AN ABSTRACT OF THE THESIS OF

MARJORIE KUH MORRAY for the DOCTOR OF PHILOSOPHY

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Title: PHONOLOGICAL CONTRASTS AND WORD-DECODING SKILLS OF THE READER OF ENGLISH AS A SECOND LANGUAGE

Abstract approved: Redacted for Privacy

Dr. Thomas Grigsby

Purpose of the Study

The purpose of the present study was to investigate the extent to which phoneme and grapheme-phoneme contrasts between English and Spanish influence the word-decoding skills of Spanish-speaking adults who are early readers of English.

The major objectives of the research were to investigate:

1. The differences in subjects' discrimination between sounds contained in both English and Spanish and those found in English only.

2. The differences in subjects' decoding of nonsense words containing letter-sound combinations occurring in both English and Spanish and those found in English only.

3. Differences in sound-discrimination and word-decoding between native speakers of Spanish and English.
4. Differences among English proficiency levels in sound-discrimination and word-decoding performance.

5. The influence of a contrast between Spanish and English in spelling the same sound (e.g., ph and f) on the ability of Spanish-speakers to decode English words containing such letter-sounds.

6. The degree of association between performances in sound-discrimination and word-decoding.

Procedures

Two exercises, one in sound-discrimination and the other in word-decoding, were administered to two main groups of subjects. The first was made up of seventy-four Spanish-speaking adults on four levels of English-language proficiency. The second, a control group, was composed of twenty native-English-speaking adults.

Results were analyzed for significant differences in performance by means of three-way analysis of variance. Degree of association between performances on Exercises 1 and 2 was measured by the Pearson Product Moment Correlation Coefficient.

Findings of the Study

No significant difference existed in sound-discrimination performance on nonsense words containing familiar as compared to unfamiliar sounds. Moreover, position of the experimental sound in the word produced no significant difference. However, significant differences appeared in word-decoding performance on words containing familiar as compared to unfamiliar letter-sounds and on letter-sounds in terminal and initial position as compared to medial in favor of the former.
Significant differences on both exercises were revealed between English-speakers and Spanish-speakers and between subjects on higher and lower levels of English-language proficiency in favor of the former.

The use of an unfamiliar spelling for a sound familiar to Spanish-speakers resulted in a significant difference in decoding accuracy between words containing that feature and words with letter-sounds found in both languages.

Finally, slight to moderate association was revealed between performances on items in Exercise 1 and corresponding items in Exercise 2.

**Implications**

The implications of these findings are that difficulties in word-decoding for Spanish-speaking adults are associated with the presence of letter-sounds which are not found in Spanish.

Unfamiliar spellings of sounds that occur in Spanish are also associated with problems in word-decoding.

As English-language proficiency increases, such difficulties tend to decrease.

**Recommendations**

**Further Research**

1. Theoretical research
   a. Investigation of reasons for Level 50's high performance level
b. Investigation of the association between word-decoding and word-comprehension

c. Replication of the present study with the substitution of different sounds and letter-sounds and with speakers of other languages as subjects

2. Research into the utility of selected methodological techniques

a. Informal Reading Inventories (I.R.I.'s)

b. Word-decoding drills

c. Word-practice in a variety of contexts

d. Appropriate audio-visual materials

e. Criterion-referenced tests
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by

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To these friends, colleagues, companions, I offer my heartfelt thanks.
ERRATA

Page 33, line 21: Change:

"Phonemes found in both English and Spanish which have small numbers of contrasting features are /c/ and /s/ (both experimental sounds), /t/ and /θ/, and /d/ and /ð/.

"Phonemes which have small numbers of contrasting features are /c/ and /s/ (both experimental sounds), /t/ and /θ/, and /d/ and /ð/. All are found in English; one in each pair (/c/, /t/, /d/), in Spanish.

Page 38: \( H_0^{10} \) is missing. It should be inserted after \( H_0^9 \).

\( H_0^{10} \) states:

\( H_0^{10} \): There is no association between performance on items in Exercise 1 and corresponding items in Exercise 2.
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INTRODUCTION

The establishment of efficient reading habits in the early reader is a demanding task for the instructor (57:55-7, 61). Even more demanding is instilling such habits in the non-native speaker of English who is learning to read in the second language (79:138-9). In the case of the adult non-native speaker, survival in the English-language environment requires the fulfillment of reading tasks basic to everyday life -- understanding written instructions and notices, finding lodging and shopping facilities, following directions, reading the newspaper, etc. Adult non-native speakers may be enrolled in classes demanding reading tasks for which their skills are inadequate or employed in jobs requiring reading ability.

Particularly acute is the problem of the native Spanish-speaker in the United States (12:17). The problem is acute, not only because many persons are affected (the Spanish-speaking population of Oregon, for example, amounts to approximately 60,0001), but because they are citizens of the United States. It is vital that Spanish-speaking American citizens possess the skills essential for participation in their economic, political, and social milieu.

Background of the Problem

Investigation of literature dealing with the educational problems of Mexican-Americans indicates that the language-acquisition needs of this group are not being satisfactorily met. Thomas P. Carter says:

In the area of language arts Mexican-Americans achieve at a rate substantially lower than national norms or their local Anglo counterparts. The ability to read is perhaps the most crucial skill learned in school, and in this area Mexican-American children fall to reach the proficiency generally acquired by others. In no aspect of reading are they normal (12:17).

That the handicaps which are created in the early years of schooling continue into the secondary level is brought out in the report of the U.S. Commission on Civil Rights, A Better Chance to Learn: Bilingual Bicultural Education. The document states:

In the Southwest, 40% of Mexican-American students are reading two or more years below grade level at the eighth and twelfth grades (82:49).

Supporting the Commission's testimony are statements by Uranga.

School holding power is measured by the percentage of students entering first grade who continue in school. The proportion of minority students who remain in school through the twelfth grade is significantly lower than that of Anglo students. Mexican-Americans demonstrate the most rate of attrition. The Commission estimates that out of every one hundred Mexican-American youngsters who enter first grade in the survey area, only sixty graduate from high school (83:164).

...Reading achievement drops greatly for children of all ethnic groups as they advance in age and grade. For minority children, however, the drop is more severe. At the fourth grade, 51% of the Mexican-Americans...compared with 25% of the Anglos are reading below level. By the eighth grade corresponding figures are 64% for Mexican-Americans....
Further deterioration occurs by the twelfth grade despite the fact that many of the poorest achievers have already left school. At this stage 63% of the Mexican-Americans are reading below level as are...34% of the Anglos (83:165).

Carter attributes the difficulties identified in these reports and in his own work to failure to diagnose individual reading problems, inability on the part of teachers to deal effectively with them, and inadequacy of materials.

Basic sources of reading disability, undetected and unsolved at the beginning of Spanish-speaking adults' experience in reading English, may permanently impair their reading skills (83:165). Locating these sources of reading difficulties in the American whose first language is Spanish, is an important and relatively unexplored area of research. In the words of Elinor Tripato Massoglia:

"The concept of bilingual programs in adult education opens to educators a veritable virgin field for exploration and innovation. Generally speaking, research carried on with the adult learner is "abysmally small," a condition ripe for change (81:107).

One of the basic sources of difficulty referred to above may well be the fact that native Spanish-speakers who are learning to read English encounter sets of letter-sound combinations in English that do not occur in their native tongue. For example, they find digraph-sound pairs such as th (voiced and voiceless) and sh, which are not found in Spanish. Although their native language contains /f/, that sound is never spelled ph. Many reading authorities state that word-recognition includes a visual stimulus which calls forth an auditory image which evokes meaning. If such is the case, letter-sound contrasts like those above may result in errors stemming from
lack of familiarity with English sounds and letter-sound combinations.

This study has investigated the question of whether there is an association between reading errors and letter-sound contrasts between English and Spanish. Its findings should contribute to the knowledge of the sources and remediation of reading disability. On their basis instructors can design reading materials fitted to the needs of the native speaker of Spanish who is learning to read English.

**Purpose of the Study**

The purpose of the present study was to investigate the extent to which letter-sound contrasts between English and Spanish influence the adult early reader's decoding of words containing unfamiliar letter-sound combinations.

The major objectives were to:

1. Investigate the differences in subjects' discrimination between sounds (initial, medial and terminal) contained in both English and Spanish and those found in English only.

2. Investigate the differences in subjects' decoding of nonsense words containing letter-sound combinations (initial, medial and terminal) occurring in both English and Spanish and those found in English only.

3. Investigate differences in sound-discrimination and word-decoding as described in 1 and 2 above between native speakers of Spanish and native speakers of English.
4. Investigate differences among English proficiency levels (50, 100, 200, 300) (see Appendix A) with respect to performance in the sound-discrimination and word-decoding tests (Exercises 1 and 2)\(^2\) (see Appendix C) designed for this study.

5. Investigate the influence of a contrast between Spanish and English in spelling the same sound (e.g., \textit{ph} and \textit{f}) on the ability of Spanish-speakers to decode English words containing such letter-sounds.

6. Investigate the degree of association between performances in sound-discrimination and word-decoding.

\textbf{Theoretical Basis for the Study}

This section is designed to establish a theoretical background for the objectives presented in the preceding section.

The section that follows contains a summary of opinions of experts in four disciplines -- reading theory, linguistics, psycholinguistics, and psychology -- concerning the nature of the reading act. As will be seen, there is a consensus among all but the psycholinguists as to the existence of an auditory state in reading. That is, the reader's visual image of letters or graphemes stimulates internal auditory images of corresponding sounds, which, in turn, evoke

\(^2\)The term exercise was used as a title for the tests in order to reduce test anxiety.
meaning. If the concept just described is valid, one may logically inquire as to the influence of phonological (sound) differences between non-native speakers' first and second languages on their decoding of words containing unfamiliar letter-sound combinations.

A basic factor to be considered in relation to Objectives 1, 2, and 3 of this study is non-native speakers' comprehension and production of sounds which do not occur in their first language but do occur in the second. In *Linguistics Across Cultures* (52:11), Robert Lado discusses phonological differences between languages and their influence on the behavior of non-native speakers. Lado describes the distortions in the pronunciation of English sounds by speakers of German, Chinese, and Spanish. Furthermore, he states:

...Much less known, and often not even suspected may be the fact...that the speaker of one language listening to another does not actually hear the foreign language sound units -- phonemes. He hears his own (52:11).

If Lado's statement is accurate, the Spanish speaker to whom the word *shoe* is addressed, actually hears *chew*, since Spanish does not contain the *sh*/(/ʃ/) grapheme-phoneme combination but does possess the similar letter-sound *ch*/(/χ/). This "perception blind spot" may cause the early reader some confusion in the auditory stage of the reading act.

Lado arrived at his conclusions concerning the sounds and structures presenting most difficulty to the learner of a new language through "contrastive analysis," the systematic comparison of the native and target languages. His use of contrastive analysis for predicting the problems of second-language learners is no longer
accepted as valid. Many experts maintain, however, that a weaker form, which attempts to explain, rather than predict, language-learning behavior, is still considered viable (Wardhaugh: 181-4). For example, Ritchie (63:183-197) employs distinctive-feature hierarchies and rule-cycling to explain problems such as the Frenchman’s substitution of *sink* and the Russian’s of *tink* for the English word *think*.

Another factor contributing to ease or difficulty of distinguishing between sounds and decoding letter-sound units is their position in the spoken and written word. The findings of Shankweller and Liberman (71:293-317) indicate that initial letter-sound items are more easily recognized in reading than are medial and final letter-sound items, whereas in listening, identification of initial and final segments is essentially equal. The grapheme-phoneme combinations tested in this study were equally distributed among initial, medial and terminal positions.

With respect to Objective 4, an examination of the competencies required for Levels 100, 200 and 300 (see Appendix A) in the San Francisco Community College District, where the tests in this project were administered, reveals an increase in English-language proficiency as a criterion for promotion from one level to another. The degree to which developing language skill is accompanied by improved performance in sound discrimination and word decoding was investigated in this research.

The subject of Objective 5, reading errors resulting from unfamiliar spellings of familiar sounds, e.g., *gh* or *ph* for */f/*, was
investigated by Gibson et al. (28:565) in a study of grapheme-phoneme correspondence and word perception. They found only sixteen errors out of a total of 7250 opportunities for response attributable to the use of unfamiliar spellings for familiar sounds. However, Gibson’s subjects were all native speakers of English. The present research provided an appropriate context in which to look into the same question among early readers whose first language was Spanish, not English.

**Definition of Terms**

For the clarification of terms employed in this study, the following definitions are provided:

**Aural discrimination**: Ability to hear differences between two dissimilar sounds or groups of sounds.

**Contrastive analysis**: The method by which the differences between two (or, more rarely, among more than two) languages are described.

**Decoding**: "Cracking the code"; assigning sounds to letter symbols, e.g., b --- /b/, ch --- /tʃ/, ate --- /et/.  

**Deep structure**: The underlying meaning of a sentence or question.

**Digraph**: A combination of two letters to form one simple sound, in this study, a consonant sound, e.g., sh, ch, ph.

**Distinctive features**: Minimal distinctive differences in sounds, e.g., voiced versus voiceless, nasal versus non-nasal.

**Grapheme**: A letter-symbol, e.g., a, b.
Grapheme-Phonemes: Letters and the phonemes (see below) with which they are associated.

Initial sounds or letters: Sounds or letters which occur at the beginning of words.

International Phonetic Alphabet (I.P.A.): An alphabet consisting of letters which symbolize all the sounds employed in all the languages of the world in any stage of their development.

Letter-sounds (symbol-sounds): Letters and the sounds associated with them in the mind of the reader.

Linguistics: The scientific study of language.

Medial sounds or letters: Sounds or letters which occur in the middle of words.

Minimal pair: A pair of words which are identical except with respect to only one sound.

Non-native speaker: The speaker of a language which is not her/his first or native language.

Nonsense words (pseudowords): Words without meaning which are constructed according to the rules of spelling-sound correspondence of a language.

Phoneme: A basic unit of sound used in a language system alone or in combination with other basic sounds to form the minimal meaningful linguistic units called morphemes (words or parts of words). Examples of phonemes are /b/, /d/, /t/, which are joined in English to form the word bat. A pair of slanting parallel lines (/ /) identifies a phonemic symbol.
Phonological: Relating to the sound system of a language.

Pronounceable words: Words which are predictably pronounceable because they are constructed according to the rules of spelling and pronunciation of a language. An example of a pronounceable word in English is glurck.

Rule-cycling: The ordered application of rules governing changes in the sounds and grammatical forms of a language.

Sociolinguistics: The study of language in its sociological setting.

