

EVALUATION OF AN AUDITORY DISCRIMINATION PRESCRIPTION-
INTERVENTION PROGRAM WITH MEXICAN AMERICAN
KINDERGARTENERS

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DEDICATION

To my husband and son for their love, patience, and helpful interest in this study.

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Chapter 1

INTRODUCTION

The education of children from families speaking languages other than English is the focus of increasing concern to educational planners (Carter, 1971; Thonis, 1976, pp. 1-66; Troike, 1978, p. 15; Ulibarri, 1969, pp. 3 & 5). Judicial, legislative, and administrative mandates require that linguistically different children be provided with equal educational opportunities (Carter & Segura, 1979, p. 253).

Texas law currently requires bilingual education programs in grades Kindergarten through Elementary in school districts where concentrations of students of limited English proficiency exist. In 1973, Senate Bill 121 required bilingual education programs for grades 1-6. Then in 1975, House Bill 1126 changed the requirements to K-3. The last legislative session, which ended on June 2, 1981, changed this requirement to Kindergarten through Elementary. Inherent problems in this mandate include adequate assessment and culturally appropriate interventions (DeAvila & Havassy, 1974; Sattler, 1974, pp. 36-37).

The literature indicates that auditory discrimination ability is greatly influenced by the native language

background of the listener and that individuals tend to tune out those phonemes which are not part of their own language (Politzer & McMahon, 1970). Leading linguists have indicated that there is wide discrepancy between the English and Spanish language phonemes (Olguín, 1971; Saville-Troike, 1976, p. 18). Therefore, Mexican-American children may find it difficult, because of phonological differences between Spanish and English, to discriminate auditorily English phonemes.

Problem

The facilitation of auditory discrimination in non-English speaking children is dependent upon adequate assessment of their auditory discrimination in their native language and culturally appropriate interventions. Appropriate measurements and programs are needed.

Purpose

This study evaluated the effectiveness of one prescriptive-intervention approach designed to fit auditory-discrimination limitations identified on a measure of auditory discrimination. The intervention program was implemented for three months with an experimental group. Both experimental and control groups were assessed by the Auditory Discrimination Test of Spanish Phonemes (ADTSP).

Research Hypothesis

This study investigated the question of the relative effectiveness of these instructional materials in relationship to the groups and in relationship to specific auditory problems. The basic rationale of this study is a diagnostic prescription approach to education. The intervention materials were directly related to identified auditory limitations, and the research intention was to measure specific as well as overall gains.

These concerns led to the structure of the following research hypothesis: Children in the experimental group evidence greater gains on the ADTSP than do children in the control group.

Delimitations

The sample in this study was delimited to 82 subjects, including 5 and 6 year old males and females enrolled in five participating kindergarten classrooms during the Spring 1981 school year. The treatment was delimited to 3 months, and the daily exposure to auditory discrimination training was during twenty minute sessions. This study was delimited to daily sessions for a total exposure of twenty hours.

A second delimitation applied to the type of population for which this program was specifically designed, that is, Mexican-American children whose dominant language is

Spanish. The ADTSP may not be applicable to similar children of the same age level who come from different linguistic or cultural backgrounds.

A third delimitation applied to the geographical area for which the Auditory Discrimination Prescription-Intervention Program was designed. This refers to Zapata Independent School District, Zapata, Texas.

Definition of Terms

For purposes of this study, the following definitions were utilized:

1. Auditory Discrimination. Perceived differences in recognition of phoneme sounds as measured by scores on the ADTSP.

2. Auditory Discrimination Prescription-Intervention Program (ADPIP). This program, which was designed specifically for this study, is designed to approach those identified limitations in auditory discrimination with culturally relevant classroom activities.

3. Auditory Discrimination Test of Spanish Phonemes. A diagnostic instrument designed to provide a more precise description of auditory discrimination skills Mexican-American children have or have not yet acquired.

4. Prescription-Intervention. The educational rationale which develops educational experiences directly

related to identified limitations in the child's perceptions.

5. Teacher Training. A series of experiences in which teachers and instructional aides were exposed to written and oral exercises, activities, small group discussions, and individual conferences related to the ADPIP.

Conclusions

Concern for the facilitation of auditory discrimination of Mexican-American children who are dominant Spanish speakers led to the development of this study. Their difficulty in discriminating English sounds within the English language may have an adverse effect on learning reading-readiness skills. Appropriate intervention programs may facilitate their discriminating English sounds and eventually support their learning reading-readiness skills.

Chapter 2

REVIEW OF THE LITERATURE

This chapter is divided into two major sections, each of which relates to the overall study. The first section presents a historical setting. Federal and state interest and guidelines are reported from a historical point of view --from 1839 to the present, 1981--in relation to equal educational opportunities for Spanish-speaking students. The size and trends of Spanish-speaking populations are also reflected.

The second section pertains to auditory discrimination skills. Influencing factors, such as native-language background, and linguistic contrasts are reviewed. Studies on the relationship between reading abilities and auditory discrimination are provided. The possibility of sex differences in auditory discrimination skills was also explored in the literature, as well as the significance of diagnostic-prescriptive techniques as an effective educational alternative. These are presented in the last portion of this chapter.

Historical Setting

Our nation recognized the needs of Spanish-speaking students, as well as German and French speaking students, more than a century ago. According to Andersson and Boyer (1970), bilingual public schools prospered from 1839 to 1917 in the United States. However, these schools disappeared after World War I.

Equal educational opportunities for students whose primary language is not English has evolved from a series of legislative and judicial rulings that can be traced back to the United States Constitution (Casso, 1976, pp. 9-10). A historical overview of the major legal events must recognize the Fourteenth Amendment, Brown vs. the Board of Education, the Civil Rights Act, the Elementary and Secondary Education Act, the Bilingual Education Act, the National Origin Memorandum, the Lau Remedies, and the Equal Educational Opportunity Act.

Federal and State Guidelines

The Fourteenth Amendment. The Fourteenth Amendment to the U.S. Constitution was passed in 1868 and established the principle of equal opportunity. It gives congress the power to enforce by legislation. It protects the privileges and immunities of all citizens and provides equal protection under the law.

Brown vs. Board of Education. Brown vs. Board of Education further established the principle of equal educational opportunity in 1954. It strikes down the separate but equal doctrine. The Supreme Court affirms that "it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education" (Brown vs. Board of Education, 1954).

Civil Rights Act. The Civil Rights Act of 1964 further established the principle of equal opportunity for national origin minority groups. The Department of Health, Education, and Welfare was authorized to apply compliance procedures and to review and withhold federal funds (Rosen & Stickler, 1977, pp. 518-519).

The Elementary and Secondary Education Act of 1965. The Elementary and Secondary Education Act of 1965 placed emphasis on educational opportunities for the economically disadvantaged; however, it did not contain specific provisions for the development of appropriate programs for linguistically and culturally different children. In 1967 Senator Ralph Yarborough of Texas introduced and co-sponsored the first Congressional bill for bilingual education in the United States. The bill proposed supplemental funding for school districts that would establish programs for children of limited English-speaking ability in the United States (U.S. Commission on Civil Rights, 1975).

Bilingual Education Act. President Lyndon B. Johnson commented on the first bilingual education bill in the history of the United States:

This bill . . . contains a special provision establishing bilingual education programs for children whose first language is not English. Thousands of children of Latin descent, young Indians, and others will get a better start--a better chance--in school . . . We have begun a campaign to unlock the full potential of every boy and girl--regardless of his race or his region or his father's income. (Andersson & Boyer, 1970, p. 1)

Passage of the bilingual education bill in January 1968, as Title VII--The Bilingual Education Act, recognized the existence of a large student population in the nation with limited English-speaking abilities (Andersson & Boyer, 1970, Vol. 1, p. 147). Gonzalez (1975, p. 11) stated that this law provided "formal governmental recognition of the legitimacy of bilingual education."

The Bilingual Education Act of 1968 enabled the use of a small amount of federal funds to meet the educational needs of linguistically different children. The Texas Education Agency points out in the Texas Statewide Design for Bilingual Education (November 1968) that the Bilingual Education Act affirms the primary importance of English while at the same time it recognizes that the non-English language of a child can have an effective role in the educational process.

State support. The National Institute of Education (1976, p. 4) pointed out that twenty-three states had prepared legislation or regulations concerning bilingual education since 1968. Texas passed the first State Bilingual Legislative with no funding in 1971. Then in 1973 when Senate Bill 121 was passed, funds were allocated to meet the needs of students whose native language was not English in first through sixth grades. These funds were allocated on a yearly basis. Later, Texas House Bill 1126 was passed, and State legislation provided complete programming for the lower grade levels--kindergarten through third grade. The 1981 Legislature increased funding for the bilingual program and expanded its scope by providing for Grades Kindergarten through Elementary.

National Origin Memorandum. The Department of HEW Memorandum of May 25, 1970, also known as the National Origin Memorandum (35 Federal Register 11575), established the principle of equal educational opportunity for language minority children. It affirms the application of Title VI of the 1964 Civil Rights Act to language minority children (Casso, 1976, p. 19).

Three main areas of concern are identified in the National Origin Memorandum. They are: (a) unequal access to participation in school programs because of language, (b) segregation by tracking, ability grouping and assignment

to Special Education and (c) the exclusion of parents from school information (U.S. Commission on Civil Rights, 1975).

Lau Remedies. In the Lau vs. Nichols decision, January 21, 1974, the United States Supreme Court found a denial of equal educational opportunity under the Civil Rights Act of 1964--Title VI. This federal case affirmed the validity of the National Origin Memorandum which extended the Civil Rights Act of 1964 to language minority children. As a result of Lau vs. Nichols, 414 U.S. 563, the Department of HEW was affirmed authority to require affirmative remedial efforts to give special attention to students whose primary language is not English (Casso, 1976, p. 20; Wright, 1973).

Molina (1974) had this to say concerning the United States Supreme Court decision on Lau vs. Nichols:

Providing students who cannot comprehend the language of instruction with the same facilities, texts, teachers and curriculum does not solve the problem. If they cannot understand the language of the materials, they are being denied an equal educational opportunity. (p. 19)

This court decision did not prescribe a specific remedy but ordered the San Francisco School Board to provide the appropriate relief.

Lau Remedies provide interpretive federal regulations by which the Office of Civil Rights conducts compliance reviews. The Lau Remedies require school districts to

develop and implement a Lau plan when a school district has 20 or more students of one language group identified as having a primary or home language (Rosen & Stickler, 1977, pp. 529-530).

Equal Educational Opportunity (EEO). Equal Educational Opportunity Act of 1974 (20 U.S.C. Secs. 1703, 1706, 1708-10) affirms the responsibility of the state and local educational agency to take appropriate action to overcome language barriers that impede equal participation by its students in its instructional programs. This law, which was passed by Congress, reaffirms the Fourteenth Amendment.

United States vs. Texas, 1981 (Civil Action 5281), finds violations of the 14th Amendment to the U.S. Constitution and the Equal Educational Opportunity Act of 1974 Section 1703 (f), which prohibits denial of Equal Educational Opportunities by failure of an educational agency to take appropriate action to overcome language barriers that impede equal participation by its students in its instructional program. The U.S. Supreme Court also declares that Texas has failed to take affirmative steps to remove the vestiges of past discrimination. This affirms Section 1703 (b) of Equal Educational Opportunity Act of 1974.

