequency

Table 1

Means and Standard Deviations for the Index scores for French Influence Errors for High Frequency, Low Frequency and Non-Frequency Words for Grade 3 and Grade 6 Male and Female Students

<table>
<thead>
<tr>
<th></th>
<th>High Frequency</th>
<th>Low Frequency</th>
<th>Non-Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>St.Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Grade 3 (72)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (39)</td>
<td>-.154</td>
<td>3.074</td>
<td>-.256</td>
</tr>
<tr>
<td>Female (33)</td>
<td>.030</td>
<td>2.899</td>
<td>-.121</td>
</tr>
<tr>
<td>Grade 6 (55)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (24)</td>
<td>.667</td>
<td>1.404</td>
<td>1.167</td>
</tr>
<tr>
<td>Female (31)</td>
<td>.323</td>
<td>.832</td>
<td>.581</td>
</tr>
</tbody>
</table>

NOTE: French Influence Error = -1; English word spelled correctly = 0; English error = 1

MAIN EFFECT £=.204 n.S. £=.088 n.s. £=.037* (GRADE) £(1,126)=1.634 £(1,126)=2.95 £(1,126)=4.454

ANOVA for Word Frequency by Sex by Grade revealed a significant main effect for Grade in favour of the Grade 6 students £(1,126)=4.64, £=.033*

* £<.05

The initial hand-scoring of the individual English dictations revealed evidence of French influence errors. As
Table 1 reveals, there is clear evidence of French influence among the grade 3 students as predicted by hypotheses 1 and 2. As expected, the influence is strongest with nonsense or non-frequency words. Table 1 also reveals that hypothesis 2 is supported in that the incidence of French influence errors is much less at grade 6. Furthermore, hypothesis 3 was also supported, since more French influence errors were noted for low frequency and non-frequency words than for high frequency words.

Hypothesis 4 was not supported, since the highest score for French influence errors occurred for female grade 3 subjects. Females did not perform better than the males in this study in this specific area.

**Analysis of Variance**

To further investigate these findings and to determine whether the performance of the groups were significantly different, a three-way analysis of variance (ANOVA) including Word Frequency (HIGH, LOW, NON), Sex (MALE, FEMALE) and Grade (3, 6) was computed on the French influence errors in the English dictation. A main effect for Grade, $F(1,126)=4.64, p < .05$, indicated fewer French influence errors in Grade 6. No main effect or interactions for Word Frequency or Sex were found.

A two-way analysis of variance (ANOVA) was redone for each word frequency category separately. The independent
variables were Sex and Grade. A main effect for Grade was found for non-frequency words, \( F(1,123) = 4.454, p < .05 \). The other two categories (HIGH, LOW) produced no main effects or interactions.

Figure 1
French Influence Errors:
Index Scores by Grade

This pattern can be seen more clearly in graphic form, where the negative values indicate French influence errors. Figure 1 indicates clearly the bias for French influence error patterns for the grade three students. It also shows that French influence patterns became more frequent as the word...
level shifted from high frequency, to low frequency and non-
frequency or nonsense words. The grade 6 students showed
minimal French influence errors in their English dictations
overall.

Figure 2

French Influence Errors:
Counts by Word Frequency and Phoneme for Grade 3

Grade Three

<table>
<thead>
<tr>
<th>Nonsense Words</th>
<th>Low Frequency Words</th>
<th>High Frequency Words</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

NOTE: 1=[u], 2=[i], 3=[j], 4=[s], 5=[d] final, 6=[b] final, 7=[t] final, 8=[m] final, 9=[k] final, 10=[l] final, 11=[p] final, 12=[pr], 13=[t] past tense marker
French Influence Errors:
Counts by Word Frequency and Phoneme for Grade 6

Grade Six

NOTE: 1=[u], 2=[i], 3=[j], 4=[s], 5=[d] final, 6=[b] final, 7=[t] final, 8=[m] final, 9=[k] final, 10=[l] final, 11=[p] final, 12=[r], 13=[t] past tense marker

The pattern is further clarified in Figures 2 and 3 when the French influence errors were broken down by targeted phoneme for each grade. There was once again obvious reliance on French orthographic strategies amongst the grade 3 subjects. There were no significant differences found between males and females.
Although the frequency levels of "high" and "low" were based on Thomas' (1974) work with Canadian anglophone students in English programs, it is plausible to say that for the French Immersion students in this study, particularly those at the grade 3 level, these words could very well be unfamiliar or non-frequency words. This could be the reason for the high number of French influence errors reported for so-called "high" and "low" frequency words.