Surface structure: The form in which a phrase, sentence or question is expressed orally or in writing.

Terminal sounds or letters: Sounds or letters which occur at the ends of words.

Unpronounceable words: Words which are not predictably pronounceable because they are not constructed according to the rules of spelling and pronunciation of a language. An example of an unpronounceable word in English is ckurgl.

Word-decoding: Conversion of graphic symbols to their sound equivalents.

Limitations of the Study

The present study confined itself to the investigation of word-decoding skills. It did not include word-meaning and word-comprehension in its research, since all the words employed were nonsense words.

The principal subjects of the research were Spanish-speaking adults who were early readers of English. English-speakers were included
only as a control group.

Many investigators have studied the relationships between the non-native speaker's attitude toward the second language and its culture and the degree of proficiency he achieves in its use (Spolsky: 271-80, Gardner:141-50). This study, however, excluded the consideration of attitudinal and sociological aspects of language acquisition, and confined its research to the decoding processes involved in the act of reading.

Moreover, the research did not investigate physical abnormalities which may contribute to reading disabilities.

It did not deal with methodological approaches for remedying reading difficulties; however, implications for research into methodological approaches may be discussed in the recommendations which conclude this study.

Finally, the Spanish-speaking subjects paired with the English-speaking control group in four phases of the study were those in the 300-level class, which had the greatest English-language proficiency.
II REVIEW OF THE RELATED LITERATURE

The following review of literature related to the study of phonological contrasts and word-decoding skills of adult early readers of English as a Second Language is presented in two major sections. They are:

1. A description of the development of written language from a pictographic form to one in which graphic symbols represent verbal sounds.

2. An analysis of studies in this area by experts in the following fields:
   a. Reading authorities
   b. Linguists
   c. Psycholinguists
   d. Psychologists

Alphabetic-Phonological Writing Systems and Reading Problems

Aaron Carton's Orientation to Reading (13:67-85) provides an appropriate introduction to this review: it describes a historic change in man's method of conveying meaning through orthographic symbols, a change which provided the basis for the problem studied in this research. The development Carton discusses was responsible for many of the difficulties members of our Western societies encounter in learning to read. The same change, incidentally, has complicated the process by which the speaker of one language grasps the meaning
of a message written in another (13:82).

According to Carton, early writing systems, e.g., Sumerian, Egyptian, Chinese, were pictographic in nature. That is, the message to be conveyed was expressed in drawings of the act, circumstance or individual involved. Despite the fact that pictographs became stylized into linear cursive forms far removed from the original drawings, they avoided the need for auditory intervention between the visual stimulus and meaning; thus, they could be understood by representatives of different languages. An example of such a system is Chinese. Although there is no single Chinese language -- only dialects, many of which are not mutually intelligible --, all literate speakers of Chinese are able to read the same written system as are speakers of Korean, Japanese, and other Far Eastern languages, which do not belong to the same language family.

Carton states that the auditory phase of reading was introduced by ancient Egyptians, who, in inscribing messages on stone, employed the name of an object which was a homophone for the sounds of the words in the message, instead of a picture of the object, e.g., 1 (１), be (ｂｅ), son (ｓｏｎ). This type of symbol, known as the rebus, introduced a phonological element into reading, says Carton.

Reading Authorities and the Reading Act

Reading specialists occupy a broad range of opinion as to the importance of the auditory phase of the reading act. Among those urging the emphasis of letter-sound correlations in early reading
are designers of reading systems employing artificial alphabets based on letter-sounds to facilitate accurate reading. **Unifon**, the Initial Teaching Alphabet (i.t.a.), and Gattegno's Words in Color are examples (3:329-382).

Another group advocates language-experience reading, in which the individual dictates whole occurrences, reactions and feelings, which, when transcribed, serve as his reading text. Still others stress whole-word recognition rather than letter-by-letter or syllable-by-syllable correlations. Probably most reading instructors employ all these approaches, developing in the early reader strategies for forming letter-sound correspondences (14:308).

Authorities such as Arthur Heilman (39:124), Robert Karlin (45: 3-15) and Eleanor Wall Thonis (79:103-68) argue for the reality of a grapheme-phoneme stage as an essential component of the reading act. Thonis advocates a rich, varied program in oral English as a precursor to reading instruction.

Emmett Betts' Foundations of Reading Instruction (6:625) describes the problems inherent in the one-to-one letter-sound approach to reading instruction. He stresses the importance of an analytic approach to decoding; identification of letter-sound relationships must be carried out within whole-word context. Sounds of letters, he says, should not be given in isolation. Visual, not auditory, analysis should be the basic process.

George Spache, on the other hand, advocates a synthetic approach to beginning reading instruction. He begins with the introduction of letters and their related sounds, which are later combined to form
words. Although his methodology includes a strong emphasis on the establishment of letter-sound correspondences in the early stages of reading instruction, Spache states that "word recognition by letters (or letter-sounds) soon disappears as reading ability increases," to be replaced by the use of context, syllabication and word analysis (77:209-10).

In Jeanne Chall's investigation of early reading instruction, she finds that children whose training includes extensive practice in decoding (assigning sounds to graphic symbols) learn to read more effectively and rapidly than those with little or no training in phonics (14:305-14). Her conclusions conflict with those of Jane W. Torrey, a psychologist, whose observations of John, a child who learned to read without instruction, indicate that practice in decoding is not an essential part of reading instruction (80:147-57). However, Torrey's work concerns one individual, whereas Chall's research covers the experience of thousands of children and professionals in the field of reading.

Despite differences of approach among the authorities mentioned above, all but Torrey agree as to the existence and importance of letter-to-sound decoding in the reading act.

**Linguists and the Reading Act**

Like reading specialists, linguists represent essentially similar points-of-view vis-à-vis the basic importance of the auditory stage in reading. It must be stated, however, that they differ in the emphasis they place on this stage.
An advocate of the concept that reading involves a visual image related to a sound sequence which evokes meaning is Leonard Bloomfield. Bloomfield's definition of the reading act is so restricted that he confines it to the letter-sound relationship; the sound-meaning association is excluded from his concept of reading (8). Despite the outcries of those authorities who protest at the unreality of a concept of reading that precludes meaning, Bloomfield's theories played a significant role in the development of linguistic (including reading) analysis. His rigorous examination of language helped to clarify its nature and components. In his classic work, Language (7), he sets forth a system of language analysis, which he terms "mechanistic" in contrast to the "mentalistic" description of prior linguists. Successors, among them Charles C. Fries, Zelig Harris and Noam Chomsky, have profited from Bloomfield's scholarly research in developing their own concepts of linguistic analysis. Chomsky and psycholinguists such as Kenneth Goodman and Frank Smith have woven the linguistic elements isolated in Bloomfield's investigation into integrated systems incorporating the findings of psychology and linguistics.

The reading model of Charles C. Fries resembles that of Bloomfield. "The process of learning to read," he says, "is the process of transfer from the auditory signs for language signals which the child has already learned, to the new visual signs for the same signals" (23:xv).

Carl LeFevre's analysis of the reading process departs from that of Bloomfield in his emphasis on the sentence as the basic unit of reading comprehension (54). He can be said to occupy a position between those of Bloomfield and Fries and the psycholinguists, whose
theories will be discussed next.

Recent research among sociolinguists tends to support the claims of those authorities who give reality and importance to the existence of an auditory phase in the reading process. The results of William Labov's investigation into the causes of acute reading problems among Black street gang members in the Harlem ghetto in part support the claims of the reading specialists and linguists. Labov finds that phonological and grammatical contrasts between Standard English and BEV (Black English Vernacular) are at the heart of these reading problems. He also concludes, however, that the observed linguistic difficulties had been determined and defined by the social organization of the peer group of the urban core (49:35).

Similar evidence of the significance of auditory activity in the act of reading is furnished by Yolanda Lastra de Suarez (53:61-69) in her study of the reading problems of Chicanos in the U.S. Southwest. Phonological and grammatical contrasts between the Mexican-American and Standard English dialects, she finds, result in reading problems analogous to those of the speaker of Black English Vernacular.

Hatch deals with the influence of sound contrasts between the first (Spanish) and second (English) languages of a beginning reader of English (37:53-61). She investigates the question of whether the learner should be taught to read in his first language before receiving instruction in reading the second. The results of her tests support the hypothesis that phonological interference does occur in silent reading. However, the instruments she employs in her study do not screen out the influence of meaning and familiar spelling patterns.
In the words they use. For example, one of Hatch's test items asks, "Which of these are parts of your body? hands, when, fit, eyes, shirt." or "Which of these are colors? blue, happy, yellow, grin." Finding that the children underline fit and grin, Hatch states that these are errors resulting from sound contrasts. This researcher maintains that Hatch's conclusion can be questioned. Factors other than phonological differences might very well have determined the subjects' responses. It should be noted that the vowel in both fit and grin occurs medially, a position in which, research indicates (71:308-10), decoding is more difficult than it is in initial and terminal positions. The initially and terminally-placed consonants are those which would appear in the correct responses. The combination of the meaning of the question items in Hatch's exercise and these consonants would cause the subjects to underline fit and grin as the correct answers, giving scant heed to the medially-placed vowels.

Through the use of nonsense words, the present study eliminated the possibility of responses influenced by semantic and spelling familiarity.

Conclusions contrary to those of Labov, Lastra and Hatch are reached by Melmed (59), who found that Black children had difficulty in the aural discrimination of words which are homonymous in Black English although not in Standard English. Moreover, they were unable to translate graphic sequences into sound sequences, that is, to decode. Nevertheless, they were able to comprehend such words when reading orally or silently. Several explanations may account for these results: 1) the readers' use of context to arrive at meaning;
2) their decoding of graphic symbols into the phonology of their dialect, much as the speaker of Standard English decodes knight into /nalt/, disregarding the k and oh; 3) their moving from letter symbols directly to meaning without the intervention of a sound stage. Inasmuch as the investigator used meaningful words, it is difficult to isolate the factors which would allow a learner to commit decoding errors and still understand what he is reading.

**Psycholinguists and the Reading Act**

Psycholinguistic theories, as opposed to those of the linguists, maintain that reading is a total process, not one aspect of which can be isolated from the rest (34:100-12, 33:143-59). Demessaging, the comprehension of groups of words having a central meaning, is the psycholinguists' description of the reading act. Thus, they do not accept the visual image-auditory decoding-meaning chain posited by their colleagues. Moreover, they reject the various phonics approaches springing from the emphasis on the establishment of grapheme-phoneme correspondences. It should be noted, however, that Kenneth Goodman, a leading proponent of the psycholinguistic philosophy, concludes that in the beginning stages of reading, there is a decoding process that includes an auditory phase (31:16).

Between the linguists and psycholinguists are those authorities who feel that reading must combine decoding and demessaging. Roger Shuy is one of these. He argues for the utility of the "mundane behavioral skills" involved in grapheme-phoneme correlation as well as the cognitive processes described by psycholinguists Goodman,
Paul Kolers and Frank Smith. Letter-sound correspondence, he says, is crucial at the onset of learning to read. As reading skill develops, decoding is replaced by demessaging, and syllable, morpheme, word and sentence identification. Thereafter, the total linguistic environment, including phonological and syntactic information on the paragraph and discourse levels, is employed by the reader.

But Shuy goes beyond this. He contends that the child's pragmatic knowledge, his understanding of how language is used in the real world, is essential to meaningful reading (73).

When the polemics of the preceding sections are analyzed, there remains a broad area of agreement; this maintains that in the early stages of reading, decoding is essential for meaning. Later, as the reader gains experience and facility, his reliance upon an auditory stage diminishes until, with gifted readers, it all but disappears.

**Psychologists and the Reading Act**

The findings of psychologists actively engaged in studying the reading process provide valuable information into the nature of reading. Their research, much of it clinical, has revealed aspects of reading that lead to an improved understanding of the total process. The first group of psychologists discussed in this section has studied the existence and importance of a phonological stage (subvocalization, internal articulation) in the reading act, a question central to this project. Intimately related to the question as to the reality of a phonological stage is that concerning
the reader's reliance upon decoding throughout the stages of his reading experience.

A second group of psychologists included in this summary has investigated the degree to which individual letter-sound correlations serve as the basis of decoding in reading. These scientists conclude that syllables, words, or even larger units, not single grapheme-phoneme combinations, serve as the basic reading unit, depending upon the skill of the reader. Since the sound of one grapheme-phoneme unit is influenced by the sounds in its environment, letter-sound relationships differ in accordance with their context. This variation complicates the study of the role of phonology in reading. The present study takes account of such changes in letter-sound relationships by placing the experimental grapheme-phoneme combinations initially, medially and terminally.

The summary concludes with a brief description of a model in which automaticity in the reader's processing reading materials from the visual image through the sound image to meaning is mapped on various levels of reading skill (automaticity is defined as the ability to carry out such processing without conscious attention). The model provides an explanation of the diminishing need for attention in going from one stage of the reading act to the next as the reader gains proficiency.

The first psychologist to be discussed here is Edmund Burke Huey, whose classic work, The Psychology and Pedagogy of Reading, was published in 1908. Well before the invention of many of the electronic devices employed by contemporary psychologists, linguists
and reading experts, Huey devised ingenious instruments for the study of saccades or eye movements in reading. Moreover, his research explored the inner speech of reading and its role in the perception of what is read.

With regard to inner speech in the reading act, Huey states:

...But although there is an occasional reader in whom the inner speech is not very noticeable, and although it is a foreshortened and incomplete speech in most of us, yet it is perfectly certain that the inner hearing or pronouncing, or both, of what is read, is a constituent part of the reading of by far the most of people, as they ordinarily and actually read. The evidence is cumulative from many sources, and cannot all be given here, but there is no doubt as to the fact (41:117-8).

Although lip-movement was found to be universal in tests made on children who were learning to read, it decreased with practice and usually disappeared in rapid and more intelligent readers, states Huey. However, a test made on thirty adults revealed that the large majority found inner speech in some form to be a part of their ordinary reading. Purely visual reading was not established in any of them, although the test did not preclude its possibility for a few. Paul Kolers, in his introduction to The Psychology and Pedagogy of Reading, says:

...Huey recognizes that differences exist among readers and is merely reporting the evidence that some form of imagery -- auditory, kinesthetic, or even visual -- characterizes the reading that most people do; he notes, however, that imagery may not be necessary to effective reading, and that reading may proceed on a purely visual basis (41:xxvi).

Kolers states that, whereas the beginning reader verbalizes extensively, the skilled reader may be able to avoid this activity altogether.
Despite the time interval since the appearance of Huey's book, many of its concepts are as contemporary as those of psychologists of the 1970's. In the words of Gibson, "It is amazing to read this book in 1971 and find out how little we have discovered about reading since that time" (46:8).