Spanish-Speaking Populations

Spanish-speaking populations have increased during the last two decades. The trend in Mexican-American populations

is toward higher educational attainment. Therefore, the educational system must be well equipped in order to meet the needs of this special student population.

Fernandez (1974) reported that between 1968 and 1970 the total number of students attending public schools increased by 3.5%, while the number of Spanish-speaking students alone rose by approximately 13.6%. Fernandez (1974) attributed the disproportionate trend to the increasing birthrate of Spanish-speaking populations and immigration rate, as well as to the decreasing birthrate of the majority population.

Wright (1973) reported that there were 3.4 million Mexican-American children between the ages of 5 and 19 in the United States, of whom 2 million actually speak Spanish at home. A recent report by Santiago and Feinberg (1981, p. 292) is consistent with Wright's statistics of 1973. They reported that over 3 million Hispanic children, which comprise 6% of the total school population, were enrolled in elementary and secondary public schools during the 1980-81 academic year.

The trend in the Mexican-American populations is toward higher educational achievement. The younger the group the higher the educational attainment. The 1960 Census reflects 8.3 mean years of formal education completed by 14-year-olds of Spanish surnames in five Southwestern

states, as compared with 7.1 mean years completed by adults. The State of Texas alone reflected a two year difference of formal education between 14 year olds and adults in 1960. However, Texas also reflected the lowest educational attainment in 1960 and again in 1970 for the Spanish surname population. Table 1 depicts the 1960 median number of formal school years attained by Spanish surname populations living in the five Southwestern states of Texas, New Mexico, Arizona, California, and Colorado.

Table 1

1960: Median Number of School Years Completed by
Spanish-Surname Population Living in Five States

	Adults	14 Years & Over
Arizona	7.0	8.3
California	8.6	9.2
Colorado	8.1	8.7
New Mexico	7.1	8.8
Texas	4.7	6.7
Mean	7.1	8.3

Source: United States Census, 1960.

The reason for reporting statistical information for Texas, New Mexico, Arizona, California, and Colorado was

that the majority of the Mexican-American population live in the five Southwestern states, according to Wright (1973). In 1976, California had the largest number, while Texas was reported as having the second largest number of Mexican-Americans (U.S. Bureau of the Census, 1980, p. 36).

The trend toward higher educational attainment among the Spanish-speaking populations was reflected in the U.S. Bureau of the Census (1980). In 1975 the median school years completed by Spanish origin people was 9.6. An increase of nine academic months was evident in 1979. Median school years completed by Spanish origin in 1979 was 10.3. These data are based on persons 25 years old and over. The U.S. Bureau of the Census stressed that persons of Spanish origin may be of any race. Median years of school completed by all races in 1975 was 12.3 and 12.5 in 1979 (See Table 2).

Table 2
Median School Years Completed in U.S.

	Spanish Origin	All Races
1975	9.6	12.3
1979	10.3	12.5

Source: Statistical Abstract of the U.S.: 1980, p. 149.

Auditory-Discrimination

Leading authorities such as Bender (1970) and Wepman (1973) indicated that the perceptual processes are developmental in nature and that children normally improve in each process with age. The primary modalities for learning are the auditory and visual processes. These develop independently (Turaidis, Wepman, & Morency, 1972) and are normally fully mature by the age of nine. Similar hypotheses were tested by Politzer and Weiss (1969) and Politzer and McMahon (1970) in two separate studies. These researchers found that auditory discrimination increased with maturation, that is, performance in auditory discrimination tasks improved according to age level.

Wepman (1960) pointed out that children who have good auditory acuity or peripheral hearing do not necessarily discriminate or understand what they hear. There are three elements of audition, according to Wepman (1960), which are developed sequentially: (a) acuity, which is the ability of the ear to collect sounds; (b) understanding, which is the ability to give sounds meaning; and (c) discrimination and retention, which is the ability to hold specific sounds in mind and to differentiate between them. Figure 1 provides a summary overview of four research studies reviewed.

Figure 1
Auditory Discrimination

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1960	Wepman, J.	156	Average readers	1st & 2nd grades	A positive relationship is shown between poor reading scores and poor auditory discrimination scores.
1969	Politzer, R. & Weiss, L.	257		Grades 1, 3, 5, 7, 9.	Overall test results showed that performance in auditory discrimination tasks improve according to age level. The percentage of correct responses increased from grade to grade.
1970	Politzer, R. & McMahon, S.	226	142 English-speaking 84 Spanish-speaking	Grades 1, 3, 5, & 7.	Auditory discrimination ability increases with age. Results also indicate that auditory discrimination ability is influenced by the native language background.

Figure 1 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1970	Bender, L.	A few examples are given		Ages 6-9	Learning processes are maturational. Children with learning disabilities have intact central nervous system but a maturational lag occurs when one functional part of the brain develops more slowly than the others.

Influencing Factors

Auditory discrimination ability is greatly influenced by the native language background of the listener, thus individuals tend to tune out those phonemes which are not part of their own language (Axelrod, 1974; Dreher & Larkins, 1972; Lado, 1956, 1977; Politzer & McMahon, 1970). Children learn the phonemic distinctions of their own language as part of the process of learning to communicate with other members of society and learn to ignore sound distinctions which are nonphonemic in that system (Blank, 1968; Bryen, 1976; Matluck & Mace, 1973; Olguin, 1971; Ornstein, 1971).

Lado (1956, 1977) and Olguin (1971) indicated that there are sounds which listeners with an English background discriminate, but which may be confused by listeners with a Spanish language background. A Mexican-American child who is unaccustomed to the English language "cannot hear" the difference between such pairs as sheath/sheaf, wreath/reef, or shawl/shoal (Poltizer & McMahon, 1970). On the other hand, a monolingual English-speaking child "cannot hear" such sounds as the velar fricative in Spanish juego or gajo. That same child "cannot hear" the difference between the alveolar flap /r/ and the trill /r̄/ as in caro and carro, or the difference between Spanish panal and pañal, llave and lave simply because these Spanish phonemes do not exist in

the English consonant patterns (Lado, 1956). He pointed out that the problem "is not only the inability to produce Spanish /r/ but also the inability to make a phonemic distinction between the flap /r/ and the trill /r̄/" (p. 26).

Politzer and McMahon (1970) stressed that "any discussion of auditory discrimination that does not take into consideration the native language background of the listener is likely to overlook a very important variable" (p. 19). Sapon and Carroll (1958) agreed that auditory discrimination depends upon the native language of the listener.

The probability of perception of a given sound in a given environment is related to the language of the listener . . . where errors in perception occur, the direction and magnitude of many errors are systematically related to the language spoken by the listener . . . (pp. 67-68)

In 1970, Politzer and McMahon conducted a study of 226 children in Grades 1, 3, 5, and 7 and found that there is a relationship between auditory discrimination and native-language background. They administered an auditory discrimination test to two groups of children, Spanish-speakers and monolingual English-speakers. The test consisted of three sections: part one of the test was based on distinctions utilized in the French phonemic pattern; part two was based on phonemic differences in English; and part three relied on distinctions used in Spanish. Results indicated

that there was no difference in the performance of the two groups on the French section. Monolingual English speakers performed significantly better than the Mexican-American children in the English section. The Mexican-American children outperformed the monolingual English-speaking children in the Spanish section.

A similar study was conducted by Blank (1968) in Israel. She used auditory discrimination tests in Hebrew as well as in English and found that Hebrew was significantly easier than English to the children in Israel.

Bryen (1976) hypothesized that the ability to make correct speech-sound discriminations is influenced by the child's own language background. She conducted a study utilizing a sample of three ethnic groups at the second grade level: White, Black, and Puerto Rican. Each group was administered three short tests composed of minimal word pairs that reflected phonological structures of "Standard" English, "Black" English, and "Puerto Rican" Spanish.

Results indicated that each group performed significantly higher on their own language test than the other two groups. For example, Puerto Rican students scored significantly better on the Spanish test than on either the "Black" English or "Standard" English tests.

Dreher and Larkins (1972) conducted a study with students taking first year Spanish in college. They found that

for these students the task of discriminating paired nonsense syllables in English was easier than identifying the typically Spanish sound combinations in a list of meaningless words.

Linn (1965) compared the ability to discriminate English phonemes among three groups of seventh and eighth graders: (a) Mexican-American children who had spoken both English and Spanish when they entered kindergarten; (b) Anglo-American children who had spoken only English when they entered kindergarten; and (c) Mexican-American children who had never spoken any language but English, but whose parents communicated in both English and Spanish. Results of this study indicate that there were no significant differences among groups in ability to discriminate English phonemes.

García and Trujillo (1979) conducted a similar study composed of 30 Spanish-English bilingual and 30 English monolingual children ranging from 3 through 7 years of age. Two tests of phonemes identified as "high risk" for both groups were administered to all 60 subjects.

Results indicated that there were no significant differences between monolingual and bilingual children on English phonemes. Both groups scored at near 100% correct. On the Spanish phonemes, the bilinguals scored significantly higher than monolinguals. The researchers, García and

Trujillo (1979) attempted to show that "bilingual" subjects were in fact bilingual, and that "Spanish competency on tasks like these does not 'handicap' similar competencies in English for bilingual children at these age levels" (p. 161).

In summary, the ability to make correct auditory discrimination is apparently influenced by the native language background. Bryen (1976), Olguin (1971), and Reyes-Kramer (1978) supported the idea that there are English sounds which are confusing or difficult for Spanish-speaking children to discriminate. Figure 2 presents a summary of the research studies reviewed.

Linguistic Contrasts

A contrastive analysis of English and Spanish language phonemes is presented. The work of linguists, such as Fasold (1971) and Lado (1956, 1977) who studied the effect of close contact between languages in bilingual situations, reported that many linguistic distortions heard among bilinguals correspond to describable differences in the languages involved.

The vowel system of the Spanish language consists of only five phonemes: /a e i o u/, and in 1945 Lynn reported that all these vowels produced by Mexican-Americans are of shorter duration. The mouth positions for producing the /a e i/ is in "smiling position," while /o u/ are in a

Figure 2

Native Language Background

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1965	Linn, G. B.	90	30 Anglo-American children who spoke only English at the age of 5; 30 Mexican-American children who spoke both English and Spanish at the age of 5; 30 Mexican-American children who spoke only English but the parents communicated in both languages.	7th & 8th graders	There were no significant differences among groups in ability to discriminate English phonemes. Children who were taught both languages before entering kindergarten performed less well in articulation of phonemes than those taught only English.
1968	Blank, M.	46	23 average readers; 23 slow readers; and Israeli children (IQ variable was not controlled)	1st graders	Hebrew was significantly easier for Israeli children than English nonsense syllables. Performance in auditory discrimination skills of both average and slow readers declined roughly when confronted with another language.

Figure 2 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1970	Politzer, R. & McMahon, S.	226	142 English-speaking 84 Spanish-speaking	Grades 1, 3, 5, & 7.	Auditory discrimination ability is influenced by the native language background.
1970	Dreher, B. & Larkins, J.	40	College students	over 18 years of age	For all Anglo-American students taking first year Spanish in college, the task of discriminating paired nonsense syllables in English was easier than identifying the typically Spanish sound combinations in a list of meaningless words.
1976	Bryen, D.	192	Lower socioeconomic status; White, Black, and Puerto Rican	1st & 2nd graders	Children performed significantly better on measures of speech-sound discrimination which reflected the phonological structure of their own language.