The grade 6 subjects showed a large number of French influence errors in the spelling of the low-frequency word "bumped" (13 on Figure 3). It is possible that they applied an analogy strategy and related "bumped" to "compte", because of the unusual "mp" consonant combination followed by [t].

**Chi Square Analysis**

In order to determine whether there were any significant grade differences for error patterns for high, low and non-frequency words in the English dictation, chi square analysis was computed. The 39 words could have been coded three different ways: 1 = French influence error, 2 = English words spelled correctly, 3 = English error for a total of 117 (39 x 3). There were 81 counts of significance of the 117 possible counts (69%), all in favour of the grade 6 students. Of these 81 counts where $p < .05$, there were more occurring for low frequency words (32/81 or 39.5%) and non-frequency words (31/81 or 37.8%) than for high frequency words (18/81 or 22%).
Of the possible 117 cases (39 x 3), only five counts of significance where $p < .05$ occurred for gender. The gender differences, all in favour of females, occurred more for high frequency words (4/5 or 80%) than for low frequency words (0/5 or 0%) and for non-frequency words (1/5 or 20%). This was some evidence of gender differences in spelling determined by this study.

**Analyses of Variance**

**Language Read First by Sex by Grade**

Early literacy experiences contribute to spelling ability (Bradley & Bryant, 1985). In order to determine if the language read first (French or English) affected the students' performance on the various elements of the study, particularly the French influence on the English dictation, four three-way analyses of variance (ANOVA) were computed on the scores for (1) French Dictation, (2) French Phonemes Correct, (3) English Dictation, and (4) French Influence Errors in the English Dictation. The independent variables were Language Read First (French, English), Sex (Male, Female) and Grade (3, 6). Four subjects were omitted from this analysis because they had indicated on the questionnaire that they had learned to read in another language, other than French or English. This left a total of 123 subjects.
Table 2

Means and Standard Deviations for the Percentage scores for French Dictation, French Phonemes Correct, English Dictation, and French Influence Errors in the English Dictation for Language Read First (French, English), Sex and Grade

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Fr. First (43)</td>
<td>56.99</td>
<td>14.09</td>
<td>83.22</td>
<td>12.77</td>
</tr>
<tr>
<td>Male Gr. 3 (13)</td>
<td>62.50</td>
<td>16.43</td>
<td>84.66</td>
<td>9.39</td>
</tr>
<tr>
<td>Male Gr. 6 (8)</td>
<td>56.82</td>
<td>14.04</td>
<td>77.65</td>
<td>10.16</td>
</tr>
<tr>
<td>Female Fr. First (43)</td>
<td>77.27</td>
<td>13.38</td>
<td>88.18</td>
<td>10.76</td>
</tr>
<tr>
<td>Female Gr. 3 (12)</td>
<td>79.83</td>
<td>11.13</td>
<td>90.06</td>
<td>8.82</td>
</tr>
<tr>
<td>Female Gr. 6 (10)</td>
<td>64.59</td>
<td>18.72</td>
<td>84.45</td>
<td>9.62</td>
</tr>
<tr>
<td>Female Eng. First (80)</td>
<td>82.73</td>
<td>11.58</td>
<td>92.05</td>
<td>9.66</td>
</tr>
</tbody>
</table>