Contemporary psychologists investigating the reading process concur with Huey's conclusion that the degree to which readers rely upon decoding, the establishment of correlations between letters and sounds, depends on the skill of the reader. The heavy reliance upon auditory images as intermediaries between the graphic symbol and meaning, they state, tends to diminish as the individual gains speed and skill in recognizing words and word groups and associates them with meanings.

Ignatius Mattingly describes this diminution of reliance upon internal verbalization as a direct comprehension of the deep structure of the message. Whereas the early reader, he says, forms a "quasi-phonological" representation of a sentence based on his visual perception of the written text, the skilled reader does not need complete phonological information and probably does not use all that is available. He describes the skilled reader as one who accumulates information, which Mattingly identifies as auditory imagery, efficiently and synthesizes it at very high speeds (46:141-4).

Doubts concerning Kolers' statement that for the skilled reader visual forms are related to complex meaning, are expressed by Posner, Lewis and Conrad. They advocate further detailed empirical analysis before such conclusions are drawn (46:166).
The use of electromyographic techniques by Conrad for detecting internal articulation (electrical activity in muscles required in the production of speech sounds) leads to his conclusion that articulation almost always occurs in silent reading. However, he questions the necessity for articulatory input in reading comprehension and searches for a more basic factor that in turn employs inner speech. That factor he identifies as Short Term Memory (STM), which makes use of internal articulation as an efficient device for storing items of information gained in reading until synthesis of the stored units may be effected. Conrad's studies of the significant problems of the profoundly deaf in learning to read convince him that use of internal articulation is an efficient reading strategy. However, the fact that the deaf can learn to read indicates that other strategies are also feasible. He concludes that man uses a speech code in reading because it best sustains the necessary Short Term Memory processes, not because silent speech is essential to reading. If non-speech codes, he states, were developed by training to the extent that speech codes are, they would not in themselves be inefficient. However, when non-speech codes are used to translate printed words that derive from spoken forms, they put the reader at a disadvantage. (46:206-11).

Thomas G. R. Bower arrives at conclusions similar to those of Conrad concerning the importance of an acoustical contribution to reading. His study of student reading habits at the Massachusetts Institute of Technology indicated that 92% of his subjects were "listening" readers, whereas 8% were "visual" readers. Bower finds
that, whereas an auditory stage is an important factor in reading, it is not essential (9:134-46).

Similarly, Gibson, Shurcliff and Yonas provide tentative support for the psycholinguists' question as to the existence of a discrete auditory phase in the reading act. In a comparative study they investigated deaf and hearing subjects' ability to read "pronounceable" as opposed to "unpronounceable" nonsense words. They found that the two groups performed similarly, reading the former items more easily than the latter -- this despite the impossibility of letter-sound associations by the deaf students (30:62-72).

Shankweiler and Liberman maintain that "the perception of speech by reading has problems which are separate and distinct from the problems of perceiving speech by ear. We cannot predict the error rate for a given phoneme in reading from its error rate in listening" (46:308-10). One of the bases for the differences between listening and reading problems is the position of the experimental item in the word, they find. Initial letter-sound combinations are more easily recognized in reading than medial and final, whereas in listening, identification of initial and final segments is essentially equal. Shankweiler and Liberman's conclusions have direct implications for the present research, which investigated sound-discrimination and word-decoding. Furthermore, the experimental items appearing in the test exercises of the study occurred initially, medially and terminally.

Another aspect of reading investigated by psychologists has been the complications of establishing one-to-one relationships between letters and sounds. These studies have looked into the
use of grapheme-phoneme combinations as the basic unit in reading. Building on Margaret Hubbard Jones' studies (44:117-30) into the inconsistencies in letter-sound relationships in English, Rebecca Barr (5:131-9) investigated the reading problems experienced by children who were speakers of Romance languages, German, English and Japanese. She found that the English-speaking children had the greatest difficulty; the Japanese, the least. Barr attributes the difference to the facts that: 1) Kana symbols represent syllables in which consonants, except n, never appear in isolation and 2) the relationships between visually perceived letters and corresponding phonemes are consistent in Japanese Kana but variable in English.

Supporting Barr's conclusions as to the efficiency of an approach to reading emphasizing the processing of units larger than single letters, digraphs, diphthongs or blends is Rozin, Poritsky and Sotsky's experiment (68:105-15) with disabled readers on the second-grade level. In this project eight Black children from the inner city with clear motivational and letter-sound decoding problems were taught to read English material written as thirty different Chinese characters (ideographs) in 2.5 to 5.5 hours of tutoring.

Subsequent research by Rozin and Gleitman indicates the importance of readers' ability to correlate the graphic image on the printed page with its phonological counterpart. So important is it, they say, that:
...Apparently, an inability to notice and cope with phonological aspects of the language poses a stumbling block to reading acquisition.... Phonology, not meaning, is at the crux of the early reading problem (67:97-8).

Rozin and Gleitman's conclusion is that the syllable is a more accessible unit for the correlation of letters and sounds than is the single grapheme, digraph or cluster. The reason for their finding is the changing nature of a sound as it occurs before and after other sounds. It is difficult to generalize concerning a single sound, since its quality depends on its environment. Generalizations concerning syllables, e.g., Consonant-Vowel-Consonant, are possible.

The research of psychologist Eleanor J. Gibson (28:554-70) corroborates that of Hubbard Jones (44:117-30), Barr (5:131-9), and Rozin, Poritsky, and Sotsky (68:105-15). In an experiment investigating spelling-to-sound correlations, she establishes the psychological reality of letter-groups -- not single letters -- as the units the individual associates with sound patterns in reading. This is so, says Gibson, because there is no invariant match in our language for single letters, e.g., a is pronounced /a/ as in father, /æ/ as in cat, /e/ as in mate, and in various other ways depending upon its environment, whereas, as has been stated above, there are spelling-to-sound constants for letter-groups.

These findings undoubtedly contain implications for the present study, since the experimental grapheme-phoneme combinations are set within letter-groups in which the surrounding letter-sound units influence the sound of the experimental element.
A point investigated in the present project is the influence of alternate spellings for the same sound upon the recognition of words in which familiar sounds are spelled in unfamiliar ways, e.g., clerf - clerph. Gibson's study looked into the same matter. Her conclusion was that alternate spellings produce some errors but not enough to be considered significant (28:565).

Confirmation of the foregoing conclusions is contained in research by Harris B. Savin, whose investigations indicate that people do not proceed to synthesize phonemes into syllables but to analyze syllables into component sounds. Another observation made by Savin is that when adults "sound out" unfamiliar written words, they do so syllable-by-syllable, not sound-by-sound (46:323).

LaBerge and Samuels (48:293-323) have performed a systematic study of the process by which early readers develop automaticity in combining visual images (letters) and their phonological counterparts into words.

Their lucid, carefully detailed investigation describes the manner in which readers expand their ability to perform automatically the associative operations necessary to reading. Their conclusion is that a visually presented word may take any of many alternative routes in its passage from the eye to the semantic memory. Some routes require attention for the completion of an associative step; others do not. The amount of attention needed varies inversely to the reader's familiarity with the words in the text.

The degree of automaticity with which the subjects in the present research may be able to decode nonsense words containing
letter-sound combinations not found in their first language, may influence their performance in the exercises administered in this study.

The above summary of research by psychologists into the nature and problems of the reading act indicates a consensus as to the reality and importance of an auditory stage in the sequence from grapheme to meaning. Their experiments provide empirical evidence upon which to base further studies of reading and to design methodological approaches to the solution of related problems.

It appears that there exists substantial agreement among authorities in three disciplines closely related to reading -- reading theory and instructional methodology, linguistics and psychology -- that decoding, the association of letter-symbols with sounds, is an important component of the reading act. Although the members of the fourth group included in this review, the psycholinguists, do not concur in this view, one of their leaders affirms the need for an auditory phase in the early stages of reading.

The present study may provide useful evidence as to the validity of the points-of-view summarized in the foregoing summary. Strangely enough, there has been little research on non-native speakers of English to substantiate the claims of authorities as to what happens when one reads. This researcher suggests that the use of students of English as a Second Language may produce findings as to the role of sound features in word-decoding not available in studies of native speakers of English.
The reasons for this statement are:

1) the effect of a shift in grapheme-phoneme correspondences for non-native speakers and 2) a change in the orthographic rules, which, when internalized by readers, enable them to predict sequences of letter-sound units which may occur in the language they are reading.
III PROCEDURES

The present study was an investigation of sound-discrimination and word-decoding skills of the early reader of English as a Second Language. The major purpose of the research was to determine the extent to which letter-sound contrasts between English and Spanish influence the early reader's decoding of words containing unfamiliar letter-sound combinations.

Settings of the Experiment

The test exercises designed for the present study were administered to five groups of subjects. Four groups were Adult Education-English as a Second Language classes in the Mission District of San Francisco, California, the population of which is predominantly Spanish-speaking; the fifth group was composed of English-speaking students at Linn-Benton Community College in Corvallis and Albany, Oregon. The former classes were located in Mission Community College Centers, parts of the San Francisco Community College District, which was created for the purpose of providing "all persons with equal employment and educational opportunities regardless of race, color, religion, sex, national origin, marital status, age or physical handicap." All classes have open enrollment, no tuition fees, and no advance registration requirements for any San Francisco resident eighteen years or over.

The Mission Community College Centers were chosen as locations for the first half of the study for two reasons: 1) the large number of Spanish-speakers enrolled in their Adult Education-English as a

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3 Class schedule announcements, Mission Community College Centers, Spring, 1977.
Second Language classes and 2) the organization of ESL classes into proficiency levels as described below.

The students at Linn-Benton Community College were also enrolled in an Adult Education program. Since no special linguistic characteristics were required of them beyond that of native English-speaking competence, a location close to the researcher's center of investigation was chosen.

**Sample of the Experiment**

The original sample of non-native English-speakers amounted to ninety-two subjects. However, ten of these students were determined to be native speakers of languages other than Spanish (Indian, Chinese, French and Italian) in a manner to be described below. Their responses were, therefore, removed from those tabulated for the investigation. Subsequently, eight more subjects were rejected for failure to complete the exercises. Thus, the total sample of Spanish-speaking subjects amounted to 74. These were divided into four groups as follows: Level 50: 21, Level 100: 23, Level 200: 16 and Level 300: 14.

The twenty subjects in the fifth group, all native speakers of English, were enrolled in General Educational Development (GED) classes. Their performance was compared with that of the Spanish-speaking group having the greatest English-language proficiency, namely, the 300-level.
ERRATA

Page 33, line 21: Change:

"Phonemes found in both English and Spanish which have small numbers of contrasting features are /ˈc/ and /ˈʃ/ (both experimental sounds), /t/ and /θ/, and /d/ and /ð/.

to:

"Phonemes which have small numbers of contrasting features are /ˈc/ and /ˈʃ/ (both experimental sounds), /t/ and /θ/, and /d/ and /ð/.

All are found in English; one in each pair (/ˈc/, /t/, /d/), in Spanish.
The four classes of Spanish-speakers represented four different levels of English-language proficiency (50, 100, 200 and 300) (see Appendix A) as determined by the Ilyin Language Placement Test (see Appendix B). This instrument is employed throughout the Adult Education ESL program in the San Francisco Community College District for the placement of non-native speakers of English in appropriate classes of English as a Second Language.

Focus of the Study

For purposes of determining whether Spanish-speaking adults who are learning to read English experience difficulties in recognizing sounds found in English but not in Spanish and in decoding words containing letter symbols of these sounds, a limited group of grapheme-phoneme combinations was chosen for use in testing. This group was made up of the digraphs ch (/ʃ/), sh (/ʃ/), th (voiceless) (/θ/), th (voiced) (/ð/), and ph (/f/). They were selected as the points of focus in the research because of the following relationships between English and Spanish: 1) the digraph and phoneme of ch (/ʃ/) are found in Spanish; 2) the phoneme but not the graphemic representation of ph (/f/) is found in Spanish; 3) neither the graphemic representations nor the phonemes of sh (/ʃ/), th (v1.) (/θ/), th (vd.) (/ð/) occur in Spanish. Phonemes found in both English and Spanish which have small numbers of contrasting features are /ɛ/ and /ʃ/ (both experimental sounds), /t/ and /θ/, and /d/ and /ð/. Minimal pairs were constructed in which the first item in each of these sets was matched with its corres-
ponding phoneme. A phoneme which occurs in both languages and contains a small number of contrasting distinctive features, /p/, was paired with /f/. A control pair of non-digraphs, p(/p/) - t(/t/), the graphemes and phonemes of which occur in English and Spanish, was included.

Nonsense words were used in the design of minimal pairs for the present study. Nonsense (pseudo-, synthetic) words are used extensively in tests designed to assess learners' ability to associate letters and their related sounds. The reason for the use of nonsense words is the necessity to eliminate the influence of prior familiarity with the graphic forms, sounds and meanings of words already known by the subject. Researchers who have employed nonsense words in investigations of reading and pronunciation are Calfee, Venezky, and Chapman (1969); Chapman, Venezsky, and Calfee (1970); Ekwall (1973); Gibson et al. (1962). The nonsense words used in the present study were sequences of phonemes and graphemes that occur in English.

Seventy-five sets of minimal pairs of nonsense words were designed. One word in each pair contained an experimental digraph-phoneme; the other, a contrasting phoneme found in Spanish and English.

Fifteen minimal pairs were prepared for each of the five sets of grapheme-phoneme contrasts, namely, p-t, sh-ch, th(vl.)-t, th(vd.)-d and ph-p. Initial, medial and final positions in the words were distributed equally in each group of grapheme-phoneme contrasts, so that the association between position and subject performance might be studied. The chart on page 36 shows the
environment in which the experimental digraph-phoneme combinations were placed.

Thereafter, two tests (see Appendix C) were designed for the purpose of determining whether there were significant differences in aural discrimination and decoding between words containing phonemes common to both English and Spanish and those with phonemes found only in English.

The test pamphlet was organized as follows: A cover sheet, including the test number and a space for signature, was provided. It performed two functions: 1) It protected the anonymity of the subject, since it was signed and removed from the pamphlet before the first exercise began; 2) It permitted the identification of ESL students who were not native Spanish-speakers by providing the surname of each subject.

Following the cover sheet was the first test, a Same/Different exercise, the items of which were based on the seventy-five pairs described above. Through a modified random selection process, items were chosen in such a way that some pairs were identical, e.g., ach-ach, and others minimally contrastive, e.g., ash-ach. Item order and initial/medial/terminal position were similarly determined. The pairs were tape-recorded by the researcher with instructions in both Spanish and English. Items were repeated only once. The subjects' task was to underline S or D, depending upon whether the items in each pair sounded identical or different to them.

