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Comerse las eses: A selective bibliographic survey of /s/ aspiration and deletion in dialects of Spanish

Mason, Keith William, Ph.D.

The University of Michigan, 1994

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COMERSE LAS ESES :

A SELECTIVE BIBLIOGRAPHIC SURVEY OF /s/ ASPIRATION AND DELETION IN DIALECTS OF SPANISH

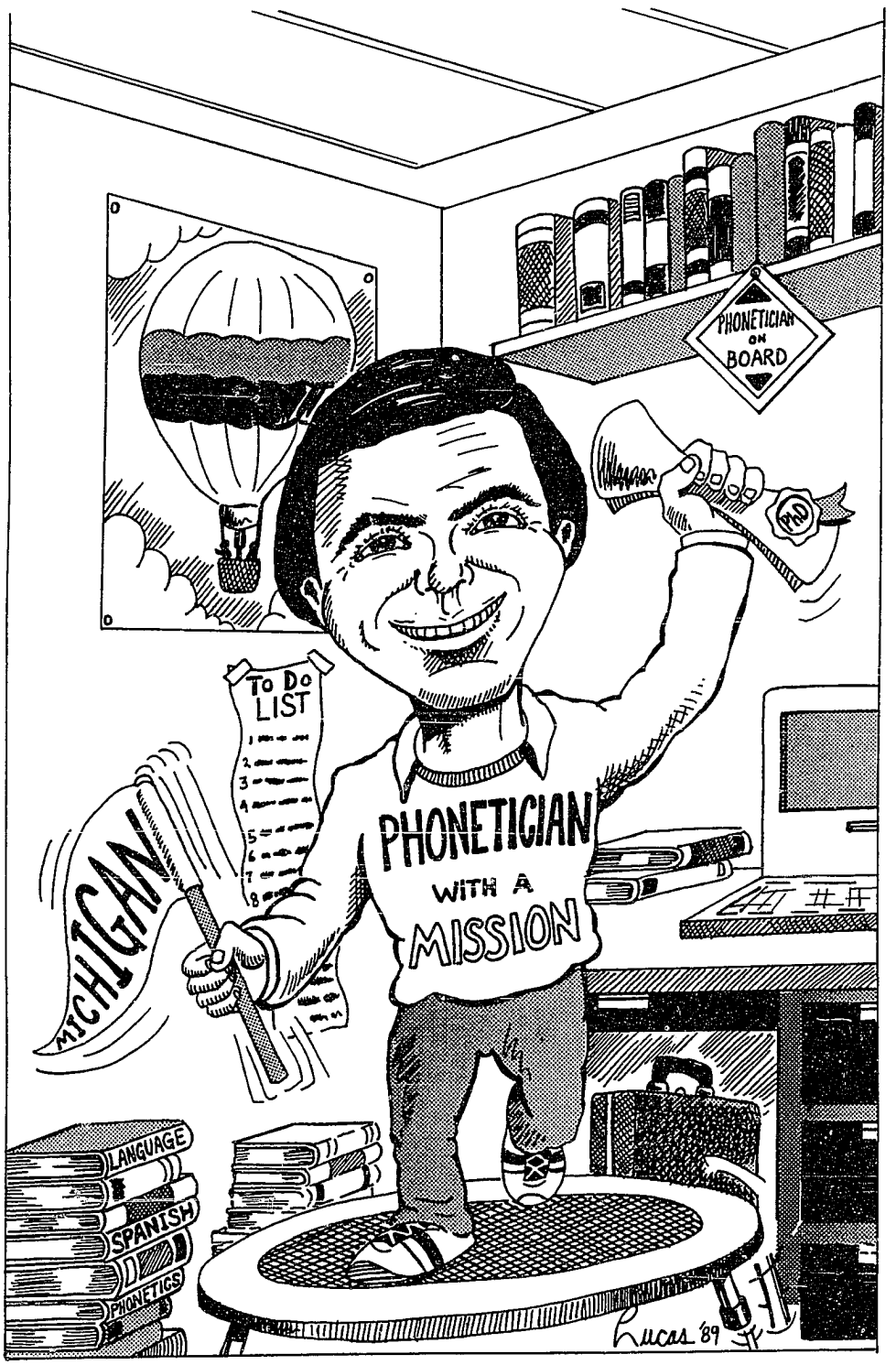
by

Keith William Mason

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Romance Languages and Literatures: Romance Linguistics)
in The University of Michigan
1994

Doctoral Committee:

Professor Steven N. Dworkin, Chairman
Associate Professor Patrice Speeter Beddor
Assistant Professor Lynn Carbón Gorell
Associate Professor Clifford S. Leonard, Jr.



For my grandparents, Dorothy Esposito Sparaco, Benedetto Sparaco,

Anna Leary Mason, William Mason, and my aunt, Anne Mason Puleo

IN MEMORIAM

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LIST OF SYMBOLS

[s]	phonetic transcription
/s/	phonemic transcription
s	orthography
C	consonant
V	vowel
#	pause (or silence)
ø	zero realization
[V:]	long vowel (in phonetic transcription)
[V´]	stressed vowel
[V̩]	unstressed vowel

These symbols have their IPA value:

consonants: [p], [f], [ɸ], [b], [v], [β], [t], [θ], [d], [ð], [k], [x], [χ], [g], [ɣ], [m], [n], [ɲ], [ŋ], [l], [ʎ], [r], [ɾ], [s], [s̪], [ʂ], [z], [z̪], [ʃ], [ʒ], [ç], [j], [w], [h], [ɦ], [ʔ]

vowels: [a], [æ], [e], [ɛ], [i], [o], [ɔ], [u]

CHAPTER 1

PRELIMINARIES

1.0 Introduction and background

The /s/ in Spanish has several manifestations that have been carefully explored in the available literature. Scholars in Spanish phonetics including Terrell (1979), Lipski (1985a), Dalbor (1980), and Quilis (1981, 1985), among others, report that Spanish is rich in allophonic realizations of /s/. Quilis (1981:234) states, "En español, /s/ es el fonema que quizá presente más realizaciones."

Two basic /s/ types exist in the Spanish language, **apicoalveolar** or **apical** and **laminoalveolar** or **laminal**.[1] In apicoalveolar articulations, the tip or apex of the tongue approximates the flat part of the alveolar ridge (Catford 1977:151). In laminoalveolar articulations, the tip of the tongue rests on the lower teeth and the blade of the tongue articulates in approximation with the alveolar ridge (Catford 1977:152).

These two basic realizations of /s/ are widespread in Modern Spanish dialects. The apicoalveolar [s̻] is found in Castilian Spanish and in the dialects of the Caldas and Antioquia regions of Colombia. The laminoalveolar [s] is employed in parts of Southern Spain and most American Spanish dialects. Several conservative dialects exist in which a laminal [s] is consistently retained (Mexico City, Highlands of Colombia, Peru, Ecuador and Bolivia) and other innovative dialects in which [s] is aspirated or deleted in certain phonetic contexts (Southern Spain, Canary Islands, Caribbean, Central America, lowland and coastal regions of South America).

Native speakers of Spanish refer to the changes in the innovative dialects as *comerse las eses* ("eating the s's").[2] The most common linguistic term used to describe the change from [s] to [h] in Spanish has been /s/ **aspiration** or "*aspiración de la /s/*." Uber (1981: 82) refers to this term as a misnomer on the grounds that aspiration is not a term that normally describes fricatives in Spanish. She believes that perhaps in English it was a mistranslation of the Spanish "*aspiración de s*", which can mean "aspiration from *s*" rather than "aspiration of *s*." López Scott (1983:24) makes a similar comment regarding the term. The term aspiration, within the phonetic literature, normally describes a period of voicelessness following release of constriction (Ladefoged 1982:47). Despite the original usage of the term, the term aspiration will be used to describe the s > h change in Spanish as is done consistently in the Hispanic linguistic literature.[3]

In the context of other languages, the s > h change as found in Spanish is also found in some varieties of Malay, Sanskrit, and in various Romance languages, e.g. Portuguese and Gallo-Romance (Ferguson 1990:65). For example, the Sanskrit [s] changed to [h] in syllable-final position mainly before voiceless obstruents and in absolute sentence-final position (Ferguson 1990:71).

While aspiration or deletion of /s/ generally occurs in syllable- and word-final positions, /s/ may also be aspirated or deleted in syllable- and word-*initial* positions in some varieties of Colombian, Honduran, and Salvadoran Spanish. The initial versus final distinction will be highlighted throughout the following chapters, especially Chapter 2, since phonetic context is important for characterizing manifestations of /s/. Indeed, the final position is the more common context in Modern Spanish for sound changes to occur in dialectal Spanish. Diachronically, several sound changes involving fricatives occurred in initial position (e.g., /f/ > /h/, /ʃ/ > /x/), a point that is further developed in Chapter 3.

The aspiration of Spanish /s/ or s > h change has aroused much discussion in the literature. Ferguson (1990:64) emphasized the abundance of research regarding the aspiration and deletion of Spanish [s] as follows:

> Apart from the large and still growing literature on the 'short a' phenomena of English... the aspiration and deletion of /s/ in dialects of Spanish may be the most extensively treated of all sound changes being investigated from an empirical, variationist perspective.

Moreover, Kiparsky (1988:377) maintained that this process had normally followed a pattern of phonological weakening: it was "usually context-sensitive and favored in unstressed position, in the syllable coda, and in casual speech." Spanish /s/ aspiration has become very widespread for laminal articulations of *s* occurring in syllable- and word-final positions. It is interesting that final /s/ normally has been retained in those dialects that have apical [s̻], for example, peninsular dialects such as Castilian in Spain, and Antioquian and Caldan in Colombia. One of the key questions within Spanish phonetics asks why the laminal [s] articulation tends to aspirate while the apical [s̻] articulation tends to be retained. Focusing solely on the articulation of the two [s]- types in Spanish dialects, however, may not be an adequate strategy in answering why the apical and laminal articulations have had different outcomes in syllable- and word-final positions. Acoustic, perceptual, historical, dialectal, and sociolinguistic aspects may all play an important role in answering these questions.

One explanation for /s/- variation in Spanish may be functional: pluralization of definite articles, nouns, adjectives, and in some cases, verbs are marked with *-s* in Spanish. This being the case, there is often much redundancy because many lexical items in a given sentence or utterance may have plural [s]. For example, in the sentence *Las casas están en las calles hermosas de España*, the *-s*'s are redundant in that both the context and verb marked in the plural tell the listener that the noun phrase is indeed plural. According to a functional account of /s/ variations, often only one *-s* in each phrase is necessary to show plurality and thus a phonetically stable [s] is not realized consistently and could be a factor in the aspiration or deletion of this sound in Spanish.

In terms of functional load, /s/ is morphologically important for marking the plural of nouns and second person singular verb forms in all tenses except the preterite (e.g.

tienes "you have", *hablabas* "you were speaking"). In spontaneous speech, many native speakers of Spanish add an analogical *-s* to the preterite second person singular as well (e.g. *hablastes* "you spoke").

A closer look at the phoneme /s/ reveals that it is the most frequently occurring consonantal phoneme in the Spanish language. The /s/ is the fourth most frequently found sound in the Spanish language, occurring only less often than the three vowel phonemes /e/ (14.7%), /a/ (12.2%), and /o/ (9.10%), but more often than the two vowel phonemes /i/ (7.4%) and /u/ (3.3%). It occurs 8.3 per cent of the time in spoken language (Quilis and Esgueva 1980) and 8.5 per cent of the time in written language (Navarro 1968:19). However, in spite of its high frequency of use, Spanish /s/ is described as "the most unpredictable, elusive, shifting, erratic and troublesome sound in the Spanish language" (Obaid 1973:60). In addition, Lipski (1984b:31) maintained that "The behavior of the phoneme /s/ is one of the most variable phenomena characterizing Spanish phonology, and the differential behavior of this same phenomenon is perhaps the single most useful parameter in dialectological description." It seems that the large number of reported variations in /s/ articulation, both in dialects and in idiolects, contributes to its often imprecise definition within the literature.

What makes the analysis of /s/ complex is the fact that perceptible differences exist among speakers in terms of how the /s/ is articulated. Lipski (1986b:46) pointed out these perceptible differences in his study of the local speech of Honduran towns. Lipski stated that "it is the variability itself rather than the existence or non-existence of the rule of aspiration that constitutes the differentiating characteristics of each local dialect" (46). Following Kiparsky, one may infer that the aspiration/deletion phenomena are not the only cause of dialectal variation, since variation also occurs in the sibilant realizations when consistently retained.[4]

1.1 Rationale and Procedure

In order to provide a comprehensive account, the present study will bring together research on the various manifestations of /s/ in the Spanish speaking world, particularly on the Spanish /s/ aspiration/deletion phenomena, that could provide a possible explanation. In the following sections, I compile studies which describe and analyze this phenomenon within five linguistic frameworks: phonetics, phonology, diachronic linguistics, dialectology, and sociolinguistics. No previous study has attempted to synthesize the literature on the aspiration/deletion of Spanish /s/ in this manner. The synthesis here will bring together studies that treat Spanish /s/ aspiration and deletion in synchronic and diachronic terms.