Figure 2 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1979	García, E. E. & Trujillo, A.	60	30 Spanish- English bilin- gual 30 English mono- lingual	3-7 years	There were no signif- icant differences between bilingual and monolingual per- formance on English phonemes. However, bilingual children scored significantly higher on the Spanish phonemes.

"lips forward" position, according to Olguín (1971). The English language, on the other hand, consists of eleven vowel phonemes. Therefore, the Spanish speaker has more than double the number of distinctions to make in the native vowels in order to understand English (Olguín, 1971). None of the Spanish vowels are the same as the English vowels, according to Cardenas (1960). He reported that Spanish vowels are "pure" and "short" while many English vowels are pronounced with a slightly diphthong effect (p. 34).

One of the most frequently used vowel sounds in English is the schwa ("uh"), as in unable, around, and common. The schwa is not present in the Spanish language; therefore:

(a) There is no audio record of it; (b) There are no mouth-muscle habit patterns to produce it since schwa takes place where no Spanish vowel occurs; (c) It will be perceived as "ah" by the Spanish-language oriented listener (Olguín, 1971, p. 353). Lado (1956) indicated that the Spanish speaking listener will sometimes hear this English vowel sound--the schwa--as Spanish /a/, /o/, or /e/.

Castro-Gingras (1972) pointed out a neutralization of the phonemic difference between /iy/ and /i/, such as in feel/fill. She attributed this phonemic neutralization to the fact that "Spanish has but one phonemic unit (/i/) in the phonological space where English has two (/iy/ and /i/" (pp. 5-6).

There is a wide discrepancy between the way in which words end in Spanish and in English. In the Spanish language words usually end in only 10 sounds: /i e a o u l n r s/ and a noiseless /d/. In English, on the other hand, there are approximately 40 ways in which words end. Therefore, when Spanish speaking children are exposed to English, they do not hear many of the new word endings. What the child hears is distorted and connected together in many strange ways. When a child, who is accustomed to only 10 word endings, hears any of the 30 additional endings which have not been internalized, it is very likely that the child will be unable to perceive them correctly (Olguín, 1971).

English has 24 consonant phonemes while Spanish has only 18 consonant phonemes. Eight of the English phonemes are absent in the Spanish language: /v/, /θ/, /ð/, /z/, /ʃ/, /ʒ/, /j/, /ŋ/, according to Saville and Troike (1975, p. 35). These English phonemes for which there are no similar Spanish equivalents are predicted as difficult for Spanish-speaking children (Saville & Troike, 1975).

In comparing English and Spanish, Olguin (1971) indicated that both languages have /p t c k b d g/; however, Lynn (1945) indicated that there is a difference in the way these sounds are produced in both languages. She pointed out that there is a difference of voicing and voicelessness

as well as aspiration and tension. There is also a difference in sound and sense stress which leads to an unnatural stressing of the unstressed sounds and sound combinations (Lynn, 1945, p. 179).

In English, the initial /s/ followed by a consonant creates a problem for the Spanish-speaking child. In Spanish, initial /s/ words are never followed by a consonant. All Spanish words beginning with /s/ are followed by one of the five vowels. When a Mexican-American child, who is unaccustomed to the English language, is asked to repeat "scan," it becomes "escan." Other examples of distortions in hearing perceptions of /s/ followed by a consonant are: slim/exlim, small/exmall, and snail/exnail (Olguín, 1971). He indicated that when the consonant in an "s-plus-consonant" initial blend is voiced, the 's' takes on 'z' characteristics; when the consonant is voiceless, the 's' is also voiceless" (p. 354).

The English language makes a phonemic distinction between /s/ and /z/. This distinction is constantly used to distinguish words like zip and sip, race and raise, ice and eyes. It is very difficult for a Spanish-speaking child to make these auditory discriminations (Lado, 1956).

Spanish has no phonemic contrast, as English does, between /č/ and /ś/. There is no /ś/ in Spanish, only the /č/. Spanish words rarely end with /č/ as English words do

(church, much, ranch). Furthermore, the /č/ in the Spanish language is produced with very little air. It is produced without the customary air blast which English enunciation requires. Therefore, a Spanish-speaking child will experience difficulty hearing the contrast between these two sounds (Axelrod, 1974; Olguín, 1971; Ornstein, 1971).

Reading Ability

Auditory discrimination ability tends to be a significant factor in learning to read well. Research studies indicate a high correlation between high achievement in reading and good auditory discrimination skills (Deutsch, 1964; Flynn & Byrne, 1970; Wepman, 1960). Therefore, special consideration was given to research studies dealing specifically with the relationship of auditory discrimination and reading.

Wepman (1960) investigated the relationship between poor reading achievement and the auditory discrimination ability of first, second, and third grade students. With intelligence held constant, findings indicated that 27% of the 80 children in the first grade showed inadequate auditory discrimination and reading scores significantly below the reading level of children with adequate auditory discrimination.

Thompson (1963) explored the relation of auditory discrimination and intelligence test scores to success in

primary reading. First grade students were tested in September 1958 and again in May 1960 when these 105 children completed second grade. She found that high auditory discrimination test scores are more likely characteristic of good readers at the upper end of the reading-achievement distribution but high auditory discrimination scores are not as likely when these good readers are those whose reading ages exceed their mental ages. The study shows predictive value in determining who will become a good reader as based on accurate discrimination ability.

Deutsch (1964) investigated correlations between Wepman's Auditory Discrimination Test and other measures. She concluded that Wepman's Test correlated with few other measures which relate to verbal abilities; however, Wepman's Auditory Discrimination Test differentiates good from poor readers at the .001 level of significance. Developmental patterns suggested that the various perceptual skills may relate differently to reading achievement at various maturational stages. Younger children seemed to experience more problems with discrimination tasks. These problems decreased with age, even in poor readers. Implications derived from this study indicate that poor readers could "catch up" in some skills with maturation, whereas others might require specific intervention for correction.

Lingren (1969) compared the functioning of 20 good readers and 20 poor readers in relation to auditory and visual variables. Subjects in the study ranged from eight to 14 years of age. Results showed no significant differences between the poor and good readers on the Bender-Gestalt and the visual-motor matching task. However, the good readers performed significantly better than the poor readers on an auditory discrimination instrument.

Golden and Steiner (1969) studied the relationship between specific auditory and visual functions and reading performance among second graders. They found that poor readers are weak in auditory processes rather than in visual skills.

The contention that good readers tend to have a strong auditory modality while poor readers tend to be weak was supported by Flynn and Byrne (1970). Their study of 94 third graders focused on advanced and slow readers from both high and low socioeconomic schools. There were significant differences between the two groups of readers in tests that required discriminating between pairs of words, nonsense syllables, musical pitches, and blending of phonemes and syllables.

The effect of teaching prereading skills to kindergarteners on their reading readiness scores were investigated by Stanchfield (1971). The following prereading skills

were taught in the experimental groups: listening for comprehension of content, visual discrimination skills, oral language skills, motor-perceptual skills, and sound-symbol correspondence skills. Analysis of covariance indicated that in the total test and all individual tests, children in the experimental groups outperformed those participating in the control groups.

Marzano, Barbar, Breen, Larson, Larson, and Tilton (1976) compared the relationship between good auditory discrimination skills and high reading scores in sixth and seventh grade students. The comprehension and auditory discrimination subtests of the Stanford Diagnostic Test were administered to 352 subjects. The investigators found a significant correlation between auditory discrimination and reading comprehension. There was also an indication that low achievers encountered more difficulty with vowel sounds.

In an effort to support an earlier study by Wallach and Wallach on teaching disadvantaged children to read, Wallach, Wallach, Dozier, and Kaplan (1977) conducted a study which included 76 low-income children and 70 middle-class children. They found that neither group had difficulty with tasks involving auditory discrimination skills. However, almost all of the disadvantaged but none of the middle-class children did very poorly on tasks involving phonemic analysis of words--for example, indicating whether given

sounded phonemes occurred in various spoken words.

Research studies are further summarized on Figure 3. Educational implications derived from this portion of the literature would include development of auditory discrimination skills through prescriptive-intervention strategies. These would provide each child with a sound foundation for reading readiness.

Sex Differences

An overview of research literature on auditory discrimination skills tends to indicate some sex differences; however, the number of studies is limited, and no conclusions can be drawn. It is evident that there is great need for further research studies on sex differences in ability to discriminate auditorily, especially with young children between the ages of five and nine when the perceptual processes are developing rapidly.

May and Hutt (1974) offered partial support to the notion of sex dependent sensory propensities. They found that nine year old girls performed better than boys when stimuli were presented in the auditory mode. All sixty subjects (30 males and 30 females) were given one presentation of a list of nouns and then performed both recall and recognition tasks.

Koppitz (1970) reported that the difference was not significant between the performance of the boys and girls,

Figure 3
Reading Ability

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1963	Thompson, B.	105	Longitudinal study (same students were retested nearly two years later)	1st & 2nd graders	High reading scores correlate with good auditory discrimination ability.
1964	Deutsch, C.	48	Black-American children: 50% represent upper third and 50% represent lower third in reading ability in their group	Grades 1, 3, & 5	The auditory discrimination test differentiated good from poor readers. The interaction between age and reading was also significant. Differentiation between reading groups is less for the older children than it is for the younger ones.
1969	Golden, N. E. & Steiner, S. R.	20	Controlled for MA, IQ, & CA variables	2nd graders	There was a correlation between poor readers and students who were weak in auditory processes rather than visual skills.

Figure 3 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1969	Lingren, R. H.	40	Average & poor readers; controlled for IQ, CA, & sex variables	Ages 8-14	Average readers performed significantly higher than poor readers on auditory discrimination skills.
1970	Flynn, P. T.	94	Students with reading scores of 2.2 or 4.4; Upper & lower socioeconomic levels		Tests which called for discriminatory judgments differentiated advanced and slow readers. Socio-economic environment, alone, did not affect auditory ability.
1971	Stanchfield	17 Kindergarten schools	Cross section of socioeconomic including Mexican-Americans	Kindergarten	Children taught in a structured sequential program with appropriate materials achieved significantly more than children in the regular kindergarten curriculum. Six major prereading skills in kindergarten, including auditory discrimination, were evaluated.

Figure 3 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1976	Marzano, R., Barbar, D. J., Breen, N., Larson, C., Larson, S., & Tilton, P.	352	Predominantly middle class children	6th & 7th graders	A significant relationship was found between auditory discrimination and reading comprehension in older children. Secondly, vowel sounds are the types of auditory discrimination errors made most commonly by poor readers.
1977	Wallach, L., Wallach, M. A., Dozier, M. G., & Kaplan, N. E.	146	70 middle-class and 76 low-income English-speaking	Kinder- garten level	There was no difference between middle class and low income English-speaking children in auditory discrimination skills. However, almost all of the low-income children, while none of the middle-class children performed very poorly on tasks involving phonemic analysis of words.