The first exercise was followed by a second instrument, also tape-recorded, designed to determine whether there was a significant differ-
List of immediate grapheme-phoneme environments

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List of immediate grapheme-phoneme environments in which experimental digraph-phonemes were placed in the items in Exercises 1 and 2.
ence in word-decoding performance between nonsense words containing grapheme-phoneme combinations found in both English and Spanish and those occurring only in English. This exercise consisted of the seventy-five pairs designed for the study. All were minimally contrastive with order determined by a modified random selection procedure. They were printed on an answer sheet. Subjects heard one word in each pair once. They underlined the nonsense word they heard.

Hypotheses to be Tested

In accordance with the major objectives of the study, the following hypotheses were tested:

$H_o^1$: There is no significant difference in Spanish-speaking subjects' discrimination between sounds contained in both English and Spanish and those found in English only.

$H_o^2$: There is no significant difference in Spanish-speaking subjects' decoding of nonsense words containing letter-sound combinations occurring in both English and Spanish and those found in English only.

$H_o^3$: There is no significant difference in Spanish-speaking subjects' ability to discriminate between sounds whether they occur initially, medially or terminally.

$H_o^4$: There is no significant difference in Spanish-speaking subjects' ability to decode words whether experimental letter-sound combinations occur initially, medially or terminally.

$H_o^5$: There is no significant difference in sound-discrimination (as described in $H_o^1$ above) between native speakers of Spanish and
ERRATA

Page 38: \( H_0^{10} \) is missing. It should be inserted after \( H_0^9 \).

\( H_0^{10} \) states:

\( H_0^{10} \): There is no association between performance on items in Exercise 1 and corresponding items in Exercise 2.
native speakers of English.

\( H_0^6 \): There is no significant difference in word-decoding (as described in \( H_0^2 \) above) between native speakers of Spanish and native speakers of English.

\( H_0^7 \): There is no significant difference in sound-discrimination ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300 -- See Appendix A).

\( H_0^8 \): There is no significant difference in word-decoding ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300 -- See Appendix A).

\( H_0^9 \): There is no significant difference between subject performance on items in Exercise 2 containing grapheme-phoneme combinations found in both Spanish and English, e.g., \( \text{p-t} \), and on items containing familiar sounds spelled in an unfamiliar manner, e.g., \( \text{ph} \) for /f/.

**Statistical Procedures**

For the testing of Hypotheses One through Nine, the principal statistical procedure employed was three-way analysis of variance, an application of the F-Statistic, which permits the testing of hypotheses having two or more means.

The F-Statistic, according to Courtney and Sedgwick, is a "robust tool for testing means.... Its actual use is in the comparison of variance, and to test differences between means." (17: #37:2). As applied in three-way analysis of variance, it was an appropriate procedure for the present study, since it permits the testing of
hypotheses involving two or more sets of variables. This investigation had three sets of means: 1) five letter-sound groups, 2) three positions in words, and 3) five levels of English proficiency, including four groups of native Spanish-speakers and one group of native English-speakers.

Hypothesis Ten required the use of a correlation procedure, in order that association between performances on Exercise 1 and Exercise 2 might be determined. For this purpose the Pearson Product Moment Correlation Coefficient (Pearson "r") was employed. The Pearson "r" is a correlation procedure used to determine the degree of linear relationships between two measures, in this case, performance on items in Exercises 1 and 2.

In summary, the research was designed to investigate sound-discrimination and word-decoding skills of adult early readers of English who are native Spanish-speakers. Hypotheses were tested through the use of three-way analysis of variance and the Pearson Product Moment Correlation Coefficient (Pearson "r"). The results of these tests will be described in the following chapter.
IV PRESENTATION AND ANALYSIS OF DATA

The present study was undertaken for the purpose of investigating the extent to which letter-sound contrasts between English and Spanish influence the early reader's decoding of words containing unfamiliar letter-sound combinations.

Data were gathered simultaneously on three sets of variables: 1) phonemes and phoneme-grapheme combinations found in English and Spanish and those found in English only; 2) positions (initial, medial and terminal) of these phonemes and phoneme-grapheme combinations in the words in which they were placed; 3) five English proficiency levels: Spanish-speakers: Levels 50, 100, 200 and 300 (see Appendix A); English-speakers (one group). All subjects were participants in Adult Education classes. The first four groups were classes in the Mission Community College Centers, San Francisco, California. The fifth was made up of students at Linn-Benton Community College, Corvallis and Albany, Oregon.

The principal statistical procedures employed for analysis of data were three-way analysis of variance and the Pearson Product Moment Correlation Coefficient (Pearson "r"). Decisions as to significance were made at the .01 level.

The results of these analyses will be presented on the basis of the null hypotheses set forth in the preceding chapter.
Analysis Procedure

$H_0^1$: There is no significant difference in Spanish-speaking subjects' discrimination between sounds contained in both Spanish and English and those found in English only.

On Exercise 1 sounds were divided into two groups, those with experimental phonemes contained in both Spanish and English (/p/-/t/, /f/-/p/) and those with experimental phonemes occurring in English only (/s/-/ç/, /θ/-/t/, /ʃ/-/d/) (see Appendix C).

Main effects of the analysis of scores on Exercise 1 revealed no significant difference between group performance on sounds contained in both Spanish and English and those occurring in English only, $F(1,70) = 7.01$, $p > .01$. The decision as to lack of significance was due to the fact that the F-score computed in the analysis of responses on sound-discrimination problems in Exercise 1 (computed $F = 1.903$) was smaller than the F-score tabulated for the degrees of freedom in this phase of the analysis of variance (tabulated $F = 7.01$, degrees of freedom: 1, 70). Data supporting the decision as to lack of significance may be found in Table 1.

Although overall scores on sound discrimination in Exercise 1 did not reveal differences that were significant at the .01 level, there appeared to be a trend indicating greater accuracy on the part of Spanish-speakers in discriminating between words containing sounds occurring in both Spanish and English than between words one of which contained a sound that does not occur in Spanish. All levels except 100 recorded higher means on the first group than on the second.
A notable difference in subject performance on discrimination between pairs of words containing one sound unfamiliar to Spanish-speakers occurred in those items designed to test discrimination between /θ/ and /t/. /t/ had been matched with /θ/ because of a parallel relationship between English /θ/-/t/ and /ð/-/d/. /ð/ is the voiced counterpart of /θ/ as /d/ is the voiced counterpart of /t/. The expectation that performance on both sets of pairs would be comparable was not borne out. The data showed that Spanish-speaking subjects' performance on /θ/-/t/ was superior to that on /ð/-/d/ and /ʃ/-/ɕ/, as can be seen in Table 1.

These results support contrastive analysis theories that attempt to explain the language-learning behavior of non-native speakers (88:181-4). Authorities who have studied the Spanish-speakers' substitution of sounds found in English and Spanish for sounds which occur in English only, state that, whereas native Spanish-speakers frequently substitute /d/ for /ɹ/ and /ɕ/ for /ʃ/, they tend to substitute /s/, not /t/, for /θ/ (87:39-41, 60:53). Thus, discrimination between /θ/ and /t/ for the Spanish-speaking subjects of this study was not difficult, although the point of articulation of /d/ and /t/ in Spanish is very close to that of English /ɹ/ and /θ/ and therefore, it can be inferred, easily confused with the two latter sounds.

In summary, H₀ was retained. No significant difference was found in responses on Exercise 1 between pairs of nonsense words containing sounds occurring in both Spanish and English and pairs of words containing a sound found only in English. There were trends
indicating greater accuracy of performance by Spanish-speakers on the first group of sounds than on the second. Nevertheless, those trends were not statistically significant enough to justify rejection of the null hypothesis.

TABLE 1: Means of Spanish-speaking adults' performance on sound-discrimination problems in Exercise 1.

(N=74)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Sounds found in Spanish and English (Overall Mean: 3.84)</th>
<th>Sounds found in English only (Overall Mean: 3.74)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All four levels</td>
<td>/θ/-/t/</td>
<td>/θ/-/p/</td>
</tr>
<tr>
<td>50</td>
<td>3.7099</td>
<td>3.7660</td>
</tr>
<tr>
<td>100</td>
<td>3.7460</td>
<td>3.6667</td>
</tr>
<tr>
<td>300</td>
<td>4.1875</td>
<td>4.0208</td>
</tr>
<tr>
<td></td>
<td>4.2143</td>
<td>4.0000</td>
</tr>
</tbody>
</table>
$H_0^2$: There is no significant difference in Spanish-speaking subjects' decoding of nonsense words containing letter-sound combinations occurring in both English and Spanish and those found in English only.

Under Hypothesis 2 the word-decoding skills of Spanish-speaking subjects were investigated. So that performance on words containing familiar sounds spelled in unfamiliar ways might be measured, ph-p was placed in a category of its own (the sound /f/ is found in Spanish, but it is never spelled ph). In the analysis of Exercise 1, it had been grouped with /p/-/t/, since both sets were composed of sounds familiar to Spanish-speakers. Thus, the letter-sound categories in Exercise 2 were divided into three groups: p-t; sh-ch, th-t, and th-d; and ph-p.

Three-way analysis of variance of scores on Exercise 2 revealed significant differences between Spanish-speakers' decoding of words containing sounds found in both English and Spanish and those occurring in English only, $F(2,70) = 4.92, p < .01$. Overall means on the three groups of letter-sounds for the four groups of Spanish-speaking subjects supported the computed main effects. On p-t, the mean was 4.41; on sh-ch, th-t, and th-d, 3.03; and on ph-p, 4.01. For more detailed data, see Table 2.

The high means of Spanish-speakers' performance observed in Exercise 1 on pairs of words containing the th-t combination disappeared in Exercise 2. Errors committed on these items in the second exercise may have been attributable to lack of familiarity with the digraph th.
The matter of unfamiliar orthography will be taken up under $H_0^9$.

$H_0^2$ was rejected. The inference was that Spanish-speaking adults who are early readers of English experience greater difficulty in decoding words containing letter-sounds not found in Spanish than they do in decoding words with letter-sounds found in both Spanish and English.

A comparison of subject performance on sound-discrimination versus word-decoding problems contained in Exercises 1 and 2 respectively may be found in Figures 1 and 2.

### TABLE 2: Means of Spanish-speaking adults' performance on word-decoding problems in Exercise 2.

(N=74)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Letter-Sound found in Spanish &amp; English</th>
<th>Letter-Sounds found in English only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p-t</td>
<td>ph-p</td>
</tr>
<tr>
<td>Overall Mean:</td>
<td>4.41</td>
<td>Overall Mean:</td>
</tr>
<tr>
<td>Overall Mean:</td>
<td>4.1587</td>
<td>Overall Mean:</td>
</tr>
<tr>
<td>Overall Mean:</td>
<td>3.1587</td>
<td>Overall Mean:</td>
</tr>
<tr>
<td>Overall Mean:</td>
<td>2.1594</td>
<td>Overall Mean:</td>
</tr>
<tr>
<td>All four levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>4.4783</td>
<td>3.7246</td>
</tr>
<tr>
<td>100</td>
<td>4.4783</td>
<td>3.7246</td>
</tr>
<tr>
<td>200</td>
<td>4.4783</td>
<td>4.1458</td>
</tr>
<tr>
<td>300</td>
<td>4.4783</td>
<td>4.7381</td>
</tr>
</tbody>
</table>

Grand Mean: 4.26

Overall Mean: 3.03
FIGURE 1- SOUND-DISCRIMINATION PERFORMANCE OF FOUR GROUPS OF SPANISH-SPEAKING SUBJECTS BY ENGLISH-LANGUAGE PROFICIENCY LEVELS

![Graph showing sound-discrimination performance.]

FIGURE 2- WORD-DECODING PERFORMANCE OF SPANISH-SPEAKING SUBJECTS BY ENGLISH-LANGUAGE PROFICIENCY LEVELS

![Graph showing word-decoding performance.]

---

**Graph 1 Notes:**
- DF = 1
- F = 1.303
- < p < 0.160
- \( H_0 \) retained

**Graph 2 Notes:**
- DF = 2
- F = 153.798
- < p < 0.001
- \( H_0 \) rejected

---

Sounds found in Spanish and English:
- /p/-/t/
- /t/-/p/
- /s/-/e/
- /e/-/l/
- /l/-/d/

Sounds found in English only:

---

Letter-sounds found in Spanish and English:
- p-t
- ph-p
- sh-ch
- th-t
- th-d

Letter-sounds found in English only:

---
$H_0^3$: There is no significant difference in Spanish-speaking subjects' ability to discriminate between sounds whether they occur initially, medially or terminally.

$H_0^3$ was retained on the basis of evidence that no significant differences existed in the subjects' ability to discriminate between sounds found in both Spanish and English and those found in English only, whether these sounds occurred initially, medially or terminally, $F(2,70) = 4.92, p > .01$. The group means of 3.80, 3.77 and 3.76 for the three positions bore out the main effects (see Table 3). It was inferred from the data that Spanish-speaking adults who are early readers of English do not incur significantly greater difficulty in discriminating between familiar and unfamiliar sounds whether the sounds occur in initial, medial or terminal position.

**TABLE 3:** Means of Spanish-speaking adults' performance on sound-discrimination problems in Exercise 1 by position of experimental sounds (initial, medial, terminal) in the words in which they appear. (N=74)

<table>
<thead>
<tr>
<th>Sounds found in Spanish &amp; English</th>
<th>Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/-/t/</td>
<td>Initial (Overall Mean: 3.81)</td>
</tr>
<tr>
<td></td>
<td>3.7739</td>
</tr>
<tr>
<td>/f/-/p/</td>
<td>3.8194</td>
</tr>
<tr>
<td>Sounds found in English only</td>
<td></td>
</tr>
<tr>
<td>/s/-/t/</td>
<td>3.5973</td>
</tr>
<tr>
<td>/b/-/t/</td>
<td>4.3137</td>
</tr>
<tr>
<td>/y/-/d/</td>
<td>3.6818</td>
</tr>
</tbody>
</table>
H⁰⁴: There is no significant difference in Spanish-speaking subjects' ability to decode words whether experimental letter-sound combinations occur initially, medially or terminally.

