ORTHOGRAPHIC REALIZATIONS OF A SELECTED SAMPLE OF STUDENTS OF ENGLISH AS A SECOND LANGUAGE

by

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ABSTRACT

This research investigated the problems adult non-native speakers experience in their acquisition of English language spelling strategies. The problems inherent in the spelling system of English were examined by the writer. The research of other investigators in the areas of applied linguistics and language skills acquisition was examined for insights. To further clarify the areas of spelling difficulty encountered by second language learners, an experimental spelling test, incorporating several potentially troublesome segments, was given to 102 adult language students enrolled in English language classes. The results of this experiment were analyzed in the context of applied linguistics theory and current pedagogic practice to determine what, if any, conclusions could be drawn about the second language learner's internalized knowledge of the rules governing English spelling. Strategies for preparing useful teaching materials utilizing the theories of applied linguistics were considered with reference to the spelling abilities of non-native students as determined by their performance on the experimental test.

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CHAPTER I

INTRODUCTION

This research investigated the problems adult non-native speakers experience in their acquisition of English language spelling strategies. To identify the problems inherent in the spelling system of English, the writer has relied upon her own and her colleagues' classroom experience teaching adult students of English as a second language. The research of other investigators in the areas of applied linguistics and language skills acquisition was examined for additional insights. To further clarify the areas of spelling difficulty encountered by second language learners, an experimental spelling test, incorporating several potentially troublesome segments, was given to 102 adult language students enrolled in English language classes. The results of this experiment were analyzed in the context of applied linguistics theory and current pedagogic practice to determine what, if any, conclusions could be drawn about the second language learner's internalized knowledge of the rules governing English spelling. Strategies for preparing useful teaching materials utilizing the theories of applied linguistics were considered with reference to the spelling abilities of

non-native students as determined by their performance on the spelling test.

The spelling problems of the adult learner of English seem to be neither wholly a function of the grapheme-phoneme relationships and irregularities inherent in the language, nor of the lack of linguistic sophistication necessary to utilize the underlying lexical relationships afforded by the orthographic system. It appears rather that both of these theories can be transposed to applied linguistics problems such as the development of second language teaching materials.

Approaches from Applied Linguistics

Because English spelling has traditionally been thought of as both irregular and difficult, very little has been done to systematically approach the problem of spelling instruction, especially where second language learners are concerned. Whereas the English-speaking student may well accept the difficulties associated with spelling as a necessary chore that requires rote memorization, for the non-English speaking student the task is often approached with bewilderment which is far from allayed by his teacher, fellow students or English-speaking contacts. Apart from the usual 'rules'— '_i_ before _e_ except after _c_,' etc., the regular patterns of the spelling system have been neglected as pedagogic tools in the acquisition of English as a

second language and are too infrequently made part of the English student's conscious knowledge. The student is seldom helped to overcome spelling difficulties by the application of the distributional rules of English grapheme-phoneme relationships because, in general, teachers are rarely aware of them and many textbooks do not take advantage of them.

One example of the regularity that applied linguistics tasks might make more use of in teaching spelling and reading strategies to non-native speakers of English is to be found in the work of Hanna, Hanna, Hodges and Rudorf (1966). They demonstrate that according to computer analysis of phoneme and grapheme positioning in English syllables

> Nineteen [out of thirty] consonant phonemes attain the 80-percent criterion when positional factors are not considered. But when distributions of graphemic options in initial and final positions in syllables are tabulated, 21 of the 30 consonant phonemes exceed the 80-percent criterion, leaving only 9 which still fall below this figure, the phonemes /CH/, /J/, /NG/, /S/, /SH/, /Y/, /Z/, and /ZH/. [Hanna *et al.* 1966:81].

These researchers conclude from their study that,

> The important generalization to be made from these data is this: When the phonological structure underlying the orthography is analyzed sequentially from simple phoneme-grapheme correspondences, through

> phoneme position in stressed and unstressed syllables, a hierarchical relationship is observed for both the *phonological structure and the orthography.* [Ibid:96].

Writers of spelling texts and teachers of spelling skills might be well advised to use this distributional regularity as a starting point for spelling instruction in order to give students a firm foundation in phoneme-grapheme relationships along with their distributional possibilities. Though the focus here is on the non-native learner of English, the implications for young children (or illiterate adults) learning to spell and read their language is obvious.

More recently, a rather different approach from the phonological tradition has been suggested from the merger of distinctive feature phonology with generative-transformational grammar. Distinctive feature phonology posits a set of binary oppositions, universal in their potential application which are part of Noam Chomsky's wholistic theory of the nature of language. The merger of this particular phonological tradition with the essentially deductive, rationalistic logico-grammatical formalism of generative grammar has meant that abstract "underlying" forms are often to be posited for phonological shapes as well as for grammatical shapes. Speakers of a language are to be credited with knowledge of more than just that which

appears in the surface structure.

This recent linguistic tradition has lately found itself heavily drawn into matters of developmental psycholinguistics and first-language acquisition. Thus it is not surprising that a good deal of deductive generative commentary has recently been written on topics like orthographic matters and the teaching and acquisition of reading skills. For example, Carol Chomsky (1970) recommends that the role of underlying lexical relationships is also important, perhaps most important, in the processing of both reading and spelling. This is quite distinct from the alphabetic or phonemic approach to spelling and reading. Chomsky notes:

> that words whose spelling is phonetically accurate do not constitute a distinct and meaningful category in the language. They are not the only systematically spelled words in the language, as is often believed. All words whose conventional spelling is close to their abstract lexical spelling are spelled systematically, and this is the more meaningful category. [C. Chomsky 1970:298].

Words which undergo change in phonological shape due to such factors as stress or suffixation usually do not undergo graphological change; this allows the reader and the writer to immediately identify the semantically meaningful element of the written material. C. Chomsky and others like Read (1971) and Barganz (1974), stress the overwhelming

regularity of English spelling when it is approached in this way. These lexicalists maintain that the Traditional English system of abstract spelling "retains in the lexical spelling similarities which are real in the language." [*Ibid.*:298]. C. Chomsky gives examples like *nation* and *national* which she notes are not different words in the same sense that *nation* and *notion* are different words. Rather, they are different forms of the same word. This systematic retention of the base spelling "offers the advantage of expressing an underlying reality of the language which is masked by surface phonetic features." [*Ibid.*:289]. Such graphological features as silent letters—as in *bomb* and *sign*—are also used by the reader to identify the semantic message of the derived forms *bombardier* and *signature*, in which they represent a phonetic reality.

From the point of view of the foreign student learning English, the problem of when c represents /s/ and when /k/ is very real. Equally problematic is the spelling decision of precisely which grapheme to use to represent a given phoneme. When are /s/ and /k/ written as 's', 'k', or 'c'? "What the foreigner lacks," writes C. Chomsky "is just what the child already possesses, a knowledge of the phonological rules of English that relate underlying representations to sound." [*Ibid.*:299]. Although the difficulties inherent in English spelling seem

to be apparent to everybody, there has not yet been a systematic investigation of the non-native learner's ability to internalize and to use the phoneme-grapheme relationships that do occur. Read's work with children clearly indicates that, at least for native speakers, there is a very real phonological basis that dictates word shape. Studies by Hanna *et al.* (1966), Venezky (1967, 1970) and others have shown that there are predictable distributions for almost all graphemic options of English. C. Chomsky believes that underlying lexical relationships are the essence of effective reading and spelling using the traditional English orthography.

Given these criteria as the bases of current English spelling and reading difficulties and realizing that for the adult learner of the language there exist few, if any, applied linguistics approaches that capitalize on the potential of English spelling, there seems to be a need for research into how the rules that govern the regularities of the English orthographic system are internalized. This is an area of research which, considering its strategic place in the young native speaker's repertoire of learning, seems to be badly neglected. Moreover, considering that much of the non-native learner's desired skills in speaking-understanding and reading-writing (including spelling) is production, considerable attention should be paid to the

problem of rule internalization in the preparation and utilization of appropriate applied linguistics materials for non-native speakers acquiring English skills. This thesis examines some aspects of the latter applied linguistics task. It is presumed that by investigating the traditional and current approaches to the acquisition of written language skills, by investigating the sources of traditional orthography, by investigating the role of linguistic science in the pedagogic process and by direct evaluation of the spelling skills of adult English language learners that a valuable contribution will be made to the development of textual materials suitable and useful for the task of unravelling the intricacies of English phoneme-grapheme relationships.

That students of English encounter difficulty with spelling has become apparent to the writer through her classroom experiences. Exactly which one of the divergent views of the spelling-reading processes— phoneme-grapheme relationships or underlying lexical representations— actually solves the greatest problems and thus affords the greatest potential as a pedagogic approach is perhaps best determined by a systematic examination of just which items are misspelled by non-native speakers at various levels of language acquisition. It would seem that one way of validating whether neophyte spellers encounter difficulties with the area suggested by these competing theories is to

test their spelling expertise. The evaluation of spelling skills already possessed by students at distinct levels of language acquisition is very important to the plan of this thesis. It is the writer's belief that the phonemic-graphemic rules of English spelling are eventually assimilated by students in an *ad hoc* manner, and that the results of such assimilation vary in their suitability. The regularities of the underlying lexical system appear to be left to individual discovery and the results of this process of individual discovery are not always satisfactory. Yet, the orthographic system is internalized with varying degrees of success, and perhaps in some typical order. If in fact the rules are processed in some general order, the most effective and efficient teaching approach would be to utilize this phenomenon by building on the students' competence in their new language. The information and opinions secured from a search of the literature should be carefully considered in terms of their importance to the over-all goals of this thesis. An analysis of the data in this study will reveal the strengths and weaknesses of students and thus the system that presently teaches them to spell. This examination can obviously be used to great advantage in the development of a spelling test that will utilize the knowledge of English spelling rules already possessed by the student as a tool in the teaching-learning process.

An attempt has been made to determine some of the socio-linguistic factors that might affect the unconscious exposure to and internalization of English phoneme-grapheme relationships. The belief that exposure to the oral language will influence the learner's ability to deal with the written language is suggested by Nelson (1969) in his work with congruent and non-congruent spellings. Although the major emphasis of the present work is directed toward an examination of the acquisition of the rules that govern the ability to spell English automatically and correctly, a brief consideration of the educational and social situations that might influence the total input of linguistic data processed by each subject who took part in the experiment seemed of value to the thesis as a whole. How influential the socio-linguistic factors under consideration actually are, in regard to patterns of spelling rule internalization, are examined in Chapters 4 and 5 along with the results of the spelling experiment described in Chapter 3. If, in fact, these factors do appear to affect spelling performance, it seems desirable that any curriculum designed for spelling instruction should take them into account.

Spelling vs. Reading

One apparent problem should be clarified early in the discussion. While reading and spelling might be considered as related linguistic arts, the acquisition of one or the

other skill is hardly dependent on the other. Reading is a receptive skill and spelling is a part of the creative skill. LeFevre (1962) sees the communication arts as divided into the field of *receiving* (that is, reading, listening) and the field of *sending* (that is, speaking, writing); spelling is seen as a part of the sending operation of communication. He comments that

> This broad contrast of the sending and receiving operations of writing and reading may suggest a reason why good spellers are often poor readers, and poor spellers good readers. Whatever the inter-connections may be, *spelling is not reading*, and *reading is not spelling*. [LeFevre 1962:165].

Doman (1963) also points out the diverse nature of the skills when he says,

> Spelling, on the other hand, *is* a proper school subject. A child may be a splendid reader and not necessarily a good speller. They are two totally diverse processes. Reading is something the brain does, and spelling is a subject about certain rules people have invented to help keep reading and writing orderly. When the teacher teaches spelling, she is passing on the facts from a body of knowledge which man has accumulated. When a child reads, his brain is not concerned with the details of how a word is constructed. The child's brain is actually interpreting thoughts, expressed by the writer. [Doman 1963:105-6].

In his pedagogic work on teaching spelling, Thomas (1974) also comments on the differences between spelling

and reading. He remarks that

> Much more practice and effort will be required before a student can make intelligent choices for the graphic representation of vowel sounds. To develop these skills, it is necessary to use a process that begins with phonemes and produces the required graphemes. The spelling process is essentially a reverse operation that goes from a given grapheme to the appropriate phoneme. [Thomas 1974:7].

If we accept as reality the cognitive differences between the processing of reading and spelling skills, why then have this and other studies investigating spelling relied so heavily on literature that is concerned with the acquisition of reading ability? Piaget (1970) answers this question when he observes

> Everyone accepts, for example, the fact that in order to live a social existence it is necessary to know how to spell (leaving aside any discussion of the rational or purely traditionalist significance of such a necessity). But we continue to lack all decisive knowledge of whether specialized instruction in orthography increases our learning ability in this field, is wholly neutral in its effects, or can sometimes become an outright hinderance. Certain experiments have shown that the automatic recording processes of our visual memory achieve the same result as systematic lessons; in two groups of students, of which one had been given spelling instruction and one had not, there was no difference between the two sets of marks...it is scarcely believable that in a field so accessible to experiment, and one in

> which the divergent interests of traditional grammar and contemporary linguistic theory are in such direct conflict, that the pedagogue has not organized sustained and methodical experiments, but has remained content to decide upon such questions on the basis of opinions whose 'common sense' in fact conceals more affectivity than effective reasoning. [Piaget 1970:7].

On the basis of the research results available in the literature, it appears that while investigators claim to have reached some conclusions about learning to read, virtually no one has looked at the problem of learning to spell, particularly learning to spell English words as an adult second-language learner. It should be noted that exceptions to this almost total neglect of the field of spelling acquisition are few. The suggestions of C. Chomsky (1970, 1971) in regard to underlying lexical relations, the work of N. Chomsky and Halle (1968) in this regard as well as in the investigation of the numerous sub-regularities inherent in traditional English orthography, and the classic study of phoneme-grapheme relationships by Hanna and his colleagues do deserve a mention. However, these studies are the exception rather than the rule. Moreover, it is necessary to note that such studies have really been generated within interests germane to a universal theory or a universalist pedagogy applicable to the first and native language, not to problems of applied linguistics and second language learning. Thus, their

concerns could be said to be peripheral to the focus of this thesis if they exist at all.

Some research, however, has more direct applications to this topic. For example, Brown's research (1970) into categories of spelling difficulty for speakers of English as a first and second language is an attempt to evaluate the cognitive process involved in the actual spelling of words taken from categories representing various levels of frequency and regularity. In his work (to be considered in greater detail in Chapter 2), he observes that too little attention has been given, both at the native and non-native level, to the systematic regularities that are an important part of English spelling. Such considerations, he claims, might greatly simplify the process of learning the skill.