Figure 3 (continued)

Date	Author	Size of Sample	Special Characteristics	Age/Grade	Relevant Findings
1978	Reyes-Kramer, V.	15	Spanish-speaking children	Kindergarten through 2nd Grade	A four-week ear-training program was effective in helping Spanish-speaking children discriminate English sounds identified as difficult for them. This was true both for sounds taught and sounds not taught. However, this training program had no effect on the experimental subjects' abilities to learn phonics.

ages 6 and 11, in terms of auditory and visual discrimination ability. She conducted a study in an attempt to secure normative data for the Visual Aural Digit Span Test, an unpublished manuscript at that time.

In 1975, Roberts found significant sex differences in the performance of auditory synthesis and analysis among 5 and 6-year-old children. Another study, which involved only auditory synthesis, was conducted by Roberts in 1979. This time she utilized 168 children in her study. However, she reported no sex differences in ability to complete the process of auditory synthesis during the early stages of reading. Figure 4 presents a summary of the research studies on sex differences.

Diagnostic-Prescription

Implementation of adequate diagnostic-prescriptive interventions is a factor critical to the effectiveness of a sound educational program. Andersson and Boyer (1970, Vol. 1, p. 67) believed that there should be some concern for making sure that the prescribed educational treatment is being administered.

The Lau Remedies (1975) is designed to assist school districts in the development and implementation of Lau Compliance plans. This set of guidelines (Lau Remedies, 1975) recommends the use of diagnostic-prescriptive techniques. However, as De Avila and Duncan (1979) have observed:

Figure 4
Sex Differences

Date	Author	Size of Sample	Age/Grade	Relevant Findings
1970	Koppitz, E. M.	100	Grades 1-5	Visual presentation of digits resulted in much better recall than aural presentation of digits. No sex differences were found.
1974	May, R. B., & Hutt, C.	60	9-year-old children	Girls performed better than boys when stimuli were presented in the auditory mode. Furthermore, students --both girls and boys--receiving items visually recalled better than those with auditory presentation.
1975	Roberts, T.	40	5 & 6 years old	Purely auditory synthesis in early reading was found to be considerably easier than any other skill. Analysis involving both auditory and visual modalities was found to be by far the most difficult. There were significant differences between sexes ($p < .05$), favoring girls.
1979	Roberts, T.	168	5 years old	The majority of the students were either competent or not competent in ability to perform tasks of auditory synthesis (sound blending). Sex was not found to be an important factor.

. . . while the Lau Remedies encourages the use of prescriptive techniques, only one of the 46 tests we examined contained any concrete suggestions as to specific activities or exercises to remediate any of the problems identified. (p. 448)

DeAvila and Duncan (1979, p. 446) believe that language assessment instruments should include a measure of auditory discrimination in order to determine if the child has a problem with a significant aspect of language and thus needs educational help. The degree of communication may not necessarily be affected if a child pronounces the initial "p" of the American English word "potato" as an aspirated or as an unaspirated stop. However, if the child cannot distinguish between "yellow" and "jello" or "wash" and "watch," DeAvila and Duncan (1979) stress that "there is likely to be a breakdown in communication and/or an occasion for ridicule, as in the case of a visiting foreign student who announced, 'When I go out to dinner, I always wash the hostess'" (p. 446).

Summary

The search of the literature indicated federal and state emphasis on equal educational opportunities for Spanish-speaking students. The trend is toward increased educational achievement.

Studies were found to support the notion that auditory discrimination skills are influenced by native language background, and that there are linguistic contrasts between

English and Spanish. Studies also indicated a relationship between auditory discrimination skills and reading achievement. It is evident that "correlation does not necessarily imply causation" (Isaac & Michael, 1975, p. 150) and that most of these are correlational studies. However, there is a great deal of intuitive logic to the concept that increased ability in auditory discrimination may tend to increase reading readiness achievement.

The sex variable appeared to have some significance in the literature. Literature also reflected the need for a diagnostic-prescriptive approach as an effective instructional strategy for Mexican-American students. Thus, literature led to this study exploring the effectiveness of an auditory discrimination prescription program for Mexican-American students at the kindergarten level.

Chapter 3

METHODOLOGY

This quasi-experimental study of the effectiveness of Auditory Discrimination Prescription-Intervention Program (ADPIP) was implemented in the spring semester of 1981 with 82 Mexican-American children in one south Texas town. The teachers and instructional aides of both the experimental and control groups were bilingual, and the children were all dominant Spanish-speaking as assessed by the Language Assessment Scale (LAS).

LAS was developed by DeAvila and Duncan for the purpose of identifying limited or non-English-speaking children in Grades K-5 who could benefit from bilingual programs (Brainard, 1978). LAS is individually administered and consists of two tests, one in English and one in Spanish.

Design

Due to the necessity of using naturally occurring groups, randomization procedures for selection of sample students were not possible; therefore, the study was quasi-experimental in design. The Nonrandomized Control-Group Pretest-Posttest Design used in the study is presented in Figure 5.

E ₁	T ₁	X ₁	T ₂
C ₁	T ₁	.	T ₂
E ₂	T ₁	X ₁	T ₂
C ₂	T ₁	.	T ₂
E ₃	T ₁	X ₁	T ₂

Figure 5. Quasi-experimental design: Nonrandomized five-group design

All five intact kindergarten classes were utilized in the study. Of these five classes, two were randomly assigned as control groups and the other three as experimental groups for a period of 12 weeks. All five groups were pretested and posttested with the Auditory Discrimination Test of Spanish Phonemes (ADTSP).

The independent variable consisted of an ADPIP for Mexican-American kindergarteners, an instructional program which was used by the three teachers and three instructional aides working with the three experimental groups. The two teachers and two instructional aides with the control groups taught in a traditional bilingual setting. All children participating in the study were tested with the dependent measure before the program was initiated and again after

completion of the program implementation during the spring semester of 1981.

Null Hypothesis

The null hypothesis tested was that there would be no statistically significant difference in adjusted posttest mean performance in auditory discrimination skills between the experimental and control groups.

Population

Subjects for this study were selected from Zapata Independent School District. Five kindergarten classrooms participated in this study of 82 Mexican-American children 5 and 6 years of age.

Graphical Setting

The Zapata Independent School District is a county-wide school district. There are no established nonpublic schools in Zapata County. A survey taken in January, 1981 reflected a total student population of 1,761 students composed of 89% Mexican-American pupils and 11% Anglo-American pupils. Description of student enrollment and ethnic composition in elementary grades, junior high, and high school is shown in Table 3.

Zapata County is in the southern part of the State of Texas. The county is on the banks of the Rio Grande River and borders with Mexico. Figure 6 presents the geographic

Table 3

Student Population at Zapata Independent School District

	Mexican Americans		Anglo Americans		Total
	N	%	N	%	
High School	415	92	34	8	449
Junior High	336	88	45	12	381
Elementary	822	88	109	12	931
Total	1573	89	188	11	1761

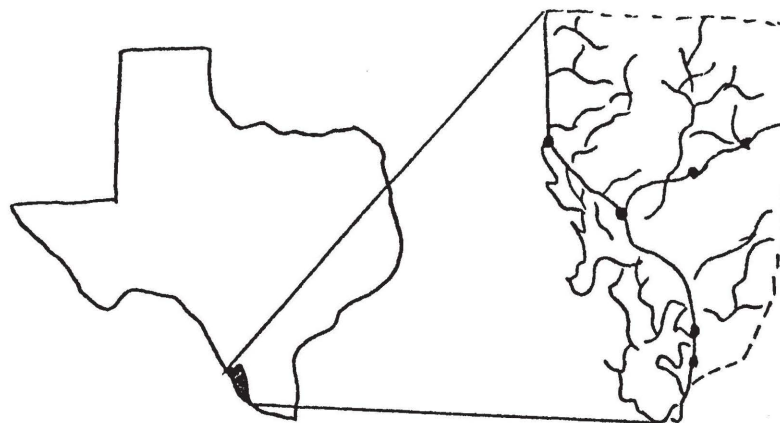


Figure 6. Zapata County

location of Zapata County in relation to the State of Texas.

The Texas Almanac of 1980-81 reports 3,689 registered voters. The following physical features describe Zapata: Rolling; brushy; sparsely populated; 100% rural area; broken by tributaries of Rio Grande; Falcon Lake.

Minerals and agriculture are Zapata's major sources of income. The 1980-81 Texas Almanac reports \$62 million average yearly production of gas and oil, and \$8 million average yearly income from agriculture.

Historical Background

The history of Zapata has undoubtedly influenced the language usage and culture of the children involved in this study. From 1748 to 1821, this territory was claimed by Spain as part of the Spanish Province of Nuevo Santander (de la Garza, 1944). All current abstracts or deeds of Zapata County go as far back as the original grants of this period, when the King of Spain granted land grants in "porciones" or land parcels to the early colonizers from Spain (Martinez & Lott, 1943, pp. 1-5). José de Escandon, a colonel in the Spanish Army, was commissioned by the King to command the settlement (Byfield, 1966; Fields, 1962, p. 48). Some of the "porciones" are still owned by the heirs of the original grantees, as indicated by the abstracts recorded at the Zapata County courthouse.

Then in 1821 this territory went to the Mexican State of Tamaulipas (Byfield, 1966). In 1836 this territory was claimed by the Republic of Texas, and in 1839 it became the Republic of the Rio Grande (Martinez & Lott, 1953, pp. 105-113). Nearly a year afterwards, in November 1840, this territory went back to Mexico until February 2, 1848 when

the Treaty of Guadalupe-Hidalgo was signed (de la Garza, 1944).

The County of Zapata was created in 1858 (Byfield, 1966; Martinez & Lott, 1953, p. xiii). Zapata derived its name from Colonel Antonio Zapata, a military strategist along the Rio Grande who led many campaigns against the Indians throughout this area (de la Garza, 1944; Fields, 1962, pp. 49-50).

Zapata was inundated on October 19, 1953 due to the completion of the reservoir, the Falcon Dam. The United States government condemned over 90,000 acres of land for the purpose of erecting Falcon Dam and Reservoir (Byfield, 1966). The new county seat was relocated three and one-half miles east at the intersection of Highway 83 and the Hebbbronville Farm Road (Martinez & Lott, 1953, p. 243).

Instrumentation

The dependent variable consisted of the Auditory Discrimination Test of Spanish Phonemes (ADTSP). This test was piloted with Mexican-American children at Zapata, Texas in September, 1976. It is composed of 36 items and takes approximately 10 minutes to administer (Appendix A). The individually administered test requires no reading or writing ability and is intrinsically motivating because of language familiarity. The score is based on the total number of correct responses. The examiner reads the stimulus

word pairs from the Scoring Analysis Protocol and the child is asked to repeat the word pairs in each item exactly as heard. The stimulus word pairs are presented with the stress and intonation of natural, conversational speech without exaggerating any of the words. Articulation is clear and precise.

Spanish words in each pair are matched for length; therefore, the ADTSP measures the child's ability to discriminate auditorily and not span. Items in this test are unique in that the two different phonemes occur in exactly the same position in each word pair and the phonemes selected for matching are within the same Spanish phonetic categories, that is, phonemes produced in the same manner of articulation such as stops, fricatives, nasals, and laterals. For example, in matching lexical items within the category of voiceless stops, only /p/ versus /t/ versus /k/ are considered. In pairing nasals, which are voiced, only these phonemes are used: /m n ñ/.