There were significant differences in Spanish-speaking subjects' performance on word-decoding problems containing letter-sounds found in both Spanish and English and those found in English only on the basis of the position of the letter-sounds in the words in which they were placed. Main effects, F (2,70) = 4.92, p < .01, were supported by means of 3.50 for initial letter-sounds, 3.35 for medial and 3.65 for terminal (see Table 4). Therefore, H⁰⁴ was rejected, as the data implied that when Spanish-speaking subjects decode words containing letter-sounds found in both Spanish and English and those found in English only, their performance is best on letter-sounds occurring in terminal position. It is slightly less accurate on items in initial position and least accurate on letter-sounds found in medial position. These conclusions are supported by the results of research by experts in the field of reading (66:107; 47:308).

Figures 3 and 4 provide a comparison of subject performances on the basis of the positions of the experimental sounds and letter-sounds in the words in Exercises 1 and 2.
TABLE 4: Means of Spanish-speaking adults' performance on word-decoding problems in Exercise 2 by position of experimental letter-sounds (initial, medial, terminal) in the words in which they appear. (N=74)

<table>
<thead>
<tr>
<th>Letter-Sounds</th>
<th>Initial (Overall Mean: 3.50)</th>
<th>Medial (Overall Mean: 3.35)</th>
<th>Terminal (Overall Mean: 3.65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-t</td>
<td>4.5311</td>
<td>4.3562</td>
<td>4.4014</td>
</tr>
<tr>
<td>ph-p</td>
<td>4.3230</td>
<td>3.7915</td>
<td>4.1614</td>
</tr>
<tr>
<td>Letter-Sounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>found in Spanish and English</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sh-ch</td>
<td>3.1749</td>
<td>3.1490</td>
<td>3.0578</td>
</tr>
<tr>
<td>th-t</td>
<td>3.1969</td>
<td>2.8706</td>
<td>3.6173</td>
</tr>
<tr>
<td>th-d</td>
<td>2.4269</td>
<td>2.6056</td>
<td>2.6090</td>
</tr>
</tbody>
</table>
FIGURE 3 - PERFORMANCE OF SPANISH-SPEAKING SUBJECTS ON SOUND-DISCRIMINATION ON THE BASIS OF SOUND-POSITION

![Graph showing performance of Spanish-speaking subjects on sound-discrimination.]

FIGURE 4 - PERFORMANCE OF SPANISH-SPEAKING SUBJECTS ON WORD-DECODING ON THE BASIS OF SYMBOL-SOUND POSITION

![Graph showing performance of Spanish-speaking subjects on word-decoding.]

Legend:
- Initial (I)
- Medial (M)
- Terminal (T)

- Sounds found in Spanish
- Sounds found in English only

- Letter-sounds found in Spanish and English
- Letter-sounds found in English only

Statistical results:
- DF = 2
- F = 0.183
- $\alpha = 0.032$
- $H_0$ retained

- DF = 2
- F = 5.368
- $\alpha = 0.001$
- $H_0$ rejected
There is no significant difference in sound-discrimination (as described in $H_0$ above) between native speakers of Spanish and native speakers of English.

The Spanish-speakers included in this phase of the study were in the group demonstrating the greatest proficiency in English, namely, the 300-level group. This group was chosen so as to provide a basis for meaningful comparison with the English-speakers. By matching the highest level of Spanish-speakers with the English-speaking subjects, the researcher employed groups with more equivalent educational experience than would have been possible in a comparison of the 50-, 100-, or 200-level group with the English-speakers.

The performance of the English-speaking subjects on Exercise 1 was significant, $F(1,32) = 7.50$, $p < .01$. These main effects were repeated in performances on sound-discrimination problems including all experimental sounds in all three positions (initial, medial, terminal) in the nonsense words presented in the study (see Table 5). It was noted that the disparity in performance by the two groups was greater on discrimination between words containing sounds that do not occur in Spanish than on discrimination between words containing sounds that do occur in Spanish. In responses on the former group of words, the Spanish-speakers' performance declined, whereas the performance of the English-speakers remained relatively uniform.

An explanation is needed for the difference in performance between the two groups in discriminating between sounds found in both languages.
Since these phonemes are common to Spanish and English, it might have been reasonable to expect that the two groups would perform comparably. However, there are reasons for the discrepancy in performance between Spanish- and English-speakers. 1) Although /p/, /f/, and /t/ are found in both languages, they are not identical. Differences in distinctive features exist between the Spanish and English /p/, /f/, and /t/: they are articulated in slightly different ways. Thus, the Spanish-speakers have more difficulty in recognizing English /p/ than do English-speakers (83:175-86). Moreover, English /p/ sounds different from Spanish /p/. 2) The environment in which experimental sounds are set affects the sounds themselves. Therefore, although /p/, /f/, and /t/ are familiar to Spanish-speakers, the sounds surrounding them, e.g., /v/, /e /, /i / may not be. Vowel and consonant combinations influence the sounds of nearby phonemes (61:39-59). When experimental sounds are set in unfamiliar environments, they become more difficult to recognize.

$H_0^5$ was rejected. English-speakers' discrimination between sound-pairs found in both Spanish and English and in English only was superior to that of the Spanish-speakers. The data indicate that English-speakers experienced less difficulty in discriminating between sound-pairs containing sounds found in both languages as well as in discriminating between pairs made up of sounds found in English only.
TABLE 5: Means of Spanish- and English-speaking adults' performance on sound-discrimination problems in Exercise 1. (N=34)

<table>
<thead>
<tr>
<th>Sounds</th>
<th>Spanish-speakers (300-level)</th>
<th>English-speakers Mean score: 4.58</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All positions</td>
<td>Init.</td>
</tr>
<tr>
<td>Sounds found in Spanish and English</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sounds found in English only</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
$H_0^6$: There is no significant difference in word-decoding (as described in $H_0^2$ above) between native speakers of English and native speakers of Spanish.

The data showed that the English-speaking control group's performance was significant at the .001 level, $F(2,32) = 5.34$, $p < .01$.

The mean of the Spanish-speaking group on Exercise 2 was 4.23, while that of the English-speakers was 4.79. On all letter-sounds, both those found in Spanish and English and those found in English only, placed initially, medially and terminally, the performance of the control group was superior to that of its Spanish-speaking counterpart (see Table 6). The most notable aspect of the two groups' performance on Exercise 2 was the Spanish-speakers' increase in decoding errors on words containing letter-sounds not found in Spanish ($p-t$: 4.6429; $ph-p$: 4.7381 versus $sh-ch$: 4.2619, $th-t$: 4.2856, $th-d$: 3.2143). On the other hand, the performance of English-speakers remained relatively stable (4.9, 4.7333, 4.7333, and 4.8667).

The data indicated that the results obtained in mean scores for $H_0^6$ supported those results obtained in mean scores for $H_0^2$, namely, that Spanish-speaking adults have greater difficulty in decoding words containing letter-sounds not found in Spanish than they do in decoding words with familiar letter-sounds. The English-speaking control group's relative lack of difficulty on the decoding of all letter-sounds included in the exercise reinforced the above inference; its superior performance was attributed to the fact that all the letter-sounds were familiar to its members. Thus, $H_0^6$ was rejected.
Refer to Figures 5 and 6 for a comparison of Spanish- and English-speaking subjects' performance on Exercises 1 and 2.


(N=34)

<table>
<thead>
<tr>
<th>Letter-Sounds</th>
<th>Spanish-speakers (300-level) Mean score: 4.23</th>
<th>English-speakers Mean score: 4.79</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All positions</td>
<td>Init.</td>
</tr>
<tr>
<td>Letter-Sounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>found in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter-Sounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>found in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English only</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 5- PERFORMANCE OF SPANISH-SPEAKERS (LEVEL 300) AS COMPARED WITH THAT OF ENGLISH-SPEAKERS ON SOUND-DISCRIMINATION PROBLEMS

\[ \text{DF} = 1 \]
\[ F = 65.432 \]
\[ \alpha = 0.001 \]
\[ H_0 \text{ rejected} \]

Sounds found in Spanish and English

Sounds found in English only

FIGURE 6- PERFORMANCE OF SPANISH-SPEAKERS (LEVEL 300) AS COMPARED WITH THAT OF ENGLISH-SPEAKERS ON WORD-DECODING PROBLEMS

\[ \text{DF} = 1 \]
\[ F = 77.056 \]
\[ \alpha = 0.001 \]
\[ H_0 \text{ rejected} \]

Letter-sounds found in Spanish and English

Letter-sounds found in English only
$H_0^7$: There is no significant difference in sound-discrimination ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300) (see Appendix A).

Main effects of three-way analysis of variance showed a significant difference $F$ (3, 70) = 4.08, $p < .01$, in the performance of Spanish-speaking subjects on four levels of proficiency. Subscores for each level of English-language proficiency supported the main effects (see Table 7). $H_0^7$ was rejected. The data showed that as English-language proficiency levels increase, Spanish-speakers who are early readers of English improve in their ability to identify sounds which are found in English but not in Spanish.

### TABLE 7: Performance means of Spanish-speaking adults on four levels of English-language proficiency on sound-discrimination problems in Exercise 1

(N=74)

<table>
<thead>
<tr>
<th>Sounds Found in Spanish and English</th>
<th>Level 50 (Mean: 3.6317)</th>
<th>Level 100 (Mean: 3.6319)</th>
<th>Level 200 (Mean: 3.9503)</th>
<th>Level 300 (Mean: 4.0726)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sounds Found in English only</th>
<th>Level 50 (Mean: 3.6317)</th>
<th>Level 100 (Mean: 3.6319)</th>
<th>Level 200 (Mean: 3.9503)</th>
<th>Level 300 (Mean: 4.0726)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
<td>All positions</td>
</tr>
<tr>
<td>3.5020</td>
<td>3.0750</td>
<td>3.1330</td>
<td>3.6670</td>
<td>3.1330</td>
</tr>
<tr>
<td>4.0476</td>
<td>4.4200</td>
<td>3.8995</td>
<td>3.9048</td>
<td>3.9048</td>
</tr>
<tr>
<td>3.2540</td>
<td>3.0810</td>
<td>3.4762</td>
<td>2.9408</td>
<td>3.4762</td>
</tr>
</tbody>
</table>
There is no significant difference in word-decoding ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300) (see Appendix A).

The data resulting from three-way analysis of variance of Spanish-speaking subjects' responses on the word-decoding exercise designed for this study revealed significant differences, $F(3, 70) = 4.08, p < .01$. Subscores dealing with proficiency levels and their relationship to experimental sounds and positions of sounds in words substantiated the data on main effects (see Table 8). $H_0^8$ was rejected. The data indicated that as English-language proficiency levels increase, Spanish-speakers' ability to decode words containing letter-sounds not found in Spanish also increases.

Figures 7 and 8 contain a comparative view of subject performance by English-proficiency level.

<table>
<thead>
<tr>
<th>TABLE 8: Performance means of Spanish-speaking adults on four levels of English-language proficiency on word-decoding problems in Exercise 2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>th-d</td>
</tr>
</tbody>
</table>
FIGURE 7- SOUND-DISCRIMINATION PERFORMANCE OF SPANISH-SPEAKERS ON FOUR LEVELS OF ENGLISH-LANGUAGE PROFICIENCY

[Graph showing data points with annotations: 0.00, 1.00, 3.00, 4.00 on the y-axis, and /p/-/t/, /t/-/p/, /θ/-/s/, /g/-/t/, /ʃ/-/d/ on the x-axis.]

- Df = 3
- F = 9.643
- \( \alpha = 0.001 \)
- \( H_0 \) rejected

Sounds found in Spanish and English

Sounds found in English only

FIGURE 8- WORD-DECODING PERFORMANCE OF SPANISH-SPEAKERS ON FOUR LEVELS OF ENGLISH-LANGUAGE PROFICIENCY

[Graph showing data points with annotations: 0.00, 1.00, 3.00, 4.00 on the y-axis, and p - t, ph - p, sh - ch, th - t, th - d on the x-axis.]

- Df = 3
- F = 40.035
- \( \alpha = 0.001 \)
- \( H_0 \) rejected

Letter-sounds found in Spanish and English

Letter-sounds found in English only
$H_0^9$: There is no significant difference between subject performance on items in Exercise 2 containing grapheme-phoneme combinations found in both Spanish and English, e.g., $p-t$, and on items containing familiar sounds spelled in an unfamiliar manner, e.g., $ph$ for $/f/$. 

Main effects and subscores related to proficiency levels, letter sounds ($p-t$ or $ph-p$), and position of the experimental letter-sounds in the words in which they were placed indicated significant differences in performance between $p-t$ and $ph-p$, $F(2, 89) = 4.85$, $p < .01$. Performances on $p-t$ on all levels except 300 was superior to that on $ph-p$ (see Table 9). Therefore, $H_0^9$ was rejected with the implication that unfamiliar spelling of familiar sounds creates word-decoding problems for native Spanish-speaking adults who are early readers of English.

Since $p-t$ and $ph-p$ both represent phonemes found in English and Spanish, the difference in scores supported an inference that the spelling $ph$, which does not occur in Spanish, provided word-decoding obstacles for the Spanish-speakers on the lower levels of English proficiency ($50, 100, 200$). Additional evidence for this inference was provided by the analysis of responses under $H_0^2$ (see Table 2, Figure 2). The results showed that the Spanish-speaking subjects' performance on the letter-sounds $th-t$ in Exercise 2 contrasted with that on the sounds $/θ/ - /t/$ in Exercise 1. In the latter exercise, Spanish-speakers performed better on $/θ/ - /t/$ than on $/ð/ - /d/$ and $/s/ - /d/$, despite the fact that all three sound-sets contained elements not found in
Spanish. In Exercise 2, however, their performance on th-t was comparable to that on sh-ch and th-d. It was inferred that the unfamiliarity of the digraph th to Spanish-speakers was responsible for the contrast in performance on Exercise 1 and Exercise 2. For 300-level Spanish-speakers and English-speakers, who had had more experience in decoding English, the difference in the spelling of /f/ did not produce significant contrasts in performance.

An additional three-way analysis of variance was run on the performance of all five groups of subjects on Exercise 2. In this test, three letter-sound groups, p-t; ph-p; and sh-ch, th-t, th-d constituted the letter-phoneme variable. The results described in the preceding paragraphs were confirmed (see Table 2, Figure 2). At the same time, the results provided evidence as to the source of the word-decoding errors committed by the subjects. Whereas responses on ph-p indicated that the unfamiliar spelling of /f/ contributed to decoding difficulties, the greater incidence of mistakes on sh-ch, th-t, and th-d led to the inference that something besides orthography was responsible for these errors. It was inferred that phonological contrasts between Spanish and English were additional factors in decoding errors on the letter-sound combinations sh-ch, th-t, and th-d.