*(123 subjects) - four subjects were omitted, having indicated another language read first.*
Table 2 compares the percentage scores for all four components (French Dictation, French Phonemes Correct, English Dictation and French Influence Errors) for Language Read First (French, English), Sex (Male, Female) and Grade (3, 6). It is clear that the grade 3 students who learned to read French first made more French influence errors than their peers who read English first. The grade 6 males who read French first follow this pattern, showing a higher incidence of French influence errors than their male or female peers who read English first. An unexpected finding was that the grade 6 females who read English first made more French influence errors than their female peers who read French first, or their male counterparts who read English first. The grade 6 females who read English first scored the highest overall French spelling scores. Having read English first, one would expect that their spelling strategies would be more embedded in the English phoneme-grapheme system. Such does not appear to be the case.
Figure 4 shows clearly the relationships of the French dictation scores by language read first, sex and grade. There was a main effect for Grade in favour of Grade 6 $F(1,115)=44.998$, $p < .001$. There was also a main effect in favour of females $F(1,115)=4.326$, $p < .05$. A main effect for Language Read First was also found in favour of English $F(1,115)=6.449$, $p < .01$. No two-way or three-way interactions occurred.
Figure 5 shows graphically the relationships between the French Phonemes correct scores. There was a main effect for Grade in favour of Grade 6 $F(1,115)=19.653$, $p < .001$. No two-way or three-way interactions occurred.
Figure 6 shows clearly the great grade difference in the English dictation scores. It should also be noted that the English read first results in more favourable scores. There was a main effect for Grade in favour of Grade 6 $F(1,115)=171.495, p < .001$. There was also a main effect for Language Read First in favour of English $F(1,115)=9.782, p < .01$. No two-way or three-way interactions were evident.
Figure 7 shows the overwhelming number of French influence errors for grade 3 students quite clearly. At the grade 3 level, and for grade 6 males, having read French first resulted in a higher incidence of French influence errors, as would be expected. There was a main effect for Grade indicating that French Influence Errors were more predominant in the Grade 3 subjects' English dictations $F(1,115)=72.783$, $p < .001$. No two-way or three-way interactions occurred.
Age of Onset of English Reading by Sex by Grade

Since English literacy experiences contribute to English spelling performance (Wood, 1982; Bradley & Bryant, 1985), further analysis was done to determine if the age at which the child learned to read English affected the various components of the study. Early Readers were those who had indicated that they learned to read in English up to and including age 4. Late Readers indicated that they learned to read in English at age 5 or later. It was interesting to note that a few of the grade 3 students did not consider themselves to be able to read in English yet. This group was included in the Late Readers' group.

Four three-way analyses of variance (ANOVA) were computed on (1) French Dictation, (2) French Phonemes Correct, (3) English Dictation, and (4) French Influence Errors in the English Dictation. The independent variables were Age of Onset of English Reading [Early (1-4 years), Late (5 and up)], Sex and Grade.
Table 3

Means and Standard Deviations for the Percentage Scores for French Dictation, French Phonemes Correct, English Dictation, and French Influence Errors in the English Dictation for Age of Onset of English Reading, Sex and Grade

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Gr. 3(72)</td>
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<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early (14)</td>
<td>56.82</td>
<td>16.80</td>
<td>79.55</td>
<td>13.19</td>
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<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late (25)</td>
<td>56.73</td>
<td>14.26</td>
<td>80.36</td>
<td>11.64</td>
</tr>
<tr>
<td>Fem.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Early (12)</td>
<td>58.71</td>
<td>21.45</td>
<td>76.89</td>
<td>14.17</td>
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<tr>
<td>Fem.</td>
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<tr>
<td>Late (21)</td>
<td>60.61</td>
<td>16.22</td>
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<tr>
<td>Gr. 6(55)</td>
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<td>Male</td>
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<tr>
<td>Early (9)</td>
<td>81.31</td>
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<tr>
<td>Male</td>
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<td></td>
</tr>
<tr>
<td>Late (15)</td>
<td>69.70</td>
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<td>86.36</td>
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<tr>
<td>Fem.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early (13)</td>
<td>85.32</td>
<td>10.69</td>
<td>93.00</td>
<td>7.56</td>
</tr>
<tr>
<td>Fem.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late (18)</td>
<td>77.27</td>
<td>12.28</td>
<td>88.89</td>
<td>11.16</td>
</tr>
</tbody>
</table>

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Table 3 indicates that at the grade 3 level, early English reading females had the lowest incidence of French influence errors, which supports hypothesis 4. The other three groups performed quite similarly (36 to 39.56%). At the grade 6 level, the early English reading males had the fewest number of French influence errors in their English dictation. The other three groups once again scored approximately the same (9.12 to 9.66%). The reversal in gender performance (in favour of females at grade 3, in favour of males at grade 6) is interesting.
Figure 8

French Dictation Scores
by Grade, Sex and Age of Onset of English Reading

Grade Three

<table>
<thead>
<tr>
<th>Grade Three</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Late</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Grade Six

<table>
<thead>
<tr>
<th>Grade Six</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Late</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Figure 8 shows clearly that there is no difference in French dictation scores for Early or Late English Readers at grade 3 or at grade 6. There is no significant difference related to gender. There was a main effect for Grade in favour of Grade 6 $F(1,119)=47.963$, $p < .001$. No two-way or three-way interactions occurred.
Figure 9

French Phonemes Correct Scores
by Grade, Sex and Age of Onset of English Reading

Grade Three

Grade Six
Once again, there is no significant difference related to age of onset of English reading or gender at the grade 3 or 6 level. There was a Main Effect for Grade in favour of Grade 6 $F(1,119)=22.086, p < .001$.