Content Validity

Content validity was established when a complete study of every word included in the test was found in Velázquez' dictionary (1974) or Diccionario De La Lengua Española (1970) to ascertain that words make sense to the child being tested. Only lexical items that are familiar to the Mexican-American child whose dominant language is Spanish

were included.

Content validity was further established by a jury of acknowledged experts in the fields of the Spanish language, speech, testing young Mexican-American children, child development, bilingual education, and early childhood education. This jury of five experienced authorities endorsed the ADTSP (Appendices B & C).

Congruent Validity

Congruent validity was also built into the test. Auditory acuity was evaluated by the elementary nurse in order to determine whether peripheral hearing was intact. Every child included in this study was evaluated individually prior to pretesting with the dependent variable, ADTSP.

Of the 82 children involved in the study, 80 girls and boys were found to have normal hearing acuity in both ears. However, two children failed the screening hearing test. One male subject was reported by the school nurse as having failed the acuity test on his right ear. He was a participant in one of the experimental groups. Hearing on this child's left ear was reported to be intact; therefore, both pretesting and posttesting with the ADTSP were administered directly from behind the student's left side. Furthermore, the student's teacher was aware of his hearing impediment during implementation of the Program. Thus, proper seating arrangements were provided.

Another subject, female, was reported by the school nurse as having a weak left ear. Her right ear, however, was intact. This student was a participant in a control group.

Reliability

Reliability data on the ADTSP included the Split-Half Reliability on 169 subjects ages 5 and 6 years. A Pearson's Product-Moment Correlation was used in the determination of the Split-Half Reliability. The 18 odd number items were correlated with the 18 even number items. A correlation coefficient of .97 was obtained from these results. The information was found to be reliable.

Pilot Study

A study was conducted during the month of November of 1976 by administering the pilot instrument--The Auditory Discrimination Test of Spanish Phonemes--and Wepman's Auditory Discrimination Test to 23 Mexican-American children and 13 monolingual English-speaking children. All children participating in the study were 5 and 6 years of age.

The two null hypotheses tested were: (a) Mexican-American children do not differ from monolingual English-speaking children of the same age as displayed by the average ranks on an auditory discrimination pilot test of Spanish phonemes. (b) There is no difference between the

rankings of the English monolingual speaking children as compared to those of the Mexican-American children on Wepman's Auditory Discrimination Test.

Two basic assumptions of the study were: (a) Presently available instruments on auditory discrimination skills do not yield adequate results for Mexican-American children whose dominant language is Spanish. (b) A Spanish auditory discrimination instrument, truly representative of the structure of the Spanish language, yields a true picture of the child's auditory discrimination skills for whom the test is designed.

An elementary substitute teacher was hired by the experimenter to administer both instruments to all 36 students participating in the study. Children were individually tested only in the mornings in order to insure optimum performance and control for effects due to time of the day.

The Mann-Whitney U Test was applied to compare the performance of the two independent, non-matched groups whose members have been rank-ordered on the performance measures. Results of Wepman's Auditory Discrimination Test were statistically significant, indicating that the rankings of the English monolingual speaking children were better than those of the Mexican-American children. However, Mexican-American children outranked monolingual English

speaking children in their performance, as determined by the ADTSP. Thus, based on this evidence, it appears that auditory discrimination ability is influenced by the native language background of the listener.

Auditory Discrimination Prescription-Intervention Program

The instructional program consists of individualized prescriptive-interventions on auditory discrimination geared for young Mexican-American children who need to acquire the necessary reading readiness skills either in English or in Spanish (Appendix D). This instructional program deals specifically with discrimination of single Spanish phonemes that are also common in the English language.

Analysis reveals that sounds within the same phonetic category are more difficult for the child to discriminate (Saville-Troike, 1976, p. 11; Wepman, 1973). Therefore, the phonemes selected for discrimination are within the same phonetic categories, that is, phonemes produced in the same manner of articulation such as stops, fricatives, nasals, and laterals.

Numerous instructional activities have been included for each phonetic category in Spanish first and then in English. The activities in each language are color coded in order to facilitate teacher's usage of the program.

This instructional program is designed to teach the child to focus on selective auditory stimuli and to help.

the child become aware of sounds that previously were meaningless. It helps train the child to listen to or focus on what is heard and facilitates the transition from Spanish to English.

The auditory discrimination program was designed to be used with large groups and small groups of children as well as with individuals. The recommended minimum time for a lesson is 20 minutes on a daily basis.

Procedures

Human Subjects

Approval from the Human Research Review Committee of Texas Woman's University was obtained before initiating the study. Permission was secured from the superintendent and the principal at Zapata Independent School District. Appropriate human subjects clearances were obtained from teachers, instructional aides, subjects' parents, and participating students (See Appendices E, F, G, H, & I).

Random Selection

The five classrooms utilized in this study were randomly selected and grouped into two control groups and three experimental groups on January 13, 1981. The investigator met with the elementary principal and the five participating kindergarten teachers at the principal's office as pre-planned. The process of random selection was explained "

briefly to the group by the investigator. A table of random digits was used for the selection of the control and experimental groups (Glass & Stanley, 1970, pp. 510-512).

Each of the five teachers was asked to select any number from one through nine. The principal dropped his pencil on the first page of random digits with his eyes closed. The two digits closest to his pencil point were two (2) and nine (9). He moved to the intersection of row two and column nine of the table to begin selections.

Moving along row two starting with column nine the principal called out each digit. The first two teachers who had said digits were selected as the control groups. It was understood that the remaining three teachers were to serve as the experimental groups, and thus implement the Program.

Possible limitations relate to teachers' awareness of control-experimental status. This may have produced a confounding influence on posttest scores.

Test Examiner

One test examiner was selected and trained to administer the Auditory Discrimination Test of Spanish Phonemes. The fundamental qualifications for the test examiner were as follows: (a) effectiveness as a substitute teacher for kindergarten classes, (b) bilingual and good Spanish diction, (c) sensitivity to the child's cultural background;

and (d) ability to establish rapport easily with young children.

The test examiner received training in the administration and scoring of the instrument prior to the administration of the test. She was not cognizant of the desired outcome of the study; therefore, the test examiner remained objective throughout the pretesting and posttesting sessions.

The Spanish Language Proficiency Interview in Texas (1980) was administered to the test examiner in order to insure adequate results of children's test performance. The purpose of the interview was to give the test examiner the opportunity to demonstrate, in a realistic conversational situation, the level of proficiency at which she was able to speak the Spanish language. Several specific linguistic areas were assessed from the interview. They were: Spanish pronunciation, grammatical accuracy, vocabulary, fluency, and listening comprehension.

Dr. Ramón Alaníz, Assistant Professor in Education and Psychology at Laredo State University, administered the oral language examination to the test examiner at the Administration Building of the Zapata Independent School District. Results indicated that the test examiner performed above the minimum acceptable passing score.

Testing

Children were tested individually in a quiet and comfortable room free from any distractions. The directions were presented to each child in a spontaneous manner. After the directions were given, the child was turned to face the opposite direction from the examiner in order to prevent the use of visual cues such as the examiner's movement of lips, facial expressions, and eye cues.

Pretesting was implemented between January 30 and February 6, 1981. Eighty-two children enrolled in three experimental groups and two control groups were pretested and posttested. The experimental treatment extended from February 9, 1981 through May 5, 1981. Control subjects continued the usual kindergarten routine. Posttesting was conducted on May 6-7, 1981.

Teacher Training

The three teachers and three instructional aides in the experimental classrooms received training on the use of the ADPIP. Two 45-minute sessions of preservice were held prior to the implementation of the study with the teachers and also with the aides. Meetings were separate because of the needs of the children. After the implementation began, individual meetings were held on a monthly basis with experimental teachers and instructional aides. The foci of

these meetings were on the activities for consonant or vowel phonemes projected for subsequent weeks. Appendix D describes the sequence, provides a teacher log, and outlines the training.

Data Analysis

An analysis of covariance was used to compare the control and experimental groups with the pretest as the covariate and the posttest as the criterion. The treatment was the independent variable. The statistical analysis provided F-ratios which were examined for significance at the .05 level.

The analysis of covariance made statistical adjustments in the posttest means for any pretest differences between the groups. Since the regression of the posttest scores was significant, the adjusted mean square was smaller, thus permitting smaller confidence limits to be constructed around differences between means (Wildt & Ahtola, 1978, p. 6).

Chapter 4

ANALYSIS OF THE DATA

This chapter provides a descriptive analysis of the scores of 82 kindergarten Mexican-American children on the Auditory Discrimination Test of Spanish Phonemes (ADTSP). It also reports the statistical analysis relating to the hypothesis. A brief report on sex differences is provided as well as an analysis on the consonant and vowel phoneme scores.

Description of Subjects' Scores

Scores could range from 0 to 36 on the ADTSP. The pretest scores in this study ranged from 10 to 36 with a mean score of 25.29. The Control Group ranged from 10 to 36 on the pretest with a mean of 25.92, while the Experimental Group ranged from 8 to 33 on the pretest with a mean of 24.72. The 43 males evidenced a pretest mean score of 24.00 and the 39 females a pretest mean score of 26.72.

The posttest scores ranged from 19 to 36 with a mean score of 30.15. The 39 subjects in the Control Group and the 43 subjects participating in the Experimental Group both scored between 19 and 36 points on the posttest. However, the means for each group were slightly different. The

posttest mean score for the 43 males equaled 29.44, while the 39 females' posttest mean score was 30.92. Table 4 presents a summary of the mean scores.

Table 4
ADTSP Mean Scores

Subjects	N	Pretest Scores	Posttest Scores	Adjusted Means
Total Subjects	82	25.29	30.15	-----
Control	39	25.92	29.54	29.28
Experimental	43	24.72	30.70	30.94
Total Males	43	24.00	29.44	-----
Total Females	39	26.72	30.92	-----

Hypothesis and Findings

The null hypothesis tested was that there would be no statistically significant difference in adjusted posttest mean performance in auditory discrimination skills between the experimental and control groups. ANCOVA controlled for pretest differences, allowing for posttest comparisons free of pretest influences.

The analysis of covariance for the ADTSP scores produced significant differences between the experimental and control groups. An $F = 4.83$ was found. This F value has a probability of .03. The direction of the difference was in

favor of the experimental group. The difference is explained by the treatment in the experimental group. Therefore, the null hypothesis was rejected. Table 5 shows the analysis of ADTSP scores.

Table 5
ANCOVA Summary Table on ADTSP Scores

Source	df	SS	MS	F-Ratio	Significance
Treatment	1	55.74	55.74	4.83	.03*
Error	79	910.89	11.53		

* $p < .05$

Sex Differences

A t-test was computed on the pretest for sex differences. Results revealed that statistically significant differences did exist between the performance of girls and boys favoring girls ($t = -2.03$, $p = < .05$). However, results of a second t-test based on the posttest, which was administered three months later, indicated that there were no significant differences between girls and boys ($t = -1.62$, $p = > .05$). The statistical data are reflected in Table 6.

Table 6
Summary of t-tests for Sex Differences

	Sex	Mean	SD	Standard Error	t	p
Pretest	M	24.00	6.16	.94	-2.03	.045*
	F	26.72	5.94	.95		
Posttest	M	29.44	4.83	.74	-1.62	.110
	F	30.92	3.41	.55		

* $< .05$

Consonant Phonemes

A one-way analysis of covariance was used to analyze the effects of the experimental conditions. The independent variable was treatment or experimental condition. The dependent variable was the set of consonant phoneme posttest scores.