Figure 9 reveals the comparison between performances on the two grapheme-phoneme combinations.
TABLE 9: Performance means of Spanish- and English-speaking subjects on decoding of words containing ph-p and p-t.

<table>
<thead>
<tr>
<th></th>
<th>Level 50</th>
<th>Level 100</th>
<th>Level 200</th>
<th>Level 300</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Init.</td>
<td>Mod.</td>
<td>Term.</td>
</tr>
<tr>
<td>p-t</td>
<td>levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1450</td>
<td>1.5470</td>
<td>1.7950</td>
<td>1.9010</td>
<td>1.9260</td>
</tr>
</tbody>
</table>

FIGURE 9- WORD-DECODING PERFORMANCE BY FIVE GROUPS ON FIVE LEVELS OF ENGLISH-LANGUAGE PROFICIENCY- NONSENSE WORDS CONTAINING P-T VS. PH-P

$F = 25.266$
$\alpha = 0.001$
$H_0$ rejected
\( H_0^{10} \): There is no association between performance on items in Exercise 1 and corresponding items in Exercise 2.

Expressed in statistical terms, this hypothesis can be rewritten as \( R = 0 \), which means that the correlation coefficient, as analyzed by the Pearson Product Moment Correlation test, is equal to zero.

Responses on Exercise 1 and Exercise 2 of this study were analyzed for association by the use of the Pearson "r" test. This had been made possible by the pairing of the items in the two exercises so that experimental sounds in Exercise 1 were matched with corresponding letter-sound combinations in Exercise 2 (see Appendix C). Through this procedure the possible association between sound-discrimination on Exercise 1 and word-decoding on Exercise 2 was investigated.

The overall correlation coefficient (\( r \)) was 0.3246, with an \( R^2 \), area of commonality between performances on the two exercises, of 0.1054. These measurements indicated a small but definite correlation between performances on items in Exercises 1 and 2, as can be seen in Table 10.

The data indicated that, with the exception of the English-speakers' performance, slight to moderate significant relationships existed between the subjects' performance on corresponding items in Exercise 1 and Exercise 2. The inference drawn from the results of the statistical analyses described above was that sound-discrimination skills were associated with word-decoding ability in relationships ranging from slight to moderate. Analyses of the performance on the two exercises revealed areas of commonality at a level of significance which precluded attributing their relationships to mere chance.
Therefore, $H_0^{10}$ was rejected. Although the coefficients of correlation between the performances of Spanish-speakers on Exercises 1 and 2 were not large, they were definite and significant at a level below the .01 required as a basis for decisions in this research.

Scattergrams of these results may be found in Appendix F.

TABLE 10: Association between performance on items in Exercise 1 and corresponding items in Exercise 2 by sound/letter-sound and English-language-proficiency level.

<table>
<thead>
<tr>
<th>Sound/Letter-Sound</th>
<th>Correlation Coefficient</th>
<th>$R^2$ (Commonality)</th>
<th>By English-language Proficiency Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Sound/Letter-Sound</td>
<td></td>
<td></td>
<td>By English-language Proficiency Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Level</td>
</tr>
<tr>
<td>/p/-/t/</td>
<td>0.26642*</td>
<td>0.07098</td>
<td>50</td>
</tr>
<tr>
<td>/f/-/p/</td>
<td>0.35717*</td>
<td>0.12757</td>
<td>100</td>
</tr>
<tr>
<td>/s/-/s/</td>
<td>0.42334*</td>
<td>0.17921</td>
<td>200</td>
</tr>
<tr>
<td>/θ/-/θ/</td>
<td>0.33046*</td>
<td>0.11456</td>
<td>300</td>
</tr>
<tr>
<td>/θ/-/d/</td>
<td>0.25485*</td>
<td>0.06495</td>
<td>English</td>
</tr>
</tbody>
</table>

* .01 level of significance
In summary, three-way analysis of variance of subjects' responses to sound-discrimination and word-decoding items in Exercises 1 and 2 of this study produced the following information:

1. Performance on Exercise 1 (sound-discrimination instrument) did not reveal significant differences in Spanish-speaking subjects' accuracy on the basis of the familiarity of the experimental sounds in the nonsense words included in the first exercise. Thus, $H_0^1$ was retained.

2. On Exercise 2 (word-decoding test), analysis of Spanish-speaking subjects' responses revealed significant differences in accuracy on the basis of familiarity of the experimental letter-sounds in the nonsense words included in the second exercise. Responses were significantly more accurate in items containing letter-sounds found in both Spanish and English. Thus, $H_0^2$ was rejected.

3. There was no significant difference in Spanish-speaking subjects' performance on the basis of the positions of experimental sounds in the words in which they were placed. Thus, it was inferred that position did not significantly affect the subjects' performance on sound-discrimination problems. $H_0^3$ was retained.

4. Analysis of Spanish-speaking subjects' responses on Exercise 2 indicated that their accuracy was significantly less in the decoding of medially-placed experimental letter-sounds than in the decoding of initially- and terminally-placed letter-sounds. Thus, $H_0^4$ was rejected.

5. English-speakers performed with significantly greater accuracy on both Exercises 1 and 2 than did Spanish-speakers on the highest level.
of English-language proficiency included in the study. As a result, $H_0^5$ and $H_0^6$ were rejected.

6. Higher levels of English-language proficiency among Spanish-speaking subjects were associated with significantly better performances on Exercises 1 and 2. Therefore, $H_0^7$ and $H_0^8$ were rejected.

7. Spanish-speakers performed with significantly less accuracy in decoding nonsense words containing ph-p than in decoding items with p-t. Thus, it was concluded that the unfamiliar spelling (ph) of a familiar sound (/f/) presented word-decoding problems to the Spanish-speaking subjects. $H_0^9$ was rejected.

8. Finally, paired scores on Exercises 1 and 2 were analyzed by the Pearson Product Moment Correlation test with a resultant coefficient of .3246, a small but definite correlation. Coefficients indicating association between performances on Exercises 1 and 2 on the basis of experimental phonemes/grapheme-phonemes and levels were also small but definite with the exception of those relating to the English-speaking subjects. For these reasons, $H_0^{10}$ was rejected.

The conclusions drawn from these results and recommendations based thereon will be included in the following chapter.
Summary

The desire to locate sources of reading difficulties in Spanish-speaking adults who are early readers of English motivated this research. The investigation focused on the sound-discrimination and word-decoding skills of such individuals. It studied the degree to which phonological contrasts between Spanish and English were associated with these skills in its subjects. Data from seventy-four Spanish-speaking and twenty English-speaking adults were collected and analyzed to determine whether sound-discrimination and word-decoding errors were associated with the presence of phonemes and grapheme-phonemes found in English but not in Spanish.

The major objectives were to:

1. Investigate the differences in subjects' discrimination between sounds (initial, medial and terminal) contained in both English and Spanish and those found in English only.

2. Investigate the differences in subjects' decoding of nonsense words containing letter-sound combinations (initial, medial and terminal) occurring in both English and Spanish and those found in English only.

3. Investigate differences in sound-discrimination and word-decoding as described in 1 and 2 above between native speakers of Spanish and native speakers of English.

4. Investigate differences among English proficiency levels (50, 100, 200, 300) (see Appendix A) with respect to per-
performances on the sound discrimination and word-decoding tests (Exercises 1 and 2) (see Appendix C) designed for this study.²

The content of these objectives was stated in ten null hypotheses which were tested through three-way analysis of variance for the discovery of significant differences. Contrasts were sought among Spanish-speakers' performances on sound-discrimination and word-decoding items containing familiar and unfamiliar sounds and letter-sounds. In addition, Spanish-speakers' performances on sounds and letter-sounds placed initially, medially and terminally in nonsense words were studied for differences. Contrasts in performance among English-speakers as well as Spanish-speakers on various levels of English-proficiency were investigated. The possibility that unfamiliar spellings of sounds familiar to Spanish-speakers might be a source of word-decoding errors was looked into. Finally, the degree of association between sound-discrimination and word-decoding performances by all the subjects included in the study was analyzed through the use of Pearson Product Moment Correlation Coefficient (Pearson "r").

The study differed from others investigating the problems of early readers in several respects.

1. It confined its investigation to adult readers.
2. The subjects studied were native speakers of Spanish. English-speakers were used only as controls.
3. Whereas most studies dealing with the reading problems of non-native speakers of English investigate difficulties of advanced readers, e.g., Croft (19:188-207), Rivers (65:213-239), this research concerned itself with the problems of
early readers.

4. The present study confined itself to the investigation of the word-decoding skills of Spanish-speaking adults who were early readers of English. It did not include the element of meaning in its study, focusing on the connection between the visual stimulus of the printed letter and the image of its corresponding sound in the mind of the reader.

Basic to this research was the question: Does word-decoding consist of a visual stimulus (grapheme) which is associated in the mind of the reader with a sound? If this is the case, the absence of a particular phoneme from the first language of a non-native speaker of English may well cause difficulties in decoding words containing such sounds and their corresponding graphic symbols.

Research of the literature relative to the existence of a phonological stage in word-decoding revealed that there is a consensus among reading authorities, linguists, and psychologists that such a stage does exist. Only the psycholinguists protest at the fragmentation of the reading process into discrete stages.

Additional evidence as to the nature of the reading act was sought through the analysis of responses on two exercises designed to test the hypotheses on which the study was based. The first of these exercises was a sound-discrimination test; the other, a word-decoding instrument. Each exercise was composed of 75 pairs of nonsense words. Thirty of these pairs contained experimental phonemes familiar to both Spanish- and English-speakers; forty-five contained phonemes found in English only.
The exercises were administered to seventy-four Spanish-speaking adults in English as a Second Language classes in Mission Community College Centers in San Francisco, California, and to twenty English-speakers in Adult Education classes at Linn-Benton Community College, Albany and Corvallis, Oregon. The limitation on the choice of ESL classes for the investigation was that they represent four different levels of English-language proficiency (50, 100, 200, 300) (see Appendix A).

All groups were given both the sound-discrimination and the word-decoding exercises.

Performance data were analyzed and discussed on the basis of ten null hypotheses. Decisions as to the significance of the findings resulting from analysis of data were made at the .01 level.

There follows a summary of the results of the study organized by hypotheses.
$H_0^1$: There is no significant difference in Spanish-speaking subjects' discrimination between sounds contained in both English and Spanish and those found in English only.

Data from Exercise 1, a test requiring discrimination between sounds found in English and Spanish and sounds found in English only, showed no significant difference in performance between the two groups of sounds, $F(1, 70) = 7.01, p > 0.01$. Analysis of subject performance on the basis of language-proficiency levels also failed to show significant differences in sound-discrimination between the above sound groups. $H_0^1$ was retained.

$H_0^2$: There is no significant difference in Spanish-speaking subjects' decoding of nonsense words containing letter-sound combinations occurring in both English and Spanish and those found in English only.

Responses on word-decoding problems, in which letter-sounds found in both English and Spanish were matched with those found in English only, revealed significant differences in favor of the former, $F(2, 70) = 4.92, p < 0.01$. $H_0^2$ was rejected.

$H_0^3$: There is no significant difference in Spanish-speaking subjects' ability to discriminate between sounds whether they occur initially, medially or terminally.

$H_0^3$ was retained on the basis of evidence that no significant differences existed in the subjects' ability to discriminate between sounds found in Spanish and English and those found in English only, whether these sounds occurred initially, medially or terminally, $F(2, 70) = 4.92, p > 0.01$. 
There is no significant difference in Spanish-speaking subjects' ability to decode words whether experimental letter-sound combinations occur initially, medially or terminally.

There were significant differences in Spanish-speaking subjects' performance on word-decoding problems containing letter-sounds found in both Spanish and English and those found in English only on the basis of the letter-sounds in the words in which they were placed. Main effects, $F (2, 70) = 4.92, p \ll .01$, were supported by means of 3.50 for initial letter-sounds, 3.35 for medial, and 3.65 for terminal. Therefore, $H_0^4$ was rejected.

$H_0^5$: There is no significant difference in sound-discrimination (as described in $H_0^1$ above) between native speakers of Spanish and native speakers of English.

The performance of the English-speaking subjects on Exercise 1 was significantly superior, $F (1, 32) = 7.50, p \ll .01$, to that of the Spanish-speakers having the greatest English-language proficiency (Level 300). Thus, $H_0^5$ was rejected.

$H_0^6$: There is no significant difference in word-decoding (as described in $H_0^2$ above) between native speakers of English and native speakers of Spanish.

Again, the English-speaking control group rendered a significantly superior performance to that of the Spanish-speaking subjects, this time on the word-decoding problems of Exercise 2.

Main effects indicated a significant contrast, $F (2, 32) = 5.34, p \ll .01$. $H_0^6$ was rejected.
H₀⁷: There is no significant difference in sound-discrimination ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300) (see Appendix A). Main effects of three-way analysis of variance showed a significant difference $F (3, 70) = 4.08, p < .01$, in the performance of Spanish-speaking subjects on four levels of proficiency. For this reason, $H₀⁷$ was rejected.

H₀⁸: There is no significant difference in word-decoding ability among Spanish-speaking subjects at different English-language proficiency levels (50, 100, 200, 300) (see Appendix A). The data resulting from three-way analysis of variance of Spanish-speaking subjects' responses on the word-decoding exercise designed for this study revealed significant differences on the basis of English-language proficiency levels, $F (3, 70) = 4.08, p < .01$. Thus, $H₀⁸$ was rejected.

H₀⁹: There is no significant difference between subject performance on items in Exercise 2 containing grapheme-phoneme combinations found in both Spanish and English, e.g., $p-t$, and on items containing familiar sounds spelled in an unfamiliar manner, e.g., $ph$ for $/f/$. Main effects and subscores related to proficiency levels, letter-sounds ($p-t$ or $ph-p$), and position of the experimental letter-sounds in the words in which they were placed indicated significant differences in performance between $p-t$ and $ph-p$, $F (2, 89) = 4.85, p < .01$. Therefore, $H₀⁹$ was rejected.
H_0^{10}: There is no association between performance on items in Exercise 1 and corresponding items in Exercise 2 (R=0).

Analysis of the responses of all five groups of subjects through the use of the Pearson Product Moment Correlation Coefficient test revealed a coefficient of .3246, a small but definite correlation at the .001 level of significance. H_0^{10} was rejected.

Conclusions

The findings of the present research are as follows:

1. The ability of Spanish-speaking adults who are early readers of English to discriminate between nonsense words containing sounds found in both Spanish and English and in English only is not significantly impaired by the presence of the latter sounds; their ability to decode words containing letter-sounds not found in Spanish, however, is significantly impaired by the presence of such items.