![Figure 10](image)

French Phonemes Correct:

Two-Way Interaction Effect

A two-way interaction occurred for Age of Onset of English Reading x Grade $F(1,119)=4.148, p < .05$. (Figure 10 clearly indicates that the pattern for the change in scores was different. The Early Reading Grade 6 students performed better than Late Reading Grade 6 students, whereas Grade 3 Early English Readers scored lower than Late Reading Grade 3 students. No three-way interactions occurred.
Figure 11

English Dictation Scores
by Grade, Sex and Age of Onset of English Reading

Grade Three

Grade Six

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Figure 11 indicates that the grade 6 students performed much better on the English dictation than the grade 3 students, in support of hypothesis 2. There was a Main Effect for Grade in favour of Grade 6 $F(1,119)=170.251$, $p < .001$. There was also a three-way interaction Age of Onset of English Reading x Sex x Grade $F(1,119)=6.871$, $p < .01$. This was in favour of Early Reading males at the Grade 6 level.
Figure 12
French Influence Error Scores
by Grade, Sex and Age of Onset of English Reading

Grade Three

Grade Six

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In Figure 12, once again the pattern of French influence errors decreases as the grade level increases, in keeping with hypothesis 2. There was a Main Effect for Grade showing more French Influence Errors in the Grade 3 students' English Dictations $F(1,119)=69.843$, $p < .001$. No two-way or three-way interactions were found. Early English Reading females show the lowest incidence of French influence errors at the grade 3 level, and Early English Reading males have the fewest influence errors at grade 6 and overall.

**Stepwise Multiple Regression Analysis for French influence errors:**

Age of onset of English reading seems to be a significant factor in conjunction with grade and sex, as well as the language read first. In order to determine the influence of the variables given on French influence errors in the English dictation, a Stepwise Multiple Regression was computed. The variables entered were Grade, Sex, Language Read First (French, English), Age of Onset of French Reading, and Age of Onset of English Reading.
Table 4

Stepwise Multiple Regression Analysis
Dependent Variable: French Influence Errors in the English Dictation

<table>
<thead>
<tr>
<th>Step</th>
<th>Additional Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grade</td>
<td>60.7%</td>
</tr>
<tr>
<td>2. Read First (French/English)</td>
<td>1.7%</td>
</tr>
<tr>
<td>3. Sex</td>
<td>0%</td>
</tr>
<tr>
<td>4. Age of Onset of French Reading</td>
<td>0%</td>
</tr>
<tr>
<td>5. Age of Onset of English Reading</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62.4%</strong></td>
</tr>
</tbody>
</table>

Significance of contribution of Grade: $F=72.8$, df $1,125$, $p<.001$

Significance of contribution of Read First: $F=39.5$, df $2,124$, $p<.001$

This analysis points out that most of the variance in French Influence Errors in the English Dictation can be explained in terms of the grade level of the child (60.7%). Language Read First also accounts for some of the variance (1.7%), although quite a bit less than Grade level. Students who read in French first exhibited more French Influence Errors in their English Dictation.

No variances were related to Gender, Age of Onset of French Reading, or Age of Onset of English Reading in the Stepwise Multiple Regression Analysis.
Chapter 7 Discussion

Findings Related to Hypotheses

This research project supports the first hypothesis regarding French Immersion Students' tendencies to employ French graphemes to represent the selected phonemes in the English words and nonsense words constructed according to English orthographic principles. There was evidence of French influence errors in the grade 3 French Immersion students' English Dictations. When confronted with nonsense words, the students tended to use French graphemes to represent the targeted English phonemes. The students represented certain targeted phonemes in the English dictation with French orthographic patterns.