The lack of literature dealing specifically with spelling has, naturally, impeded the progress of the present study in some ways; yet it has also afforded the opportunity to investigate the closely related topics of reading acquisition and reading development. As these two are so closely intertwined with the actual academic situation in which spelling is taught, it has been of considerable value to look closely at the areas of overlap as well as at the distinctly separate spheres of these two skills. In examining the spelling proficiency of both the test subjects and the English speaking individuals with whom the writer is in frequent contact, LaBerge and

Samuel's (1974) observation in regard to good readers seems to apply to the essence of good spelling as well: good readers, they say, are unaware of the several individual skills that they must have mastered in order to read; but it is just these skills, taken as separate tasks that create reading difficulties for the poor reader. It was hoped that by reading widely in the fields of reading development and perception that some insight might be gained into the development of the skills required to process language from thought into written word.

Historical Orthography

Learning the spelling of English words—which at best has been approached as difficult and irregular and at worst, as impossible by native speakers of English—may present special difficulties to adult second language learners. This is especially true for those who speak a language which much more closely approaches the 'phonemic ideal' than does English. The many linguistic sources of English borrowing, from which it derives its cosmopolitan richness of vocabulary, is also a major cause of the phoneme-grapheme irregularities that give rise to spelling difficulties. Although the introduction of the printing press to England in 1476 put written material into the hands of many, writing, and thus orthographic styles, were certainly well established throughout The British Isles by

that period. Caxton's role in the standardization of both English spelling and English orthography is of considerable importance, for to some degree he attempted to apply rules of regularity to the spelling of each lexical item. Due to the fixed nature of the printing press, he not only helped to standardize the orthography of that day, but also was instrumental in introducing an educated Latinate flavour to the already highly individualized spelling that marks the literature of that time.[1]

The phoneme-grapheme (thus the spelling) relationships of English orthography have been subject to argument and revision since the first attempts at standardization. From the 15th Century forward, scholars and writers have spent both years and fortunes on unsuccessful proposals designed to make traditional orthography—and thus spelling—adhere more regularly to the 'alphabetic principle' of a truly phonetic script. Men such as John Hart (in the 16th Century) published volumes that both detailed proposed orthographic changes and presented literary material in the new script. Even now, scholars and teachers in the fields of linguistics, psycholinguistics and reading research are presenting important and thoughtful considerations of the pedagogic problems inherent in the continued use of traditional orthography [see Steinberg 1971, 1973, for example] and the potential educational benefits that might be derived from an ortho-

graphy that utilizes the surface phonetic realizations rather than the underlying lexical representation [see C. Chomsky 1970, or N. Chomsky 1970, for example].

English orthography, in fact, does give the impression that it is far from the one-to-one phoneme-grapheme correspondence preferred by such scholars as Steinberg and Downing,[2] as well as by most students of the language. However, as mentioned in the preceding discussion, several statistical analyses of actual grapheme-phoneme and phoneme-grapheme relationships claim that graphemic options for English are predictable at least 80 percent of the time. The fact that written language has remained fairly static in terms of graphemic representation since the time of Caxton, while spoken language has changed and developed is another reason which accounts for a sizeable percentage of the irregularities in the spelling of Modern English. Many common and uncommon words are still spelled as if the Great Vowel Shift and various consonantal alternations and losses had never taken place. Added to this is the large vocabulary of words borrowed from all sources: Latin, Greek, German, French, American Indian tongues, and so forth.

The irregularities in English orthographic representation are, then, partly the products of shifts in the spoken language away from the pronunciation in use during the 14th and 15th Centuries (this is especially true

of the vowel system). Other irregularities are due to the re-Latinization of vocabulary that (a) entered English through French rather than through Latin and (b) was assumed to be derived from the wrong Latin root.[3] This situation accounts for many 'silent' consonants in Modern English (as in island, doubt, debt).

Further confusion has been created by the gradual shifts in consonantal qualities in various distributions, due to such considerations as change in stress, loss of inflection, and so on, thus a given consonantal grapheme might now represent voiced versus voiceless oppositions as well as other such considerations [see N. Chomsky and Halle 1968, for further detail]. According to Hanna *et al.* (1966), Modern English, as spoken in North America, consists of 30 consonantal phonemes and 22 vocalic phonemes which function as syllabic nuclei and which are represented graphically by the twenty-six letters of the Roman alphabet. This does not account for such supra-segmental elements as pitch, juncture and stress. Other dialects vary somewhat in the phonetic qualities assigned to these twenty-six symbols; thus, the pan-dialectic nature of traditional orthography, while a help in reading, has become a nuisance in spelling and in learning the written language.

The developmental history of written English is of considerable interest to those who would study the

diachronic patterning and shifts in language. However, it is important to note that it is the orthography as it is and as it is used today that confronts the English language learner and that must be internalized if he is to effectively use his new language. Therefore, the elements of synchronic orthography and the manner in which they are utilized in the language learning situation are the primary concerns of this paper.

CHAPTER II

REVIEW OF LITERATURE

The contribution of linguistics to the traditional approaches to reading and spelling can be better appreciated by examining briefly some of the more pertinent literature in this field. Material in this area, it seems, has been divided into specialized and testable approaches to the problems encountered in the scholastic education of native speakers of English. There have been attempts to justify the phonemic principle as a teaching and learning tool as well as more recent psycholinguistic investigations [see Read, 1971] into the mental constructs of young native learners that might be responsible for some of the usefulness of this particular linguistic unit. Others, for example, Savin and Bever (1970) have examined the psycholinguistic reality of the phoneme itself and thus its usability as a linguistic entity. They determined that whatever its status with respect to reality, it is a useful, and perhaps necessary component of the tools of linguistics.

The area of academically-instigated language skill acquisition has been investigated by Hardy *et al.* (1972) and

a number of others. The emphasis here is mostly on the mental processing involved in reading and the automatic semantic interpretation of written material. This is, after all, an ultimate educational goal in this aspect of the pedagogical enterprise.

Throughout the literature, the vowel shift and consonantal alternations have been cited as both major causes of spelling and reading difficulty and as possible major contributors to the real regularities of the language. While some researchers, for example, Moskowitz (1973), claim that the phonetic alternations of English are not psycholinguistically significant to learners, others, such as the Chomskys [C. Chomsky 1970, 1971; N. Chomsky 1970; Chomsky and Halle 1968], view the same linguistic processes as the most meaningful pattern of the language. They contend that the system of alternations is already of considerable use to fluent readers and should be made evident to young spellers.

Although the majority of research in the acquisition of English language skills concerns the young native speaker, a few investigators, for example, C. Chomsky (1969) and Cronnell (1972), have given thought to the special difficulties encountered by the non-native language learner. Brown (1969) actually examines the spelling ability of a sample of foreign students at a university in California and points out that empirical evidence suggests that poor spellers, both native and non-native, share many of the same

problems.

The dilemma of regularity or lack of regularity in English spelling is a central theme in the work of several researchers. The actual phoneme-to-grapheme relationships of the written language have been tabulated by Hanna *et al.* (1966) as well as by other investigators. Where as the correspondences of English were shown, by actual count, to exhibit much greater regularity than has been traditionally thought, the authors of the study point out that the alphabetic regularities have never been thoroughly or properly exploited in a course of spelling instruction.

A more recent development in linguistic as well as pedagogic approaches to teaching langugage arts skills has been the concept of underlying forms whose spelling hold true even in derived forms which undergo alternation in phonetic shape. The Chomskys [C. Chomsky 1969, N. Chomsky 1970] have both written about the overwhelming regularities that occur in English spelling when spelling is viewed as a basically regular process with easily demonstrable sub-patterns. Whether or not this type of lexically or semantically based model is of use to the non-native student is still unclear. There has of yet been too little research or experimentation to test the validity of this pedagogic method on either native or non-native English language learners and some researchers [i.e., Moskowitz

1973, Steinberg 1971, 1973] actually claim it is quite useless.

Linguistic Research and the Phonemic Principle

Until recently, language skills building materials generally have relied heavily on the phonemic principle as the means to atomize written words into pronouncible and spellable units. Read's (1971) research in pre-school and kindergarten spelling has shown that this concept of the phoneme as a basic in word construction is well-founded. Read studied the phonemic system of children who have spontaneously attempted to spell English words using toy alphabets or other objects that they perceive as letters of the alphabet. His findings indicate that the individual's sense of phonetic representation is developed at a very early age. Read further found striking similarity of sound-to-grapheme relationships among the children (that is, from child to child) and bases his work on the assumption that since the children all represent the sounds in a given way (even though incorrect by adult standards), that there must be an underlying feature similarity between phonemes which becomes distinctive for the child, but which is no longer distinctive for adults. Children, at an early age, are aware of the distinctive differences between groups of phonemes, and hear phonemes as significantly different entities, even though their under-experienced ears are not

yet tuned to the acoustically important and meaningful distinctions between the phonemes of the language they are learning.[4]

Part of Read's research was directed towards determining what parts of the phonological system are internalized at specific developmental stages in order to determine how this series of phonetic realizations can be utilized in teaching reading and spelling to children. Read writes, "What is significant...is that each child arrived at roughly the same system, using certain spellings that seem implausible to his parents and teachers, but which can be explained in terms of hypotheses about the children's implicit organization of English sounds." [Read 1969:4]. He notes several examples of the children's work, such as DA for 'day' and MI for 'my', and remarks on regularities in the systems of both vowels and consonants among all the children. For example, for children at age five and under, the representation of lax vowels is extremely regular. Children also tend to use symbols to represent vowels and consonants in accordance with phonetic features such as place of articulation, so that, in Read's terms, the 'long E' of *seek* and the 'short I' of *frontier* would both be represented as I in the children's system. Working with the available data, Read is unable to determine the most important feature (to children) of the vowel sounds: whether it is 'backness' as predicted by Chomsky and Halle,

or 'height' as determined by Jakobson. He makes an interesting observation in regard to affrication of consonants. The children apparently mistake this important English feature and thus treat adult /č/ and /tr/ as one sound unit—represented as HC, and adult /ǰ/ and /dr/ as one sound unit—represented as G, selecting affrication rather than place of articulation as the distinctive feature.

Savin and Bever (1970) have also studied the individual's perception of the phonemes of English. In an article concerning the non-perceptual reality of the phoneme they present experimental findings that "phonemes are not perceived before the syllabic units that contain them..." [Savin and Bever 1970:299]. They write further that "phonemes are identified only after some larger linguistic sequence (e.g., syllables or words) of which they are part;" thus "syllables within slowly recognized words are themselves slowly recognized, and, if syllable recognition invariably precedes phoneme recognition, then syntactic complexity can affect phoneme identification via effects on word recognition." [*Ibid.*:330]. Savin and Bever present and argue various views about the reality of phonemes as entities, psychological, linguistic and otherwise. They cite Wickelgren's argument which expresses the view that phonemes do not exist: "For example, he denies that there is any psychological unit that occurs twice in

the word *did* since the initial and final /d/ are different articulatorily and acoustically." [*Ibid.*:300]. Based on their analysis of the results of their work, the investigators agree that there is not clear evidence for the existence of phonemes as entities, "except in one respect, whose theoretical import is quite unclear: the subjects did somehow know what we were talking about when we gave them phoneme-target instructions." [*Ibid.*:301]. In defence of the phoneme they note the "occurrence of alphabetic writing systems, the existence of rhyme and alliteration in non-literate poetry, the natural existence of segmental phoneme spoonerisms, and the innumerable well-attested historical changes in language that are described very simply in terms of phonemes and only clumsily and arbitrarily without them." [*Ibid.*:301]. They also note the vast number of regularities in "every modern language which can be stated satisfactorily only by referring to phonemic features." [*Ibid.*:301].

However, most researchers have taken the psycho-linguistic reality of the phoneme for granted and tested the individual's ability to recognize and to interpret the acoustic or written representation. Many investigators, for example Hardy, Smythe, Stennett and Wilson (1972), have centered their research on the acquisition of English phoneme-grapheme relationships by children. Hardy and her

colleagues looked at the developmental patterns in elemental reading skills and found that children are better able to relate the phoneme-grapheme relationships than the grapheme-phoneme relationships in English. They cite the work of Venezky who has shown that "increases in mastery of letter-sound correspondences occurred as far as the Grade 11 level of secondary school." [Hardy *et al.* 1972:433]. They found that the easiest phoneme-grapheme associations for the children were "long vowel sounds, whose letter names and sounds are identical, consonants with which only one sound is associated, and the short /a/ sound, whose sound alone constitutes a word..." [*Ibid.*:434]. According to Hardy, the most difficult associations were determined to be the short vowel sounds /ĕ/, /ŏ/, /ĭ/ for which there are several possible spellings, and the consonant /v/. Difficult grapheme-phoneme associations are the vowels i and e, for which there are several possible pronunciations; three consonants with which two or more sounds are associated: c, which is either /s/ or /k/, g, which is either /g/ or /dz/, s which can be either /s/, /z/ or /š/; and the consonant x when it represents /ks/.

The lack of simple one-to-one correspondence between the English phoneme and its written representation can often be attributed to a regular pattern of historical shift in pronunciation. Because once standardized, spelling is slow to change, one phoneme of Modern English might now be

represented by two or more orthographic options, this is the case of /s/ in *stir* and *concert*. Or, one grapheme might now represent two or more phonemes; this is the case of s in *lease*, *ease* and *sugar*. The continuing evolution of the pronunciation of English vowel sounds is another cause of disparity between symbols and phonemes. The spellings of Modern English vowel phonemes have derived from traditional spellings for words whose pronunciation has altered over the years since their spellings were fixed. /i/, for example, is the current pronunciation for Old English /ǣ/, /æ:a/, /e:/, and /e:o/, which were spelled respectively æ, ea, e-e, and eo. In the early Middle English period, the first two vowels fell together as /æ:/ and the second pair fell together as /e:/. Sometime during the 17th Century, the Middle English vowels shifted from /e:/ to /i/. Thus giving rise, along with the spellings of French loanwords, to at least four spellings for the phoneme. [For further details of this historical development see Robertson and Cassidy 1954].

Much of the seeming irregularity and confusion within the consonantal graphemes of English can be explained in terms of conditioning environments and distributional possibilities. The letter c, for example, is generally pronounced /s/ when it occurs before a high-front vowel (e or i); exceptions include *cello* and *provincial*. When c precedes any of the other vowels, any of the consonants, or

is word final, it is usually pronounced /k/; exceptions include *Caesar* and its derivations. The digraph ch usually indicates one of several other phonemes, however in word initial position it usually represents /k/ as in *character* or *charisma*. Such correspondences are, of course, not easy to relate or to teach to students of spelling who are faced with so many facets of their new language at the same time. However, unless one is made aware of the distributional restrictions on the graphemic representation of the phonemes represented by these orthographic symbols used in the alphabet (letters), the choice of the correct graphemic option could well prove to be a block to accurate and rapid spelling.