2. The ability of Spanish-speaking adults who are early readers of English to discriminate between sounds found in English and Spanish and those found in English only is not significantly affected by the position of the experimental sounds (initial, medial, terminal) in the words in which they are placed. Subjects' ability to decode words containing experimental letter-sounds is, however, affected by the position of letter-sounds in the words in which they are placed. Their performance on words containing experimental letter-sounds in terminal and initial position is significantly superior to that on words containing such letter-sounds in medial position.
3. English-speaking adults perform significantly better than do Spanish-speaking adults with a high degree of English-language proficiency (Level 300) on problems requiring aural discrimination between nonsense words containing sounds found in Spanish and English and those containing sounds found in English only. Similarly, English-speakers' performance on decoding nonsense words containing letter-sounds found in Spanish and English and those found in English only is significantly superior to that of Spanish-speaking adults on a high level of English-language proficiency (Level 300).

4. Spanish-speakers perform significantly better on sound-discrimination and word-decoding problems containing sounds and letter-sounds found in both Spanish and English and on those with such items found in English only, as the subjects' English-language proficiency increases.

5. Unfamiliar spellings of familiar sounds produce significant differences in the word-decoding performance of Spanish-speaking adults who are early readers of English, particularly at the lower levels of English-language proficiency (50, 100).

6. There is a small to moderate but definite association between the sound-discrimination performance of Spanish-speaking adults who are early readers of English on words containing sounds found in Spanish and English and those found in English only and the word-decoding performance on items containing the same sounds and their corresponding graphic symbols.

The next section contains recommendations for further research.
Recommendations

The following recommendations contain suggestions as to directions for further research, both theoretical and methodological, into phonological contrasts between languages and word-decoding skills of adults who are early readers of English as a Second Language.

1. Theoretical research
   a. In view of the relatively high performance level of Group 50 as contrasted with that of the Group 100 despite its classification as the lowest English-language-proficiency level, study of the placement procedures at present employed in the Mission Community College Centers would be useful.
   b. In order to ascertain the influence of phonological contrasts on reading skills, it would be important to study the relationship of word-decoding to word-comprehension in non-native speakers of English.
   c. In order to investigate the general applicability of the findings of the present study, it is suggested that the research be replicated with the substitution of different phonemes for those employed in the present research, e.g., /s/ (s) for /t/ (t) in /θ/ (th) - /t/ (t), vowels such as /i/ (i), /æ/ (æ), /au/ (au).
   d. For further research into the general applicability of the findings of the present study, it is recommended that the investigation be replicated with the use of speakers
of other languages as subjects.

2. Research into the utility of selected methodological approaches
   a. Informal Reading Inventories (I.R.I.'s) containing words with the letter-sounds studied in the present research (e.g., shoe, wash, washer, thing, bath, bathe, that, mother, phone, graph, telephone) as well as other unfamiliar letter-sounds should be studied to determine their accuracy in the identification of subjects' word-decoding skills.
   b. Research should be conducted into the usefulness of word-decoding drills employing words from the I.R.I.'s and stressing syllable- or short-word decoding rather than one-to-one letter-sound correlation. Such studies would add to available information on the effectiveness of word-decoding practice on materials longer than single letter-sounds but shorter than phrases or sentences.
   c. Studies of word-decoding practice in longer contexts (dialogues, question-and-answer drills, controlled conversations, dictations, etc.) would compare the advantages of such materials with those described in b above.
   d. The utility of audio-visual materials and situations resulting in language-experience compositions containing experimental letter-sound combinations should be investigated. A study of the effectiveness of combining the language-experience approach with that of word-decoding would indicate whether these two methodological devices can be mutually reinforcing
with the end result better decoding strategies in the reader of English as a Second Language.

e. The usefulness of criterion-referenced tests requiring decoding of nonsense and meaningful words containing letter-sounds not found in Spanish (or the subjects' first language) should be investigated. In these, as in the drills suggested in b above, research into the effectiveness of intensive practice on limited segments of written material as compared to longer segments would be of aid to ESL professionals.

The present research has investigated an area not heretofore studied, the association of phonological contrasts between the first and second languages of adults who are non-native speakers of English and the ability of these subjects to decode words containing unfamiliar letter-sounds. The finding that such contrasts do influence word- decoding skills contributes to the understanding of sources of reading difficulties in adults who are early readers of English as a Second Language. Additionally, the findings, though limited to this initial research, tend to reinforce the theorists who believe that a relationship exists in the mind of the reader between a graphic symbol and its corresponding sound.
BIBLIOGRAPHY


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APPENDIX A

Competencies: levels 100, 200, 300
Competencies: Levels 100, 200, 300

ESL 100

PREREQUISITES

Students who have little knowledge of English as determined by an oral interview and the following EPT A/B, C/D scores:

Beginning of semester: 11-15 Middle: 16-19 End: 20-25

Placement must be determined by both the student's oral ability and test score.

OBJECTIVES

General

The basic goal of ESL 100 is for students to begin to communicate and conduct the affairs of daily life in spoken and written English. An important aspect of this goal is that the students communicate in a manner that will help them function effectively in a society that uses English as its primary language. The students need to be able to speak clearly and understandably and to use English correctly and effectively.

Specific

I. Listening

Students will be able to:

A. Respond to teachers' and classmates' questions

B. Respond to requests and commands

II. Oral Production

Students will be able to:

A. Respond orally to statements, questions, requests, and commands with short answers and complete sentences using an understandable pronunciation.

B. Generate sounds, words, and sentences similar to a model with some degree of accuracy.
ESL 100

C. Request limited information on telephones or in person (directions, services, schedules, time)

D. Relate sounds to phonological spelling in English

III. Reading

Students will be able to:

A. Read cues and sentences for drills

B. Read simple conversations and paragraphs based on oral work learned in class

C. Read silently for comprehension

D. Relate phonological spelling in English to sounds

E. Recognize high frequency words that do not follow rules of phonological spelling in English

IV. Writing

Students will be able to:

A. Write dictations based on oral work and reading materials

B. Write controlled sentences based on oral work and reading materials

C. Answer questions in a narrative form to produce short controlled written paragraphs

D. Start sentences with capitals and end them with periods or question marks; use apostrophes in contractions and possessive nouns; use a comma after "yes" and "no"

V. Special Skills

Students will be able to:
A. Provide basic information about self and family members verbally and in writing (name, sex, age, address, telephone number, marital status, number of dependents, native country, birthdate)

B. Use standard polite expressions, including greetings, leave-takings, and introductions

C. Recognize traffic and emergency signs ("exit," "hospital," "danger," "flammable," "poison")

D. Request assistance from police, the fire department, the hospital, and the doctor

E. Describe medical symptoms and illnesses

F. Extract information from schedules and maps

G. Locate places in the community (neighborhoods, landmarks, places of interest)

H. Tell time

I. Use the telephone for simple calls, including emergencies

J. Use public transportation

K. Shop for food, clothing and other necessities

L. Take simple teacher-made tests

M. Fill out simple applications and Community College Center registration forms

N. Read a calendar

O. Count money

P. Identify and discuss holidays and celebrations observed in the United States
ESL 100

Q. Pronounce common first names
R. Alphabetize

APPROACH - METHODS AND MATERIALS

At this level, students can be very easily overwhelmed by the enormity of learning a new language. As students find they are able to master some fundamentals of the language, they realize English is learnable. It is essential for the teacher to be patient and encouraging at this level.

In ESL 100 the major emphasis is on oral skills. Reading and writing are generally introduced as an adjunct to these oral skills. Basic survival skills are the students' greatest need at this level. Therefore, emphasis must be placed on the teaching of these skills.

Because of limited vocabulary, visual materials are an essential teaching tool. At this level, there is a systematic introduction of grammar with a textbook or teacher-made materials. Language lab techniques and tapes are useful for developing comprehension from models other than the teacher.

See the introduction for a general discussion of ESL methodology and other relevant information.

COURSE CONTENT

The following areas are those to be covered by the teacher in teaching the skills previously listed under "Specific Objectives." It is not expected that any one teacher cover all the specific objectives and/or course content. However, since each level depends on its correlation with those preceding and following it, an attempt should be made to cover the material as thoroughly as possible. When a student has more than one teacher, the teachers should coordinate their materials so that the student will be exposed to as much as possible. The sequencing of items under "Course Content" is to be determined by the teacher.
ESL 200

PREREQUISITES

Successful completion of ESL 100, or an oral interview and the following EPT A/B, C/D scores:

   Beginning of semester: 18-27   Middle: 21-29   End: 26-36

The oral interview consists of questions about the student, his/her English, and the room where the interview is taking place. The student will be able to answer the questions appropriately and intelligibly despite possible structural errors. Placement must be determined by both the students' oral ability and test score.

OBJECTIVES

General

The basic goal of ESL 200 is for the students to continue gaining simple communicative ability to function in practical areas necessary for survival in the United States. Specific language abilities and experience are developed further so that students will be able to express themselves simply and clearly in specific contexts that use the simple past, present, future and present perfect. They will be able to understand native speakers using simple tenses in limited situations and will be able to respond in such a way that the native speaker will understand their simple communicative efforts.

Specific

1. Listening

   Students will be able to:

   A. Respond both orally and in writing to teachers' and classmates' questions, statements and requests

   B. Respond physically to requests and commands

   C. Distinguish singular from plural
D. Distinguish time reference

E. Differentiate words that differ by one or two similar sounds (eat/it, nine/night, Jones/John's, etc.)

II. Oral Production

Students will be able to:

A. Respond orally with short, natural, appropriate responses, using understandable pronunciation, to greetings, simple requests, and statements

B. Respond orally with limited vocabulary to visual stimuli

C. Imitate and repeat sounds, phrases and sentences with a degree of accuracy intelligible to a native speaker

D. Recite a series of short related sentences about themselves, others or material studied in class with a rhythm and intonation pattern understandable to a native speaker

E. Initiate questions and appropriate responses to simple statements or expressions of emotional concern

F. Request simple services and ask for and pass on information

G. Ask for a short simple explanation and ask for repetition

H. Repeat and rephrase and correct questions, requests, or statements when unclear or not intelligible to listeners

I. Read with intonation, rhythm and phrasing intelligible to English-speaking listeners

J. Relate sounds to phonological spelling in English
ESL 200

III. Reading

Students will be able to:

A. Read cues for sentences and drills
B. Read silently for comprehension
C. Read simple conversations and paragraphs based on oral work learned in class

IV. Writing

Students will be able to:

A. Fill in and answer exercises based on class work
B. Correctly spell words used frequently in class materials
C. Apply phonological rules of English spelling
D. Write dictated sentences based on oral work and reading materials
E. Start sentences with capitals and end with periods or question marks; use apostrophes in contractions and possessive nouns; use commas after "yes" and "no," items in a series, compound sentences and tag questions
F. Generate simple sentences about themselves and their environment

V. Special Skills

Students will be able to:

A. Read and write checks and deposit and withdrawal slips
B. Extract price information (bills, advertisements, price tags, etc.).
C. Extract information from schedules and maps
D. Read menus
E. Read traffic and emergency signs
F. Read simple directions
G. Fill out simple forms
H. Shop for food, clothing and other necessities
I. Use recreational facilities (parks, swimming pools, zoo, etc.)
J. Locate words in a bilingual dictionary
K. Use standard polite expressions, including greetings, leave-takings, introductions
L. Tell time
M. Give and follow directions to specific destinations
N. Request emergency and community services (police, fire, ambulance, health department, etc.)
O. Use postal services (money orders, stamps, parcel post, etc.)
P. Pronounce common first names
Q. Discuss holidays and celebrations observed in the United States
R. Find telephone numbers in the white pages

APPROACH - METHODS AND MATERIALS

Listening and speaking skills are emphasized in contexts which are meaningful and useful to students in their daily lives. Role-playing, dialogues, taped conversations and field trips
ESL 300

PREREQUISITES

Successful completion of ESL 200, or an oral interview and the following EPT A/B, C/D scores:

Beginning of semester: 30-37  Middle: 35-37  End: 37 and out

If students score 37 or more on A/B, C/D, at the beginning of the semester or 40 at the middle or end, the EPT G/H test must be given. The following G/H scores are applicable to ESL 300:

Beginning and middle of semester: 0-14  End, 0-18

Placement must be determined by both the student's oral ability and test score. In addition, an on-the-spot sample of student writing is recommended.

OBJECTIVES

General

ESL 300 is a settling-in time, when students assimilate what they have learned. They discuss, both orally and in simple written paragraphs, many subjects with a certain degree of accuracy as well as fluency. The students might be expected to reach a learning plateau at some time during the semester. From this transitional level, students move into more advanced classes where they will develop a more sophisticated use of the language.

Specific

1. Listening

Students will be able to:

A. Respond to oral directions and instructions

B. Distinguish the individual sound segments of English
C. Distinguish semantic change by interior shifting of stress and intonation within a one-word sentence

  e.g., The boy likes candy. (Implies someone else does not)

  The boy ____ likes candy. (Implies reassurance of doubter)

  The boy likes candy. (Implies he does not like something else)

D. Participate in conversations with classmates and teacher

E. Understand simple stories and jokes

II. Oral Production

  Students will be able to:

  A. Generate more complicated questions and statements in basic conversation

  B. Interview classmates about personal backgrounds and classroom activities

  C. Plan in small groups to carry out classroom activities

  D. Record events and incidents

  E. Converse informally

III. Reading

  Students will be able to:

  A. Read and recount simple stories and adapted newspaper and magazine articles

  B. Read for explicit information
IV. Writing

Students will be able to:

A. Write complete sentences using structural forms mastered up to this point

B. Write dictated sentences based on oral work and reading materials

C. Write controlled and original narrative and descriptive paragraphs when supplied with simplified models and outlines

D. Use correct writing format, spelling, and punctuation, including rules for direct quotation

E. Apply phonological rules of English spelling

V. Special Skills

Students will be able to:

A. Use American English/English dictionaries for spelling, pronunciation, and meaning, including alternative meanings

B. Gather limited information from encyclopedias and other reference works

C. Familiarize themselves with traffic regulations for safety and for obtaining drivers' licenses

D. Fill out simple job applications

E. Use telephone directory information, including yellow pages (services, rates, telephone numbers, maps, time zones, etc.)

F. Identify and differentiate bank services (money orders, personal checks, credit cards, savings accounts, loans
and non-bank credit systems (charge accounts, gasoline credit cards, installment buying)

G. Give and follow directions to specific destinations

H. Pronounce common first and last names

I. Converse about holidays and celebrations observed in the United States

APPROACH - METHODS AND MATERIALS

In general, the methods of instruction at ESL 300 follow those of ESL 100 and 200, emphasizing oral skills, including dialogues, role-playing, oral drills and pronunciation work. Writing must be taught as an essential and effective tool of language learning. There is a need for dictation drills and for spelling exercises related to phonology. In addition to reading selections, texts and pictures, films with simple narration or silent films can be used. Games, crossword puzzles, and charades are also effective ways of introducing and reinforcing new vocabulary.