Examination of adjusted group means indicated that Control Group Mean was adjusted downward, while Experimental Group Mean was adjusted upward. However, there were no significant differences between adjusted mean scores. The zero slope indicated that there was a significant correlation between pretest and posttest data on consonant phonemes.

An $F = 2.79$ was found. This F value has a probability = .09. Since .09 is greater than $\alpha = .05$, there were no

significant differences in posttest consonant scores for kindergarten students experiencing experimental treatment. Table 7 presents an analysis of consonant phoneme scores on the ADTSP.

Table 7

ANCOVA Summary Table on Consonant Phoneme Scores

Source	df	SS	MS	F-Ratio	Significance
Treatment	1	23.10	23.10	2.79	.09
Error	79	654.81	8.29		

Vowel Phonemes

A one-way analysis of covariance was used to analyze the effects of the experimental treatment. The independent variable was the treatment or experimental condition. The dependent variable was the set of vowel phoneme posttest scores.

An F value of 2.73 was obtained having a probability of .10. This value is not significant at $\alpha = .05$. Thus, there was no significant difference in posttest vowel phoneme scores for kindergarten students experiencing experimental condition. Table 8 contains a summary of the statistical data.

Table 8
ANCOVA Summary Table on Vowel Phoneme Scores

Source	df	SS	MS	F-Ratio	Significance
Treatment	1	4.08	4.08	2.73	.10
Error	79	118.07	1.49		

Thus, the comparison of vowels and of consonants would not support differential effectiveness based on this dichotomy. Overall significant gains were reflected on the total program.

Summary

This study of 82 Mexican-American children in five kindergarten classrooms at Zapata Independent School District, Zapata, Texas indicated a significant difference in posttest scores of 43 subjects experiencing the experimental condition. The effectiveness of a three-month prescriptive-intervention program on auditory discrimination skills was evaluated. Experimental exposure consisted of daily 20 minute training sessions.

Sex differences were also explored using t-tests. Results revealed that significant differences did exist between the performance of girls and boys, favoring girls on the pretest but not on the posttest.

An analysis was then computed on the consonant and vowel phoneme scores separately. No significant differences were found between the experimental and control groups on the consonant phoneme scores nor on the vowel phoneme scores.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study evaluated the possible effects of a prescriptive-intervention approach designed to fit auditory discrimination limitations identified on a measure of auditory discrimination. This quasi-experimental study involved 82 Mexican-American students in five kindergarten classrooms. The intervention program was implemented for three months with an experimental group. The daily exposure to auditory discrimination training was during a 20 minute session.

The instrument designed for this study was the Auditory Discrimination Test of Spanish Phonemes. Reliability of the instrument was found sufficiently high for the purpose of investigating group differences in auditory discrimination. The correlation coefficient yielded a Pearson's Product-Moment correlation of $r = .97$.

Analysis of covariance controlled for pretest differences, allowing for posttest comparisons free of pretest influences. The ANOVA for the ADTSP scores produced significant differences between the experimental and control groups. Thus, the null hypothesis was rejected. The

Auditory Discrimination Prescription-Intervention Program was effective in helping Mexican-American students learn more easily to discriminate specific sounds identified as difficult for them.

Conclusions

This demonstration of the effectiveness of the ADPIP offers kindergarten teachers of Mexican-American students a curriculum which they can begin to use with confidence. The ADPIP should be a part of the regular kindergarten curriculum for Mexican-American students in order to meet the needs of each child. It is recommended that kindergarten teachers include in their lesson plans 20 minutes a day to the instruction of auditory discrimination skills. Specific activities and materials are suggested in the ADPIP for each lesson designed to teach one phoneme at a time. These phonemes are arranged within categories, and each category is carefully sequenced. It is recommended that the sequence be followed in order to insure effective results.

A prerequisite to the ADPIP includes a comprehensive program of gross auditory discrimination skills. There is one already available. It was developed at Texas Woman's University by Rodriguez (1973). It is recommended, however, that other investigators implement this type of program, which involves gross sounds, in a structured setting.

Recommendations

The results from this study would encourage further investigations to improve the learning opportunities of young Mexican-American students. The effectiveness of the Auditory Discrimination Prescription-Intervention Program has been demonstrated with kindergarten Mexican-American students living in a rural area; however, further research is necessary to evaluate this program with Mexican-American children in other rural areas as well as in urban areas. Replications of this study should be undertaken with other age groups to assess its relative effectiveness with 4-year-old, 5-year-old, and 6-year-old children.

Other investigators could expand on the ADPIP so that it could provide the necessary scope and sequence starting with the Early Childhood Program for 4-year-old children throughout the elementary grades. Since this Program deals specifically with Spanish phonemes that are also common in the English language, it is suggested that other educators concentrate their efforts on the development of a similar sequential program that deals specifically with English phonemes not found in the Spanish language. These phonemes should include long vowel sounds, initial /s/ followed by a consonant, as well as: /v, θ, ð, z, š, ž, j, ŋ/. A comprehensive program of this nature would indeed meet the needs of older students.

APPENDICES

Appendix A

Auditory Discrimination Test of Spanish Phonemes (ADTSP) Description

Descriptors: Auditory discrimination skills; Spanish; ages 5 and 6; kindergarten level; 36 scores: 28 consonant phonemes and 8 vowel phonemes; individually administered; 10 minutes; test instructions included; requires no reading or writing; orally presented; child repeats word pairs; language familiarity to Mexican-American child; word pairs matched for length; contrasted phonemes; phonetic categories; sequentially arranged.

Reliability: Split-Half Reliability on 169 subjects; Pearson's Product-Moment correlation coefficient of $r = .97$.

Content Validity: All test items found in Velázquez' Dictionary and/or Diccionario De La Lengua Española; endorsed by jury of acknowledged experts.

Congruent Validity: Evaluation of auditory acuity (peripheral hearing) on all subjects conducted by school nurse.

Description: The ADTSP is a criterion-referenced test which specifies the kind and amount of performance needed if the kindergarten student tested is to be considered as having successfully learned specified phonemes in Spanish. This auditory discrimination test in Spanish points out the phonemic categories, in addition to the specific phonemes, which have been mastered and those which need attention. Test results can be used to determine group as well as individual instructional needs.

This test is keyed to a sequential prescriptive intervention program and thus may be used to document the student's ability to recognize the fine differences that exist between the phonemes used in the Spanish language. The Auditory Discrimination Prescription-Intervention Program (ADPIP), which complements this test instrument, suggests appropriate methods and activities of intervention. The ADTSP utilized with the ADPIP is designed to assist educational planners and teachers especially concerned with children who are native speakers of Spanish.

Researchers interested in the use of this instrument may	
contact: Dr. Vera Gershner	or Anita R. Medina
Educational Foundations	P. O. Box 971
Texas Woman's University	Zapata, Texas 78076
Denton, Texas 76201	(512) 765-4522
(817) 382-1558	

Appendix B

Jury of Experienced Authorities

Juror #1 is fulfilling his position as director of the Gifted and Talented Program at Region One Educational Service Center in Edinburg, Texas for the fifth year. He received his Doctor of Philosophy Degree from the University of Texas at Austin in 1966. Dr. Allen DePagter is Anglo-American but speaks Spanish fluently.

Juror #2 is an instructor at Laredo State University in the areas of early childhood and reading. Irene Rodriguez is a doctoral candidate at Texas Woman's University. She is bilingual and speaks both English and Spanish with fluency.

Juror #3 owns and operates the Kiddie Korner Workshop Day Care Centers at Laredo, Texas. Mrs. Martha Moke-Gonzalez is a certified speech therapist and has had several years of experience as a speech therapist in the public schools. She is a native of Laredo and is bilingual in Spanish and English.

Juror #4 is Assistant Professor in Education and Psychology at Laredo State University. He teaches a course in contrastive languages and linguistics. Dr. Ramón Alaníz received his Doctor of Education Degree from Texas A & I University at Kingsville. He is Mexican-American and speaks both languages with fluency.

Juror #5 is currently employed in the public school as a special education director. He is a certified educational diagnostician with several years of experience in the field. Juan Sanchez, from Laredo, Texas, is Mexican-American and is knowledgeable in both languages.

Appendix C

ENDORSEMENT OF NEW INSTRUMENT

The literature indicates that auditory discrimination ability is greatly influenced by the native language background of the listener and that individuals tend to tune out those phonemes which are not part of their own language. Furthermore, leading linguists show that there is a wide discrepancy between the English and Spanish language phonemes. Therefore, Mexican-American children may find it difficult, because of phonological differences between Spanish and English, to discriminate auditorily English phonemes.

Presently available instruments on auditory discrimination skills will not yield adequate results for Mexican-American children whose dominant language is Spanish. However, a Spanish auditory discrimination instrument, truly representative of the structure of the Spanish language, will yield a true picture of the child's auditory discrimination skills for whom the test is designed.

I have examined the Auditory Discrimination Test of Spanish Phonemes developed by Anita R. Medina and feel this instrument can effectively determine the child's true ability to auditorily discriminate speech sounds in Spanish. It can be used to diagnose precise skills that Mexican-American children have acquired and those that still need to be mastered. I endorse the use of this testing instrument.

Signature

Position

Date

Appendix D

Auditory Discrimination Prescription-Intervention (ADPIP) Description

Sequence	Phonemes Taught		Total # Activities		Exemplars
	Spanish	English	Spanish	English	
1st Week	Voiceless Stops /p t k/		13		Initial Sound. A mimeographed lesson with nine pictures is prepared for the child. Each picture has "p" and "t" in large print. The child listens for the beginning sound of each picture and circles the correct letter. Other lessons include /p k/ and /t k/.
2nd Week	/p t k/		13		Pocket Charts. Three pocket charts (9" x 12") are needed, each with a picture beginning with /p/, /t/, or /k/ glued on the cover. Sets of picture cards (2" x 2") are made by gluing pictures on construction paper. Both picture cards and pocket charts are color-coded for self-correction. Initial sounds are stressed. Child places card in the correct pocket.
3rd Week	Voiced Stops /b d g/		17		Stacking Picture Cards. Prepare sets of picture cards beginning with /b d g/ sounds. Label the box in three sections using pictures. The child selects a card, tells the beginning sound, and stacks it in its corresponding group.