The experimental work of Nelson (1969) in bimodal recall is based on the premise that a "'word' is, in addition to a meaning, an amalgamation of an auditory pronunciation and a visual spelling" and that, "learning is not usually considered complete until the word can be recalled bimodally." [Nelson 1969:118]. The purpose of his research was to determine the reason that some syllables are easier to recall than are others. Nelson examined three parameters that he feels influence the bimodal recall of unfamiliar syllables in English: (1) the degree of similarity between the new 'word' and already familiar words, (2) similarity of pronunciation between the new 'word' and already familiar listening pronunciations, (3) phonetic-

graphemic congruency of the word itself. The third parameter is of special interest to this study. Whether, in fact, an approach to a one-to-one correspondence between sound and spelling actually does affect the language user's ability to perceive and use a word is important pedagogically in teaching a language which incorporates in its lexicon many examples of both highly regular and highly irregular grapheme-to-phoneme correlations. Nelson's results show that words with congruent spelling and pronunciation have a greater influence on bimodal recall than do words with either similar spelling or similar pronunciation to English. The results also indicate that similar spelling is a more influential factor in bimodal recall than is similar pronunciation. Nelson notes that "the model assumed to underlie spelling-pronunciation congruency is that a perceived spelling elicits an implicit pronunciation, and perceived pronunciation elicits an implicit spelling." [*Ibid.*:119].

Phoneme-Alternations A Key to Spelling?

The problem with English spelling seems to be that in fact it lacks the constant implicit-explicit relationship of grapheme to phoneme. The phonetic alternations that result from the vowel shift, for example, are not generally reflected in traditional Modern English orthography. The psycholinguistic reality of the vowel shift rules to native

speakers of English is currently one important area of investigation and of much contention. The historical change in the quality (tense to lax) of the vowels that precipitated in the vowel system of English during the 15th Century changed the pronunciation but not the spelling of hundreds of English words. This shift in vowel quality, which was, in part, a shift away from phonemic length and toward distinctive tenseness, caused the quality of the vowel to alter depending on the syllabic stress. Thus, the evolution of the total vowel system of the language has affected the pattern of alternation of multi-syllabic words which undergo vowel shifts under derivation. The underlying lexical vowel shifts in pronunciation when a suffix is added. For example, following Chomsky-Halle (1968), the lexical vowels /i u e o æ ɔ/ shift to /æ ɔ i u e o/ under specified conditions. Note the vowel alternations in such pairs as *serene-serenity, cone-conic, abound-abundant, courage-courageous, nation-national,* and so on.[5]

Whether or not the overt phonetic realization of the vowel shift has become a subconsciously useful clue to learners of the language is debatable. The question of people's awareness of the underlying lexical relationship that exists between a base form, such as *meter* with its tense vowel and the derived form, *metric*, with a lax vowel has been studied by several linguists interested in both the fields

of psycholinguistics and applied linguistics. Applied linguists, especially, have attempted to show that the regularities exemplified by the pattern of the vowel shift alternations would be a practical technique for organizing and demonstrating some of the inherent systemization of the language to learners.

Disagreeing with the assumption that the vowel shift has potential as a valuable pedagogic tool, Moskowitz, in her article dealing with the status of the vowel shift in English (1973), seriously questions the justifiability of relying on this phonemic fact either for purposes of education or as a psychological reality for native speakers. She writes, "it is not *a priori* obvious that historically related words are also synchronically related...The matter is no doubt further complicated by the existence of semantically and historically unrelated pairs which follow the same phonological pattern..." (Moskowitz 1973:225). In order to test the validity of the alternations for speakers of English, Moskowitz presented 72 pairs of nonsense words as a base form and its derived form with '-ity' to children of several ages. The base forms were divided into three groups: (1) those which conform to the predominant pattern of English surface alternations, (2) those which differ by tenseness and dipthongization but involve no quality shift, and (3) those which undergo an incorrect quality shift. The 'words' were read to the subjects who were to determine

whether or not the derived '-ity' form was pronounced with the correct vowel quality shift from the base form. The results of this experiment indicate that the children are "able to manipulate vowel-shift patterns well but are *strongly* resistant to other patterns..." [*Ibid.*:248]. In part, Moskowitz accounts for this ability to handle the shift alternations by the heavy emphasis placed on spelling, especially vowel spellings, in the early school years. She also cites Read's (1971) work investigating the invented spellings of pre-school children in which he notes that the children "prior to indoctrination into the written form of English,...find tense-tax pairing of vowels natural[6] and offer no evidence of knowledge of vowel shift alternations." [*Ibid.*:248].

Moskowitz claims that the formal instruction in reading and writing received by the children in her experiment (as compared to the subjects of Read's work) has introduced them to the subtleties of the vowel shift rules and that "*the source of these childrens' knowledge of the vowel shift is the spelling system of English.*" [*Ibid.*:249]. This would account for the childrens' poor performance with words in condition 2, which differ from the base form only in tenseness and laxness. If Moskowitz's position is correct, then it is pure tautology to claim that the use of the vowel alternation rules to teach or to enhance spelling abilities is valuable. Rather, it would be just the other way around,

to make the student consciously aware of the pattern of alternation or of the lexical relationships would tend to detract from his overall capacity to spell the language based on the imperfect alphabetic principle that is employed. It might actually cause him to generalize away from correct phoneme-grapheme relationships in favour of incorrect, but lexically relevant misspellings. If, as Moskowitz suggests, much of one's knowledge of the alternation rules comes from his having been coached in the spelling strategies of such rules, then the validity of the rules being internalized by native speakers must be questioned seriously. It may be that the reading (receptive) realizations of the semantic content are more readily recognized and utilized than are the less obvious productive writing relationships. Although the psycholinguistic questions raised by Moskowitz may be pertinent to the written language skills acquisition of native speakers, for the non-native learner, and for students in general, the possibility that the sub-regularity inherent in the vowel shift alternations might be influential and helpful to the learning situation makes it a potentially valuable source of teaching material.

Other investigators, including the Chomskys and Halle, have expressed the view that the vowel shift is "without doubt the pivotal process in Modern English

phonology." [Chomsky and Halle 1968:187]. They feel that the underlying lexical relationships retained by the non-changing shape of the base form are of most use to the reader and writer of English. In their work they claim that traditional English orthography is 'near optimal' in that "phonetic variation is not indicated in the lexical spelling when it is predictable by general rule." [C. Chomsky 1970: 291]. The retention of the same written vowel symbol in pairs such as *nation* and *national*, or *divide* and *division* permit the reader to rapidly and correctly identify the semantic relationship that holds between the base and its derived forms. C. Chomsky also comments that "letters represent segments in lexical spellings, not sounds. It is the phonological rule system of the language...that relates the lexical segments to sound in a systematic fashion." [*Ibid.*:298].

Read (1971) supports the Chomskys' lexical learning strategies when he remarks that in the case of pre-school childrens' spellings, "the resulting spelling seems odd to most adults, just because adults have long since learned that spelling represents the lexical level at which the words are related." [Read 1971:7-8].

Brengleman (1970) also accepts as valid the Chomsky-Halle observations regarding the fundamental regularity of English spelling and the importance of non-changing

graphemic representation. He writes, "It is not a defect in English spelling that...[one symbol might represent two or more phonetic representations]. Rather it is an indication of the efficiency of the system that it provides a single character which is automatically related to different pronunciations according to rules known by speakers of English." [Brengleman 1970:1116].

C. Chomsky (1970) writes that an advantage of traditional lexically based orthography in reading is that

> the reader does not have to abstract away from unnecessary phonetic detail to reconstruct the lexical representation of words... Silent reading may take place primarily at the lexical level, without requiring the experienced reader to convert to the surface phonetic level... But this phonological processing may be minimal in rapid silent reading. Indeed, it may be that part of learning to read rapidly and well is learning to dispense with the application of phonological rules. [C. Chomsky 1970:300].

Brengleman (1970) refers to the same concept when he writes that a

> good spelling system is one which allows the skilled reader to cover the maximum text in the minimum of time. It also provides him with the means of identifying words which he may not have read—or even heard—before... this means that not only must the same word be spelled in the same way each time it appears despite differences in the way it may be pronounced, but the same meaningful word part must also be spelled in the same way." [Brengleman 1970:1114].

He also notes that the most useful spelling system is one

> which can be used by the maximum number of readers and writers...it must be as nearly as possible pan-dialectal for the same language. This means that some archaic spellings must be retained...A spelling system cannot be a mere representation of a sound system because writing and speech are not carried on under the same circumstances. [*Ibid.*:1114].

N. Chomsky (1970) notes that a "lexical representation... provides a natural orthography for a person who knows the language." [N. Chomsky 1970:7].

For the adult student of English, however, the questions of underlying lexical representation and the retention of graphemic symbols under conditions of phonetic alternation are often far removed from the reality of his linguistic competence. "What the foreigner lacks," writes C. Chomsky (1970:299), "is just what the child already possesses, a knowledge of the phonological rules of English that relate underlying representation to sound."

Actually, C. Chomsky's contention that the underlying lexical relationships are the important constructs of English for both reading and spelling is not unfounded for the non-native speaker for whom the orthographic system often presents so many difficulties. The concept of root words which can be augmented with affixes can help the

foreign student to understand some of the basic semantic overlaps and parallels that he encounters in written work. Largely, his problem is to relate the spoken word with its written form— especially when *he* is doing the writing. It may well be that to realize that a derived word is often actually spelled the same as its base form plus a suffix would ease the transition from oral to written English by instilling some confidence in the student's own judgment of how a word would most likely be spelled.

Studies on Spelling and E.S.L.

Cronnell (1972) refers to the relationship between English spelling and English pronunciation as "two-way and not entirely reversible...from spelling to sound for reading and from sound to spelling for writing." [Cronnell 1972:17]. He adds that the "native reader would never be so stupid as to spell /fiš/ as *ghoti* or to read *ghoti* as /fiš/." [*Ibid.*:18]. This supports the notion that the native reader-speaker has internalized the grapheme-phoneme rules of English in relation to the orthographic distribution possibilities of the language.

Brown (1970), however, found evidence that native "speakers do not have a very powerful set of internalized phoneme-grapheme principles to enable them to spell unfamiliar but regularly spelled words. "One might assume from the results [of his experiment] that both types of

speakers have learned words as units and not as particularly predictable strings of graphemes." [Brown 1970:235]. Brown further attempts to determine whether the four categories of spelling difficulty for non-native English speakers that were proposed by Lester in 1964 actually do apply to adult English language learners. Lester lists four categories of spelling difficulty in English: A) words of high frequency and high regularity, B) words of low frequency and low regularity, C) words of low frequency and high regularity, and D) words of high frequency and low regularity. On the basis of his research results, he concluded that the order of spelling difficulty would be A-C-D-B for native English speakers, while for second language speakers it would be A-D-C-B. This is presumably because the native speaker has internalized a set of phoneme-grapheme rules which permit him to spell words that are regular, whereas the non-native speaker is more likely to have memorized his vocabulary apart from any set of internalized spelling rules. Brown suggests that both groups will find the word categories to be difficult in the same order: A-D-C-B. He feels that frequency of use, and thus exposure, is a far greater predictor of spelling performance than is any orthographic regularity. Brown used a computer to select 40 English words, ten from each of the four categories above, and tested them for 'spellability' on both native and non-native English speakers. Results indicated that both groups

actually do spell words of high frequency better than words of low frequency. Brown points out that "given the necessary motivation, educated people in general eventually learn to spell words which they know they must use in the communication process..." [*Ibid.*:236]. He also refers to the goals and means of spelling instruction and suggests that although the goals are the same for native and non-native speakers, the approach and direction of the pedagogical process must necessarily differ. Certainly the linguistic competence in English with which the two groups enter their courses of study differ significantly. That which should be obvious to the native speaker is often a revelation to the foreign student. Although one presumes that the principles of good pedagogical practice and curriculum development are the same for both groups, the emphasis for the non-native speaker must center on the realization that he is always unsure of the 'correct' (i.e., 'native-like') performance of linguistic feats and therefore he can not determine the rules or generalize from them. Brown recommends that a course of spelling instruction should be designed that focuses on the concept of "regularity which with all of its ramifications [may] actually make a significant difference in spelling performance on words typical of category C [i.e., words of low frequency and high regularity]." [*Ibid.*:236].

Alphabetic Regularity

The regularity of English spelling has been stressed by many linguists and educators who are concerned with the problems of teaching spelling. Phonetically-based reading curriculum (phonics) enjoys a long tradition in the classroom. Children are taught to 'sound out' words rather than to recognize the 'word shape' (as in the look-say method). The problem has been that in general educators have never seen the underlying regularities of the English phoneme-grapheme relationships and, therefore, each new word must be 'sounded out' individually.

Hanna *et al.* (1966) in their major study of phoneme-grapheme correspondences as cues to spelling improvement have noted that "traditional spelling programs have made little use of the alphabetic principle underlying the American-English orthography. Accordingly, it has seemed necessary to educators to consider each spelling word as a separate learning act since very few words appear to contain consistent phoneme-grapheme relationships." [Hanna *et al.* 1966:7]. In order to determine whether there are actual patterns of phonemic-graphemic relationships in English, Hanna and his colleagues selected what they determined to be the 17,000+ most used words in the language and programmed these words according to their graphemic representations through a computer. The computer was able to determine and to classify the phoneme-grapheme relationships from the data

it received and therefore tabulated the actual number of times that various phonemes are represented by various graphemes in given positions in the total lexicon used in the programme. The computer was also programmed to determine the grapheme-phoneme relationships under various conditions of stress and accent as well as to determine the statistical likelihood of grapheme occurrence in the appropriate environments (word initial, final, following other graphemes, digraphs, etc.). The results of this study show that the consonant phonemes are actually much closer to the alphabetic principle than are the vowel phonemes of English. Results also show that several letters of the alphabet are extraneous because other letters more justifiably represent the phoneme that they signify. The letter x, for example, has no phoneme which it represents exclusively in the system, while /š/ is represented by several graphemic options.

Using Moore's earlier study of phoneme-grapheme correspondences, as well as the later study (1966), the researchers determined that the traditional orthography is alphabetic approximately 80-percent of the time and that the actual frequency of use of the various graphemic options definitely does affect the likelihood that any phoneme will be misspelled. They consider the significance of this study for spelling and spelling instruction to point out that it is

> this kind of relationship which enables the individual to choose the correct graphemic option for a particular phoneme in spelling... If it can be determined that CH, for example, is the only graphemic option of the five that will occur in initial position in syllables, the speller then can eliminate the other options when this phoneme occurs in this position. In effect, it would be highly relevant to determine how *all* the graphemic options for a given phoneme are distributed among *each* position in syllables as well as knowing how *each* graphemic option is distributed among *all* the positions in syllables. [*Ibid.* :69-70].