See the introduction for a general discussion of ESL methodology and other information relevant to this level.

COURSE CONTENT

The following areas are those to be covered by the teacher in teaching the skills previously listed under "Specific Objectives." It is not expected that any one teacher cover all the specific objectives and/or course content. However, since each level depends on its correlation with those preceding and following it, an attempt should be made to cover the material as thoroughly as possible. When a student has more than one teacher, the teachers should coordinate their materials so that the student will be exposed to as much as possible. The sequencing of items listed under "Course Content" is to be determined by the teacher.
APPENDIX B

Ilyin language placement test
### English – Second – Language Placement Test Revised*  
**by**  
Donna Ilyin

---

**Read this sample question:**

**A.** I is here.  
**B.** I am here.  
**C.** I are here.

**NOW, do these two sample questions:**

Put the X on the letter of the best answer — only one X for each test question.

**Example 1.**

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<tbody>
<tr>
<td><strong>A.</strong></td>
<td>She goes to school.</td>
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<tr>
<td><strong>B.</strong></td>
<td>She go to school.</td>
</tr>
<tr>
<td><strong>C.</strong></td>
<td>She going to school.</td>
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</table>

**Example 2.**

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<tbody>
<tr>
<td><strong>A.</strong></td>
<td>She's a book</td>
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<td><strong>B.</strong></td>
<td>It's a book,</td>
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<tr>
<td><strong>C.</strong></td>
<td>You're a book.</td>
</tr>
</tbody>
</table>

Your teacher will look at your answers.

You will have thirty minutes to do the test. Work quickly. Do the test questions you know first. Then go back to the others. Do not use a dictionary or a book. Do not ask questions after you open the test. Stay in your seat at all times.

**Wait for your teacher.**

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**B Reliability**

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**Form Correlation A & B**

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The test places students in one of the first three levels of English as a Second Language class referred to as ESL Levels: 100, 200, 300. Raw score: 0-19 = level 100; 20-30 = level 200; 30-40 = level 300.

Standardization was done on students at Alemany Adult School under the direction of the principal, Mr. William Tresnon, and with the cooperation of Mr. Dalton Howatt and Mr. George Johnson of the San Francisco Unified School District.

Mrs. Jean Jacobs of Fremont Adult School in Sacramento and Dr. Gerald Jenson of the Imperial Valley Schools in El Centro, California, assisted in establishing State Norms made possible by a grant from S.W.C.E.L. through the State Department of Education.

In order to protect the security of the test, items have been rearranged and vocabulary changed. These revised tests are made available at cost from Alemany Adult School of the San Francisco Community College District.
ADMINISTRATION INSTRUCTIONS

EPT 100 - 200 - 300 can be used both as an achievement test and as a placement test. Reliability will depend on how carefully each school administers the test and guards it for future use.

If students circulate copies of the test or share notes about it with other students, the validity and reliability of the test will be impaired.

It is suggested that one person in each school be chosen to administer and control testing by numbering all copies and keeping them in sequence in envelopes in a locked area.

Dispose of used copies in trash far away from the school.

PRE-TEST PROCEDURES

Arrange seats in well-separated rows with space for proctors to walk between and behind each chair. Seat students in alternate rows like this:

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  x & 0 & x & 0 \\
  x & 0 & x & 0 \\
  x & 0 & x & 0 \\

text:
  x & 0 & x & 0 \\
  x & 0 & x & 0 \\
  x & 0 & x & 0 \\
\end{array}
\]

TESTING

Give form C to the X rows and form D to the 0 rows. Count and check the numbers of the tests with the number of students. Remind them not to open the tests.

Tell the students to print their names on the tests and to do the examples. Walk around to see that names are down and that the X is on a letter, not beside it. Remind them not to open the tests.

When you have checked that each one knows how to mark the tests, tell them to open the books and begin. Write the starting time and the finishing time on the board - a total of 30 minutes.

To protect the validity of this test for future use, watch carefully for exchange or copying of answers and taking of notes about test items.

Remind finishing students to turn their tests over and to remain quietly seated until the others finish.

Collect tests promptly at the end of the time period. Count to be sure there is a test for each student. Arrange the tests numerically and put them back in the envelopes with any unused copies.

SCORING

See accompanying information sheet for scoring, use of answer sheet, student instructions and bibliography.
1. A. The mailmen are there.  
   B. The mailmen are there.  
   C. The mailmen are there.  

2. A. How many days are there in a week?  
   B. How many days are there in a week?  
   C. How many days are there in a week?  

3. A. What is Jack's father making?  
   B. What is Jack's father making?  
   C. What is Jack's father making?  

4. A. Where goes he to school?  
   B. Where is he going to school?  
   C. Where does he go to school?  

5. A. She never make a cake.  
   B. She never make a cake.  
   C. She never makes a cake.  

6. A. When was he working?  
   B. When worked he?  
   C. When were he working?  

7. A. Ed and Al were here, weren't they?  
   B. Ed and Al were here, were he?  
   C. Ed and Al were here, weren't Ed and Al?  

8. A. Bill didn't help you, did he?  
   B. Bill didn't help you, didn't he?  
   C. Bill didn't help you, didn't he?  

9. A. He is five years young than you are.  
   B. He is five years younger than you are.  
   C. He is five years younger than you are.  

10. A. He is sick, isn't he?  
    B. He is sick, isn't he?  
    C. He is sick, isn't he?  

11. A. How were they feeling yesterday?  
    B. How did they feel yesterday?  
    C. How were they feeling yesterday?  

12. A. Do you want these cookies?  
    B. These are two dozen here.  
    C. They are two dozen here.  

13. A. Bob is twenty years old.  
    B. Bob is twenty years old.  
    C. Bob is twenty years old.  

14. A. How old are you?  
    B. How old are you?  
    C. How old are you?  

15. A. No, I don't speak English.  
    B. No, I don't speak English.  
    C. No, I don't speak English.  

16. A. Does Jane speak Spanish?  
    B. Does Jane speak Spanish?  
    C. Does Jane speak Spanish?  

17. A. Where are we going tonight?  
    B. Where are we going tonight?  
    C. Where are we going tonight?  

18. When do you leave for work?  
   A. We leave at 7:30.  
   B. We left at 7:30.  
   C. We are leave at 7:30.  

19. Are you a student?  
   A. Yes, I am.  
   B. Yes, I do.  
   C. Yes, I'm.  

20. Do you eat lunch at one o'clock?  
   A. No, I do.  
   B. No, I don't.  
   C. No, I am not.  

21. A. Ann speaks Chinese.  
    B. Ann speaks Chinese.  
    C. Ann speaking Chinese.  

22. A. My brother and sister buy the food.  
    B. My brother and sister buy the food.  
    C. My brother and sister buy the food.  

23. A. Helen hasn't seen the movie yet.  
    B. Helen hasn't gone the movie yet.  
    C. Helen hasn't went to the movie yet.  

24. A. I don't have anything.  
    B. I don't have anything.  
    C. I don't have something.  

25. A. Was she cooking last night?  
    B. Did she cook last night?  
    C. Does she cook last night?
26. A. I have much of friends.
  B. I have lots of friends.
  C. I have many of friends.

27. A. He isn't thinking about her.
  B. He ain't think about her.
  C. He don't think about her.

28. A. How long did you lived there?
  B. How long you have lived there?
  C. How long have you lived there?

29. That boat goes under bridges, 
   A. but this one doesn't go under them.
   B. but this one doesn't go under it.
   C. but this one doesn't go under there.

30. A. I no come in class.
  B. I didn't come in class.
  C. I wasn't in class.

31. A. After ate, she brushed her teeth.
  B. After to eat, she brushed her teeth.
  C. After eating, she brushed her teeth.

32. A. Which is faster?
  B. Which is more fastest?
  C. Which is more faster?

33. A. They saw many different kind cars.
  B. They saw many different car.
  C. They saw many different cars.

34. I begin class at 10 o'clock. Peggy begins class at 9 o'clock.
   A. I begin earlier than she does.
   B. I begin after than she does.
   C. I begin later than she does.

35. That hat is Jim's.
   A. It is belong to him.
   B. It is his.
   C. It is him hat.

36. A. They have lived there many years.
  B. They have living there many years.
  C. They had live there many years.

37. A. Where is she come from?
  B. Where she come from?
  C. Where does she come from?

38. A. It is a largest tree.
  B. It is the largest tree.
  C. It is largest tree.

39. A. I was measured that box.
  B. I have been measured that box.
  C. I measured that box.

40. Tom studied history from 1965-1971.
   A. He studied for 6 years.
   B. He studied 6 years ago.
   C. He studied since 6 years.

41. A. I get back for my umbrella.
  B. I went back for my umbrella.
  C. I am go back for my umbrella.

42. A. We study with one of your brothers.
  B. We study with one of your brother.
  C. We study with one your brother.

43. A. We don't know because we have never been there.
  B. We don't know because we never been there.
  C. We don't know because we been there never.

44. A. I weigh 130.
  B. I am weigh 130.
  C. I weigh is 130.

45. A. This house is smallest than that.
  B. This house is smaller than that one.
  C. This house is smallest than the other one.

46. A. We made our beds and they made them beds.
  B. We made our beds and they made theirs beds.
  C. We made our beds and they made their beds.

47. A. Robert will teach at this time tomorrow.
  B. Robert will be teacher at this time tomorrow.
  C. Robert will be teach at this time tomorrow.

48. A. He has never hearing about it.
  B. He has never hear about it.
  C. He has never heard about it.

49. A. A friend of mine will go to Japan.
  B. A friend of my will go to Japan.
  C. A friends of mine will go to Japan.

50. A. Mary will be call her mother.
  B. Mary calling her mother.
  C. Mary will call her mother.
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APPENDIX C

Morray study: Exercises 1 and 2
Answer Sheet: Exercise 1

Instructions: Underline **S** if the two words are the same.

Underline **D** if the two words are different.

Examples:  

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<td>S</td>
<td>D</td>
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APPENDIX C

Answer Sheet: Exercise 2

Instructions: I will read one word in each pair. Put a line under the word you hear.

Example: plip plit

1. muttit muppit
2. tum thum
3. lawsh lawch
4. orp ort
5. zephkel zepkel
6. clepper cletter
dill
lote
uth
chaw
chummer
trode
thra
trupis
wuth
eephem
futhy
lithuh
pram
thawp
woophen
wirp
shon
aidem
teng
lawthe
shoove
daf
steetik
nophe
31. voper vopher
32. floot flooth
33. rutwin ruthwin
34. bruchin brushin
35. plizz phlizz
36. zeet zeeth
37. traup trauip
38. rad rath
39. thuzz duzz
40. stoothes stootes
41. dup thup
42. etnist ethnist
43. brape brate
44. tinnel pinnel
45. toiber poiber
46. praipo praito
47. achit ashit
48. nushra nuchra
49. prooze trooze
50. ith id
51. tana pana
52. blast blach
53. groop groop
54. phay pay
55. kooth koot
56. autwel aupwel
57. yoth yote
58. patna pathna
59. theb deb
60. kloot kloop
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<td>krawdern</td>
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APPENDIX D

Summary tables of the analyses of variance on correct responses in Exercises 1 and 2
Appendix D

TABLE 11: A Summary Table of the Analysis of Variance on the number of correct responses on Exercise 1 by Spanish-speakers.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
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</thead>
<tbody>
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<td>2</td>
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TABLE 12: A Summary Table of the Analysis of Variance on the number of correct responses on Exercise 2 by Spanish-speakers.

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<th>Source of Variation</th>
<th>Sum of Squares</th>
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<td>8.628</td>
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TABLE 13: A Summary Table of the Analysis of Variance on the number of correct responses on Exercise 1 by Spanish- and English-speakers.

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<th>Source of Variation</th>
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TABLE 14: A Summary Table of the Analysis of Variance on the number of correct responses on Exercise 2 by Spanish- and English-speakers.

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APPENDIX E

Raw scores of subjects in Morray study
### APPENDIX E: Table 15

**Raw Scores of Five Groups of Subjects on Exercises 1 and 2**

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Appendix E -- Continued.

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APPENDIX F

Scattergrams: Degrees of correlation between performances on Exercises 1 and 2 by sound and level
Correlation Between Subject Performances on Exercises 1 and 2:

Sound and Letter-Sound /p/(p)/t/(t)

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Correlation (R) .35717

Significance of R .0001
### Correlation Between Subject Performance on Exercises 1 and 2:

**Sound and Letter-Sound */v*(sh)*/v*(ch)**

**Down** Ex. 1  
**Across** Ex. 2

- **Correlation (R)**: 0.42346  
- **$R^2$**: 0.17921

**Significance of R**: 0.00001

---

### Correlation Between Subject Performance on Exercises 1 and 2:

**Sound and Letter-Sound */v*/(th)*/v*/(t)**

**Down** Ex. 1  
**Across** Ex. 2

- **Correlation (R)**: 0.33946  
- **$R^2$**: 0.11456

**Significance of R**: 0.00001
5. Correlation Between Subject Performances on Exercises 1 and 2:
   Sound and Letter-Sound /Y(th)/-/t/(d)
   (Down) Ex. 1  (Across) Ex. 2
Correlation (R) .25485  R² .06435
Significance of R .00001
6. Correlation Between Subject Performances on Exercises 1 and 2:

Level 50

(Down) Ex. 1 (Across) Ex. 2
Correlation (R) .23939 \( R^2 .05731 \)
Significance of R .00402

7. Correlation Between Subject Performances on Exercises 1 and 2:

Level 100

(Down) Ex. 1 (Across) Ex. 2
Correlation (R) .19707 \( R^2 .03994 \)
Significance of R .00023
8. Correlation Between Subject Performances on Exercises 1 and 2: Level 200

(Down) Ex. 1 (Across) Ex. 2
Correlation (R) .18990 $R^2 .03602$

Significance of R .00316

9. Correlation Between Subject Performances on Exercises 1 and 2: Level 300

(Down) Ex. 1 (Across) Ex. 2
Correlation (R) .24472 $R^2 .05969$

Significance of R .00035
Correlation Between Subject Performances on Exercises 1 and 2:

English-Speaking Group

(Down) Ex. 1    (Across) Ex. 2

Correlation (r) .12411    $R^2 .01540$

Significance of r .03163 (ns)