Most of the studies describe the phenomena in dialectal terms, often using a quantitative data analysis. Far fewer studies attempt to explain the s > h change. While the descriptive studies are of interest in providing a more complete depiction of Spanish /s/ aspiration and deletion, an emphasis will be placed on those studies that attempt to explain these sound changes. From surveying the body of literature about s > h, we can formulate specific hypotheses that attempt to explain s > h in Spanish.

In several respects, the present dissertation is innovative. Never have the dozens of research articles and book discussions treating Spanish /s/ aspiration/deletion been brought together in one study. The review of the studies included in this dissertation does not attempt to be exhaustive. Rather, studies from the 1970's to the present are emphasized. The review provides an overall view of this vast literature and a comparison of these studies. In fact, the s > h issue is undoubtedly the most analyzed sound change by phonetic and phonological researchers within the Hispanic field. Thus, by evaluating what has already been done, we may attempt to advance knowledge of the s > h issue in future research.

By comparing Spanish to other Romance languages such as French and Italian, we see that Spanish is following its Romance sisters by losing final /s/. The motivation for the aspiration/deletion phenomenon and its comparison to other Romance languages is an important question not only within Hispanic linguistics but within Romance linguistics as well.

The s > h change is widespread in dialects of Spanish, and continues to spread even in the so-called conservative dialects where final consonants are retained. The s > h change will continue exhibiting effects on the Spanish language in future generations. These effects are not merely phonetic and phonological but also morphological, syntactic, semantic, and lexical.

In the following three chapters, I review five research areas in which Spanish /s/ aspiration/deletion has been explored. These areas are phonetics, phonology, and diachronic linguistics, dialectology and sociolinguistics. I have found the five linguistic areas in which Spanish /s/ aspiration/deletion studies have been undertaken by doing an extensive bibliographical search, mainly on the MLA International Bibliography on CD-Rom and from Solé (1990) and Quilis (1984). The Spanish /s/ aspiration/deletion studies reviewed here include journal articles, books, conference papers, and Ph.D. dissertations. All the /s/ aspiration/deletion studies reviewed in this study may be classified into at least one of these five areas, although some studies can be placed into more than one category. In such cases, I utilized the key word information on the MLA CD-Rom in order to categorize each study into one main linguistic area and thus into one chapter.

The following chapters reflect these five areas and are organized as follows: Chapter 2 outlines in greater detail phonetic aspects of sibilants in general and of Spanish /s/ in articulatory, acoustic, and perceptual terms in particular. It also includes studies within theoretical phonology that address /s/ aspiration/deletion in Spanish. A closer look at place of articulation, the apical/laminal distinction, and syllable structure in general terms is treated in Chapter 2 since this information could provide insights that might help explain

aspiration/deletion in Spanish. In Chapter 3, the major diachronic studies on Spanish /s/ aspiration/deletion are reviewed. Chapter 4 addresses dialectal and sociolinguistic aspects of /s/ aspiration/deletion. Chapter 5 presents the conclusion with suggested directions for future research of Spanish /s/.

The phonetic, phonological, and diachronic studies are organized by theme in order to provide the necessary background information on Spanish /s/ and the aspiration/deletion processes. For this reason, these studies are presented earlier in the dissertation. The dialectal and sociolinguistic studies are presented in a later chapter, as they require a basic understanding of the phonetics and phonology of /s/ and diachronic aspects of /s/ aspiration/deletion. Because the majority of the studies in these two areas are country-specific, the dialectal and sociolinguistic studies are organized in sections corresponding to a particular country or geographical zone. Thus the chapters have been sequenced to provide a logical progression from basic themes to more specific themes. Although, the chapters survey comparatively the large number of studies written in the five areas mentioned above, the coverage is unavoidably uneven and this represents a reflection of the research available in the various linguistic areas.

A careful survey of the /s/ aspiration/ deletion literature reveals that the majority of the research focuses on quantifying the /s/ allophones used in various dialects of Spanish. While this focus successfully allows for a better understanding of dialectal variation, it also reveals two omissions. The first oversight is the non-inclusion of what /s/ type is being aspirated or deleted. The reader must consult other dialectal sources to verify /s/ type. The second oversight is the focus on syllable and word final aspiration and deletion with very little coverage of syllable- and-word-initial aspiration. Final aspiration/deletion is much more common and is indeed synchronically the more common position in the syllable for consonant reductions or modifications to occur. Nevertheless, a closer look at syllable and word initial aspiration seems appropriate because, in the contemporary language, the syllable onset is not the most common position for sound change to occur.

With regard to linguistic terminology and phonetic and phonemic transcriptions, it becomes immediately apparent from surveying all the different studies written about Spanish /s/ aspiration and deletion that a number of inconsistencies arise. To confront them, I use linguistic terms as they are consistently accepted within general linguistics and adopt IPA usage for the transcriptions. If any ambiguities are still apparent in either terminology or transcriptions, I offer further descriptions in order to clarify these ambiguities.

The body of literature on Spanish /s/ aspiration or deletion is extensive and the sources are, in some cases, not very accessible. In this dissertation the key research on Spanish /s/ aspiration/deletion is brought together in one study for the first time allowing linguists to formulate hypotheses for explaining /s/ aspiration/deletion. By closely analyzing the previous research, we are able to determine exactly what we already know about Spanish /s/ aspiration/deletion and establish what we still need to investigate in the future to advance our knowledge of this important sound change, one that is changing and may continue to change Spanish in future generations.

Notes to Chapter 1

[1]Once one specifies that a given sound is alveolar, apical and laminal may be effectively used to refer to the tongue position.

[2]*Comerse las eses* is used in regular conversation among native speakers of Spanish to refer to the s > (h) > ø sound change.

[3]Aspiration is so commonly used in the literature for s > h in Spanish, we might as well resign ourselves to the fact that its usage is here to stay. Linguistically, aspiration has two definitions in terms of describing sounds in Spanish. The only other terms that could be used to describe s > h are glottalization or backing. Glottalization could also include the glottal stop [ʔ].

[4]Very little research, if any, addresses differences in sibilant articulations. Almost all the energies of investigations have gone to the allophones of /s/ such as [h], [ɦ], [ʔ], and ø. It would be interesting in the future to verify whether variation in sibilant production, transmission, or perception might have an effect on the aspiration/deletion of /s/ in dialects of Spanish.

CHAPTER 2

PHONETIC AND PHONOLOGICAL ASPECTS OF SPANISH /s/ ASPIRATION/DELETION

2.0 Introduction

This chapter presents current views on the articulatory, acoustic, and perceptual characteristics of fricative and sibilant sounds in general, and it reviews research on Spanish /s/ in particular. It also includes an overview of phonological research on /s/ aspiration/deletion within the various schools: structural, generative, autosegmental, and metrical.[1] The main focus here is to consider data from articulatory, acoustic, and perceptual phonetics and how these data may help explain /s/ aspiration and deletion in dialects of Spanish.

Two 1991 studies are particularly relevant to understanding /s/ aspiration and deletion in Spanish and therefore merit particular consideration in this chapter. Dart (1991) investigated articulatory and acoustic aspects of apical and laminal consonants. Widdison (1991) discussed the phonetic basis of Spanish /s/ aspiration, focussing mainly on acoustics and perception. By considering data from articulation, acoustics and perception, we are better positioned to address such questions as: Why is /s/ aspirated or deleted in Spanish? Why does aspiration and deletion appear to affect the laminal /s/ in particular? Considering all three branches of phonetics in combination could help explain Spanish /s/ aspiration/deletion more adequately and completely.

The following sections discuss key concepts in phonetics needed to describe fricatives and sibilants in general with particular attention given to the Spanish /s/. Section 2.1 presents an articulatory characterization of /s/ and Section 2.1.1 discusses the articulatory phonetics of Spanish /s/. Section 2.2 addresses the acoustic characterization of /s/, Section 2.2.1 provides acoustic phonetic descriptions of Spanish /s/, and Sections 2.3 and 2.3.1, respectively, do the same for perceptual properties. Phonological studies are presented in section 2.4. A summary of both general and Spanish-specific studies discussed in these sections is given in Table 2.1. Within each of these sections, three main issues related to the retention versus aspiration/deletion of Spanish /s/ are discussed: apical versus laminal articulations of /s/, the place of articulation of /s/ (specifically, alveolar versus postalveolar or (pre-)palatal), and the position of /s/ within the syllable (i.e., initial versus final position).

Justification for focussing on these three issues is as follows: As outlined in Chapter 1, two basic /s/ types are commonly reported in dialects of Spanish: an apical [s̻] and a laminal [s] (Dalbor 1980, Quilis 1981). A link has been made between the apical type and retention of /s/ and the laminal type and reduction of /s/, even though very few dialects use the apical (Politzer 1947, Straka 1964). However, place of articulation appears to differ for the articulation of apical and laminal sibilants and therefore the place factor in the retention versus reduction issue cannot be ignored. Finally, /s/ reduction is documented in both syllable-initial and syllable-final positions in Spanish, with a preference for syllable-final reduction. By considering the effects of syllable position on the phonetic characteristics of consonants and more specifically fricatives, one may arrive at phonetic reasons why syllable-final consonant reduction occurs more frequently than syllable-initial reduction.

General Articulation of /s/	**General Perception of /s/**
Aitchison 1991	Behrens and Blumstein 1988b
Catford 1977	Harris 1958
Crystal 1985	Mann and Soli 1991
Dart 1991	**Perceptual Studies of Spanish /s/**
Nartey 1982	Gurlekian 1981
Articulatory Studies of Spanish /s/	Manrique and Massone 1981
Catalán 1971	Uber 1981
Malmberg 1965	Uber 1984
Martínez Celdrán 1984	Widdison 1991
Torreblanca 1980	**Phonological Studies of Spanish /s/**
General Acoustics of /s/	Catrice and Cedergren 1986
Behrens and Blumstein 1988a	Cressey 1989
Dart 1991	Goldsmith 1981
Ladefoged and Maddieson 1986	Hammond 1989a
Mann and Solí 1991	Hammond 1989b
Shadle 1986	Harris 1983
Shadle 1990	Núñez Cedeño 1989
Acoustic Studies of Spanish /s/	
Manrique and Massone 1981	
Marrero 1990	
Martínez Celdrán 1984	
Quilis 1981	
Widdison 1991	

Table 2.1 General and Spanish-specific phonetic and phonological studies of /s/ reviewed here

2.1 Articulatory characterizations of /s/

The articulatory characteristics of fricatives have been described in detail by Nartey (1982), Catford (1977), and Dart (1991). Important for the present discussion is that Catford (1977) and Dart (1991) both focused on the distinction between apical and laminal sibilant articulations. The following discussion outlines key articulatory information concerning fricatives, sibilants, place of articulation, the apical/laminal distinction, and syllable position.

An articulatory description of /s/ necessitates a complete discussion of fricatives. Crystal (1985:128) defined fricatives as "sounds made when two organs come so close that the air moving between them produces audible friction. There is no complete closure between the organs (in which case a plosive articulation would be produced), there is simply a stricture or narrowing." Allophonic variants of [s] are typically sibilants, a class of fricatives defined by Crystal (1985:279) as: "a fricative sound made by producing a

narrow, groove-like stricture between the blade of the tongue and the back of the alveolar ridge. These sounds, such as [s] and [ʃ] , have a high-frequency hiss characteristic."

As Nartey (1982:1) stated, "Phoneticians know very little about the phonetic properties of fricatives." He indicated that the IPA has more symbols for fricatives than for other manners of articulation; early works in phonetics give a great number of symbols for places and manners of fricatives (e.g., Sweet 1890, Bell 1907, Hockett 1955). Nartey hypothesized that this was due to the difficulty of providing accurate descriptions of specific articulations and offered an example applicable to our discussion of Spanish /s/:

> the usual lateral x-ray pictures cannot show us the precise size of the groove in the tongue in the production of sibilant sounds. Palatographic methods cannot tell us much either as they do not record the shape of the tongue, which is a major factor in the production of fricatives... (Nartey 1982:1).

For place of articulation of sibilant articulations, the IPA recognizes a variety of possibilities, most notably a dental [s̪], an alveolar [s] and a postalveolar [ʃ]. For Spanish /s/, the alveolar and palatal regions are the most important. Place of articulation for Spanish /s/ is discussed more fully in 2.1.1.