Throughout their work, Hanna and his colleagues emphasize that spelling is only a part of the whole of learning to utilize the written language. It is the principle of phoneme-grapheme relationships and the vast actual regularity and predictability of those relationships that underlie the spelling of English which should be the bases of spelling instruction.

Underlying Lexical Representation and Regularity

Despite N. Chomsky's (1970) observation that a "...broad phonetic (or possibly, so-called phonemic) representation is the only kind of spelling that would be of any use to someone who knows nothing of the syntax of the language but who wishes to produce a noise that is close to the phonetic form of a sentence," [N. Chomsky 1970:13],

attempts to create a more phonetic orthography for pedagogical purposes have continued with reasonable success. It is believed by many that the multi-phonemic and multi-graphemic options inherent in traditional orthography cause considerable confusion in children who are learning to read. The effectiveness of phonetically based teaching orthographies seems to be in that they provide cues and identifiable features that help the student to relate the phonetic pattern of the language to the graphemic pattern of the language. Read (1971) questions the advisability and usefulness of such cued orthographies, suggesting that the phonetic 'facts' emphasized by these systems may well not be those that are troublesome or relevant to the child who is learning to read and write.

In the United States, a phonetically based, cued system has been devised for use by non-native English students. It seems unlikely, however, that reading aloud is a goal of any teaching situation for foreign adults (except actors). More important, it is necessary and desirable for adults to utilize the actual orthographic system of English as rapidly as possible. Therefore, how useful, how effective and how widespread the technique employed by *Break Through* will be is yet to be seen.

Most recent linguistic thought has preferred a less phonetic approach to teaching strategies (but classroom practice is usually far behind and slow to change). C.

Chomsky (1970), in particular, has stressed the use of base and derived forms as tools for teaching language arts skills (see Chapter 4 of this paper). Brengleman (1970) agrees that the regular relationships that hold between the base word and its derived forms should be exploited. In a footnote to his article about the relationship of phonology and reading, N. Chomsky (1970) considers the 'notion' "true irregularity" and points out that there are "surprising subregularities even in such cases as *run, ran, cling, clung* and *satisfy, satisfaction.*" [N. Chomsky 1970:7]. The psychological validity of such underlying lexical relationships for use as pedagogical tools has not yet been thoroughly examined, although some experiments have been reported by Jarvella and Snodgrass (1974) (see Chapter 4 of this paper). Moskowitz (1973) points out that many base-derived-form spelling relationships do not follow the pattern of graphemic retention and therefore the underlying form is not reliable as a general teaching rule.

The theory of subconscious awareness of underlying lexical relationships offers interesting possibilities for the development of spelling curriculum that puts into play students' linguistic competence. However, until there is more substantial experimental evidence that native speakers actually do possess such knowledge and that such knowledge is available for specific language skills tasks, it seems

unwise to commit too much valuable curriculum time to teaching based on a spelling principle which may not be an integral part of the speaker-student's knowledge.

Pro-lexicalists argue not so much against the alphabetic principle as a teaching tool, as against those who do not see and do not utilize the regularities that occur within the seeming irregularities of the orthography. Whether or not regularities, both alphabetic and underlying, are in fact utilized by adults learning English, or whether each lexical item must be processed as a 'new word' are some of the factors considered in the experimental research to follow in Chapter 3.

The Need for Research

It is not difficult to see that non-native students experience many problems with the rules of English spelling. Their inability to determine the correct phoneme-grapheme relationships is two-fold. On the one hand, they are not sufficiently familiar with the pronunciation of English words to know whether their own production is accurate and, therefore, a reliable guide to alphabetic selection. On the other hand, the student rarely encounters any precise rules or cues to help him select the correct graphemic option once the phoneme to be spelled has been identified.

Although research into phonetic realization and spelling difficulty has typically revolved around the problems of young native speakers, the current trend has

been increasingly to examine and to relate the findings to the non-native situation as well. The increasing importance of E.S.L. in both Canada and the United States among the Native Indian as well as the immigrant populations has given impetus to the design and evolution of the specialized techniques needed to develop a total mastery of oral and written English among large numbers of speakers of many languages. Unfortunately, as yet, there have been few concrete and meaningful contributions to the subject of spelling instruction. However, applied linguists and educators, such as C. Chomsky, Cronnell, and Brown, have clearly indicated that they recognize the need for specialized curriculum that effectively teaches spelling relationships to the non-native student. Such a curriculum must take into account differences in linguistic competence of the native and foreign student. Whether or not it takes other factors, such as mother tongue of the student, under advisement is one of the considerations of Chapter 4 of this paper.

Pedagogical guide lines would have to incorporate elements of both the phonetic and the lexicalist theories if they were to fully utilize the richness of regularity and sub-regularity found within the language as part of the methodology. The regularities and sub-regularities, wherever they are found, would be the most satisfactory feature around which to build a spelling course for all

students. This is especially true for those whose mastery of the pronunciation, the stress patterning, and the derivational system of English are imperfect.

Spelling research to date has almost totally neglected the special needs of the adult who is learning English. Little effort has been made to determine anything but obvious difficulties, and little help has been given to solve any but the most obvious problems. If anyone has actually examined the spelling output of the adult non-native student for areas of difficulty or patterns of correctness, his findings have yet to be made available for classroom guidance. The purpose of the experiment described in Chapter 3 is just this: To systematically analyze the strengths and weaknesses of students who are actually learning to spell English and to incorporate the analysis into a spelling curriculum developed principally for such students.

CHAPTER III

SPELLING RESEARCH EXPERIMENT

This study investigates the problems non-native speakers have in acquiring English-language spelling strategies. This is obviously a necessary preliminary to the formulation of effective spelling programmes for teaching non-native language users the rules of English spelling. To this end, a spelling test was devised, incorporating words that represent a variety of spelling problems, for example, vowel spellings, silent letters, treatment of final consonants under conditions of derivation, and so forth. The areas of difficulty to be considered were identified through teaching experiences of the writer and others and by examining some frequently used spelling texts. Research studies in English spelling such as Hanna *et al.* (1966) and Kurth (1964) offer valuable information about the sources of spelling problems in the language. The validity of the vowel shift rules as a 'carry-over' cue in the spelling of derived forms was also tested by the inclusion of several words representing the lax and tense vowel pairs involved. The actual spelling test is included as Appendix I.

A proto-test of the spelling test was administered during the 1975 spring term to students enrolled in the intermediate and advanced English language classes at Vancouver City College Special Programmes Division. The first test was also taken by students attending the English Language Institute during the 1975 Summer Session at the University of Victoria. Based upon these results the original test was revised.

It was decided to exclude any word which was spelled correctly by the vast majority of the subjects, thus, for example, the lexical item *boy* in the original version was changed to *loyal* in the final version, retaining the principle of the oy graphemic representation for the /oi/ dipthong, but precluding, where possible, the possibility that any large number of subjects had already memorized the correct spelling for most of the words.

It was felt that by comparing the actual spellings of each subject with the correct spellings of the experimental words, as well as by examining all of the incorrect spellings at each level within each language group represented, that some observable pattern might emerge. This pattern would be the key, presumably, to the types of spelling mistakes that are actually made by non-English speakers who are learning the language and who may be classed at different levels of ability. If, in fact, such a pattern emerged then the error types would be predictable,

students enrolled in the English Language Institute were included in the original sample. They were divided into four groups according to levels of English competence as determined by the Michigan Test: Form A. This test is designed to evaluate a foreign student's competence in written language against a standard of performance and has been widely used as an indication of English language achievement.

The Sample

The subjects ranged in age from 17 to 70, in education in their own language from about third grade through university graduation. The group included nurses, teachers, businessmen, engineers, housewives, and so on. The individuals had resided in English-speaking Canada for varying periods, from only a few days through as long as 28 years. Indeed, they were a typical sample of adult second language learners which one might find in similar classes anywhere in Western Canada. There were 16 languages represented in the sample. In fact, the only factor that the subjects all shared was that each was enrolled in an English language class to which he had been assigned according to his level of language competence as determined by a standardized written examination.

Test Administration Procedures

The spelling test was administered by the writer both in regular classes and at other times during the teaching day to ease the administration of the test. For example, while all of the English Language Institute students took the test at the same time, in the same room, each of the three 099 classes took the test in its own classroom during regularly scheduled class time.

Each subject was given a dittoed questionnaire (included in Appendix II) stapled to a xeroxed copy of a computer data sheet. The data sheet was numbered from left to right from one to eighty-five at ten space intervals.

The subjects were first asked to answer the questionnaire as each question was read aloud. Instructions for filling in the data sheet were then administered and questions from the subjects were answered. Each item to be tested was then read twice by the researcher. A sentence in which the item appears was read aloud and the individual item was repeated. The subjects were invited to have words or sentences repeated. Instructions were given several times to write the test words correctly, if the correct spelling was known; otherwise each participant was encouraged to write the words as he thought they *would* be spelled in English. The experiment took approximately one hour from start to finish. On completion, a dittoed sheet with all of the words spelled correctly was given to each

participant and some explanation of the nature and object of the research was provided.

The Questionnaire

It was felt that several factors apart from the actual level of English language competence and native language would affect the student's internalization of English spelling rules and his ability to spell English words properly. Besides these two considerations, the amount of daily exposure to oral English as well as the number of years of formal and informal situational use of the target language might well influence the learner's linguistic performance. These factors are detailed in Appendix III. In order to determine the extent of some of these influences, the subjects were asked to give details of their previous and present English language exposure. It was hoped that the questionnaire would be general enough to include many typical situations in which the subjects must both listen to and respond to oral language— either English or the native tongue. The emphasis on oral perception was an attempt to determine whether to some extent, the phonemic-graphemic relationships of English are affected— that is, their spelling is reenforced,— by hearing the sounds of the language while learning the written form of the language. Further, the researcher observed that the foreign language students generally do not attempt to read

English language material (i.e., newspapers, novels, magazines) until a fairly sophisticated level of competence in the language is achieved. For this reason, no survey of written English input was attempted.

The other important dimension on the questionnaire, the amount of English language training experienced by each subject, was included so that a relationship of instruction and competence could be examined. Is the assumption that formal instruction in English aids the ability to spell English words actually verifiable? And if the assumption is not true [as in the case of native speakers of the language— see Fries, 1963, Hanna *et al.* 1966] what specific approaches to the actual problems of English spelling should be employed in pedagogic methodology?

Because the above elements were considered to be potentially influential in the spelling process, the subjects' actual spellings of each word were considered in respect to both dimensions. Each rendered spelling was evaluated on the basis of the socio-linguistic factors which might have influenced the subjects who actually wrote a word a given way. The results of this procedure might indicate the potential of oral input and structured instruction for the internalization of grapheme-phoneme realizations.

This study is mainly concerned with the non-native student's ability to choose the correct graphemic option for the phonemes of English and the evaluation of the spelling

concerns itself with the manner in which the subjects represented the 'problem' phone or graph in each of the eighty-four selected words. In order to facilitate the evaluation procedure, a programme was developed to sort each spelling of each word and to display that spelling alongside the various socio-linguistic factors reported on in the questionnaire. This display technique allowed the researcher to immediately compare the actual spellings of each test word with all of the factors. Thus, it was possible to determine the most usual (and unusual) errors in phoneme-grapheme representation as well as to determine whether any pattern of error type actually appeared.

The eighty-four words in the test were keypunched on twelve I.B.M. cards for each subject. The use of a computer permitted a rapid organization and display of all data. Other researchers, such as F. L. Uskup and M. L. Al-Azzawi (1972), have also found that computer compilation of linguistic data makes it possible to obtain a more rapid and thorough evaluation of material than is afforded by the logistics of analysing masses of written notes.

Selection of the Words

Each of the words in the test was selected because it represented a typical problem for individuals learning the language. The original plan was to choose words that were found in English language texts such as Martin's *An*

Introduction to Canadian English (1972). However this study wanted to determine not only whether the student of English was able to spell words at a given academic level, but whether he would be able to apply general principles of English spelling to lexical items in the language. To this end, it was decided to first determine the scope of possible spelling problems and then to select from the total vocabulary a word or words illustrating each difficulty. The actual test, then, consisted of 84 words representing the following categories of potential linguistic problems. Some words are typical of more than one problem area. And, of course, there are exceptions to the spelling rules stated below:

1) The order of ei/ie in various environments: usually ie as in *believe*, but ei/c ____ as in *ceiling*, or when the digraph represents /e/ as in *weigh*.
2) The retention or deletion of the final silent e in derived forms: e → e/___+ consonant as in *careful*, e → ø/___+ vowel as in *taking*.
3) The retention or respelling of the final y in derived forms: y → i/1 syllable: consonant ___+ *es* as in *ladies* and *flies*, y → y/2 syllables: consonant ___+ vowel as in *studying*, y → y/vowel ___+s as in *plays*, *trays*.
4) The doubling of final consonants in derived forms: a tense vowel followed by a consonant and a final, silent

e drops the e before a suffix as in *hoped;* whereas a lax vowel followed by a consonant doubles the consonant before a suffix beginning in a vowel as in *hopped,* and *stopped* (an exception to this rule is the word *give*).

5) The softening of the g and c is indicated by a following e or i: $\begin{bmatrix} g \\ c \end{bmatrix} \begin{Bmatrix} e \\ i \end{Bmatrix} \rightarrow \begin{bmatrix} /dz/ \\ /s/ \end{bmatrix}$ as in *garage, angel, tropical, concert, accident, metric, culture,* and several other words. Many Germanic words are exceptions to this rule, for example, *finger, singer* and *give. Frolicking* was included as an example in which the /k/ represented by the final c is retained in the spelling by the addition of k before a suffix beginning with e or i is added.

6) The spelling of silent letters:
This is often a problem of underlying lexical relationships or language or origin which must be realized by the speller. Words included in this sample are *sign—signature, knee, although, psychic, night, knives, honor, thought,* and *scene.*

7) The spelling of regular and irregular plurals:
It was assumed that the subjects would have little difficulty with the form of regular plurals, however, *tomatoes, wives, knives,* and *flies* were included to give some notion of how these irregularities might be written.

8) The various spellings of /č/:
Represented by *chart, culture, watch, question,* and *factual.*

9) The various spellings of vowel phonemes:
/e/ tame, drain; /æ/ manage; /i/ eve, senior, peak, seek; /ai/ kite; /I/ written; /o/ bone, float, boulder; /oi/ loyal, toil; /ʌ/ smother, couple; /a/ bother, cough, thought; /aw/ douse; /u/ balloon, group; /ɚ/ learn, stir, germ, humo(u)r, hono(u)r, liar.