The French errors were reduced in the grade 6 subjects' English dictations, as predicted by the second hypothesis. There appears to be a developmental progression. It should be stated that many of the grade 3 subjects who made fewer than nine French influence errors were spelling more like the grade 6 subjects than the poorer grade 3 spellers, who made 20-34 French influence errors. This is evident in Table 5. The high standard deviations found in Table 1, Table 2 and Table 3 also indicate that there is a wide range of scores.
Table 5

Frequency Count
French Influence Errors in English Dictation
by Grade and by Sex

<table>
<thead>
<tr>
<th>Number of French Influence Errors</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 - 29</th>
<th>30 - 39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3 (72)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (39)</td>
<td>13</td>
<td>17</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Female (33)</td>
<td>11</td>
<td>13</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Grade 6 (55)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (24)</td>
<td>23</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Female (31)</td>
<td>29</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

These more competent Grade 3 English spellers, who showed less than nine French influence errors, were children who read in English before entering school.
Table 6
Frequency Count
French Influence Errors in the English Dictation
by Grade, Sex and Onset of English Reading

<table>
<thead>
<tr>
<th>Number of French Influence Errors</th>
<th>0-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gr. 3 (72)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male Early (14)</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male Late (25)</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Fem. Early (13)</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fem. Late (21)</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gr. 6 (55)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male Early (9)</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male Late (15)</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fem. Early (13)</td>
<td>10</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fem. Late (18)</td>
<td>16</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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It follows that these children had more experience with English print and had reached a more advanced level of spelling development. Wood (1982) indicated that exposure to standard English forms of spelling caused a shift from sound to visual memory as a strategy to spell. These students no longer relied on sound-related strategies, and were able to spell more accurately, even nonsense words constructed according to English orthographic principles.

The Stepwise Multiple Regression analysis indicated that language read first, in favour of English, was the second greatest determinant, after grade, for the variance in French Influence Errors in the English dictation.

The third hypothesis postulated that the subjects would demonstrate more French influence errors for low and non-frequency words than for high frequency words. Results supported this hypothesis as well. The students reverted to sound-based strategies rather than print-based strategies when challenged to spell unfamiliar or unknown (nonsense) words, much like the results of Zutell’s (1980) study.

Previous research in the area of spelling had found significant gender differences in favour of females (Manolakes, 1975; Yarborough & Johnson, 1980; Lum & Morton, 1984; Morton, 1985; Allred, 1990). This study found no support for gender differences. The Stepwise Multiple Regression analysis showed that gender did not account for any of the variance in the students’ spelling. Although there was one case of a three-
way interaction involving sex with other factors (Grade and Onset of English Reading), and there were counts of significance in favour of females in the chi square analysis of error patterns by word, the researcher concluded that the final hypothesis of the thesis was not supported convincingly enough.

The ANOVA analyses presented some interesting findings which deserve some attention. The transfer of language skills, here specifically spelling, from one language to the other is quite apparent. It was amazing to find that the subjects who learned to read English first not only performed better on the English Dictation than their peers who learned to read French first, but also scored higher than their peers on the French Dictation as well. This is in keeping with Cummins & Swain's (1986) concept of proficiency in Language One and Language Two as being interdependent across languages.

It may be that those students who read English first did so before entering grade one. They therefore have experienced a longer period of literacy than their peers who read French first, assuming that the onset of French reading was a school-age phenomenon. There is an argument for universality of language learning -- that once you become literate in one language, you are able to apply what you understand about language to any other language.
The Early English Readers are at an advantage then, and become adept at decoding and encoding written language. The differentiation process between the two languages progresses readily, because of a more advanced level of literacy-related skills.

In contrast, the children who learned to read in French first did so at a later age, following entry to school. It is plausible that their literacy experiences were limited in comparison to those who enjoyed personal, individualized preschool home experiences in addition to the school program. It should be noted that the students who exhibit more French influence errors may be lagging in English orthographic skills, but are still very competent language users. They are competent in encoding oral language into written form, but are using a more universal strategy. Since the two languages are out of balance in favour of French for phoneme-grapheme relationships, the students are applying this knowledge of language to spell words in French and English.