The next section deals with tongue position, which is particularly important for the present study because the apical and laminal difference may be a factor in whether retention or aspiration/deletion of *-s* is likely to occur in Spanish. Articulatory variation in Spanish /s/ may be applied to Nartey's comments on how different tongue configurations can be made at the same place of articulation. For example, modifying the shape of the tongue in the transverse plane can produce acoustic differences between fricatives at an identical place of articulation. Nartey explained that "the usual description by place is not precise enough." Moreover, there is a significant variance of sounds able to be produced at a single "place" of articulation.

Two common fricative-type channels described by Catford (1977:150) include those that use the apical and those that use the laminal parts of the tongue. Moreover,

fricatives need not be clearly apical nor laminal but can be "apico-lamino." The apicoalveolar type relevant to the description of /s/ in varieties of Spanish was described by Catford (1977:151) as involving the tip of the tongue approximating the relatively flat part of the alveolar ridge immediately behind the upper teeth. The change from laminal to apicoalveolar tends to have one or both of two effects in an /s/ articulation: The raising of the apex to form the apicoalveolar channel tends to open up, at least partially, the lower-dental cavity, characteristic of [ʃ]. Therefore, any apicoalveolar [s̻] may sound similar to a [ʃ]. In addition, for reasons not totally understood, a strongly apicoalveolar [s̻] may acquire a slightly whistled effect (Catford 1977:157).

The most common variant across dialects of Spanish /s/ is the laminoalveolar, making a detailed description of this [s] articulation critical here. Some scholars use the term "dorsoalveolar" and "dorsal" to refer to "laminoalveolar" or "laminal," respectively (e.g., Dalbor 1980). Laminoalveolar was defined by Catford (1977:152) in the following manner: "Point of tongue on backs or rims of lower teeth, blade articulating against alveolar ridge." In laminoalveolar [s], the tongue tip is lowered. Dart (1991:6) argued on the basis of electromyographic data from English and French that the tongue tip was not simply kept "out of the way," but was rather an active articulator. In English, apicoalveolars typically are not fricatives (i.e., [t d n l]). Although slightly "whistling" variants of [s z] may be produced in English, these sounds are more commonly laminoalveolar (Catford, 1977). Spanish and English are similar, then, in that the laminoalveolar articulation is much more common than the apicoalveolar one.

Release gesture is one feature that differs for apicals and laminals. In comparison to apicoalveolar articulations in which "it is quite easy to make a clear-cut sudden breakaway of the tongue point from the alveolar ridge," Catford (1977:152) reported that when the point of the tongue was lowered and contact was produced with the blade as in laminoalveolars, "it is more difficult to break away cleanly." Referring to the release of laminoalveolar sounds, Catford added that the tongue blade withdraws from the alveolar

ridge more slowly than with apicoalveolar sounds resulting in "a perceptible moment of approximation when there is an [s]-like central channel between the blade and the alveolar ridge." Apicals and laminals may vary in articulatory precision, as described by Catford (1977:150):

> You may notice that it is easy to make a clean, sharp, break of contact between the apex and the upper articulator, but the break of contact between the blade and the upper articulator tends to be a little less clear cut, a little more 'sloppy'. This is a way in which one can sometimes detect *lamino*-articulations when one hears them.

The issue of apical versus laminal articulations has not been the topic of much study, in spite of the abundance of available phonetic techniques suitable for examining these differences (Dart 1991:3). Particularly relevant here is that no detailed phonetic account of the apical/laminal distinction exists specifically for Spanish /s/. Dart's (1991) descriptions of the articulatory and acoustic properties of apical and laminal articulations were based on productions by English and French speakers. Both of these languages exhibit non-contrastive apicoalveolar and laminoalveolar articulations as well as dental and postalveolar sibilants. Dart also included data from Malayalam and 'O'odham, two languages that contrast apical and laminal articulations. The articulatory data from her study are discussed in this section and the acoustic data are discussed in Section 2.2.

Using linguagrams and palatograms, Dart's articulatory discussion focused on place of articulation, part of the tongue used, constriction length, and air channel for fricatives. Dart discussed various consonant sounds in her study but for the purpose of the present discussion, only the fricatives /s/ and /z/ are considered here. A total of 52 speakers were used in Dart's study, allowing for "fairly precise categorization of the different articulations involved" (Dart 1991:15).

Across speakers, four different tongue contact patterns were identified based on linguagrams and six places of articulation were determined according to the palatograms, although Dart collapsed these six places of articulation into three later in her analysis:

Tongue Contact Patterns:	Places of Articulation:
apical	dental
upper apical	alveolar
apicolaminal	postalveolar
laminal	

Apical refers to an articulation made with the rim of the tongue whereas upper apical uses the upper surface of the tongue apex (Dart 1991:15).

For the 21 French speakers, linguagraphic data showed that upper apical and apicolaminal contact was not found for /s/ and /z/; rather, 31.6% of speakers used apical and 68.4% used laminal articulations. Palatographic data for French /s/ and /z/ showed that all the tokens analyzed fell within the dental and alveolar ranges; they were never postalveolar regardless of the part of the tongue that was used (Dart 1991:22-23). For constriction length in French, Dart (1991:24) reported that apical [s̪ z̪] had an average constriction of 6.43 mm while the laminal [s z] was longer, with an average constriction of 7.63 mm. Channel width was somewhat greater for apical than laminal fricatives, but this difference was not significant.

For English, Dart obtained linguagrams and palatograms from 20 speakers. Only apical (42.5%) and laminal (57.5%) /s/ types were found for tongue contact; there were no upper apical and apicolaminal based articulations. This is similar to French, except that apical articulations of /s z/ were somewhat more common in English than in French.

In terms of place of articulation, the majority of the English tokens fell within the alveolar range, followed by the dental range. Only 2.5% of /s/ tokens fell within the postalveolar range. Dart (1991:29) reported that laminal [s z] tend to be articulated further back in English speakers than in French speakers but this cross-language place difference did not hold for apical [s̪ z̪].

Dart's findings show that both English and French /s/ and /z/ are more likely to be laminal than apical (1991:34). Dart stated that "this might indicate that laminal [s] and

[z] are in some way easier to produce, perhaps due to the precise aerodynamic control required in making sibilants" (Dart 1991:34).

The main issue evident in the literature regarding the apical versus laminal articulations has been determining the various consequences of the tongue tip versus tongue blade difference. The identified differences have included tongue contact, channel width, and place of articulation. It is these inherent differences between apicals and laminals that may be important to explaining the retention versus aspiration/deletion issue in Spanish.

Turning to the issue of position of consonants in the syllable, Aitchison (1991) discussed loss of word-final consonants in historical change. Aitchison (1991:126) stated that "all consonants are weak at the end of a word if no vowel follows. They are weakly articulated and difficult to perceive." Aitchison argued that this development was not merely sloppiness, but rather was due to a general and inevitable weakness of articulation of sounds at the ends of words. This weakness, according to Aitchison, is compounded and accelerated by the fact that these sounds are difficult to hear, particularly when they are not fully released. This applies especially to stop sounds. Aitchison (1991:127) stated that it was normal for consonants to disappear at the ends of words through the ages. Acoustic consequences of syllable final consonant weakening are documented in the literature, e.g., Mann and Soli (1991), and are discussed in 2.2 below.

2.1.1 Articulatory phonetics of Spanish /s/

Turning to Spanish, an articulatory characterization of Spanish /s/ based on observational data is provided in the classic treatise by Navarro Tomás (1957:105-108), who identified two /s/ articulations: an apicoalveolar and a laminoalveolar, the latter using the predorsum or blade of the tongue. Most subsequent studies treating the

articulation of Spanish /s/ recognize these same two articulations. The apical [s̻] is found in the dialects of Northern and Central Spain and in those of the Antioquia and Caldas regions of Colombia, as well as sporadically in other New World Spanish dialects. The laminal [s], on the other hand, is found in Southern Spain and most of the New World. However, a simple dichotomy between tongue tip (apical) articulation of /s/ and tongue blade (laminal) articulation of /s/ may not sufficiently characterize Spanish /s/. Several scholars, including Dalbor (1980) and Quilis (1981) stated that the apical [s̻] might not be alveolar in its place of articulation, but rather prepalatal or palatal, while laminal [s] was alveolar. Therefore, the articulatory difference between laminal and apical /s/ articulations in Spanish may be twofold: one of tongue tip versus tongue blade and one of place of articulation differences (i.e., alveolar versus prepalatal/palatal)

Across dialects of Spanish, the apical [s̻] may differ in behavior with respect to retention versus aspiration/deletion phenomenon. In Castilian Spanish, the apical [s̻] is retained in all positions, whereas in the Antioquia and Caldas Colombian dialects that exhibit both apical [s̻] and laminal [s], the /s/ may sometimes be aspirated in syllable and word-initial positions (Flórez 1957). Therefore, the dialectal evidence for apical retention is not very strong since Castilian is the only truly apical retention dialect. The apical [s̻] is found in only parts of two Spanish-speaking countries: Spain and Colombia. Most importantly, Castilian Spanish is the only apical-retention dialect of Spanish. This situation creates obvious explanatory limitations. It would be possible to make a stronger case for apical-retention if there were other apical retention dialects. The high frequency of occurrence of laminal [s] and its frequent change to [h] or ø provides stronger evidence for /s/ reduction than the low-frequency of occurrence of apical [s̻] and its retention. Recall that the majority of speakers of Spanish in North, Central, and South America, the Caribbean, the Canary Islands, and Southern Spain exhibit reduction of laminal [s]. Nevertheless, the possible tendency of apicals to be retained remains an interesting issue to examine; the diachronic evidence for apical retention is presented in Chapter 3. It has

not been documented in the literature whether the apical occurrences aspirate along with the laminal occurrences in initial position. This issue is addressed further in Section 4.2.14.

As stated above, the use of the tongue tip or tongue blade for the apical or laminal articulations of /s/, respectively, has been documented in Spanish. Figure 2.1 shows sagittal diagrams of the apical and laminal articulations of Spanish /s/. Three types of [s] articulation in Spain were reported by Martínez Celdrán (1984:321) based on observational data: an apicoalveolar [s̻] for Castilian and two [s] varieties in Andalusian Spanish. The first Andalusian [s], a laminoalveolar variety, is found in Seville, Cadiz, and Malaga "donde el ápice desciende hasta apoyarse contra la cara interior de los incisivos inferiores, o quedándose entre los bordes de los dientes" (321). The second is a coronal [s] found in Huelva, Cordoba, Jaen, Granada, and Almeria, where the corona of the tongue forms the stricture. This second [s] is less laminoalveolar and less convex (that is, the tongue does not arch down as much).

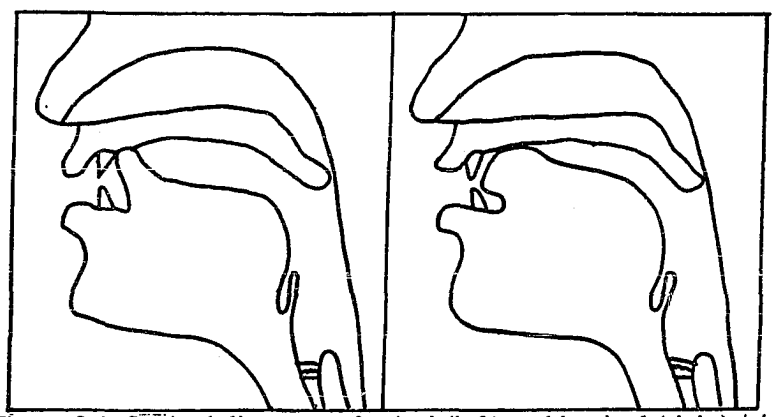


Figure 2.1 Sagittal diagrams of apical (left) and laminal (right) /s/

The laminal and apical articulations of Spanish /s/ are those consistently described in the available literature. Although Dart (1991) outlined four categories of apical and laminal consonants, she found that for the sibilants /s/ and /z/, the terms apical and

laminal were able to characterize the sibilants of French and English based on articulatory experiments using palatograms and linguagrams. This finding suggests that this two-way distinction most often used in the research dealing with Spanish /s/ may be appropriate.

The following discussion focuses on Spanish /s/-reduction in terms of the position in the syllable where reduction occurs considering both synchronic and diachronic evidence. A close look at syllable structure in Spanish reveals the strong tendency toward CV syllables. The frequency of occurrence of CV syllables in Spanish ranges from 50 to 58% of all syllables (cf. Guerra 1983; Malmberg 1965). Syllable- and word-final consonants were much more common in earlier stages of Spanish. The deletion of syllable final /s/ creates even more CV syllables, as in *casas* [ká-sa]. Even retained word-final /s/ need not create a closed syllable due to resyllabification before words with an initial vowel. For example, in the phrase *vamos a comer* "let's eat," a retained (or aspirated) final *s* of *vamos* would resyllabify to the following vowel-inital word, resulting in [bá-mo-ha-ko-mér] or [bá-mo-sa-ko-mér] (cf. Harris 1983).