Appendix D (continued)

Sequence	Phonemes Taught		Total # Activities		Exemplars
	Spanish	English	Spanish	English	
4th Week	Voiced Stops /b d g/			10	<p><u>Initial Sound Using Kinesthetics.</u></p> <p>A lesson with a picture and the initial dotted letter is provided. The child is asked to name the picture and listen carefully to the beginning sound of the word. The teacher traces the letter, stressing the direction of the strokes, as the child watches. Then the child is encouraged to trace the other letters. Name other words that start with the same sound.</p>
5th Week	Voiceless Fricatives /f s x/		14		<p><u>Indian Headband.</u> The child is given two feathers made of construction paper, one blue and one red. The blue feather has the letter "f" on it while the red one has the letter "s" on it. Pronounce words that have the /f/ and /s/ sounds interchangeably. Have the child hold up the blue feather if the word called by the teacher has the /f/ sound but the red feather if the word has the /s/ sound. A suggested list of words is in the manual.</p>

Appendix D (continued)

Sequence	Phonemes Taught		Total # Activities		Exemplars
	Spanish	English	Spanish	English	
6th Week	Voiceless Fricatives /f s x/			10	<p><u>Mr. Bunny.</u> Use an overhead projector to enlarge a picture of a rabbit on a posterboard. Cut a slit through its mouth. Give the child several carrots to feed Mr. Bunny. Each carrot has a vocabulary picture glued on it. The pictures begin with /f/, /s/, or /x/. If the child names the picture and identifies its beginning sound, it is fed to the bunny. Variation: One child stands behind Mr. Bunny and listens carefully. If the other child does not identify the initial sound of the picture correctly, Mr. Bunny "spits out" the carrot and refuses to eat it.</p>
7th Week	Voiced Nasals /m n ñ/		13		<p><u>Jack and the Beanstalk.</u> Draw a beanstalk with a palace on the top right corner of a posterboard. Cotton clouds can be glued on to the castle. Cut leaves out of green construction paper to fit into slots on the beanstalk. Each leaf contains a glued picture that has the /m/, /n/, or /ñ/ sound. The child must be able to discriminate the proper sound in order to place it on the beanstalk. When the castle is reached, a privilege</p>

Appendix D (continued)

Sequence	Phonemes Taught		Total #	Activities		Exemplars
	Spanish	English		Spanish	English	
	Voiced Nasals					Jack and the Beanstalk (continued) reward awaits on the door. The reward is a piece of individually wrapped candy stapled on the castle door.
		/m n/		7		Hand Raising Game. Say to the child, "I am going to call out some groups of words. Raise your hand when you hear a word that begins with the /m/ sound." Use the letter sound, not the letter name. A suggested list of words is in the manual.
8th Week	Voiced Laterals					Same or Different. The teacher calls out pairs of words and the child is asked whether the two words in the set are the same or different. If the task needs to be simplified, ask if the words in the pair are the same or not. The child merely responds with a "yes" or "no" answer. A suggested list of words is in the manual.
	/l l/			7		
		/l/		4		Visual-Perceptual. Present a puzzle-type of picture and ask the child to find all the spaces that have an "l" in them. Then suggest that each of these spaces be colored yellow. Talk about the picture and stress on its initial sound. Name other words with the same beginning sound.

Appendix D (continued)

Sequence	Phonemes Taught		Total # Activities		Exemplars
	Spanish	English	Spanish	English	
9th Week	Voiced Vibrants		8		<p>Passage. Read a passage slowly and have the child raise a hand every time a word beginning with /r/ is heard.</p> <p>Row, Row, Row Your Boat. Recite the lyrics of the song "Row, Row, Row Your Boat" with the child. Ask the child to listen carefully to the /r/ sound throughout the song.</p>
	/r ɾ/	/r/		4	
10th Week	Vowels		19		<p>Mexican Bingo. Make a Mexican bingo by xeroxing the set of handmade illustrations, which consist of vowel sounds. Mount them on 8" x 10" tagboard. Each board will be labeled with three vowels at the top, and there will be three illustrations, beginning with each vowel sound. Make one set of individual cards (3" x 2") for the child who calls out the bingo. The number of players may vary. One child, the caller, names the picture and identifies the beginning sound while showing the call card to the children. The players who have the called picture on their board place a marker on it. The first one to have a full card is the winner and gets to call the next game.</p>
	/a e i o u/				
11th Week					

Appendix D (continued)

Sequence	Phonemes Taught		Total # Activities		Exemplars
	Spanish	English	Spanish	English	
12th Week		Short vowel sounds		19	<u>How the Vowels Got Their Names.</u> This is a series of five short stories that bring the vowels alive. Mexican-American children relate easily to the stories because they are familiar with the nicknames used, such as "Meme" for Manuel, "Lupe" for Guadalupe, and "Meche" for Mercedes. Typical Mexican-American foods are also frequently used throughout the stories.

Teacher Training Log

January 13, 1981. Meeting at Principal's office with elementary principal and five kindergarten teachers. Explained rationale for conducting study as well as the methodology, i.e., the design of the study, instrumentation, test examiner, and program implementation. Teachers were given an opportunity to withdraw from the study if so desired. Procedures for random selection were explained to the group. Proceeded with random selection using Glass and Stanley's (1970) technique.

January 19, 1981. Met with the ten participating teachers and instructional aides. Discussed Teachers/Aides Statement of Informed Consent. Signed forms were to be picked up within the next two days. Parents' Statement of Informed Consent were also discussed with teachers and instructional aides. Teachers agreed to send notices home with their students. Each teacher was given addressed letters in sealed envelopes for the parents of each student in her classroom.

January 29, 1981. Preservice training was provided for three teachers participating in the experimental groups. An overview of the Auditory Discrimination Prescription-Intervention Program (ADPIP) was provided. Emphasis was placed on the importance of following the sequence of the phonemic categories but still allowing for individual differences. A tentative schedule was given and discussed. Parents' Statements of Informed Consent were collected from the teachers. Qualifications for test administrator were discussed. Feedback from teachers was given concerning best qualified kindergarten substitutes.

January 30, 1981. Preservice training was provided for the three instructional aides participating in the experimental groups. An overview of the ADPIP was presented. The importance of following the specified sequence of the phonemic categories was stressed, as well as allowing for individual differences within the classroom.

February 2, 1981. Preservice training session held with three teachers implementing the ADPIP. Methods and techniques of specific activities from the first two phonemic categories (/p t k/ and /b d g/) in the ADPIP were demonstrated. Instructional games and activities, such as La Burrita and Pocket Charts, were left with the teachers to use in teaching children specified phonemic discriminations.

February 5, 1981. Preservice training session held with the three instructional aides involved in the implementation of the ADPIP. Same content as for the teachers (See February 2, 1981).

February 9, 1981. Met individually with the six teachers and instructional aides participating in the experimental groups. Explained test results of each individual student in relationship to the class as a whole. Possible ways of grouping within the classroom in order to meet individual needs were discussed.

February 20, 1981. Met with the three teachers involved in the implementation of the ADPIP. Specific activities designed to help kindergarten students discriminate phonemic categories /f s x/ and /m n ñ/ were discussed. Instructional games and activities, such as Mr. Bunny and Jack and the Beanstalk, were left with the teachers.

February 23, 1981. Met with the instructional aides and covered basically the same content as with the teachers (See February 20, 1981).

March 9-10, 1981. Individual conferences were held with the six teachers and instructional aides participating in the experimental groups of the study. Specific activities designed to discriminate phonemic categories /l ɫ/ and /r ɾ/ were discussed. Instructional materials, as suggested in the ADPIP, were left with the teachers.

April 2, 1981. Follow-up meeting held with three teachers involved in the implementation of the ADPIP. Specific activities designed to discriminate vowel phonemes were discussed. Teachers were reminded that only short vowel sounds in English were to be taught. Instructional games and activities, such as Mexican Bingo and mimeographed lessons, were left with the teachers.

April 3, 1981. Met with the three instructional aides and covered basically the same content as with the teachers (See April 2, 1981).

May 8, 1981. Met at Regio's Restaurant with eleven participating teachers/aides, principal, Elementary secretary, and test administrator.

Appendix E

Superintendent's Statement of Informed Consent

As superintendent of the Zapata Independent School District, Zapata, Texas, I hereby give my permission for Anita R. Medina, a doctoral candidate at Texas Woman's University, to use our facilities and the children enrolled in the kindergarten classes in her research study.

I am aware that a pretest and posttest will be administered by a trained test administrator. The kindergarten teachers and aides will be trained in an auditory discrimination program developed by Mrs. Medina. The parents of participating children will sign and return a Statement of Informed Consent before any testing will be conducted.

Superintendent's Signature

Date

Appendix F

Principal's Statement of Informed Consent

As principal of the Zapata Elementary School, Zapata, Texas, I hereby give my permission for Anita Medina, a doctoral candidate at Texas Woman's University, to use our facilities and the children enrolled in the kindergarten classes in her research study.

I am aware that a pretest and posttest will be administered by a trained test administrator. The kindergarten teachers and instructional aides will be trained in an auditory discrimination program developed by Mrs. Medina. The parents of participating children will sign and return a Statement of Informed Consent before any testing will be conducted.

Principal's Signature

Date

Appendix G

Parents' Statement of Informed Consent

Dear Parent,

The Zapata Independent School District kindergarten classes have been selected to participate in a study. An instructional program on auditory discrimination skills has been developed specifically for this group to help in planning meaningful learning activities that will maximize the effectiveness of the child's curriculum. This program will be implemented during the months of February through April, 1981.

All children will be given a test in January and then again in May to compare the effectiveness of the instructional program. The test takes 10 minutes to administer. You will be given your child's test results if you so desire.

Your child's name will be kept strictly confidential and will not be released to anyone outside of this study. Your child may discontinue participation from this study anytime you may deem it necessary. No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

For more information contact Anita R. Medina at 765-4522 after school hours. Please return this form and indicate if your child has permission to participate in this study.

Sincerely,

Principal

Date

This is to indicate that my child, _____,
does/does not have my permission to participate in the study.

Parent's Signature

Date

I do/do not agree to participate in the research study.

Student's Signature

Date

Appendix H

Consentimiento de Padres Sobre el Informe

Appreciables Sr. & Sra. _____,

Las clases de Kinder del sistema escolar de Zapata, Texas se han seleccionado para que participen en un estudio sobre la preparación para la lectura con los niños de cinco y seis años de edad. La Señora Anita Medina ha diseñado un método de enseñanza para discriminar sonidos de palabras que es una de las bases fundamentales para aprender a leer.

De las cinco clases de kinder, tres serán seleccionadas para aplicar el método de enseñanza por 20 minutos diariamente durante un periodo de tres meses--empesando en febrero y terminando en abril. A cada niño(a) se le aplicará un examen que toma 10 minutos. Este examen se llevará a cabo en enero y en mayo para determinar el efecto del método de enseñanza.

Los resultados se les serán interpretados. Los nombres de los niños se guardarán confidencialmente y no se revelarán a nadie. Su niño (a) puede descontinuar participación en este estudio en cualquier tiempo que usted piense que sea necesario. La universidad no se hará responsable por servicios médicos ni algotros gastos a consecuencia de perjuicios por participar en este estudio. Haga el favor de firmar la forma para indicar si dá su consentimiento para que su niño (a) participe en este estudio.

Sinceramente,

Principal

Fecha

Si tengo preguntas en cuanto al estudio, entiendo que podré comunicarme con la Sra. Anita R. Medina después de escuela al número de teléfono 765-4522.

_____ Sí doy mí consentimiento para que mi niño(a)
participe en este estudio.
_____ No doy mí consentimiento.

Firma de padre o tutor

Fecha

Firma del niño(a)

Fecha

Appendix I

Teachers/Aides Statement of Informed Consent

As a kindergarten _____ in the Zapata Independent School District, I give my consent for my classroom and myself to be involved in the study conducted by Anita R. Medina, doctoral candidate at Texas Woman's University, Denton, Texas.

I am aware that I will be involved in teacher training for a period of 45 minutes per day for at least four days. Also, if selected to be in the experimental group, I will implement an auditory discrimination program, developed by Mrs. Medina, for a period of 12 weeks during the normal day of my classroom activities.