The grade 3 students are quite competent French spellers (see Figures 4 and 5), and their low English spelling scores can be attributed mostly to the French influence errors. It is expected that as these students differentiate more between the orthographic systems of the two languages, their English spelling scores will improve and they will exhibit fewer French influence errors; they will perform much like the grade 6 students in this study.
It may also be argued that the Early English Readers learned about language in a warm, naturalistic environment. Investigation into early literacy has stressed the value of preschool reading in the home (Tizard & Hughes, 1984; Wells, 1986). This may not be true for the child who becomes a French reader first. This child’s literacy experiences may be more structured and artificial than the Early English Reader. This early phonological awareness in English leads to greater spelling achievement, as originally presented by Bradley and Bryant (1985).

The ANOVA analyses of the different scores with the independent variables of Age of Onset of English Reading, Sex and Grade produced two interesting interactions. The first occurred with the French Phonemes Correct scores. There was a two-way interaction for Age of Onset of English Reading x Grade (See Figure 10). There is a greater difference between the means of Early Readers ( Grade 3 - 78.32, Grade 6 - 92.36, t(46)=4.22, p < .001) than for Late Readers ( Grade 3 - 81.52, Grade 6 - 87.74, t(77)=2.71, p < .01). Although both of these differences are significant, the early-reading grade 6 students seem to have the greatest advantage. Early literacy-related experiences in English appear to transfer readily to French and result in increased linguistic proficiency overall. It seems that it is a small group of males who are affecting the results, due to their elevated
level of linguistic proficiency, as shown in the very few French Influence Errors as well (see Table 6).

This small group of males appears to be responsible for the three-way interaction (Age of Onset of English Reading x Sex x Grade) for the English Dictation scores. The early-reading Grade 6 males performed significantly better (92.31) than the late-reading males [72.48, (t(22)=2.46, p < .025] as well as the early-reading females [79.49, t(20)=2.34, p < .05]. The late-reading females, however, scored better (88.75) than the late-reading males [72.48, t(31)=2.54, p < .025].

It is my conjecture that these early-reading males are a select group. In two of the three schools involved in the study, the Grade 6 students are in the lead class. It is possible that the parents of these early-reading males realized that these children were beyond the expected level of English reading development at the end of Kindergarten, and enrolled them in the French Immersion program as a form of enrichment. Follow-up classes, including the grade 3 students in this study, may have been enrolled because of older siblings already in the program.

**Study Implications**

This study adds to the body of knowledge linking first and second language skills. There is support for the theory of linguistic interdependence found here. Students who experienced early literacy-related skills, by learning to read in English before entering school, showed proficiency in
English, as well as French, spelling. The ability to spell seems to cross languages; there is a transfer of knowledge from one language to the other. Children who were more comfortable with the orthographic and phonemic patterns of French used their understanding of these processes to spell in English. George (1972) stated that "where the foreign language is more efficient than the mother tongue, the pull of the mother tongue is weak or absent" (p.14). This appears to be the case for the majority of the Grade three students involved in this study.

There was evidence of children spelling by analogy. Children more competent in English spelling used their knowledge of familiar English words to spell the low frequency and non frequency words. Those children who were more dependent on French orthographic and phonemic patterns used known French words as analogies to spell low frequency and non frequency words. There is a process involved here where the child applies what is known and familiar to deal with new and unfamiliar situations. Clay (1991) says "The human mind works often by analogies and will relate something new to something already known and familiar: Reasoning by analogy is probably our most fruitful source of hypotheses about any intellectual problem" (p.335).

Proposals for Further Study

This study did not involve any IQ information since the researcher did not have access to this information. Bradley
and Bryant (1985) found that Sound Categorization scores accounted for some of the variance in children's reading and spelling scores, independent of IQ. It would be interesting to design another study to investigate the French influence on English spelling for French Immersion students which would include IQ scores and some form of early phonemic awareness or sound categorization scores.

One could determine the literacy level of the incoming students and follow these students through the elementary Immersion program to determine the factors which are best predictive of future spelling competencies in English and in French.

Cummins (1979) postulated that students who have an "initially high level of L1 development are more likely to develop similar levels of competence in L2" (p.233). This could also be examined by initial language assessment of English and follow-up assessment of French and English language skills. If early phoneme awareness in English leads to greater reading and spelling achievement, as in Bradley and Bryant's study, then, through the interdependence model of language presented by Cummins, one could expect higher achievement levels in French as well.