Other cases of initial aspiration are not due to the resyllabification described above. We find that a morphological *s* whereby syllable final /s/ as a plural marker or part of verb desinences gets aspirated and then is resyllablified to a following word with an initial vowel is not the only type of /s/ aspiration. Syllable-initial lexical /s/ as in *sí*, *señor*, or *casa* may also exhibit aspiration. The lexical s > h change affecting syllable initial /s/ may have a different source than final s > h. We find that the s > h change parallels similar changes involving other voiceless fricatives like /s/, i.e., /f/ and /ʃ/ also exhibited a change to a more back sound in Spanish, e.g., /f/ > /h/ and /ʃ/ > /x/ in earlier stages of Spanish. This did take place in syllable-initial and word-initial positions as in [fa-βlár] > [ha-βlár], [ó-ʃo] > [ó-xo]. There is a definite tendency in Spanish for consonant backing, especially affecting the voiceless fricatives but not excluding other dialectal features such as Puerto Rican [r] > [R] or [χ], and [n] > [ŋ].

Catalán (1971) considered Spanish syllable structure within a diachronic framework. He reported that in earlier centuries in the literary variety in particular, there was a richness of final consonants and consonantal groups in final position much greater than in modern Spanish. Catalán (1971:81) maintained that Old Spanish was not structurally inclined to prefer the CV syllable type and that the tendency of modern Spanish toward open syllables cannot be considered a structural characteristic that was an uninterrupted tendency in the diachronic evolution of Spanish from Latin. Catalán (1971:84) targeted the 18th century as being the initiation of the weakening of final consonants, which affected final *-s*, *-z*, *-r*, *-l*, and *-n*. Although many of these consonants have been maintained in many areas of the Spanish speaking world, there are also extensive areas in which these final consonants have been weakened or lost, or in Catalán's words "find themselves in a crisis." Catalán (1971:109) concluded that the weakening and eventual loss of final consonants was a response to the tendency of Spanish speakers to reduce to a minimum the informative role of the syllable coda to generalize analogically the regular syllable structure, i.e., the CV syllable at the cost of the irregular syllable type CVC.

According to Malmberg (1965:12), the s > h change was a phenomenon based on articulatory weakening. Malmberg (1965:14) argued that in syllable-final position, the last segment suffered from a decrease in articulatory strength. Malmberg (1965:15) believed that the weakening that occurred in syllable-final or word-final position was a general phenomenon whose consequences may differ according to the language system. Malmberg (1965:24) pointed out that while the syllable-initial /s/ aspiration as in Peninsular and American dialects may seem to call into question his theory of syllable-final weakening, it need not because syllable-final aspiration is far more frequent than syllable-initial aspiration. One may conclude that some phonetic aspect of syllable codas (e.g. articulatory weakening) may provide a possible explanation for why syllable-final aspiration is more widespread than syllable-initial aspiration. Malmberg (1965:25)

believed that syllable-final weakening included the reduction of geminates and consonantal groups and that the preference for the CV syllable type manifested itself in the tendency to favor semi-vowels in syllable-final position and to transfer these semi-vowels into true consonants when in initial position. Malmberg (1965:28) stated that the CV syllable was the ideal syllable structure of Spanish and was also commonly found in other Ibero-Romance languages.[2]

Considering Malmberg's theory that the ideal syllable structure in Spanish is the CV syllable, Torreblanca (1980:506) linked the preference for open syllables in Spanish to the weakness and loss of all final consonants in modern Spanish. Torreblanca stated that the tendency for CV syllables had always existed and allows for the explanation of various Spanish phonetic phenomena. Given that /s/ aspiration may occur both syllable-initially and finally, Torreblanca questioned Malmberg's explanation of the open syllable being the motivation for /s/ aspiration. However, Torreblanca (1980:510) believed Malmberg's theory had more bearing on modern Spanish than on earlier stages of the language. This is because in earlier stages of Spanish, closed syllables were much more frequent and it was not until later stages of the language that we find more consonant final reduction, resulting in more open or CV syllables. This contradicts Catalán (1971) who stated that Old Spanish was rich in syllable final consonants and therefore had a great number of CVC syllables.

Torreblanca (1980:510) described the s > h change in word final position with regards to the issue of resyllabification. For example, in *las hermanas* the final aspirated [h] representing the /s/ may resyllabify to the following word when it begins with a vowel sound. But in a word such as *sí* in which the phoneme /s/ always occurs at the beginning of the syllable, it is not possible for there to be a morphological explanation, because this is a lexical s, and therefore does not explain the evolution of [sí] > [hí]. Torreblanca (1980:511) pointed out that syllable-initial aspiration may also apply to other consonants besides /s/, for example, in Hispano-America [f] > [h], and also in Spanish-America and

Spain, the [x] may go to [h]. Malmberg's theory maintained that it was final position or the syllable coda that was the weakest position in the syllable, therefore, aspiration of /s/ or loss of consonant sounds would be more frequent in final position or in the syllable coda due to a preference for open syllables. Torreblanca, on the other hand, believed the main cause of these phonetic changes in all positions was the same: articulatory relaxation (which is distinct from a preference for open syllables).

In summary, the most common syllable type in modern Spanish is CV. Thus, when aspirated /s/ is resyllabified to a word with an initial vowel or totally deleted, the result is most often the CV syllable. CVC syllables may become CV in at least two ways. The final /s/ may be totally deleted resulting in CVC > CV or the retained /s/ aspirated and then resyllabified yielding CVC + V > CV + CV, creating even more CV syllables.

2.1.2 Possible articulatory explanations for Spanish /s/ aspiration/deletion

This section evaluates the articulatory descriptions presented in 2.1 and 2.1.1 that may shed light on Spanish /s/ retention versus aspiration and deletion. One possibly relevant articulatory difference between apicals and laminals is the proposed difference in articulatory precision: the apical [s̻] has been described as a more precise articulation than the laminal [s] (Catford, 1977; Dart, 1991). Might the greater precision of apicals be linked to their apparently greater retention? The hypothesized link would involve the following scenario: the greater precision of apical articulations could lead to their preservation because articulations that require more exactness are more carefully produced by speakers and this greater care would make it less likely for speakers to delete the segment.

Unfortunately for the above argument, however, a counter-argument can also be made: the precision needed for apical articulations might render them more difficult articulatorily than laminals. If we accept the widespread "ease of articulation" or

"principle of less effort" argument for sound change (i.e., languages tend to move in the direction of avoiding difficult articulations), then we would expect that apicals would be avoided, and hence more likely than laminals to aspirate or delete. Ease of articulation is used by some linguists as an explanation for certain sound changes (e.g., Whitney 1868, Paul 1891, Jesperson 1921, and Martinet 1952), although such explanations have been called into question (eg., Ohala, 1990).

Articulatory precision cannot be considered a deciding factor for the retention/reduction issue because the argument against retaining precise articulations appears to be roughly as strong as the argument in favor.

Syllable position may play a role in /s/ reduction in articulatory terms. (Recall that aspiration and deletion in Spanish dialects occur in syllable initial and final positions, but both phenomena are more common in syllable- final position than in syllable-initial position). However, any such role is as yet poorly defined. Articulatory weakening of the syllable coda was discussed by Torreblanca (1980) in non-experimental terms. To our knowledge, no experimental articulatory data have verified a weakening in syllable-final position. Acoustic and perceptual experimental evidence may be more helpful in establishing a weakening (see below).

2.2 Acoustic characterizations of /s/

This section focuses on the frequency, duration, and intensity measures reported in the literature that appear to be relevant in addressing the retention or reduction of Spanish /s/. Descriptions of the acoustic characteristics of fricatives are complicated by the fact that acoustic properties are not as well understood for fricatives as for other classes of sounds (Shadle 1986). Scully, Castelli, Brearly, and Shirt (1992:39) stated that "better acoustic descriptions are needed for fricative consonants." Shoup and Pfeiffer (1976) also indicated that the acoustic analysis of fricatives and sibilants was problematic.

Shadle (1990:188) suggested that our poor understanding of the acoustic characterization of fricatives existed for three reasons:

> First, there is not a complete theoretical formulation of sound generation due to turbulence. Second, there is no mechanical vibration that is obviously correlated with the speech signal, as there is in the case of vowels; thus the primary sound generation process is more difficult to measure and to model physically. Third, the output signal - that is, the speech - is intrinsically noisy, and thus must be described statistically rather than analytically.

In terms of spectral analysis of fricatives, Shadle (1990:192) reported that considerable variation from speaker to speaker made useful generalizations about the acoustics of fricatives difficult. She also reported that the wide range of articulatory variation in fricatives observed by Ladefoged and Maddieson (1986) would also show up as acoustic variation that "we are unlikely to be able to explain at present."

Given these differences, it is not surprising that there exists no general consensus in the literature concerning which acoustic measures best characterize the structure of fricatives. For example, in their study of fricatives, Ladefoged and Maddieson (1986:59), measured three acoustic properties: overall intensity, the low frequency onset of noise, and the spectrographic components above a certain intensity threshold. They admitted, though, that there appeared to be across-speaker variability in these measures, which may reflect the "unfortunate fact" that we do not know what it is that we should be describing in the acoustic structure of fricatives.

Despite these limitations, however, it is important to consider what we do know about this class of sounds from these same investigators. Once again, the three main issues relevant to understanding the phenomenon of retention versus aspiration and deletion of Spanish /s/ involve the tongue tip versus blade distinction between apical [s̻] and laminal [s], the place of articulation of both the apical and laminal, and the syllabic environment in which aspiration and deletion occur, either syllable-initially or finally.

Beginning with place of articulation, several studies address the acoustic correlates of place of articulation. Mackay (1987: 273) spectrographically measured the

frequency (up to 8000 Hz) and intensity of English fricatives and found that /s/ noise had a frequency range of 3500 to 8000 Hz. while /ʃ/ noise, a sound perceptually close to the Spanish apical [s̻], ranged from 1500 to 7500 Hz. Fry (1979: 122) reported similar frequency measures for English /s/ and /ʃ/,with /s/ ranging from 4000 Hz. to 8000 Hz. and /ʃ/ from 1900 - 2000 Hz. to 6000 Hz. and above. In addition, a correlation exists between place of articulation and the lower noise limit, with more back articulations having lower noise frequencies (Shadle 1986). For intensity, Mackay (1987: 274) reported that /s/ and /ʃ/ were more intense than such fricatives as /f/ and /θ/.

Acoustic analyses of English fricatives were also done by Shadle (1986) and Behrens and Blumstein (1988a). Shadle (1986:128) recorded five English-speaking subjects producing six voiceless fricative sounds, [f θ f s ʃ x], chosen on the basis of their variety in terms of place of articulation. The subjects were either trained phoneticians or speech researchers familiar with the sounds. Of these six fricatives, the sounds of importance to this study are [s] and [ʃ], which were the high amplitude fricatives in Shadle's study, with [ʃ] exhibiting the highest amplitude of noise (1986:138). Generally, Shadle (1986) found that the farther back the point of articulation, the more the formant structure was visible, and the higher the overall amplitude of the noise. [ʃ] is reportedly perceptually close to the Castilian apical [s̻] based on non-experimental observations, and the apical [s̻] tends to be articulated toward the palatal region instead of the alveolar region; consequently, we might expect a high amplitude for Spanish apical [s̻] relative to laminal [s]. This possible intensity difference might have implications for our understanding of apical retention and laminal deletion in Spanish dialects and is discussed in more detail in Section 2.2.2.

Behrens and Blumstein (1988a) analyzed [f], [θ], [s], and [ʃ] followed by the five vowels [a e i o u] as spoken by three adult male speakers of American English. They analyzed a total of 100 tokens per subject. Overall fricative duration (based on noise duration) was found to be consistently longer for [s] and [ʃ] than for [f] and [θ]. In terms

of amplitude, the noise portions of |f| and |θ| were approximately 14 dB weaker than those of |s| and |ʃ|. The |s| and |ʃ| can be distinguished from each other by the frequency of high-intensity noise. The major high-intensity peaks for |s| fell in a higher frequency range (3.8-8.5 KHz) than for |ʃ| (2.3-7 KHz). These acoustic characteristics were reported to be remarkably uniform across speakers, utterances, and vowel contexts.

Therefore, acoustic measures of duration, frequency of high-intensity noise, and frequency range reveal that fricatives differing in place of articulation differ in one or more of these three properties. Sibilants -typically produced in the alveolar and potential regions- are normally longer and more intense than non-sibilants; within the class of sibilants, the major intensity peaks fall in a higher frequency range for [s] than for [ʃ]. This may have significance for Spanish /s/ because of parallels between English [ʃ] and Spanish [s̪].