I am also aware that no medical service or compensation is provided to subjects by the University as a result of injury from participation in research. I also understand that I may withdraw from this investigation at any time and that my name will not be used in any release of the data. The results of the study will be available to me through the researcher.

Signature

Date

REFERENCES

- Andersson, T., & Boyer, M. Bilingual schooling in the United States. Austin, Texas: Southwest Educational Development Laboratory, 1970, Vol. 1 and Vol. 2.
- Axelrod, J. Some pronunciation and linguistic problems of Spanish-speaking children in American classrooms. Elementary English, 1974, 51, 203-206.
- Bender, L. Use of the Visual Motor Gestalt Test in the diagnosis of learning disabilities. Journal of Special Education, 1970, 4, 29-39.
- Blank, M. Cognitive processes in auditory discrimination in normal and retarded readers. Child Development, 1968, 39(2), 1091-1101.
- Brainard, C. Reviews. Modern Language Journal, 1978, 62, 350-351.
- Brown vs. Board of Education, 347 U.S. 483 (1954).
- Bryen, D. N. Speech-sound discrimination ability on linguistically unbiased tests. Exceptional Children, 1976, 42, 195-201.
- Byfield, P. J. Falcon Dam and the lost towns of Zapata. Austin, Texas: The Texas Memorial Museum Publications, 1966.
- Cardenas, D. N. Introducción a una comparación fonológica del español y del inglés. Washington, D.C.: Center for Applied Linguistics, 1960.
- Carter, T. P. Cultural content for linguistically different learners. Elementary English, 1971, 48, 162-175.
- Carter, T. P., & Segura, R. D. Mexican Americans in school: A decade of change. New York: College Entrance Examination Board, 1979.
- Casso, H. J. Bilingual/bicultural education and teacher training. Washington, D.C.: National Education Association, 1976.

- Castro-Gingras, R. An analysis of the linguistic characteristics of the English found in a set of Mexican-American child data. California: Southwest Regional Laboratory Technical Note, June 13, 1972. ED 111002
- DeAvila, E. A., & Duncan, S. E. A few thoughts about language assessment: The Lau decision reconsidered. In H. Trueba & C. Barnett-Mizrahi (Eds.), Bilingual multicultural education and the professional: From theory to practice. Massachusetts: Newbury House Publishers, Inc., 1979, 441-453.
- DeAvila, E., & Havassy, B. E. The testing of minority children: A neo-Piagetian approach. Today's Education, 1974, 63, 72-75.
- De la Garza, L. La antigua revilla. Victoria, Tamaulipas: Imprenta Oficial del Gobierno, 1944.
- Deutsch, C. P. Auditory discrimination and learning: Social factors. Merrill-Palmer Quarterly, 1964, 10, 277-296.
- Diccionario de la lengua española. Madrid, España: Real Academia Española, 1970.
- Dreher, B., & Larkins, J. Non-semantic auditory discrimination: Foundation for second language learning. Modern Language Journal, 1972, 56, 227-230.
- Fasold, R. W. What can an English teacher do about non-standard dialect? R. Jacobson (Ed.), The English Record, April 1971, 21, 82-90.
- Fernandez, R. Staffing instructional materials and bilingual, bicultural education. California Journal of Educational Research, 1974, 25, 274-280.
- Fields, F. T. Texas sketchbook: A collection of historical stories from The Humble Way. Houston: Humble Oil & Refining Company, 1962.
- Flynn, P. T., & Byrne, M. C. Relationship between reading and selected auditory abilities of third-grade children. Journal of Speech and Hearing Research, 1970, 13, 731-740.

- García, E. E., & Trujillo, A. Development study of Spanish-English production in bilingual children. Journal of Educational Psychology, 1979, 71(2), 161-168.
- Glass, G., & Stanley, J. Statistical methods in education and psychology. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970, 510-512.
- Golden, N. E., & Steiner, S. R. Auditory and visual function in good and poor readers. Journal of Learning Disabilities, 1969, 2, 476-481.
- Gonzalez, J. Coming of age in bilingual/bicultural education: A historical perspective. Inequality in Education, 1975, 19, 5-18.
- Isaac, S., & Michael, W. B. Handbook in research and evaluation. California: EDITS Publishers, 1975.
- Koppitz, E. M. The Visual-Aural Digit Span Test with elementary school children. Journal of Clinical Psychology, 1970, 26, 349-353.
- Lado, R. A comparison of the sound systems of English and Spanish. Hispania, 1956, 39, 26-29.
- Lado, R. Acquisition and learning in early reading. Hispania, 1977, 60, 533-535.
- Lau vs. Nichols, 414 U.S. 563, 1974.
- Lingren, R. H. Performance of disabled and normal readers on the Bender-Gestalt, Auditory Discrimination Test, and visual-motor matching. Perceptual and Motor Skills, 1969, 29, 152-154.
- Linn, G. B. A study of several linguistic functions of Mexican-American children in a two-language environment. San Francisco, California: University of Southern California, 1965.
- Lynn, K. Bilingualism in the southwest. Quarterly Journal Speech, 1945, 31, 175-180.
- Martinez, M., & Lott, V. The kingdom of Zapata. San Antonio: The Naylor Co., 1953.

- Marzano, R., Barbar, D. J., Breeh, N., Larson, C., Larson, S., & Tilton, P. Sound discrimination and reading comprehension in middle school students. Journal of Reading, 1976, 20, 34-36.
- Matluck, J. H., & Mace, B. J. Language characteristics of Mexican-American children: Implications for assessment. Journal of School Psychology, 1973, 11, 365-386.
- May, R. B., & Hutt, C. Modality and sex differences in recall and recognition memory. Child Development, 1974, 45, 228-231.
- Molina, J. C. A message from Dr. John C. Molina, Director of the Division of Bilingual Education, United States Office of Education. School Management, 1974, 18, 19.
- National Institute of Education. Multicultural bicultural division fiscal year 1976 program plan. Washington, D.C.: National Institute of Education, U.S. Department of Health, Education, and Welfare, February 1976.
- Olguín, L. Solutions in communication. Elementary English, 1971, 48, 352-356.
- Ornstein, J. Sociolinguistic research on language diversity in the American Southwest and its educational implications. Modern Language Journal, 1971, 55, 223-229.
- Politzer, R., & McMahon, S. Auditory discrimination performance of pupils from English- and Spanish-speaking homes. Stanford, California: Stanford University, 1970. (ERIC Document Reproduction Service No. ED 050 853)
- Politzer, R., & Weiss, L. Developmental aspects of auditory discrimination, echo response and recall. Modern Language Journal, 1969, 53, 75-85.
- Reyes-Kramer, V. The effect of auditory discrimination training of Spanish-speaking children on auditory discrimination and sound-letter associations. Ph.D. Dissertation, Kansas State University, 1978.
- Roberts, T. Auditory blending in the early stages of reading. Educational Research, 1979, 22, 49-53.

- Roberts, T. Skills of analysis and synthesis in the early stages of reading. British Journal of Educational Psychology, 1975, 45, 3-9.
- Rodriguez, I. Development of listening skills for the disadvantaged Mexican-American child in kindergarten. Professional Paper Prepared for Master's Degree, Texas Woman's University, 1973.
- Rosen, S. J., & Stickler, G. M. Federal Civil Rights Litigation. New York: Practicing Law Institute, 1977, 517-540.
- Santiago, R. L., & Feinberg, R. C. The status of education for Hispanics. Educational Leadership: Journal of the Association for Supervision and Curriculum Development, January 1981, 292-297.
- Sapon, S. M., & Carroll, J. B. Discriminative perception of speech sounds as a function of native language. General Linguistics, 1958, 3, 62-71.
- Sattler, J. M. Assessment of children's intelligence. Philadelphia, Pa.: W. B. Saunders Co., 1974.
- Saville, M. R., & Troike, R. C. A handbook of bilingual education (Rev. ed.). Washington, D.C.: TESOL, 1975.
- Saville-Troike, M. Foundations for teaching English as a second language. New Jersey: Prentice-Hall, 1976.
- Spanish Language Proficiency Interview in Texas. Austin, Texas: Educational Testing Service, 1980.
- Stanchfield, J. M. Research: New hope for kindergarten children. Paper presented at the meeting of the California Reading Association, San Francisco, November 1971. ED 058011
- Texas almanac. Dallas Morning News, 1980-81. The Encyclopedia of Texas, Fiftieth Edition, 386.
- Texas statewide design for bilingual education. Austin, Texas: Texas Education Agency, November 12, 1968. (Mimeographed)
- Thompson, B. B. A longitudinal study of auditory discrimination. The Journal of Education Research, 1963, 56, 376-378.

- Thonis, E. Literacy for America's Spanish-speaking children. Newark, Delaware: International Reading Association, 1976.
- Troiike, R. C. Research evidence for the effectiveness of bilingual education. Rosslyn, Virginia: Center for Applied Linguistics, 1978.
- Turaids, D., Wepman, J. M., & Morency, A. A perceptual test battery: Developmental and standardization. Elementary School Journal, 1972, 351-361.
- Ulibarri, H. Interpretive studies on bilingual education: Final report. Albuquerque: College of Education, University of New Mexico, 1969.
- U.S. Bureau of the Census. Census of Population: 1960. Characteristics of the population. Washington, D.C.: U.S. Government Printing Office, 1963.
- U.S. Bureau of the Census. Statistical Abstract of the U.S.: 1980. Washington, D.C.: U.S. Government Printing Office, 1980, p. 149.
- U.S. Commission on Civil Rights. A better chance to learn: Bilingual-bicultural education. Washington, D.C.: U.S. Commission on Civil Rights, 1975.
- Velázquez de la Cadena, M. A new pronouncing dictionary of the Spanish and English languages. New York: Wilcox & Follett Co., 1974.
- Wallach, L., Wallach, M. A., Dozier, M. G., & Kaplan, N. E. Poor children learning to read do not have trouble with auditory discrimination but do have trouble with phoneme recognition. Journal of Educational Psychology, 1977, 69, 36-39.
- Wepman, J. M. Auditory discrimination, speech, and reading. The Elementary School Journal, March 1960, 60, 325-333.
- Wepman, J. M. Manual: Auditory discrimination test. Chicago: Joseph M. Wepman, 1958 and (Rev.) 1973.
- Wildt, A. R., & Ahtola, O. T. Analysis of covariance. California: Sage Publications, 1978.
- Wright, L. The bilingual education movement at the crossroads. Phi Delta Kappan, November 1973, 183-186.

BIBLIOGRAPHY

Bilingual Education Act of 1968. Title VII of the Elementary and Secondary Education Act of 1965, 20 U.S.C. 880 (L), (1968).

Bilingual Education Act of 1974. Title VII of the Elementary and Secondary Education Act of 1974, 20 U.S.C. 1703 (f), (1974).

Civil Rights Act of 1964. Section 602, 42 U.S.C. 2000 (d) and 45 C.F.R. 123.

Equal Educational Opportunity Act of 1974, 20 U.S.C. Sections 1703, 1706, 1708-10.

Lau Remedies: Interpretation. San Antonio, Texas: Intercultural Development Research Association.

National Origin Memorandum, 35 Federal Register 11575, (1970).

Texas Legislation. Section 21.451-21.460, Texas Education Code (1973).

United States vs. Texas. Civil Action No. 5281, (1981).