This study involved Grade 3 and Grade 6 subjects. Further research might involve a study including Grade 1 and Grade 8 subjects as well. Such a study could track the
developing English spelling strategies of French Immersion students more closely.

Another interesting follow-up would be to assess the spelling skills of the Grade 6 students at the Grade 8 level to see if these Early Reading students still have such great achievement in the area of English spelling.

It would also be of interest to track the Grade 3 students in this study through to Grade 6 to see how they compare with the current Grade 6 students.

Conclusions

In closing, this study has examined the English spelling strategies of French Immersion students and has found evidence of the influence of French in their English spelling. This seems to indicate a strategy involving analogies to known and familiar spelling patterns. This phenomenon is more marked at the Grade 3 level, where the students have not received any exposure to English Language Arts at school. Their limited knowledge of English orthography forces them to rely on the more familiar French orthographic patterns. As the students become more familiar with the English spelling patterns, through English Language Arts instruction at school, and become more competent English readers, they shift their basis for analogies from French to English, and thus show less influence of French in their English spelling. It is important to see this as a developmental process, which is logical and shows intellectual reasoning. Since this French

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influence is no longer substantially evident at the Grade 6 level, it is a temporary phenomenon which should not cause great concern to teachers, parents or administrators, providing they understand what is happening.
References


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APPENDIX A

PREDICTED ELEMENTS OF INTERFERENCE
### Predicted Elements of Interference

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>English grapheme</th>
<th>French grapheme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vowels:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) [u]</td>
<td>o, oo</td>
<td>ou</td>
</tr>
<tr>
<td>(2) [i]</td>
<td>ee, ea</td>
<td>i</td>
</tr>
<tr>
<td><strong>Semi-vowels:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) [j]</td>
<td>y</td>
<td>hi, i, ll</td>
</tr>
<tr>
<td><strong>Consonants:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) [s]</td>
<td>sh</td>
<td>ch</td>
</tr>
<tr>
<td>(5) [d]-final</td>
<td>d</td>
<td>de</td>
</tr>
<tr>
<td>(6) [b]-final</td>
<td>b</td>
<td>be</td>
</tr>
<tr>
<td>(7) [t]-final</td>
<td>t</td>
<td>te</td>
</tr>
<tr>
<td>(8) [m]-final</td>
<td>m</td>
<td>me</td>
</tr>
<tr>
<td>(9) [k]-final</td>
<td>(c)k</td>
<td>c, que</td>
</tr>
<tr>
<td>(10) [l]-final</td>
<td>l</td>
<td>le, lle</td>
</tr>
<tr>
<td>(11) [p]-final</td>
<td>p</td>
<td>pe</td>
</tr>
<tr>
<td>(12) [r]-final</td>
<td>er</td>
<td>re</td>
</tr>
<tr>
<td>(13) [t]-past tense marker</td>
<td>ed</td>
<td>te</td>
</tr>
</tbody>
</table>
Questionnaire

Grade 3 ___ Male ___
Grade 6 ___ Female ___

1. The language I learned to read first was:
   ___ French.
   ___ English.
   ___ __________.

2. I started reading in French when I was ____ years old.

3. I started reading in English when I was ____ years old.

4. I read in French:
   ___ with difficulty.
   ___ well.
   ___ very well.

5. I read in English:
   ___ with difficulty.
   ___ well.
   ___ very well.

6. When I read for pleasure, I read:
   ___ mostly in French.
   ___ mostly in English.
   ___ equally in French and in English.
### French Dictation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>[u]</td>
<td>soupe, boule</td>
</tr>
<tr>
<td>[i]</td>
<td>cerise, lit</td>
</tr>
<tr>
<td>[j]</td>
<td>hier, cahier</td>
</tr>
<tr>
<td>[s]</td>
<td>chat, chien</td>
</tr>
<tr>
<td>[d]-final</td>
<td>mode, humide</td>
</tr>
<tr>
<td>[b]-final</td>
<td>cube, robe</td>
</tr>
<tr>
<td>[t]-final</td>
<td>monte, porte</td>
</tr>
<tr>
<td>[m]-final</td>
<td>pomme, mime</td>
</tr>
<tr>
<td>[k]-final</td>
<td>parc, comique</td>
</tr>
<tr>
<td>[l]-final</td>
<td>balle, pilule</td>
</tr>
<tr>
<td>[p]-final</td>
<td>pipe, tulipe</td>
</tr>
</tbody>
</table>
1. monte
   Je monte dans l’ autobus.
2. pomme
   Je mange une pomme chaque jour.
3. soupe
   J’aime la soupe aux tomates.
4. hier
   J’ai visité mon ami hier.
5. balle
   Le joueur de baseball a frappé la balle très fort.
6. lit
   Mon frère dort dans son lit.
7. humide
   Les plantes préfèrent le sol humide.
8. boule
   Le chat joue avec la boule.
9. cerise
   La cerise est un petit fruit rouge.
10. chien
    Mon ami a un grand chien noir.
11. pipe
    Mon grand-père fume une pipe.
12. pilule
    Le docteur a dit d’avaler la pilule.
13. comique  
Le clown a fait une danse comique.