Moving on to the apical/laminal distinction, Dart's (1991) acoustic analysis of apical and laminal fricatives of French and English involved three measures: F1 and F2 transitions, duration of noise, and frequency of noise. Formant transition measures showed that laminals have lower values than apicals for F1. F2 measures differed for French and English. French had consistently higher values for F2 transitions into and out of apicals whereas English had higher values for laminals. Frication duration was slightly longer for laminals than for apicals but this difference was not significant.

Dart (1991:83) investigated within-speaker differences in the /s/ articulations of one speaker of English who used both apical and laminal articulations. She found that in the word *sap* the speaker used a word-initial apicoalveolar |s̪| whereas in the word *pass* that same speaker used a word-final laminal postalveolar |s|. Based on her overall comparison, she concluded that the main acoustic difference was more energy in the higher frequencies of the apical |s̪| and maintained that this was generally the case for apical versus laminal sounds due to differences in channel size, with the relatively wide

channel for the laminal articulations resulting in a lowering of the velocity of turbulent airflow and the frequency of the spectrum (Dart 1991:83). Thus:

> it is the apicals which have the greater amount of high frequency energy, the laminals having an essentially flat spectrum. This may be what Bright (1978) meant when he referred to apical fricatives as having a 'whistling' quality (Dart 1991:83).

This same observation was also made by Catford (1977).

Therefore, based on Dart's findings, apicals differ acoustically from laminals in that apicals tend to have a higher frequency of high-intensity noise (and a concomitant higher frequency of F2 transitions into and out of adjacent vowels) and perhaps a slightly shorter duration.

Turning to syllable structure, of interest here is whether acoustic properties can shed light on the greater tendency of syllable-final /s/ to aspirate or delete.

The acoustic characteristics of fricatives, and vocalic transitions into or out of fricatives, differ for initial and final fricatives. Mann and Soli (1991) examined the acoustic structure of fricative-vowel (FV) and vowel-fricative (VF) utterances in English. One major difference between FV and VF utterances was in formant amplitudes during the vocalic portion of the utterance: FV transitions maintained relatively stable amplitudes throughout, whereas the VF transitions lost amplitude rapidly as they increased in frequency. The result was VF transitions that were 40-50 dB lower than FV transitions. The possible relevance of this difference to Spanish /s/ reduction is considered in Section 2.2.2.

Specific acoustic measures of /s/ in Spanish require consideration, therefore, the following section (2.2.1) addresses frequency, duration, and intensity based on experimental data. The Spanish acoustic measures will be contrasted with measures discussed in this section. It must be emphasized that a comparison between the general acoustics of English and French sibilants and the acoustics of Spanish sibilants is problematic. Because the apical/laminal distinction is solely a tongue body difference for

English and French sibilants (i.e., apicoalveolar and laminoalveolar), it is difficult to compare Spanish sibilants to Dart's data. As noted above, the Spanish apical [s̻] may be palatal or at least prepalatal in its place of articulation instead of alveolar (cf. Quilis 1981, Martínez Celdrán 1984, Dalbor 1980b).

2.2.1 Acoustic phonetics of Spanish /s/

In comparison to the numerous articulatory and perceptual characterizations of Spanish /s/ in the linguistic literature, relatively few studies exist that address its acoustic characteristics. Most importantly, no acoustic study of Spanish /s/ closely analyzes the apical/laminal distinction. Several studies including Quilis (1981), Martínez Celdrán (1984), Manrique and Massone (1981), and Widdison (1991) reported acoustic characteristics of Spanish fricatives, which are discussed below. Emphasis is placed on Quilis (1981) because his presentation provided the most detailed coverage of Spanish /s/.

An extensive dialectal study of acoustic phonetics for Argentine Spanish fricatives was presented by Manrique and Massone (1981). The investigators described ten fricatives based on four speakers pronouncing isolated lengthened fricatives in CV syllables with the five Spanish vowels [i e a o u] and fricatives in intervocalic position in isolated CV CV words. The sounds of interest to the present study are [s ʃ x], since [s] and [x] are reported as allophones of /s/ in Argentine Spanish and [ʃ] is phonetically close to the apicoalveolar [s̻] of elsewhere. The onset noise was reported at 5000-8000 Hz for [s], 2500-5000 Hz for [ʃ], and 1000-4000 Hz for [x]. Perceptual experiments showed that all Argentine Spanish fricatives, except for [x] and [ɣ], could be uniquely identified by the friction portion.

Marrero (1990:390) analyzed the duration and intensity of noise in Spanish /s/ and found an inverse relationship between the two measures: the greater the intensity, the shorter the duration. This is a potentially important correlation that will be considered

further in the analysis of the apicoalveolar and laminoalveolar articulations of /s/. As noted above, the relative shortness of apicals might be argued to make apicals more susceptible to loss; conversely their greater intensity may compensate for or even override overall shortness.

Marrero (1990) also argued that the aspiration of Spanish /s/ was not solely due to the weakening of a syllable- or word-final consonant, and it affected principally the laminoalveolar [s] and possibly the apicoalveolar [s̻]. The apical [s̻] either remains stable in Castilian Spanish or may be ultimately aspirated, by first becoming laminal before aspirating or deleting. Conversely, the laminoalveolar |s| may be retained as |s|, or may be realized as |h| or deleted in syllable- and word-final positions. This suggests that a particular phonetic feature of apicoalveolar |s̻| may prevent it from going directly to [h] or ø. The laminoalveolar articulation may be considered the point of departure of the aspiration without being its cause (Marrero 1990). The evidence for Marrero's theory, which is mainly diachronic, is discussed in Chapter 3.

Widdison (1991) discussed both the acoustic and perceptual aspects of /s/ articulations that may help explain /s/ aspiration in Spanish, taking the position that articulatory explanations for s > h were insufficient. The following discussion focuses on the acoustic correlates of aspiration. (His perceptual data are discussed below in section 2.3.1). In an acoustic comparison of |s| and |h|, Widdison (1991:88) noted that, like all fricatives, these two sounds exhibited the presence of aperiodic (random) noise and acoustic energy that was "weak or absent in the low frequency ranges and strong in the mid and high frequencies." A primary difference between the fricatives |s| and |h| is the configuration of the noise source (Widdison, 1991:89; see also Shadle, 1990:204). The [h] has a high airflow rate because of its low resistance in the vocal tract: aerodynamically, the air is expended very quickly resulting in a high airflow sound of brief duration. This rapid flow of air also results in very little acoustic energy in the

spectrum of [h]. In contrast, the [s] is a much more intense sound acoustically with a relatively long duration as the oral constriction slows down the airflow.

A modification of the [s] is likely to occur in rapid speech as well as before another consonant, affecting both the quantity or duration and the quality or spectral properties of the [s] signal (Widdison 1991:99). Widdison argued that there was a strong correlation between the duration of (laminal) [s] in certain contexts and the retention versus aspiration of the [s] in Spanish. (Apical [s̪] was not considered in his analysis). In particular, [s] tends to be shortened in polysyllabic words in prestressed position in a fast rate of speech. In these contexts, we see the highest incidence of [s] aspiration. The [s] tends to be lengthened in monosyllabic words, in stressed position, in careful speech, and in intervocalic and word initial positions-contexts in which [s] tends to be retained. Widdison (1991:101) observed that [s] aspiration generally did not occur in slower, more careful speaking styles in which [s] duration was lengthened. This might explain why an absolute final [s] is generally conserved (its duration being relatively long, between 60 and 100 msec). Such prepausal lengthening tends to slow down articulatory movements near the end of a speech act (cf. Klatt 1976:1211-1212).

The Spanish fricative consonants were divided into two groups by Quilis (1981:220-21): (1) those that are found in low-frequency resonance zones and (2) those that are found in high-frequency resonance zones or occupy the entire spectrum. The allophones of Spanish /s/ fall into the second of these groups.

Three main variants of Spanish /s/ sounds were described by Quilis (1981:234). Quilis did not provide much information about his subjects or method but did indicate that the fricatives that were analyzed occurred in actual Spanish words and were analyzed on a spectrograph using an 8,000 Hz scale. He measured low frequency onset of frication and found that: (1) apicoalveolar [s̪] onset frequencies were 2511 (as in [úsu]) to 3888 Hz (as in [ásu]) ; (2) apicodentoalveolar frequencies were 3483-5670 Hz; and (3) predorsodentoalveolar [s] (those normally described as laminoalveolar in English;

principally alveolar) - onset frequencies began at about 4455 Hz. The frequency ranges depend to some extent on phonetic context: the frequency of /s/ tends to be higher in the environment of unrounded vowels [i, e, a] and lower in that of rounded vowels [o,u] (Quilis 1981:235-237). Also, the farther back the articulation (i.e., the apicoalveolar [s̻]), the lower the low-frequency onset and the greater the intensity of the noise. Alveolar articulations, which are of greater intensity than dentoalveolar, create more variability in the distribution of frequencies. This is attributed to the close proximity of the tongue toward the teeth and the greater wake turbulence created by the air hitting against the teeth.

Quilis (1981:234-9) and Martínez Celdrán (1984:321) reported both similar and dissimilar low frequency onsets for the apicoalveolar [s̻] and laminoalveolar [s] in Spanish as evidenced by this statement of Martínez Celdrán:

> Acústicamente la *s* predorsal tiene ruido de gran intensidad, que comienza hacia los 4000 cps hasta los 8000. En cambio la apical castellana, igualmente de gran intensidad como cualquier sonido sibilante, comienza en los 2500 aproximadamente y llega hasta los 8000 cps.

It should be noted, though, that the upper-frequency limit on these spectrographical analyses was 8,000 Hz, so that any differences in the actual upper-frequency cutoff could not be determined from these data.

The main focus of previous acoustic studies of Spanish /s/ has been the low - frequency onset of frication; acoustic measures are not reported for high frequency offset, frequency range of frication, or duration or intensity of frication. Table 2.2 summarizes the low frequency onset as reported in Quilis (1981), Martínez Celdrán (1984), and Manrique and Massone (1981).

	apicoalveolar [s̻]	laminoalveolar [s]
Quilis 1981	2511-3888 Hz	3483-5670 Hz, 4455 Hz
Martínez Celdrán 1984	2500 Hz	4000 Hz
Manrique and Massone 1981	Not reported	5000 Hz

Table 2.2 Low Frequency Onset of Spanish /s/ in previous acoustic studies

As one can see, Quilis (1981) and Martínez Celdrán (1984) reported lower measures for apicoalveolar low frequency onset than for laminoalveolar. Quilis did not specify how he determined his three articulations for /s/ and therefore I have categorized his second two together as laminal. Manrique and Massone (1981) did not report acoustic measures for an apical [s̻] because their study dealt with Argentine Spanish, which exhibits a laminal [s]. In terms of laminal [s], a lower frequency of noise was reported by Quilis (1981) and Martínez Celdrán (1984) than by Manrique and Massone, although the value Manrique and Massone reported (5000 Hz) fell within the range reported by Quilis. Quilis used Castilian and Colombian subjects while Martínez Celdrán did not specify the origin of his subjects, but probably used Spaniards of both apical and laminal speech. Manrique and Massone (1981) used subjects from Buenos Aires, Argentina and found a low frequency onset that averaged 1000 Hz higher than Martínez Celdrán. This could mean that the laminal [s], when pronounced, may register at a higher frequency range in a dialect that aspirates or deletes final /s/, such as Argentine, than in a retention dialect. However, there were numerous experimental differences between these studies, and a single study controlling for these differences would have to be conducted before we could conclude that the acoustic characteristics of laminal [s] differ in retention versus aspiration/deletion dialects.

A comparison between Dart's apical versus laminal data from French and English and Quilis' and Martínez Celdrán's data from Spanish is problematic. The principle problem deals with the fact that the French and English laminal versus apical articulations differed in tongue tip versus blade, but not in place of articulation (being mainly alveolar). On the other hand, Spanish apicals and laminals appear to differ in place as well, with the Castilian apical [s̻] possibly being palatal (or nearly so). Thus Quilis' Spanish apical data may range from alveolar to palatal. This place difference may account for the contradictory findings for low frequency onset in apicals and laminals

across these studies. Dart reported a higher low-frequency onset for French and English apicals than for laminals. Quilis (1980) and Martínez Celdrán (1984) reported a generally lower low-frequency onset for Spanish apical [s̪] than for Spanish laminal [s] which is, of course, consistent with the apicals being more back articulations.

Acoustic characterizations of fricatives in general and Spanish /s/ in particular may possibly be used to explain in part /s/ aspiration or deletion in Spanish. Such acoustic explanations are discussed in the following section.