10) The spelling of /k^w/:
The words *question* and *square.*

11) The spelling of lexically related word pairs whose consonantal quality changes in speech but not in spelling:
fact—factual.

12) The spelling of words and the derived forms that (a) undergo the vowel shift alternations when spoken, but because of the underlying lexical relationship, retain the vowel spelling of the un-derived form; or (b) because of subsequent spelling reform have actually changed the spelling of the vowel to more clearly represent the phonetic shape:
These pairs of words include *provide-division, grateful-gratitude, various-variety, nation-national, custody-custodian, cone-conic, abound-abundant, courage-courageous,* and *meter-serenity.* The lexical root in some word pairs, such as *provide-division,* was changed in the test in order to give the subjects fewer cues as to the actual spellings,

however the vowel shift is still the same. A sample of the computer printout is included in Appendix III.

CHAPTER IV

SPELLING DATA RESULTS

Not all of the 102 subjects tested responded to every item. However, there were a sufficient number of answers to each item to show a general trend of increased spelling proficiency from one level to the next. Although the focus of the spelling test was on the selection of the correct graphemic option in any given lexical item—and the correct spelling of that word—it is interesting to note the frequent choice of a phonetically correct alternative by a large number of subjects at the more advanced levels. Also of interest was a comparison of the actual number of correct word spellings to the correct graphemic representation for what was predicted as potential spelling problems in each word. Correlation tables of these factors are included as tables in this chapter. The most important observations concerning the problem spelling areas and each test item are provided below.

Analysis of Spelling Data

The correct selection of ie or ei definitely shows measurable improvement at each higher level tested. Subjects at all levels seemed to be aware of the possible

spellings for the vowel phonemes in question, but are unprepared to make the correct orthographic decision, particularly at the lower levels.

Table I

Summary of *ei/ie* Selection

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % Phonetically Acceptable Spellings
099	84	62%	82%	6%	88%
Advanced II	36	47	78	11	89
Advanced I	138	37	60	12	72
Intermediate	32	22	53	22	77

Weigh was spelled correctly by 25 of the respondents, while fifty-five answered with the similar, but incorrect, *weight*. Examining all responses, the ei graphemic option for /e/ was selected correctly by 85 subjects, while another four subjects chose phonetically correct, but orthographically incorrect spellings (i.e., ai, ay, a-e) for a total of 95 identifications of /e/. The surprising number of -t# responses, even though the sentence given in the test clearly did not indicate this word, is difficult to account for, although one experienced 099 instructor made the observation that some students of English, particularly those whose native language is Chinese, "just seem to

experience this difficulty with this word." Actually, a -t# form was given by 71 percent of the French speaking subjects and 64 percent of the Chinese subjects, as well as by subjects representing several other linguistic groups. This choice was made by students at all four levels tested, although the 099 groups, displayed a definite preference for this option. The choice of v rather than w in the word initial position was made by one Polish and one Hungarian respondent, a spelling strategy common to the orthography of those two languages.

Believe was spelled correctly by 60 subjects. At the 099 level, all but four, that is 86 percent, chose the correct spelling for /i/. Seventy-five percent of the subjects at the Advanced II level, 53 percent at the Advanced I level and 27 percent at the Intermediate level also used the correct grapheme. The ie option was chosen by 65 subjects of the total sample, while other graphemic options for /i/, ea or e-e, were used by six subjects. i-e represents the other typical misspelling.

Ceiling was spelled correctly by 71 percent of the subjects at the 099 level, 42 percent of the Advanced II level subjects, 36 percent of the Advanced I level subjects and 13 percent of the Intermediate students. Only three of the most advanced subjects used s to represent the first consonant, although this option was selected frequently by

subjects at the Advanced I and Intermediate levels. Surprisingly, only one subject, a German speaker at level Advanced I, used ie rather than ei to represent /i/ after c. The correct orthographic representation was used by 75 percent of the students at the 099 level, 50 percent of those at the Advanced II level, 40 percent of those at the Advanced I level and 40 percent of those at the Intermediate level. A total of nine subjects represented this phoneme as ee and three as ea. Seventeen subjects doubled the l.

The conditions that determine whether or not to retain the final e before a suffix seems to be well internalized by most of the subjects tested.

Table II

Summary of Retention or Deletion of Final *e*

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings
099	56	89%	93%
Advanced II	24	88	100
Advanced I	93	74	93
Intermediate	20	50	75

In spelling *careful*, 84 subjects retained the e: 93 percent of the 099 level subjects, 100 percent of the Advanced II subjects, 87 percent of the Advanced I subjects

and 60 percent of the Intermediate level subjects. Twenty subjects, including some from each level, used a double consonant in word final position.

The e was dropped in writing *taking* by almost all subjects tested. At the 099 level, 93 percent of the subjects spelled the word correctly. One hundred percent of the Advanced II level, 98 percent of the Advanced I level and 90 percent of the Intermediate level subjects left out the e. Four of the 97 respondents, or 4 percent, inserted the e.

Retention or change to i of the final y before various suffixes seems to be part of the knowledge of the subjects at the two highest levels tested. The Intermediate level subjects seem to have trouble with this decision.

Table III

Summary of Retention or Change of Final *y*

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings
099	142	82%	86%
Advanced II	59	78	85
Advanced I	227	67	74
Intermediate	50	48	54

Ladies was spelled correctly by 81 subjects. Seven subjects responded with the singular form. Eighty-five per-

cent of the total used the correct ies to represent the plural while five including one subject at the 099 level but none at the Advanced II level, selected s for this morpheme.

The y in *studying* was retained by 86 percent of the 099 subjects, although 89 percent of the total at this level actually inserted a vowel of some kind in this position. One hundred percent of the Advanced II subjects retained the y. Eighty-four percent of the Advanced I subjects retained y as did 64 percent of the Intermediate level subjects. Thirteen percent of the total sample mis-represented the /ʌ/, as a instead of u. There was a much higher percentage of misspellings at the two lower levels than at the more advanced range.

The word *plays* was spelled correctly by 85 percent of the subjects in 099, 67 percent of the subjects in Advanced II, 75 percent of the subjects in Advanced I, and 60 percent of the subjects in Intermediate. By far, the most errors with this word appear in the two advanced level groups. Five subjects, two from each of the advanced levels and one from the intermediate level spelled this word with the almost homophonous *place*.

The condition for *not* doubling the final consonant is apparently better understood than is the condition for doubling it. Subjects at the Intermediate level in this sample seem to have no realization of this rule at all.

Table IV

Summary of Doubling Final Consonants Before Suffix

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings
099	83	58%	63%
Advanced II	36	64	64
Advanced I	136	45	55
Intermediate	31	13	26

Of those who attempted to spell the past tense form *stopped*, 39 of the sample wrote it correctly: 95 percent of the 099 subjects, 50 percent of the Advanced II subjects, 53 percent of the Advanced I subjects. No subjects at the Intermediate level doubled the p. The misspelling *stoped* was chosen by one 099 student, four Advanced II students, twelve Advanced II students (also one *stoppt*), and three Intermediate students. The p was doubled by 40 of the 66 respondents or 61 percent of the total.

In *hopped*, 57 percent of the 099 subjects, 50 percent of the Advanced II, 42 percent of the Advanced I, and 11 percent of the Intermediate subjects doubled the p. Sixteen of the 76 respondents, or 21 percent, used a -t# form. Five of the total wrote *hoped.*

Hoped was spelled correctly by 64 subjects while 22 wrote *hope*. No one, however, doubled the p.

Results of the spelling data indicate that the orthographic representations of /s/ and /k/ using c and of /g/ and /dz/ using g are generally understood by English language students, at least in more common words. The widespread error in the spelling of *frolicking* may mean that this rule, governing how to orthographically represent the /k/, /g/, /s/ and /dz/ phonemes, must be explicitly stated to students.

Table V

Summary of Orthographic Representation of /dz/

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % Phonetically Acceptable Spellings
099	134	69%	93%	2%	95%
Advanced II	55	66	89	6%	95
Advanced I	198	56	75	5%	80
Intermediate	46	30	67	2%	69

All respondents followed the final g in *garage* by an e. The initial /g/ was preserved orthographically by either ga or gr. The gr option was given at all four levels by subjects whose native languages include Chinese, Japanese and Punjabi.

The ge of *angel* was predominantly misrepresented as ga or gl by subjects whose languages do not use the Roman

alphabet, although some Polish and German subjects also selected this grapheme. Sixteen subjects, that is 18 percent of the total, used e rather than a to represent the initial /e/ phoneme.

Table VI

Summary of Orthographic Representation of /g/

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % of Phonetically Acceptable Spellings
099	56	77%	82%	14%	96%
Advanced II	24	67	75	8	83
Advanced I	86	76	79	7	86
Intermediate	20	40	50	30	80

Angle was spelled correctly by 61 subjects. Several individuals wrote el rather than le to represent the final phoneme. This alternative, which would orthographically change the quality of the phoneme represented by the g from velar to palatal, was used by only one 099 level subject although it became increasingly more prevalent with each lower level group. Ten subjects, who did not spell the word correctly, followed the g by a, o, or l, and one subject whose native language is French used gue.

The /k/ in *tropical* was correctly written as ca (or other back vowel) by a large majority of the subjects. Only

two used ci/e. Five chose the orthographic symbol k.

Table VII

Summary of Orthographic Representation of /s/ Spelled c

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % of Phonetically Acceptable Spellings
099	55	86%	91%	2%	93%
Advanced II	23	70	87	13	100
Advanced I	88	77	84	7	91
Intermediate	21	38	57	29	86

The initial /k/ of *concert* was spelled correctly as c by all but one subject. The /s/ phone was mostly represented as either ce or ci. One subject used cu. Six individuals chose the s orthographic option for this sound, while one incorrectly selected z.

Most subjects correctly wrote two c's for the /ks/ sequence in *accident*. Six subjects at the Advanced II level and below used x, ax, or ex to spell the two sounds. Five subjects in the two lowest levels used e rather than i as the vowel following the second c and one subject at the Intermediate level used an a.

Nine subjects spelled the word final /k/ of *metric* as a k. One French speaking student used que for this phoneme and two subjects represented this sound by a ck sequence.

Five of the total sample spelled *frolicking* correctly. Two subjects from each of the 099 and the Advanced II groups and one subject from the Advanced II group were included in the five. Another three subjects at the 099 level used the graphemic option ck to correctly represent the /k/ phoneme before the suffix-ing.

Table VIIIa

Summary of Orthographic Representation of /k/ Spelled c Including *frolicking*

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % of Phonetically Acceptable Spellings
099	163	63%	77%	15%	92%
Advanced II	69	49	70	16	86
Advanced I	253	45	54	26	80
Intermediate	62	18	52	37	89

Table VIIIb

Summary of Orthographic Representation of /k/ Spelled c Excluding *frolicking*

Groups	Total No. of Attempts	% of Correct Word Spellings	% of Correct Problem Spellings	% of Phonetically Acceptable Alternate Spellings	Total % of Phonetically Acceptable Spellings
099	136	74%	90%	7%	97%
Advanced II	57	56	81	5	86
Advanced I	211	53	64	17	81
Intermediate	51	22	61	31	92

Words containing 'silent letters' form a special class of spelling difficulty. Usually, the spelling of such words must be memorized individually. Sub-regularities such as language of origin (for example, kn→/n/ in German loan words), could be exploited in spelling instruction wherever such spelling difficulties arise.

While *sign* was spelled correctly by 63 subjects, the lexical base of *signature* was spelled correctly by almost 90 respondents. The misspelling *-ighn* was a common error even among students in the two most advanced levels. Eleven subjects metathesised the gn. One Advanced I level subject selected the phonetically correct alternative *sine*. There was evidence of confusion in the choice of the second vowel /ə/, represented by a, at all levels.

Ninety-five percent of the total sample spelled *night* correctly. One 099 level subject wrote *nite*.

The silent k of *knee* was included in the spelling of 86 percent of the 099 level subjects, 92 percent of the Advanced II subjects, 81 percent of the Advanced I level subjects, and 40 percent of the Intermediate level subjects. The most usual spelling of /i/ was ee, although three subjects at the Advanced I level used ie for this phoneme. A -l(t)# spelling for the word was given at all levels by Chinese speaking students (18 percent of the total Chinese sample) and by one Punjabi speaker.

Although was spelled correctly by 58 subjects. Forms

with -t# were found at all but the 099 level. All but two 099 level subjects spelled this word correctly, and the two wrong spellings did not even incorporate *-ough* in their attempts. The graphemic option *-ough* was used by 76 percent of the total subjects representing all levels.

Only four 099 level subjects left out the silent c in *scene*. At the two lowest levels, the silent c was left out as often as it was included. The vowel /i/ was spelled in a number of phonetically correct ways. The homophonous word, *seen* was written by approximately 18 percent of the sample, but not by any subjects at the Advanced II level.

Seven subjects actually spelled *psychic* correctly. This may be partly due to the fact that the researcher told the subjects that the word is related to other psy- words such as *psychology* in an attempt to demonstrate underlying lexical-spelling relationships—but she did not indicate the spelling of the initial sequence directly. Correct spellings were from five 099 level and two Advanced II level subjects. The psy orthographic representation was selected by seven 099 level, one Advanced II level and five Advanced I level subjects. Alternative, but incorrect, phy, and phonetically correct but graphemically wrong si/y were also frequently used. *-eykick* was given as the spelling of the remainder of the word by nine subjects from all but the Intermediate level. Of the seven subjects at the

Intermediate level who attempted this word, all used a #s, however, there was no certainty about the vowel to use: y, i, or a.

Plural forms seem to be well known at all levels tested. The Intermediate students experienced some difficulty with the f→v alternation, however, this seemed to improve at the higher levels. It is interesting to note that so many individuals used the -es allograph for the plural of *tomatoes*. Although -o+es is usually taught as the spelling rule, with -o+s as the exception, Smith (1966) demonstrates that the situation is actually regularly -o+s with 25 exceptions requiring -es—many of those exceptions are now considered acceptable with either spelling of the plural.

Nineteen subjects, representing all levels, misspelled the plural form *wives* as *wifes*. The /v/ phoneme was spelled w by speakers of French, German, Hungarian and Serbian. Of the seven Intermediate subjects who attempted this word, six spelled it correctly.

The word *knives* was written *knifes* by 15 subjects. The /f/→/v/ shift for the plural form was noted orthographically by 76 percent of the 099 level, 73 percent of the Advanced II level, 70 percent of the Advanced I level, and 63 percent of the Intermediate level subjects. All instances of k or n for the kn- orthographic combination were found in the Intermediate or Advanced I levels.