14. cube  
Un dé a la forme d’un cube.

15. cahier  
Il écrit soigneusement dans son cahier.

16. tulipe  
La tulipe vient de la Hollande.

17. mode  
Les jeans sont très à la mode.

18. porte  
Le professeur a ouvert la porte de la salle de classe.

19. mime  
Pierrot a fait un mime intéressant.

20. parc  
Il y a un match de soccer au parc samedi.

21. chat  
Ma soeur a un joli chat gris.

22. robe  
Elle a porté une robe le jour de sa fête.
<table>
<thead>
<tr>
<th>Feature</th>
<th>High Frequency</th>
<th>English Dictation</th>
</tr>
</thead>
</table>
| [u]     | school         | Low Frequency: loose  
Non-Frequency: smoot |
| [i]     | green          | sheep: dween      |
| [j]     | year           | yours: yome       |
| [s]     | should         | shelter: shemp    |
| [d]-final | told       | spend: stind      |
| [b]-final | Bob        | club: trob        |
| [t]-final | put        | count: whast      |
| [m]-final | farm       | drum: plam        |
| [k]-final | back       | crack: swick      |
| [l]-final | well       | troll: crell      |
| [p]-final | help       | drop: thasp       |
| [r]-final | mother     | matter: traber    |
| [t]-past tense | looked | bumped: flarked   |
## English Dictation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
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<td>The traber led the others through the forest.</td>
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12. back
   The horse wears a saddle on its back.
13. yome
   It is dangerous to play with a yome.
14. whast
   The ship's whast is for balance.
15. year
   January begins a new year.
16. help
   It is wonderful to help a friend.
17. troll
   The evil troll lives under the bridge.
18. dween
   The dween is a delicate purple flower.
19. looked
   The dentist looked at my teeth.
20. shelter
   In bad weather, one should seek shelter.
21. yours
   We will share. What is mine is yours.
22. crell
   The crell of the tree is very high.
23. loose
   The rope hung loose around the dog's neck.
24. stind
   Do not stind all of your savings.
25. flarked  
The bug flarked onto the leaf.

26. farm  
My uncle lives on a farm.

27. club  
The students formed a chess club.

28. crack  
Thin ice will crack easily.

29. plam  
She will plam her room tomorrow.

30. trob  
The trob is a very unusual mammal.

31. told  
The principal told us a wonderful story.

32. thasp  
The thasp rang loudly.

33. matter  
What is the matter?

34. shemp  
It is time to shemp the tall grass.

35. count  
My baby sister cannot count.

36. sheep  
The sheep graze in the meadow.
37. Bob

My friend Bob plays hockey.

38. school

When I finish grade 8, I will go to high school.

39. drop

The dog will drop the stick after retrieving it.
Chi Square Analysis Results
Counts of Significance by Word and Error Category

Error Categories: 1=French Influence Error
2=Word Spelled Correctly
3=English Spelling Error

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VITA AUCTORIS

Lucille M. (Renaud) St. Pierre was born in Windsor, Ontario on May 8, 1957. She received her elementary education in French language schools and completed her secondary education at Assumption High School in 1975. She graduated from the University of Windsor with an Honours Bachelor of Arts degree in French Language and Literature in 1979, receiving the Board of Governors' gold medal for exceptional academic performance. In the academic year of 1979-1980, she completed the Bachelor of Education degree at the University of Windsor.

Lucille St. Pierre is currently employed by the Essex County Board of Education as a French Immersion teacher in the elementary panel.