2.2.2 Possible acoustic explanations for Spanish /s/ aspiration/deletion

Do the acoustic differences between apical and laminal described above shed any light on the tendency of Spanish laminals, but not apicals, to be reduced? A possibly relevant acoustic difference might be the intensity of these sounds. Dart (1991) characterized apicals as having a greater amount of high-frequency energy. More directly relevant, Widdison described Spanish apicals as being inherently louder (and therefore presumably more intense) than laminals (see also Quilis, 1981). Unfortunately, none of the studies surveyed here measured overall /s/ intensity. But if Widdison's and Quilis' observations hold up - i.e., if laminals are acoustically less intense than apicals - then it is tempting to speculate that laminals would be perceptually less salient than apicals. Sounds which are less likely to be detected by the listener might be expected to undergo changes such as aspiration or deletion.

Of the three acoustic features used to compare apical and laminal fricatives- intensity, frequency, and duration- only overall intensity noise would appear to shed any light on the issue of retention or aspiration/deletion of Spanish /s/. With respect to duration, apical articulations tend to be shorter than laminal ones (in Dart's data) and one might expect that a shorter articulation will be more susceptible to lost. This, of course, is not found in Spanish where apicals tend to be retained. Thus the non-significant trend in

Dart's data regarding duration does not appear to offer any explanation for the Spanish phenomena being addressed here. With respect to frequency, comparisons of low-frequency onset measures of apical and laminal /s/ articulations in Spanish do not provide any consistent differences. Data from Dart (1991) based on French and English apical and laminal consonants were unable to be compared with Spanish data because of the reported variability of place of articulation of apical [s̻] (cf. Quilis 1981). Therefore, based on currently available data, frequency by itself provides little if any explanation for the phenomena being investigated here.

In terms of syllable position, it is possible that the lower amplitude of transitions within VF syllables as compared to FV syllables reported by Mann and Soli (1991) may play a role in Spanish /s/ reduction. Spanish syllable-final /s/ is aspirated or deleted much more frequently than syllable-initial /s/. Assuming again that low-amplitude sounds are perceptually less salient than high amplitude sounds (in the same frequency range), then final fricatives should be less audible - and perhaps more likely to be lost over time - than non-final fricatives.

Assessment of the current literature therefore leads to the conclusion that, of the three common measures consistently considered in acoustic phonetics, only intensity differences appear to be possibly relevant to the tendency of syllable-final laminal /s/ to be reduced. Nevertheless, certain aspects of the intensity differences need further investigation in experimental terms.

The perceptual correlations with acoustic data require consideration. Therefore, the general and Spanish-specific perceptual data are considered in the next three sections (2.3 - 2.3.2).

2.3 Perceptual characterizations of fricatives including /s/

This section reviews research dealing with perceptual aspects of fricative sounds in terms of the same three issues discussed in the previous sections of this chapter: place of articulation, apical versus laminal articulations, and syllable position. Several of the issues first raised in the acoustics sections (2.2 - 2.2.2.) also appear: intensity, duration, and frequency. The Spanish-specific perceptual literature is presented in section 2.3.1.

Beginning with perceptual characteristics due to place of articulation, Lieberman and Blumstein (1988:227) stated that the overall noise amplitude of fricatives and distribution of spectral peaks contributed to the perception of different places of articulation. The contribution of amplitude, however, is less than that of frequency information, as suggested by the results of Behrens and Blumstein (1988b). They recorded fricative-vowel sequences in which the fricative was one of [f Θ s ʃ] and the vowel was one of [i a u]. Listeners were instructed to identify which consonant they heard; their choices were "f th s sh." Ten listeners heard consonant + vowel (CV) tokens and another ten listeners heard isolated frication noise tokens. Results of this test revealed that the overall correct identification of fricatives was very high and independent of the presence of vowels. When the fricative noise was presented to listeners in both its vowel context and in isolation, the acoustic properties of the fricative noise and formant transitions were found to be equivalent and any perceptual effects of amplitude manipulations were relatively small. Decreasing the amplitude of [s] and [ʃ] resulted in an increase in [f] and [θ] identifications; however, the reverse process, increasing [f] and [θ] up to the level corresponding to that of [s] and [ʃ], did not result in increased responses of [s] and [ʃ] for [f] and [θ]. Duration of the fricative noise also appeared to play a minimal role in perception of place of articulation in voiceless fricatives.

Even though acoustic analyses indicated consistent differences in intensity of frication between [s ʃ] and [f θ], the results of Behrens and Blumstein's (1988b:865) study suggested that these differences did not play a major perceptual role in English. They concluded that frequency rather than intensity was predominantly the acoustic feature that determined the perception of place of articulation for fricative consonants (Behrens and Blumstein 1988b:866).

Harris (1958) conducted a perceptual test involving identification of American English fricatives in CV syllables. The C and V portions of [fi θi ʃi si] were cross-spliced to create 16 possible combinations. This process was repeated for the same four fricatives with each of the vowels [e o u], yielding 64 stimuli (16 per vowel). The entire set was also constructed for the corresponding voiced fricatives ([v ð z ʒ]). The results of identification tests with 22 listeners showed that, for /s / and /ʃ/, fricative information provided by the frication portion overrode information provided by the vocalic context: [s] and [ʃ] were correctly identified, regardless of the vocalic portion with which they were paired. However, for /f/ and /θ/, the situation was more complex, and judgements were based on the vocalic portion of the syllable. Intensity level had no effect on listeners' judgements. Again, place of articulation appears to correspond more to frequency than to intensity of duration based on perceptual experiments.

In terms of the apical/laminal distinction, the literature on perception of fricatives offers little per se because a large body of the data comes from English.[3] Based on a non-experimental observation by Widdison (1991), the laminal [s] of Spanish is not as loud as the apical [s̻], but relevant experimental data are lacking.

Turning to the issue of position of fricatives within syllables, perceptual characteristics of fricatives and contiguous vowels offer possible explanations to the environment in which aspiration and deletion of /s/ occur within the Spanish syllable. Mann and Soli (1991) compared perception of initial versus final fricatives. Previous studies had shown that, in fricative-vowel (FV) sequences, the fricative contained

information for the vowel and the vowel for the fricative: of interest, then, was whether this holds for vowel-fricative (VF) sequences. To address this, Mann and Soli created a series of hybrid FV and VF syllables. Eight natural vowels were extracted from the four FV sequences [sa ʃa su ʃu] and the four VF sequences [as aʃ us uʃ]. Each vowel was paired with each member of a nine-step [s-ʃ] synthetic continuum. Thus, each fricative was paired not only with different vowels ([a] and [u]), but also with vowels potentially containing information for different fricatives (e.g., [a] extracted from the [s] context and [a] extracted from the [ʃ] context). Listeners identified the fricatives of the hybrid syllables as [s] or [ʃ]. Results showed that fricative identification was less influenced by vocalic context when the fricative was in final (VF) position than in initial (FV) position.

Mann and Soli (1991) hypothesized that this asymmetry in initial versus final position could be due either to *acoustic differences* between FV and VF sequences or to the *heard order* of the fricative and vocalic cues. Acoustic analysis of the natural FV and VF utterances showed that these sequence types differed in slope, duration, and amplitude of formant transitions (see 2.2 for more discussion). However, these acoustic differences are apparently overridden by the heard order of the segments. When the hybrid FV and VF stimuli were played to listeners in reverse, the pattern of responses also reversed: fricative identification was more influenced by vocalic context when original VF was heard as FV than when original FV was heard as VF.

Such perceptual asymmetries may be a general characteristic of CV versus VC syllables, as suggested by the studies involving stop consonants and nasals reviewed by Ohala (1990). Taken as a whole, the data suggest that certain phonetic information is less perceptually salient in syllable-final position than in syllable-initial position. When this tendency is viewed together with the claim that Spanish laminal /s/ is less intense than the apical (Widdison 1991), syllable-final laminals might be expected to be the least salient and hence most likely to undergo change.

2.3.1 Perception of Spanish /s/

This section describes specific experiments that treat the perception of Spanish /s/, including several studies treating Spanish /s/ aspiration. Gurlekian (1981), Manrique and Massone (1981), Uber (1981), Uber (1984), and most recently, Widdison (1991), have conducted relevant perceptual tests.

Two studies using Argentine Spanish speakers analyzed fricative sounds perceptually, with supporting data from acoustical analysis. Gurlekian (1979, 1981) described two perceptual experiments for the identification of /s/ and /f/ when combined with /a/. Low-amplitude fricative noise was correctly identified as /f/ by informants and high-amplitude fricative noise was correctly recognized as /s/. Gurlekian (1981:1626) found that: (1) Amplitudes between -20 and -32 dB relative to vowel amplitude were identified as /f/; (2) 18dB+ amplitudes relative to the vowel are perceived as /s/ nearly 100 % of the time, "even though the formant transitions are in a direction expected for labial fricatives"; and (3) Not only amplitude of the noise relative to that of the vowel but also the absolute amplitude of the noise influenced fricative identification. [(This seems in keeping with the results of Behrens and Blumstein (1988:2), who found reported that intensity played only a minor role in fricative identification in English, see section 2.3).] In terms of amplitude measures, Gurlekian found |f| to be weaker than |s| by about 7 dB in Argentine Spanish. Both |s| and |f| were approximately 6 dB higher for Spanish than English, and he concluded that the data demonstrated that noise amplitude plays an important role in identifying voiceless fricatives in Spanish (Gurlekian 1981:1626).

However, Gurlekian (1981) found that listeners of Hispanic and American English backgrounds differed in their responses to the experimental manipulations: Argentine listeners required a greater noise amplitude than American English listeners for correct identification of /s/.

Manrique and Massone (1981) investigated the acoustic and perceptual properties of Argentine Spanish fricatives. The stimuli which they presented to listeners included: (1) isolated lengthened fricatives, (2) fricatives in CV syllables with the five Spanish vowels |a e i o u|, and (3) fricatives in intervocalic position in CVCV isolated words. The original stimuli were produced by four male speakers of standard Buenos Aires Spanish. The recorded stimuli were then cut apart into segment-sized pieces through tape splicing and played to listeners for perceptual identification. With the exception of [x] and |ɣ|, all Spanish fricatives were accurately identified in perceptual tests by the frication portion alone; the vowels were not necessary for accurate identification.

A perceptual study of Spanish /s/ by Uber (1981) analyzed the parallels between two different sound changes, the aspiration of syllable- and word-final /s/ and the velarization of word-final /n/ in Puerto Rican Spanish. The perceptual test was designed to ascertain whether subjects from the same dialect area could perceive from phonetic information alone distinctions between items that had experienced weakening or loss of syllable- and word-final -s and -n and those syllables in which -s and -n were retained. An example given by Uber (1981: 85) is *casas grandes* "big houses" with or without the retention of /s/.

The stimuli were taken from twenty interviews with Puerto Rican Spanish speakers. Uber identified utterances that could potentially cause a perceptual problem when heard out of context. When possible, Uber chose two utterances of the same semantic/lexical item by a single speaker, one exhibiting deletion and one exhibiting retention. Some control utterances were included also to ensure that the subjects could perceive |s| or |n| if present.

Thirty-one utterances (each repeated three times) from seven speakers were extracted for the perceptual test. Ninety-six native speakers of Puerto Rican Spanish served as subjects for the study. Subjects circled the answer that best reflected what was

heard on the tape. All examples from a given speaker were grouped together so that subjects could make comparisons.

Uber's findings showed that the velarization of [n] to [ŋ] did not cause perceptual problems, while the aspiration or deletion of [s] did. That is, subjects misidentified tokens of [h], [ʔ], and ø allophones of /s/. They were misidentified more often in word-final position than in syllable-final or word-medial position. Apparently, native speakers of Puerto Rican Spanish must rely in part on syntactic, semantic, and discourse context for accurate comprehension. This is especially true when /s/ serves as a plural marker on pronouns, nouns, and adjectives or as a person number marker on verb forms. One of Uber's most important conclusions was that the weakening process for the sibilant was not analogous to the weakening process for the nasal (Uber 1981:226). Uber (1984) reported the same findings as Uber (1981).

Widdison (1991:94) discussed the importance of the different acoustic cues in fricative perception in his analysis of s > h. He stated that the intensity of the noise is important either during frication or in the transitional period. Citing Stevens (1971), Widdison (1991:94) described the [s] as having a noisy release transient and intense transitions. The [h], however, had no burst and its transitions were very weak. While Widdison (1991:97) described the [s] and [h] as distinct enough from each other, the perceptual distinctiveness of these two sounds may be weakened due to coarticulation. He stated that these coarticulations may inhibit listeners from unequivocally hearing an [s] and actually give the impression of something more [h]-like (Widdison 1991:98).

Widdison (1991) conducted two perceptual tests to verify the perceptual qualities of [s] and [h]. The first listening test consisted of 15 randomized tokens plus 30 control items from corresponding sequences (C)VC$_{STOP}$, (C)VS, and (C)VsC$_{STOP}$. The subjects were native Spanish speaking students at the Universidad del Bio-Bio, Chillán campus, Chile. The stimuli were presented as a two alternative, forced choice identification task, (C)VC$_{STOP}$ and (C)VsC$_{STOP}$. The results revealed that, overall,

the subjects identified 122 out of 375 tokens as (C)VsC$_{STOP}$, even though none of the audible frication characteristic of [s] was present. Apparently the acoustic effect of /s/ on preceding vowels lead subjects to perceive lexical items with [s], even when the [s] was absent.