Seventy-five subjects spelled *tomatoes* correctly; another five misspelled *tomato* but gave -es for the plural morpheme. Fourteen used the -s allograph. 86 percent at the 099 level, 100 percent at the Advanced II level, 86 percent at the Advanced I level, and 70 percent at the Intermediate level either spelled the whole word correctly or correctly used the -es plural.

The y→i orthographic shift in *flies* was correctly used by 90 percent of the subjects at the 099 level, 83 percent at the Advanced II level, 71 percent at the Advanced I level, and 20 percent at the Intermediate level.

In spelling *trays*, -s was the only plural allograph used. The spelling of /e/ varied considerably. ce occurred often for /z/, although not apparently as the plural morpheme: subjects misunderstood *trace* for the lexical item in question.

The orthographic representation of /č/, which varies in part with position in the word, apparently is most confusing in the medial position. The results indicate that students at all levels experience difficulty in knowing what is the correct spelling outside of the word initial or final positions.

The option ch for /č/ in *chart* was the graphemic selection of 92 percent of the total sample. Three subjects (that is ten percent) at the 099 level used other spellings:

sh by a French speaking subject and c(a) and t(e) by two Czechoslovak subjects. At the Advanced II level there were two (eight percent) misspellings: sh and *churt*. There were three misspellings (seven percent) at the Advanced I level: two German speakers used c(a) and one Indonesian used th. One hundred percent at the Intermediate level correctly used ch; however, not all subjects at this level spelled the word correctly.

The /č/ in *culture* was represented correctly by 100 percent of the subjects at the 099 level, 83 percent of the subjects at the Advanced II level, 79 percent of the subjects at the Advanced I level, and 25 percent of the subjects at the Intermediate level. The option ch was used to represent this phoneme by eight percent at the Advanced II level, ten percent of the subjects at the Advanced I level, and 38 percent at the Intermediate level. The word initial /k/ was correctly represented as c plus o, u, l or r by all but three subjects who used a k (one from each of the three lower levels).

Word final /č/ was spelled ch by all subjects except one at the 099 level who used ck. The vowel was spelled interchangeably as a or o at all levels. An h was introduced after the w once at each of the three lower levels.

All of the subjects at the 099 level correctly spelled the /č/ of *question*, as did 83 percent at the Advanced

I level and 73 percent at the Intermediate level. The correct graphemes, qu, were used to spell /k^w/ by all but three subjects at the Advanced I level who chose to use qe.

Table IX

Summary of Correct Representation of /č/

Groups	% Correct Spellings in Initial Position	% Correct Spelling in Medial Position	% Correct Spellings in Final Position
099	92%	100%	96%
Advanced II	92	83	100
Advanced I	93	85	100
Intermediate	100	49	100

The significance of the vowel shift alternations for spelling related lexical forms is apparently lost to the non-native speaker. With the exception of /e/→/æ/ (*nation, national*) and /o/→/a/ (*cone, conic*), the results clearly indicate that the subjects do not consider these pairs as from the same underlying source. In general, the foreign students's vocabulary is too scant to make much use of this important (and semantic) relationship.

The spellings of *provide* and *division* vary greatly on the whole. It is interesting to note, though, that although the percentages of correct vowel spellings for the second vowel— the one which in fact undergoes the vowel shift rules— in each word changes somewhat from word to word, the

actual *number* of correct spellings remains almost the same for both words. This may be because the number of attempted spellings of each word at each level differs. One would like to believe that the same individuals have correctly spelled the vowel in both words. Twenty-seven subjects at the 099 level spelled the second vowel in both words correctly; at the Advanced II level, 11 spelled the vowel in *provide* and 12 spelled the vowel in *division* correctly; at the Advanced I level, 42 spelled the second vowel in *provide* and 40 spelled the second vowel in *division* correctly; and at the Intermediate level, 4 spelled the second vowel in *provide* and 5 spelled the second vowel in *division* correctly. Uncertainty over the first vowel in *division* was evident at all levels tested.

The underlying vowel in the vowel shift between *meter* and *serenity* is even less known than that between *provide* and *division*. Although /i/ is represented orthographically, even if not correctly, by the large majority of subjects at all levels for the first vowel in *meter*, the figures show that u is a close second if not the first choice for the orthographic representation of the first vowel in serenity.

By analogy with the word *great*, many subjects chose to express /e/ as ea instead of a-e in *grateful*. The following table shows the actual percentages:

Table X

Distribution of Shift Vowel Selection in *Grateful* and *Gratitude*

Groups	Grateful a-e	Grateful ea	Gratitude a-i
099	69%	31%	88%
Advanced II	67	25	82
Advanced I	37	51	62
Intermediate	63	13	43

The first vowel, /æ/, of *gratitude* caused some confusion in the three lower levels. Frequent misspellings at these levels include ea, and e at the Advanced I level; o, ea, and e at the Intermediate level; and ai at the Advanced II level. All respondents gave the initial /g/ orthographically as g(l/r)a.

Analogy with *very* caused several subjects to select e rather than a for the first vowel in *various*. As Table XI shows, the choice of a for the first vowel of *variety* was much more usual at the lower levels.

The lexical relationship between *nation* and *national* must be far more obvious than it is between the other pairs in the experimental test. As the following chart illustrates, the /e/ of the first word and the /æ/ of the second word are clearly recognized as the same orthograph even by students at the Intermediate level. Although the

Table XI

Distribution of Shift Vowel Selection in *Various* and *Variety*

Groups	Various a	Various e	Variety a
099	93%	3%	88%
Advanced II	75	17	92
Advanced I	56	39	96 (most others chose o)
Intermediate	20	50	89

words themselves were not always spelled correctly, the vowel phoneme was almost universally spelled a.

Table XII

Distribution of Shift Vowel Selection in *Nation* and *National*

Groups	Nation a	National a
099	93%	100%
Advanced II	100	100
Advanced I	98	100
Intermediate	64 (one used ei)	100

Only one subject, at the Advanced I level, used ch for /č/ in this pair of words.

Eleven subjects spelled both *custody* and *custodian* correctly. Identification of the /ə/ in the first word

proved to be much more difficult than the /o/ in the second word. Many subjects at all four levels used a for the first vowel, /ʌ/, in *custodian.*

Table XIII

Distribution of Shift Vowel Selection in *Custody* and *Custodian*

Groups	Custody o	Custodian o
099	62%	83%
Advanced II	33 (others used e, er, a, i)	100
Advanced I	35	95
Intermediate	10 (almost all used a)	83

There was an amazing variety of spellings for *cone* and *conic,* however, all subjects used o to represent the first vowel sound in each word. One subject used k for the initial sound. One Chinese student in 099 and four French language students at various levels spelled the final /k/ as -que in *conic,* following the French pattern for this phoneme. Another two Chinese and one German subject selected e/ix, c(i)k was also used to some extent to represent the final vowel and consonant.

The many attempted spellings of *abound* and *abundant* clearly indicate that there is a clear realization of a dipthong in the first word, but there is certainly no clear

conceptualization of its spelling. The graphemic symbols au, ou, a, ow were all offered as possible spellings for /au/ in *abound*, and o, u, ou, ow were given as spellings for /ʌ/ in the second word. The subjects appear to be equally unsure at all levels.

The relationship of *fact* and *factual* seemed to be apparent to the subjects. Although a variety of vowel symbols were used to represent /æ/, almost everyone used t for the /č/ of *factual*.

Courage and *courageous* did not appear to be strongly related in the subjects' minds. The spelling of /I/ in *courage* was more generally correct than was the spelling of /e/ in *courageous*. Although 89 percent of the subjects at the 099 level correctly used a in the first word, only eleven percent of the same group used a in the second word. The diffusion of vowel spellings increase with each lower level.

Spelling vowel phonemes can be very difficult for individuals unfamiliar with the vocabulary of English. This is due to the large number of symbols that might be used to represent any given vowel. Many of the words in the experimental spelling sample were unfamiliar to various subjects, yet the majority of vowel spellings in practically every word was phonetically acceptable, though graphemically incorrect. Some possible approaches to teaching vowel spellings are considered in Chapter 5 of this paper.

Liar was spelled correctly by relatively few subjects at any level. Typical errors in the spelling of the vowel included ie, and combinations with y.

All but twelve subjects spelled the vowel of *tame* with phonetically correct (even though orthographically wrong) representations. These spellings include a-e, ai and ay. Other spellings used indicate either /i/ or /I/.

There were a large number of phonetically correct spellings given for the vowel in *drain*. They include a-e, ai, and ae. The symbols i and ia were also frequently used.

One 099 level subject correctly spelled *management* for the test word *manage*. Only one subject, at Intermediate level, did not use a to spell the first vowel in the test word. The second vowel was often written as either i or e even at the upper levels.

The initial vowel /i/ of *eve* was variously misspelled as ea, ee and i. One French speaking 099 subject wrote *harve* and one Intermediate level French student gave the French-equivalent, *yve*.

The vowels of *senior* were represented by a surprising variety of symbols. Most of the wrong spellings include an i although combinations with e and a occur also. Several spellings for the second vowel sound include a y as an indication of a detected glide before the schwa. Almost all spellings of the second vowel unit incorporate two vowel letters before the r.

The spelling ea of /i/ in *peak* was evidenced at every level. The misspelling ee was the most usual alternative spelling at every level. The symbol i was used alone by a few respondants at the two lower levels.

Spellings for /i/ in *seek* showed greater variety among subjects at the 099 level than in the other groups. Although the large majority of the 099 subjects spelled /i/ as ee, other spellings including i, i-e, ie, and a-e were used. Seven of the eleven Intermediate level subjects who attempted this word spelled the vowel correctly.

The dipthong of *kite* was represented correctly by students at all four levels. Almost all spellings indicate a strong feeling for the phonetic reality of the dipthong, even though many students, especially those at the Intermediate and Advanced I levels were unable to do more than to include a y in their spellings or to use two vowel symbols together, as for example in *caite* (from two subjects at Advanced I level). Several subjects from the two lowest levels used th or ht to represent the -/t/# of the word.

Written was spelled correctly by almost 70 percent of the total sample. Another three percent used itt to symbolize /It/. Six percent used it for these sounds. The most usual misspelling involved e for the vowel symbol, followed by one or two t's. Thirteen percent chose to use r rather than wr in initial position in this word.

All subjects at the 099 level correctly spelled the

/o/ of *bone*. Eighty-three percent of the Advanced II level students used the correct spelling, while one of the twelve subjects at this level used ow. At the Advanced I level, 78 percent of the subjects chose the o-e option, while another eleven percent used ou-e. Eighty-two percent of the Intermediate level subjects spelled this word correctly. The other 18 percent (two subjects) used just o or ou-e.

Only seven subjects, four at the Intermediate level, two at the Advanced I level and one at the 099 level, did not represent the vowel in *float* with two vowel symbols. The most usual misspellings of this phoneme were ou and ow, although several subjects at the two lower levels used oo.

Boulder was spelled correctly by 17 percent of the total sample, while the homophonous word, *bolder*, was written by 33 percent of the sample. Fifty-one percent of the sample represented /o/ by a single o (one subject chose a) while 48 percent used two vowel symbols together to represent this phoneme; although there was no certainty at any level as to whether the vowel symbols should be ou, ow, oa, or oo. Many subjects at all four levels chose to use t rather than d for the /d/.

Loyal was chosen for the experimental test as it was felt to be less common than *royal*, and therefore the subjects would be less likely to have memorized the spelling from written materials to which they have been exposed since

living in Canada. It is interesting to note that 44 percent of the total number of subjects representing Oriental languages used r rather than l for the initial and/or final phoneme. This misspelling was made by Oriental speakers at every level, with the exception of the one Indonesian speaker in the sample whose own language also makes the /l/-/r/ distinction. Three of the total sample used oi for the dipthong, /oi/, while several individuals used e instead of a for the final vowel symbol.

Relatively few subjects spelled *toïl* correctly. The oi combination was chosen by 48 percent of the 099 level subjects, 45 percent of the Advanced II level subjects, 39 percent of the Advanced I level subjects and 22 percent of the Intermediate level subjects. Even those who did select oi generally also used a y in their total vowel symbol. oy was a frequent alternative selected at all levels, however combinations with i were also used.

The most usual misspelling of the /ʌ/ in *smother* was a at all four levels. In fact, the correct o, is used rarely by any group. It had been incorrectly assumed that the similarity in sound between the test item and the well-known *mother* would have helped many subjects to spell this word correctly.

Couple was spelled correctly by 83 percent of the most advanced subjects, 75 percent of the Advanced II subjects, 58 percent of the Advanced I subjects, and by

38 percent of the Intermediate level subjects. Among the misspellings were surprisingly few correct vowel spellings. Typical errors included vowel spellings of u, o, oa; doubling of p; and *vowel + l* for the final le.

Two-thirds of the subjects at each of the 099 and Advanced I levels spelled *bother* correctly. Eighty-two percent at the Advanced II level and 27 percent at the Intermediate level were able to spell this word. The most usual mistake at every level in spelling the /ʌ/ was to substitute a or o. Several subjects introduced an r following the initial b, but only one subject actually spelled *brother*. The letter d was used for /ð/ at all levels.

The /f/ of *cough* was misspelled very often for such a usual word. Those who misspelled this word seemed to be aware that there is something 'odd' about the /f/ phoneme. Six of the total sample of 102 spelled the phoneme with a single f. Other spellings include ff, ght, ve, th, and ph. Even at the 099 level, fewer than half of the group spelled the word properly. At the Intermediate level, one-sixth of the subjects spelled it correctly. The vowel was generally spelled correctly, with only an occasional a or o or u.

The vowel of *thought* was generally spelled correctly, although the actual spelling given the word as a whole varied tremendously. Most misspellings either left out the h following the first t, or metathesized the final ht.

Douse proved to be one of the most difficult words in the experimental test. It was spelled correctly by only fourteen subjects, five at the 099 level (17 percent), two at the Advanced II level (17 percent), five at the Advanced I level (11 percent), and two at the Intermediate level (17 percent). Nine subjects in the total sample did not represent the vowel as a dipthong. There was considerable variety of vowel spellings among the subjects who did attempt to spell /au/. The /s/ was represented orthographically, with very few exceptions, by se. Exceptions included ce and s.

The most frequent errors in spelling *balloon* were failure to double either the l or the o, and the use of o or u for the first vowel. Very few subjects at any level (none at the Intermediate level) actually spelled this word correctly, however the misspellings at all levels were generally phonetically feasible.

All of the 099 and all but one Advanced II subjects tested spelled the /u/ of *group* correctly. Whereas 86 percent of the Advanced I subjects used ou, the remaining fourteen percent varied greatly in their representation for this phoneme. Among the Intermediate subjects, 42 percent spelled the vowel ou while the other 58 percent indicated no strong preference for any one alternative spelling.