A second perceptual test was designed to see whether the perceptual value of such judgements corresponded to [h] or something like aspiration. Widdison assessed aspiration indirectly by asking listeners if the speech style was informal (exhibiting /s/ aspiration) or formal (exhibiting /s/ retention). The results revealed a close correspondence between the expected and actual results and the subject response of both the test group (the same tokens as in Experiment 1) and the control group ((C)VsC$_{STOP}$)*in* that the behavior of the test group was very different from the others. There was nearly an even split between the test and control groups in listener judgements of test items. However, 51.5% of the responses indicating the stimuli as informal suggested that listeners were hearing some kind of aspirated effect on a good deal of test vowels. Widdison (1991:151) concluded that aspiration may be a signal of speech style or mark a phonemic distinction.

Findings of the second experiment generally complemented those of the first experiment. However, Widdison emphasized that a stronger conclusion could be made if it were known how the test words were interpreted lexically. Subjects judged the test items as informal more often when they interpreted the words as a (C)VsC$_{STOP}$ sequence. For the formal category, most judgements were made because nothing was heard in the signal of the test vowels to distinguish test words from a normal (C)VC$_{STOP}$ sequence. This means that the presence or absence of /s/ was clearly related to formality or informality, respectively. When equations of the type [pasta] or [pḁsta] (i.e., with a voiceless vowel) =*pasta* were made, they were nearly always related to informal register. Widdison maintained that this indicated that the vowels in the test group imitated the quality of aspiration rather than a continuance of the sibilant percept.

From the two experiments, Widdison concluded that the secondary effect of breathy voice murmur on vowel margins preceding [s] did indeed create an [h] percept as long as the principal frication cues for the sibilant were absent. Nevertheless, Widdison emphasized that this conclusion offers only a potential explanation of how [s] aspiration might have begun. He stated that the question remained whether this secondary vocalic effect was strong enough to obtain perceptual dominance over the primary cues for [s] where frication was weakened but not entirely erased (Widdison 1991:156). This would be because if the [s] were totally deleted, listeners would perceive cues from the vocalic margins as well as a fragment of [s] frication in order to weigh and process these competing signals.

Considering the apical and laminal distinction in perceptual terms, we find no relevant experimental data in Spanish. Nevertheless, Widdison (1991:234) emphasized that the distinction between apicoalveolar and laminoalveolar articulations of Spanish /s/ was in part due to differences in intensity (perceptually realized as loudness):

> the apicoalveolar [s̻] used in Castile and parts of Latin America is inherently louder than the dentoalveolar [s] (either flat or convex) predominant in all other areas. Curiously, this may help explain why s- aspiration has taken such a great hold in dialects with the so-called Andalusian traits while Castilian speech has remained conservative with regards to the phenomenon.

Although Widdison did suggest that the apical [s̻] was louder than the laminal [s], his actual experiments did not shed any light on this difference because his speakers used only laminal articulations of /s/.

Widdison's approach, which emphasized the listener's role in sound change, was consistent with that of Ohala (1981). Ohala has argued that certain sound changes were a result of the effects of the listener's decoding of a message, not of the encoding. Normally, the listener recognizes and thus factors out of the speech signal inherent phonetic variability that would have led to sound change. However, the listener may unknowingly participate in sound change by faithfully copying the very phonetic

variation to which he or she has been exposed. Moreover, in some cases, the listener may actually trigger sound change by misapplying the reconstructive rules that serve to correct phonetic variability (Ohala 1981:196-97). Ohala thus assumed that speaker and hearer were concerned with communicating and pronouncing words only as they heard them or think they have heard them pronounced by others.

Widdison (1991:16) speculated that the change s > h in some dialects of Spanish may have involved the second of Ohala's scenarios, that is, copying the phonetic variation in the signal:

> I suggest that originally *s*- aspiration began as a case of hypo-correction due to the listener's failure to factor out distortions in the signal of [s] which mimic the breathy effect of [h]. Listeners misjudged this aspiration as purposeful and copied it in their own speech, at which time articulation radically changed from the original sibilant segment to a sound produced in the pharyngeal region. (Widdison 1991:86)

Widdison (1991:105) also reported that the amplitude of Spanish /s/ may be substantially weakened, causing it to sound less sibilant and more like a non-sibilant fricative. This occurs particularly when the /s/ is short in duration (McCasland 1980).

2.3.2 Possible perceptual explanations for Spanish /s/ aspiration/deletion

The possible role of perceptual factors in /s/ aspiration and deletion is, not surprisingly, closely linked to the scenario for acoustic factors discussed in Section 2.2.2. Based on nonexperimental observations (Widdison 1991), the apical [s̻] is louder than laminal [s] possibly making apicals more salient and more resistant to reduction. In addition, experimental evidence supports the idea that certain acoustic information in VF syllables is less intense and perceptually less salient than in FV syllables (see Mann and Soli 1991). To account for Spanish s > h, it is necessary to assume that the saliency of apicals overrides the tendency toward final-weakening.

2.4 Phonological studies of /s/ aspiration/deletion

Several phonological frameworks have been developed in the past three decades. As successors to structuralist approaches to phonology, we have seen the birth of various versions of generative phonology (autosegmental phonology, lexical phonology, and metrical phonology). The phonological models to our knowledge have not formally addressed the apical/laminal distinction, as tied to the retention/reduction question. Several studies including Hammond (1989b, Goldsmith (1981), Cressey (1989), Harris (1983), Hammond (1989a), Núñez Cedeño (1989), and Catrice and Cedergren (1986) have treated Spanish /s/ aspiration/deletion and are discussed below.

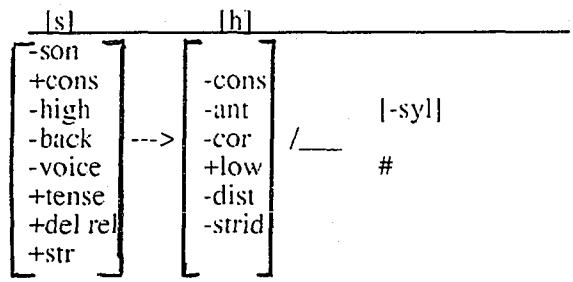
Hammond (1989b) offered an overview of how Spanish /s/ aspiration and deletion was treated within the phonological models of American structuralism and generative phonology, as presented in SPE (Sound Patterns of English by Chomsky and Halle 1968). Within structuralist phonology, Spanish /s/ was considered an abstraction (a phoneme) with three allophones. The structuralist description for /s/ aspiration and deletion in Spanish, summarized below, states that "the autonomous phoneme /s/ may be realized as [s], [h], or [ø] when followed by another consonant (within a word) or when followed by a word boundary (#)" (Hammond 1989b:38).

$$/s/ \rightarrow \left\{ \begin{matrix} [s] \\ [h] \\ \emptyset \end{matrix} \right\} \text{ in environment before } \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$$

The structuralist approach is descriptive but not explanatory; it describes environments in which the allophones occur but fails to account for why [h] and ø are allophones of /s/ (Hammond 1989b:38) and why aspiration and deletion of consonants occur (Hammond 1989b:41). Hammond argued that the SPE model did not suffer from these weaknesses.

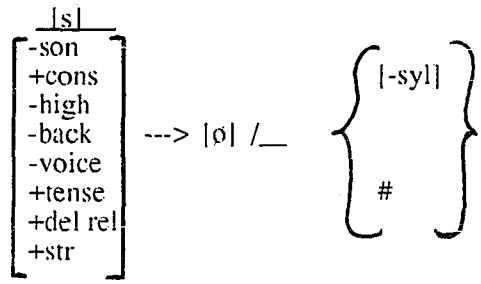
For example, SPE distinctive features capture the similarities between [s] and [h]. According to Hammond, the SPE model shows that both aspiration and deletion are closely related phonological processes.

A generative framework based on SPE, as interpreted by Hammond, would account for /s/ aspiration by means of the description below. The features that characterize [s] and [h] are based on a binary system where each sound either has a given feature (represented by a +) or does not have a given feature (represented by a -).



This description states that phoneme /s/ becomes [h] before a consonant within the same word or in word-final position. A similar context for /s/ deletion appears below.

Deletion of /s/, SPE phonology



The two rules do not differentiate precisely when s > h versus s > ø applies.

The aspiration of /s/ in *porteño* (Buenos Aires) Spanish in terms of autosegmental phonology was discussed by Goldsmith (1981:6ff). In Goldsmith's approach, one phonological tier handles place and manner of articulation and another handles laryngeal (e.g. voicing) features. "The widespread rule of 'aspiration' of /s/ to /h/ is an example of a

rule deleting the oral gesture autosegment, but leaving behind untouched the laryngeal gesture of voicelessness" (6). This might be viewed as a simplification process since the features of the oral gesture tier are lost and the tonal tier remains as laryngeal voicelessness (i.e., the voiceless glottal fricative [h]). It would appear, then, that the autosegmental approach is consistent with the claim that aspiration or deletion of [s] is a simplification process (cf. Seklaoui 1989).

Cressey (1989:55-6) described the difference between apical [s̪] and laminal [s] in Spanish using the feature system of SPE. Spanish apical-laminal pairs differ in two features, anterior and distributed, as shown below:

	laminal [s]	apical [s̪]
anterior	+	-
distributed	+	-

Anterior sounds are articulated with an obstruction in an area in front of the palato-alveolar region of the mouth. While Spanish apical [s̪] tends to be produced behind the alveolar region (prepalatal or palatal). Apical [s̪] in other world languages may be alveolar and would therefore be + anterior. Distributed sounds are articulated with "a constriction that extends for a considerable distance along the direction of the air flow." Because of the suspected difference in intensity between laminal [s] and apical [s̪], one might suspect that the - anterior (apical) would not be backed whereas the + anterior (laminal) would be backed. Nevertheless, the features reflected in the binary systems of generative phonological theories are based on articulation not acoustics. Therefore, acoustic intensity really cannot be accommodated.

Cressey (1989:65) also addressed the difference of the Castilian phonological system from the American Spanish system. Castilian has three phonemes /θ s x/ while American Spanish has /s x/ and no /θ/. Phonetically, these sounds in Castilian are: [θ] voiceless interdental fricative, [s̪] voiceless apicoalveolar fricative, and [χ] voiceless

uvular fricative, respectively. He suggested that the uvular [χ] occurred in Castilian (as opposed to the further forward velar [x] of American Spanish) to enhance the distinctiveness of the three-way contrast (as opposed to the two-way contrast of American Spanish). Thus, Cressey was implying that the size of a phoneme system, particularly in regards to a manner of articulation such as fricative, may indicate how languages differentiate sounds in order to make them more distinctive.

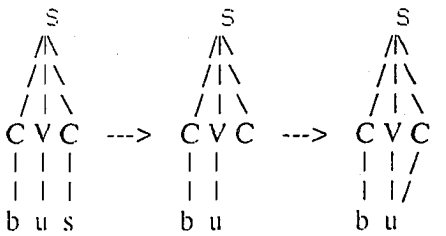
Harris (1983) discussed Spanish /s/ aspiration and /n/ velarization in terms of syllable structure. It is often erroneously reported in the research that these two phenomena occur only in final position. These two phenomena occur in syllable-initial position under the condition that they are also in word-final position and followed by a word that begins with a vowel. In this case, resyllabification occurs, as in *tienes espacio* [tjɛ́-ne-heh-pá-sjo].

Hammond (1989a:139) maintained that nonlinear versions of generative phonology are more effective than linear versions in describing syllable-final /s/ deletion and compensatory vowel lengthening as they occurred in Cuban Spanish. He explained that in unaffected or natural Cuban Spanish, any syllable- or word-final /s/ may be optionally deleted. Whenever the syllable-final /s/ is deleted within a word, the preceding vowel is compensatorily lengthened, thereby maintaining the distinction between, for example, *pescado* [pe:káðo] "fish" and *pecado* [pekáðo] "sin." A linear analysis like that proposed by Hammond (1986) appears below.

Syllable-final /s/ Deletion:
/s/ --> ø /_____$

Compensatory Vowel Lengthening
V--> [V:] /_____C
Condition: If the rule of "syllable-final /s/ Deletion" has previously applied,then this rule must obligatorily apply.

The condition on this rule is problematic since such "look back" power is a powerful device that is generally not allowed (Patrice Speeter Beddor, p.c.). Hammond (1989a:142-3) then presented a nonlinear account for /s/ deletion and vowel lengthening using the framework of CV phonology (cf. Clements and Keyser 1983). His account appears below.