Seventy-two subjects responded with ear for the vowel in *learn*. Another two used er and our. This

represents 92 percent of the total sample that attempted to spell this word. Most misspellings of this vowel involve the omission of r.

Although *stir* was more often misspelled than spelled correctly, almost all subjects were aware of the /ɚ/ sound and represented it in a phonetically acceptable way. Seventy-one percent of the 099 level subjects use ir to represent this sound, as did 42 percent of the Advanced II level subjects. Forty-one percent of the Advanced I level subjects selected ir, while several at this level chose er or ir(r)e. Thirty percent of the Intermediate level subjects selected the correct graphemic option.

The most typical misspelling of *germ* was the introduction of an r after the g. The /ɚ/ was spelled in a number of phonetically acceptable ways. The initial /dʒ/ was spelled j rather than ge by subjects representing every level.

The /h/ of *humour* was retained by all but two subjects, both at the Advanced I level. The large majority of subjects at all levels spelled the final /ɚ/ with either our or or, however spellings with ar, er, ur, and eur also occur at all levels.

The silent h of *honour* was not retained by three percent of the 099 level subjects, ten percent of the Advanced I level students, and by 30 percent of the Intermediate level subjects. While the majority used either

our or or to represent the /ɚ/ in this word, alternatives such as er, ar, ore were also used, although mostly in the lower two levels.

Although fewer than half of the total sample spelled *square* correctly, the qu sequence was used by most subjects. One subject at the Advanced I level did not follow the q by a u and one subject at the 099 level chose to use ker for quar. The most frequent error in the spelling of the word was the selection of the wrong vowel letter for the a.

Assessment of Other Factors

The number of subjects tested may not have been large enough for the study to make any definite statement about spelling acquisition on any dimension other than that of academic grouping. The disproportionately high number of Chinese and other Oriental language-speaking students, almost 25 percent of the total sample, compared to other individual language groups represented makes it possible to formulate an exact picture of the difficulties encountered at all levels by this linguistic group. The written evidence indicates that the group's difficulty with the correct oral identification and production of the English liquids, /l/ and /r/ is carried over to aural perception and spelling. They are also more likely to incorrectly formulate the clusters, gl and br, where the phonemes /g/ and /b/ are indicated.

As expected, the individuals with the most English language training in their own countries were in the two most advanced groups, and therefore also represented the best spellers. Number of years in English-speaking countries did not seem to be an important factor in determining either spelling ability or group placement. Two factors, native language and number of years in Canada, did seem to be important. For example, in the Intermediate group were Chinese speaking students who had been in Canada for seven years, while in the 099 group were students who spoke European languages but who had been in Canada for only a few months.

Exposure to and use of English on a day-to-day basis also are important contributors to language acquisition. However, there is not sufficient evidence here to indicate that they affect spelling performance. In fact, students at the Intermediate and Advanced I levels appeared to spend considerably more time watching television, going to movies, listening to radio, and so on, than did the more advanced students (many of whom work full-time, or are full-time students at the University or College and must spend 'spare-time' doing assigned written homework for their English classes).

The tendency to use one's native language while shopping and in one's own home seems to diminish with greater fluency. From conversations with several subjects

at all levels, the writer concluded that among the most advanced groups (099 and Advanced II) the entire living unit was usually involved in acquisition of the target language. Even young children in the family reject the mother tongue. Among the less advanced subjects (Intermediate and Advanced I) many individuals reported that their native language was spoken at home, at work and, predominantly, by the children. Naturally, the inability to speak the target language heightens the need and the desire to use the native tongue in essential daily business and for other important transactions.

The value of the extra-linguistic material in this survey of spelling abilities of non-native students lies in the insight that these details offer into the factors that influence English acquisition for these students. They also, in part, reveal the quality of spelling instruction that already is shaping the language competence of English language students here and elsewhere.

From the point of view of an English language instructor, it is heartening to know that the spelling knowledge of students measurably improves over the duration of their studies, and with so little explicit spelling instruction.

Discussion

Results of the spelling test show a remarkable increase in the selection of the correct graphemic option

with an increased measured level of English competence. Even so, native language and amount of language exposure appear to be significant factors. What the results also indicate is that spelling acquisition difficulties of the non-native student differ considerably from those of the English school child. Whereas the native-language student enjoys the advantages of controlled and guided introduction of a large quantity of written material, the foreign adult learning the language does not have this daily life-long acquaintance with correct orthographic forms. An evaluation of the subjects' work appears to show that a knowledge of the relationship between phoneme and grapheme exists but that the deciding factors of graphemic distribution are largely absent. The result is confusion over such orthographic matters as the selection of the correct vowel symbols, as for example, in words like *tame*, spelled *taime* by some subjects. The problem is not purely one of surface environment: the vowel shape of many words is the product of the evolution of English and therefore not easily taught by lists of rules and exceptions. The native-speaker's life-long exposure to the written language, in part, prepares him to sense what is acceptable.

The subjects' apparent ignorance of the semantic, and thus, the spelling relationships that exist between word pairs that undergo the vowel shift rules is not surprising. In fact, had the subjects attempted anything but a phonetic-

phonemic representation of these words it would have been unexpected. The basic vocabulary of native students far exceeds that of the foreign-language-using adult, yet, even they often do not realize these relationships until they are pointed out. It seems to be much more natural to spell the language sound-by-sound than to seek any underlying connections between words that might give spelling clues. Whatever the status of the vowel shift from the point of view of the native speaker, the non-native student is obviously not sufficiently familiar with the semantic content of enough affected words to utilize any possible lexical connections or spelling cues. Although explicit information of this type might prove a valuable aid in developing spelling strategies, so far, as C. Chomsky (1970) suggested, the benefits derived from such a technique are only speculatory; especially so for students whose competence in English is relatively low.

Jarvella and Snodgrass (1974) attempted to establish the psychological reality of the stem morpheme in derived and inflected forms of English words as a meaningful entity for native-English-language users. The identification of the stem morpheme as a significant element would be necessary if one were to use its spelling as a carry-over cue in the spelling of words whose pronunciation has been affected by the vowel shift. The investigators felt that they could determine whether or not the subject had direct access to

the underlying morphology of a word by measuring both the speed and accuracy of his reaction when he is asked to determine if the stem morpheme of two viewed test words are identical. They suggest that if the spelling and/or phonetic form of the underlying stem morpheme in the two forms differ, but the reaction time remains the same, then the subject must have access to the underlying form that unites the two words. The results of their experiments "indicated that subjects have more difficulty determining that two words shown side by side have the same stem morpheme if the morpheme is spelled slightly differently in the words than if it is spelled identically." [Jarvella and Snodgrass 1974:594]. The researchers found that the difference in pronunciation of the stem morpheme, as for example in *ring, rang* or *retain, retention,* does not seem to effect recognition of the stem morpheme in the two words. The possible effect of orthography on the subjects' decisions was an important consideration in assessing the experimental results. Jarvella and Snodgrass observe that the similarity in spelling of the word initial morphemes of the two words that were presented could be considered an obvious clue to the underlying morphemic relationship; however, this factor could not account for recognition of such pairs as *ring-rang*. Another factor that might account for the results is the role of semantic relatedness of the two words—both real and presumed. The investigators

suggest that the high error rate on related pairs that are spelled differently might be because the subjects saw the differently spelled words as semantically more distinct than pairs in which the stem morpheme is spelled the same way.

If, as it appears from the work of Jarvella and Snodgrass, Moskowitz (1974), and others, the native speaker of English has difficulty in utilizing the underlying relationships of words derived from the same stem when they shift in spelling, then it seems even more unlikely that an individual who is learning the language as an adult would experience any greater success with words which both change in spelling and in pronunciation. As different spelling does apparently prevent the language user from recognizing the underlying lexical relationship between two written words, the usefulness of teaching reading and spelling based on underlying relationships alone is of questionable value. Reliance on such sub-regularities as the vowel shift rules for developing a spelling curriculum would not seem to be very beneficial for the student who is not already a competent user of the language.

Interrelation of Test Results and Spelling Performance

The relationship between performance in the spelling test and the subjects' knowledge of English phoneme to orthographic correspondences is of interest to applied linguistics.

The results of the experiment described in Chapter 3 seem to give strong support to the phonemic principle as a useful teaching tool. The students seem, after all, to already possess a clear idea of how to represent the sounds of the language even if they do not fully grasp the graphological distribution peculiar to English. The truth is that no one has given alternative approaches to vocabulary building and spelling acquisition a long-term classroom trial. Foreign students who had received spelling instruction based on the principle of underlying lexical relationship might prove to have attained the ability to spell *new* derived words with ease and assurance. They might also have acquired a much larger working vocabulary than is presently the case. The performance of such a group on a test such as this would prove interesting and perhaps enlightening as to the effectiveness of present pedagogic approaches in comparison.

Certainly, the sample studied here is too small to indicate anything but the most general trend of increasing competence in spelling correlated with increased, measured abilities in the language as a whole. The experimental test itself is far from a perfect sampling of the language student's spelling aptitude. The real test, of course, is how he tackles the spelling of English words in his daily business and classroom assignments.

How language users, both native and non-native, actually do acquire a sense of orthographic acceptability for English through a teaching curriculum which typically views the spelling of each lexical item as a separate event and the spelling of the language as a whole as unsystematic is an intriguing question. Perhaps the finding of Hanna *et al.* (1966) that 80 percent of the time English spelling adheres to the phonemic principle offers a partial answer. It may be that a large proportion of the non-phonemic 20 percent are the result of such alternations as the vowel shift. If so, then classroom emphasis on the patterning of these alternations should greatly improve spelling performance.

Overall, the problem for the students represented in the test seems to be one of grapheme selection based on unconscious distributional factors, rather than the inability to spell individual phones. Helping students to become aware of these factors at a conscious level, so that they can become part of each individual's unconscious knowledge of the language is the challenge of developing a programme of spelling instruction which specifically tackles the difficulties of the non-native English language learner.

CHAPTER V

SUMMARY

This thesis examines in some detail spellings of selected English words by 102 adult students taking English as a second language. Students representing four measured levels of language competence were used in the study. The 84 word spelling test which was administered to the students were representative of spelling problems encountered by second language students of English and of English users generally. Included in the word list were examples of common and uncommon phoneme-to-grapheme relationships, silent letters, derived forms and word pairs which undergo phonetic alternations. The results of the spelling test were reviewed in light of current and traditional applied linguistic theories of language acquisition specifically concerned with reading and spelling.

An analysis of the test results indicated that second language learners were adept at assigning an orthographic symbol to a given phoneme, but they were uncertain about the rules governing the distribution of the correct symbols. In addition, students, at all levels, were

essentially unaware of the spelling relationship between pairs of words which undergo the vowel shift rules that apply to English.

This chapter suggests some of the requirements of a spelling text that would utilize the above findings. Based on the writer's research and experience, the alphabetic principle and the concept of underlying lexical relationships both have valid contributions to make with respect to pedagogical approaches in spelling. Systematic utilization of these two theories (accompanied by such additional factors as homophony and an understanding of the affixation and stem morpheme schema of the language) could be the basis of a comprehensive and practical spelling text which has as its central theme the 'overwhelming regularity' of all aspects of English spelling.

Conclusions

From the writer's research and evaluation of the test results, it is apparent that second language learners of English understand the phoneme-to-grapheme relationships of English. Although the test words were frequently misspelled, by far the majority of subjects at all levels spelled the words either partly, or completely, according to phoneme-grapheme relationships of the orthography. It is also clear that the formation of English plurals is internalized at an early level of competence as indicated by

the large number of subjects at all levels who spelled the plural allomorphs correctly. The spelling rules for suffixation are also generally well understood. In their responses the subjects were not certain about the correct orthographic elements for hardening and softening of g and c, although the spellings indicated that most subjects recognized the difference in orthographic representation. Even though most subjects correctly identified the t in *fact* and *factual*, it is obvious that the underlying spelling relationships inherent in words which undergo vowel shift alternations are not significant to the majority of the students (see Tables IX-XIII in Chapter IV). The subjects' treatment of silent letters showed definite improvement with the level of familiarity of the word in question. The /n/ of *knee*, for example, was generally spelled correctly, while the first two phonemes of *psychic* were typically misspelled.

The percentage of errors of all types decreased as the measured level of language ability increased. Generally, spelling proficiency appeared to increase with the amount of formal English studies already experienced by the subject. It also showed a trend to increase with the number of years that a subject had resided in an English-speaking environment. The amount of daily exposure to and use of oral English is much higher among subjects representing the two lowest levels tested—the worse spellers.

Implications

The results of the test indicate that what the second language learner needs in spelling instruction are specific rules and examples that will allow him to generalize correctly. No matter how a text is worded, it must attempt to compensate for the years during which the student was not exposed to the target language. It must relate the possible spellings of tense vowels, for example, to the environment in which each is used. The rules governing the correct spelling must be expressed in a manner that will allow the student to recall and to use the rule, perhaps by making use of historical, phonetic or other details wherever appropriate. Patterns and sub-patterns of regularity are important and valuable clues to the spelling of the language. They should be identified and used methodically to help the student in classifying and generalizing the spelling of English words. Each of the approaches mentioned throughout this study have merit because they are intended to assist the student in these processes. Consideration should also be given to the specific language spelling problems of students in order to facilitate the learning of English spelling rules, i.e., l/r mistakes of Oriental language speakers.

The one thing that spelling materials for non-native speakers of English must not do is rely on the student's ability to sound-out or listen to his own approximation of

the phonetic form of a word. The test shows that students at all levels can produce suitable phoneme-grapheme relationships when they hear a word spoken by someone else. The writer's experience shows that some students are hesitant, uncertain and often incorrect when asked to either repeat or to read unfamiliar words aloud. Spelling materials with an emphasis on a phonic approach could cause the students to make incorrect classifications and generalizations about the spelling of words because the student might not have had an opportunity to hear the word spoken correctly.

To be effective, a spelling text for the adult language learner cannot rely merely on the alphabetic principle or on the rules that govern the selection of letters to represent sounds. The adult learner needs and deserves a sophisticated understanding of the relationships that hold between the words of the language. This means that underlying lexical representation can be used to augment and explain many patterns that become obvious through careful analysis of the language. As pointed out by N. Chomsky (1970) and C. Chomsky (1970) the patterns found in the sub-regularities of English are the pedagogically important and useful ones. At the same time, it is essential to remain aware that the spelling cues afforded by such patterns as the vowel shift or consonantal alternations are useless as self-teaching devices when the

students lack sufficient vocabulary to comprehend the semantic transfer from one form to the other.

One reason that it is so difficult to judge or to justify how the non-native English language student performs with spelling tasks is that there seems to be so little emphasis on this subject in the classroom. Apart from the Advanced II level group and one 099 level group, the respondents who took part in the spelling test had received no systematic spelling instruction during their English training in Canada. The consistently better spelling performance of these two groups is an indication that even a small amount of specialized information concerning the rule-governed distribution of graphemic options and word families with their derivational patterning can contribute greatly to increased spelling proficiency. Lack of classroom instruction is often blamed on the absence of any text that is designed specifically for the adult who is learning English. Lack of sophistication in English must not be taken as a lack of intelligence generally. The organization of spelling texts should take into account student interests, capabilities, needs, and background experiences.

Language teachers might well look towards applied linguistics research for leadership and guidance in the design and implementation of appropriate spelling programmes for both native and non-native speakers of English. This thesis represents one step toward the development of a

programme, designed especially for adult learners of English as a second language.

Recommendations for Further Study

As a study in applied linguistics, this research has attempted to touch on both linguistic theory and its practical application. The language exercise detailed in chapters three and four offers a technique for examining language competence of adults who are learning English as a second language. A similar test could be administered to native speakers of the English language to discover their orthographic competence. Further testing of the significance of the competing theories— the alphabetic principle and underlying lexical relationships, for native and non-native language users— would be of interest to linguists. The reality of vowel and consonantal alternations to English users is an important area of investigation that could contribute to linguists' understanding of language users' semantic competence.

There are several applied linguistics problems suggested by this study. The linguistic theories investigated in this research must be examined for pedagogical applications. Additional research into effective pedagogical approaches to spelling strategies for adults for whom English is not a native language would seem desirable. Such issues as the most appropriate format for lesson

materials, the most useful teaching exercises and the selection of the actual 'spelling words' must be examined before a pertinent spelling text for instance can be developed. Further research into strategies which may be valuable for language specific spelling difficulties is also another important area requiring study.

Although this study has clarified some of the spelling problems which should be included in material for non-native students, further consideration should be given to the specific kinds of information about spelling as well as the generalizations about spelling that should appear in pedagogical references or in texts dealing with spelling.

FOOTNOTES

[1]A detailed analysis of Caxton's role in the standardization of English orthography can be found in Aurner (1965) and Bühler (1960). Insular scripts such as Monk's Hand were used before Caxton's time.

[2]Further explanation of the i.t.a. and its potential role in primary education can be found in Downing (1964, 1967) and Oliver, Nelson and Downing (1972).

[3]Pyles (1971), Strang (1970), and Robertson-Cassidy (1954) have each included detailed descriptions of the development of written English as well as the various consonant and vowel alternations which complicate the process of learning to spell.

[4]Margaret Early, at the University of British Columbia, is currently studying the spontaneous spellings of children for whom English is a second language based on the work of Read (1971).

[5]Additional history, explanation and examples of the Great Vowel Shift can be found in Chomsky-Halle (1968:178-192), and Robertson-Cassidy (1954:99-108).

[6]"That is the vowel symbol was used to spell both its 'own name' and the related lax vowel: 'e' spelled both ī̆y and ĭ, 'a' spelled both 'ēy' and 'ĕ', and 'i' spelled both 'ăy' and 'ă̆'..." [Read 1971:248].

[7]All students participating in the English for New Canadians programme at Camosun College take an extensive written examination which was prepared by the Chief Instructor. The questions are presented in an order of increasing difficulty and they include such points as formation of plurals, spelling, verb tenses, sentence structure and composition. In addition, each student is interviewed by an instructor and his oral performance is rated. The results of the written and oral examinations are evaluated and the students are assigned as homogeneously as is practical, to groups based on their competence in English.

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APPENDIX I

SPELLING TEST

1.	weigh	How much do you weigh?
2.	believe	I believe that you are telling the truth.
3.	ceiling	The ceiling is opposite the floor.
4.	careful	Be careful when you cross the street.
5.	taking	Who are you taking to the dance?
6.	ladies	Ladies is another word for women.
7.	studying	We are studying English.
8.	plays	Shakespeare wrote many plays.
9.	stopped	Harry stopped the car at the red light.
10.	hopped	The children hopped from one leg to the other.
11.	hoped	I hoped you would be here for Christmas.
12.	garage	Put the car in the garage.
13.	angel	Many people believe that angels live in heaven.
14.	frolicking	The children are frolicking on the beach.
15.	angle	A right angle has 90 degrees.
16.	tropical	A hurricane is a tropical storm.
17.	concert	We listen to music at a concert.
18.	accident	I didn't mean to do it, it was an accident.
19.	metric	Canada will soon be using metric measurements for everything.

20.	sign	Good drivers always stop at the stop sign.
21.	signature	Your autograph is your signature.
22.	night	It is dark at night.
23.	knee	The knee is the joint in your leg.
24.	although	We must leave, although we would like to stay.
25.	psychic	Witches have psychic powers.
26.	wives	All married women are wives.
27.	knives	Please put the forks and knives on the table.
28.	tomatoes	I like lettuce and tomatoes in my salad.
29.	flies	Flies are annoying insects.
30.	trays	My grandmother uses silver trays when she serves tea.
31.	chart	A chart is a map of the water.
32.	culture	Religion and art are part of our culture.
33.	watch	How often do you watch television?
34.	question	Please ask me if you have a question.
35.	provide	The school will provide the books for the class.
36.	division	In North America, the division of labor between man and wife is no longer clear.
37.	meter	A meter is slightly longer than a yard.
38.	serenity	To achieve serenity, one must be calm and quiet.
39.	grateful	We are grateful for your help.
40.	gratitude	They show their gratitude by being generous.
41.	various	The teacher assigns work on various topics.
42.	variety	The store has a variety of goods for sale.

43.	nation	Each of us is from a different nation.
44.	national	Our national anthem is O Canada.
45.	custody	The police have the thief in custody.
46.	custodian	The custodian is now called a sanitary engineer.
47.	cone	Would you like an ice cream cone?
48.	conic	The chape of a cone is called conic.
49.	abound	The rivers of British Columbia abound with fish.
50.	abundant	We are fortunate to have abundant land and natural resources.
51.	fact	That B.C. is a province of Canada is a fact.
52.	factual	The report was very factual.
53.	courage	It takes courage to sail around the world alone.
54.	liar	When you don't tell the truth you are a liar.
55.	tame	Cats and dogs are tame animals.
56.	courageous	The early settlers of the western world were courageous people.
57.	drain	The water in the sink goes down the drain.
58.	manage	Do you need help, or can you manage those parcels alone?
59.	eve	December 24th is Christmas Eve.
60.	senior	He is 20 years my senior.
61.	peak	Sir Edmund Hillory climbed to the peak of Mt. Everest.
62.	seek	To look for an answer is to seek the truth.
63.	kite	Go fly a kite means go away, stop bothering me.

64.	written	Have you written a letter to your mother lately?
65.	bone	We often give our dog a bone to chew on.
66.	float	Wood will float on the water.
67.	boulder	A boulder is a very large rock.
68.	loyal	In Canada we are loyal to the Queen.
69.	toil	To toil is to work hard.
70.	smother	Without air you will smother.
71.	couple	Mary and John are a happy couple.
72.	bother	Don't bother to wash the dishes, I'll do them.
73.	cough	When you have a cold, you often cough.
74.	thought	I thought that you might be late, so I left the light on for you.
75.	douse	The firemen will douse the flames with water.
76.	balloon	A balloon is a child's toy.
77.	group	There are 20 students in our group.
78.	learn	We are at school to learn English.
79.	stir	Stir the cake to mix the ingredients.
80.	germ	Infections are caused by a germ.
81.	humour	You laugh at my jokes, you must have a good sense of humour.
82.	honor	The Bible tells us to honor our Father and our Mother.
83.	scene	The farm scene was painted by a famous artist.
84.	square	A square has four sides.

APPENDIX II

SAMPLE OF QUESTIONNAIRE

1. What is your native language?
2. Did you study English in your own country? If yes, for how long?
3. How long have you lived in Canada, or any other English speaking country?
4. What language is spoken in your home here in Canada?
5. Do you watch T.V., listen to the radio, or go to movies in which English is spoken? About how many hours per week?
6. Do you use English or your own native tongue when you go shopping, go to the doctor, etc.?

APPENDIX III

KEY TO COMPUTER PRINTOUT

Column I: Sample of subjects' responses to items on spelling test.

Level: Subject's assigned grouping based on measured competence in English
1 = 099; 2 = Advanced II; 3 = Advanced I;
4 = Intermediate.

Language: Subject's native language
01 = Chinese; 02 = French; 03 = German;
04 = Hungarian; 05 = Hindu; 06 = Italian;
07 = Japanese; 08 = Korean; 09 = Persian;
10 = Polish; 11 = Portuguese; 12 = Punjabi;
13 = Russian; 14 = Serbian; 15 = Indonesian;
16 = Czech

Years: Number of years of formal English training in subject's native country
1 = 1 year; 4 = 8 years; 7 = 15 years;
2 = 3 years; 5 = 10 years; 8 = 18 years;
3 = 5 years; 6 = 12 years; 9 = 20+ years.

Exposure: Average amount of aural English subject is exposed to each week from sources such as television, radio, movies.
1 = none; 5 = 28 hours per week;
2 = 7 hours per week; 6 = 35+ hours per week;
3 = 14 hours per week;
4 = 21 hours per week.

Public: The subject's use of English, his native language or both while shopping, attending church, going to the doctor, and so on
1 = English used
2 = native language used
3 = both languages used

Private: The subject's use of English, his native language, both languages, or a third language in his household

1 = English
2 = native language
3 = both languages
4 = a third language

Length of Stay: Number of years a subject has lived in any English speaking country, excluding Hong Kong
1 = 6 months
2 = 1 year
3 = 18 months
4 = 2½ years
5 = 5 years
6 = 10 years
7 = 15 years
8 = 20 years
9 = more than 20 years.

APPENDIX III. SAMPLE OF COMPUTER PRINTOUT

SPELLING OF SELECTED ENGLISH LANGUAGE WORDS
BY NON NATIVE SUBJECTS

	LEVEL		LANGUAGE				YEARS				EXPOSURE				PUBLIC		PRIVATE		LENGTH OF STAY			
LIETEN	(1) 0	(1) 1	(5) 0	(9) 0	(13) 0	(1) 0	(5) 0	(9) 0	(1) 0	(5) 0	(9) 0	(1) 0	(5) 0	(1) 0	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 0	(2) 1	(2) 0	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 1	(3) 0	(7) 1	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 1	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
WRITTEN	(1) 0	(1) 0	(5) 0	(9) 0	(13) 0	(1) 1	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 0	(1) 0	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 0	(2) 1	(2) 0	(2) 0	(6) 1	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 1	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 1	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
WITTRE	(1) 0	(1) 1	(5) 0	(9) 0	(13) 0	(1) 0	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 0	(1) 0	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 0	(2) 1	(2) 1	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 0	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 1	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
BETTEN	(1) 0	(1) 0	(5) 0	(9) 1	(13) 0	(1) 0	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 0	(1) 0	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 0	(2) 0	(2) 1	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 1	(7) 0	(11) 0	(3) 1	(7) 0		(3) 1	(7) 0	(3) 1	(3) 0	(3) 1	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
RETUR	(1) 0	(1) 0	(5) 0	(9) 0	(13) 0	(1) 1	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 0	(1) 1	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 1	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 0	(2) 1	(2) 0	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 0	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 1	(8) 0	(12) 0				
FITEN	(1) 0	(1) 0	(5) 0	(9) 0	(13) 0	(1) 0	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 1	(1) 0	(1) 0	(1) 0	(5) 1	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 1	(2) 1	(6) 0	(10) 0	(2) 0	(6) 1		(2) 0	(6) 0	(2) 0	(2) 0	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 0	(7) 0		(3) 0	(7) 1	(3) 0	(3) 1	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
RAITB	(1) 0	(1) 0	(5) 0	(9) 0	(13) 0	(1) 1	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 1	(1) 0	(1) 0	(1) 0	(5) 1	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 1	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 1	(2) 0	(2) 1	(2) 0	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 0	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
GRETEN	(1) 0	(1) 0	(5) 0	(9) 0	(13) 0	(1) 1	(5) 0	(9) 0	(1) 0	(5) 0		(1) 1	(5) 0	(1) 1	(1) 0	(1) 0	(5) 1	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 1	(2) 0	(2) 0	(2) 0	(6) 0	(10) 0				
	(3) 0	(3) 0	(7) 0	(11) 1	(15) 0	(3) 0	(7) 0	(11) 0	(3) 0	(7) 0		(3) 0	(7) 0	(3) 0	(3) 0	(3) 0	(7) 0	(11) 0				
1	(4) 1	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
LEARN	(1) 0	(1) 1	(5) 0	(9) 0	(13) 0	(1) 1	(5) 0	(9) 0	(1) 0	(5) 0		(1) 0	(5) 0	(1) 0	(1) 0	(1) 0	(5) 0	(9) 0				
	(2) 0	(2) 0	(6) 0	(10) 0	(14) 0	(2) 0	(6) 0	(10) 0	(2) 0	(6) 0		(2) 0	(6) 1	(2) 1	(2) 1	(2) 1	(6) 0	(10) 0				
	(3) 1	(3) 0	(7) 0	(11) 0	(15) 0	(3) 0	(7) 0	(11) 0	(3) 1	(7) 0		(3) 0	(7) 1	(3) 0	(3) 0	(3) 0	(7) 0	(11) 0				
1	(4) 0	(4) 0	(8) 0	(12) 0	(16) 0	(4) 0	(8) 0	(12) 0	(4) 0	(8) 0		(4) 0	(8) 0	(4) 0	(4) 0	(4) 0	(8) 0	(12) 0				
DONE	(1) 27	(1) 32	(5) 0	(9) 1	(13) 0	(1) 15	(5) 21	(9) 1	(1) 1	(5) 9	(1) 65	(1) 13	(1) 21	(5) 7	(9) 3							
	(2) 9	(2) 13	(6) 0	(10) 1	(14) 1	(2) 4	(5) 9	(10) 0	(2) 19	(6) 16	(2) 1	(2) 26	(2) 10	(5) 11	(10) 0							
	(3) 34	(3) 5	(7) 4	(11) 2	(15) 6	(3) 11	(7) 6	(11) 0	(3) 15	(7) 0	(3) 13	(3) 29	(3) 7	(7) 5	(11) 0							
79	(4) 9	(4) 1	(8) 0	(12) 2	(16) 0	(4) 11	(8) 2	(12) 0	(4) 18	(8) 0	(4) 0	(4) 1	(4) 14	(8) 1	(12) 0							

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ORTHOGRAPHIC REALIZATIONS OF A SELECTED SAMPLE OF STUDENTS OF ENGLISH AS A SECOND LANGUAGE

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