S = syllable

|bu:|

At the first stage of the derivation, there is a one-to-one correspondence between segmental and CV components. When the syllable-final consonant (/s/ in this case) is deleted, its "slot" on the CV tier is reassigned or associated to the previous vowel on the segmental tier which then becomes lengthened.

In an experiment to verify experimentally the compensatory vowel lengthening, Hammond asked five native speakers of Cuban Spanish to pronounce ten words twice, once with a vowel + retained /s/ and once with a lengthened vowel and deleted /s/. Durations of word-medial |Vs| and |V:| were measured by spectrographic analysis. The data revealed that the lengths of those vowels that preceded deleted [s] were increased by durations coinciding very closely to the durations of nondeleted [s]. The mean difference was only .14 msec. A comparison of |Vs| with |V:| revealed a range of difference between + 8.0 and - 10.2 msec., representing a possible range of 18.2 msec. Hammond (1989a:144) acknowledged the limitations of his own study given the limited data. Nevertheless, the experimental data were argued to support nonlinear generative phonological frameworks over linear treatments since the nonlinear models account for

the data in a linguistically meaningful fashion (Hammond 1989a:145). Interesting enough, Hammond's statement supporting nonlinear frameworks is exactly opposite to what he reported in another study of the same year (Hammond 1989b).

In another study dealing with Spanish /s/ aspiration and compensatory vowel lengthening, Núñez Cedeño (1989:173) argued that a rule which simply changes /s/ into [h] in syllable-final position failed to express the linguistic naturalness of the aspiration process. For example, the rule does not explain that [s] becomes [h] rather than some other segment (such as [t], [p], or [r]). Instead, Núñez Cedeño (1989:182) offered another autosegmental rule that characterizes compensatory vowel lengthening when /s/ deletion applies. Compensatory vowel lengthening has been reported in Andalusian and Caribbean Spanish. The rule is as follows: V --> V:/__C (Condition: Apply this rule if /s/ deletion previously has applied). Thus, a vowel will lengthen to compensate for a lost consonant, in this case, final [s]. Núñez Cedeño's treatment of compensatory vowel lengthening is similar to Hammond (1986) (as discussed above).

In a metrical analysis of Spanish /s/ aspiration and deletion, Catrice and Cedergren (1986) analyzed the Spanish of the Dominican Republic and Panama. The investigators used the phrase *las casas rojas* ("the red houses") in order to illustrate the metrical framework and its effectiveness in describing Spanish /s/ aspiration and deletion. A grid is constructed using three tiers. The first tier is called the demibeat, the second tier is the base beat, and the third tier represents the "word" beat (see below). On the demibeat tier, every syllable receives a beat and two silence demibeats are added between the words *casas* and *rojas*. According to Selkirk (1984:183), the silent beat addition marks syntactic "constituent breaks" into the grid. This allows for variability in beat movement. On the base beat tier, all syllables receive a beat that represents the phonological accentuation or stress. On the word tier, only stressed syllables get a beat. This grid is shown below.

word			x			x			
base beat	x		x	x		x	x		
demibeat	x		x	x	x	x	x	x	x
	las		*ca*	*sas*		*ro*	*jas*		

"the red houses" (Derived from Catrice and Cedergren 1986:3)

In the case of *las casas rojas*, both the syllables *-sas* and *-jas* have unstressed vowels. Catrice and Cedergren (1986:16) stated that the most important factor in /s/ deletion in dialects of Spanish was the stress of the syllable carrying an /s/, with deletion occurring in unstressed syllables. The metrical grid clearly shows those syllables in which /s/ deletion will occur on the demibeat tier. This is superior to earlier phonological frameworks that merely stated rules but did not clearly show the motivation for the phonological processes.

All of the generative studies are based on articulatory data. Recall that Widdison (1991) questioned a purely articulatory explanation for Spanish s > h. Therefore, the phonological frameworks may be limited in explanatory power because they do not consider acoustic and perceptual data that potentially are more enlightening in explaining /s/ reduction.

2.5 Summary

A number of articulatory, acoustic, and perceptual issues have been addressed in this chapter in order to provide possible phonetic explanations for the retention versus reduction of /s/ in Spanish. This section reviews these issues in terms of place of articulation, the tip/blade distinction, and syllable position with differences in frequency, duration, and intensity, and their perceptual consequences in order to get a collective view of them.

The two most commonly reported articulations of Spanish /s/ in the literature are apical and laminal, either alveolar or palatal in place of articulation for the apical and alveolar for the laminal.

Articulatory data suggest that apical articulations are more precise than laminal articulations and that the release gesture for apicals is quicker than for laminals (Dart 1991, Catford 1977). It may be argued that a more precise articulation would more likely be retained. This claim is seriously challenged, though, by the argument that if apicals are more difficult to make than laminals because of their precision, they may be more likely to be lost (following the classic "ease of articulation" theory that sound changes are motivated by the creation of easier articulations).

In terms of syllable position, if syllable-final consonants do indeed suffer from articulatory weakening more than syllable-initial consonants, one could argue that syllable-final /s/ aspiration and deletion would be more easily explainable than syllable-initial /s/ aspiration and deletion. This is precisely what occurs in dialects of Spanish.

Turning to possible acoustic and perceptual factors, non-experimental data suggest that the apical [s̪] in Spanish is louder and more intense than the laminal [s], suggesting that the apical would be more resistant to reduction to [h] or ø. The laminal [s] would be more likely to reduce due to its lesser intensity. This issue needs further investigation in experimental terms in order to verify the non-experimental observations (cf. Quilis 1981, Widdison 1991).

Widdison (1991) questioned a strictly articulatory explanation for /s/ aspiration, focusing on acoustics and perception. Widdison (1991) determined that the [h] quality was an inherent part of the neighboring vowel sound so that the potential for aspiration was found in the signal and was perceived by listeners. The hypothesis is that the listener perceives the breathy voice in the vowel and this ultimately creates the auditory impression of a glottalized allophone for the sibilant. While Widdison's approach clearly provided insights for laminal articulations of /s/ since his subjects used that /s/ type, it is

uncertain whether his findings apply to apical [s̻]. It would be helpful to analyze experimentally the speech of native speakers exhibiting apical [s̻] to see whether apical articulations would yield have same result (i.e., reduction) or whether the apicals would resist reduction. I would expect the latter based on previous findings reported in the literature.

Marrero (1990:390) analyzed duration and intensity of /s/ and found an inverse relationship between them: the greater the intensity, the shorter the duration. One way to explain why a shorter segment, the apical [s̻], would not be reduced would be to focus on intensity. If we could verify that the apical [s̻] is more intense than laminal [s] (recall Quilis' (1981) and Widdison's observations) then the greater intensity may override the duration difference. Also, recall that the apical and laminal difference in duration was found to be not statistically significant by Dart (1991). Therefore, the intensity difference may play a more significant role than the duration difference. I posited that the intensity part of the correlation was potentially an important factor in explaining the tendency of apical [s̻] to be retained an the tendency of laminal [s] to aspirate or delete. The energy may be spread or diffused more in the laminals resulting in lower intensity even with a longer duration.

Finally, Mann and Soli (1991) reported that transitions in VF syllables were less intense than in FV syllables. This provides further evidence that the syllable coda may be a weaker position than the syllable onset, perhaps providing an impetus for syllable-final /s/ reduction in Spanish.

Now that I have discussed the phonetic and phonological characteristics of fricatives and Spanish /s/, the next chapter will elaborate on the aspiration and deletion of /s/ in dialects of Spanish in diachronic terms. The diachronic discussion will pay particular attention to the apical versus laminal distinction.

Notes to Chapter 2

[1]This chapter differs from chapters 3 and 4 in that it presents basic information about fricatives and Spanish /s/ in general; it is not solely a review of phonetic and phonological studies of Spanish /s/. The review of phonological studies in 2.4 resembles the reviews found in Chapters 3 and 4 of diachronic, dialectal, and sociolinguistic studies.

[2]García Jurado (1985) also points to the prevalence of the CV syllable type in Spanish (56% compared to 16% for CVC syllables). Preference for open syllables has also been documented in English and French.

[3]For this reason, the apical/laminal distinction is not one that receives much attention within English dialectology. Vowel variation receives much more attention since such variation is more prevalent in English. Spanish dialectal research generally addresses consonantal variation because that is the main area of variation in dialectal Spanish.

CHAPTER 3

DIACHRONIC ASPECTS OF /s/ ASPIRATION/DELETION

3.0 Introduction

This chapter reviews studies that treat the historical development of /s/ in Spanish with an emphasis on the aspiration/deletion of this phoneme.[1] The s > h change has not been researched very much within a diachronic framework (cf. Walsh 1985). The first part of the chapter discusses the sibilants in Latin and their reflexes in the Romance languages. The discussion then turns to the development of the sibilants in Spanish in general and the aspiration/deletion phenomenon in particular.

The effect that the s > h change or /s/ aspiration has exhibited in the Spanish language was expressed very precisely and succinctly by Lapesa (1981:503):

> La aspiración de la /-s/ implosiva tiene una capacidad revolucionaria superior a la de cualquier otro fenómeno fonético actuante en la diacronía de nuestra lengua desde la época de sus orígenes.

There are several studies that address the development of the /s/ phenomenon in Spanish. Table 3.1 lists the diachronic studies of sibilants treated in 3.1 according to language or theme treated.

3.1 The development of sibilants in Latin and Romance

Galmés de Fuentes (1962) outlined the principal diachronic features of Romance sibilants including a discussion of Indo-European, Latin, and the various Romance areas.

Joos (1952) pointed out that apical [s̻] was quite widespread in Indo-European languages. Adams (1975) also addressed the retracted or apical sibilants mainly in Western and

Latin/Romance Sibilants	Hammond 1978
Galmés de Fuentes 1962	Marrero 1990
Spanish Sibilants	Politzer 1972
Canfield 1952	Seklaoui 1989
Lathrop and Cuadrado 1984	Straka 1964
Lloyd 1987	Torreblanca 1987
Resnick 1981	Walsh 1985
Torreblanca 1986	Widdison 1991
Aspiration/Deletion in the New World	**Causality of s > h Change in Spanish**
Resnick 1981	Torreblanca 1986, 1989
Fontanella de Weinberg 1990	Marrero 1990
Aspiration/Deletion of /s/ in Spanish/Romance	**Aspiration as an Ongoing Process**
Chlumsky 1956	Seklaoui 1988, 1989
Fontanella de Weinberg 1990	Penny 1983, 1991

Table 3.1 Diachronic Sibilant studies cited within this chapter

Central European countries, emphasizing their distribution in the thirteenth and fourteenth centuries. His investigation was based on philological and dialectological evidence. Citing Joos and Martinet, both of whom researched medieval apical sibilants, Adams (1975: 284) found that apical [s̻] was much more widespread in European languages than either of these investigators reported. It appears that the laminal articulation is a later development of the apical articulation, and that what used to be apical [s̻] in many Romance languages has become laminal, e.g., Marero (1990), Straka (1964).

Lloyd (1987:264 ff) discussed sibilants in diachronic terms as well. He emphasized that the Latin /s/ was likely an apicoalveolar [s̻] in many if not most areas of Hispania. In the various Romance languages, the apicoalveolar [s̻] was used at one time or is still in use.

The use of the apicoalveolar [s̻] in Romance appears to derive from its predecessor Latin, also reported as having apicoalveolar [s]. Galmés de Fuentes (1962:203) stated:

> La *s* latina debió ser probablemente de articulación apicoalveolar y no predorsodental...tenemos fuertes indicios (el rotacismo, las correspondencias arabigolatinas y la existencia de [s] en grandes dominios lingüísticos indoeuropeos) en favor de una *s* apicoalveolar del latín...Los

> distintos sistemas de sibilantes de la Romania parecen confirmar este caracter apicoalveolar de la *s* latina.

Other Romance varieties use a laminoalveolar [s]. In yet other Romance languages, both apicoalveolar and laminoalveolar articulations may be found, depending on the dialect (for example, those of Portugal, Spain, and Colombia). Therefore, both apical and laminal articulations of /s/ coexist as allophones in these varieties.

The apical [s̻] is reported certain dialectal areas of the following Romance languages: Portuguese, Galician, Catalan, Castilian, Gascon, Italian, Rheto-Romance, Sardinian, and Istrian Rumanian (Galmés de Fuentes 1962:97, 103, 179, 182, and 204-208). The laminal [s] is reported for some parts of Portugal, Spain, and Standard Rumanian (Galmés de Fuentes 1962:104, 205, 208). Nevertheless, it is unclear at times in Galmés de Fuentes' discussion whether the apical [s̻] is nearly as widespread as in the past. Scholars (Straka 1964, Chlumsky 1956) have reported that the apical [s̻], through time, often converts to a laminal [s] which may then be aspirated or deleted. This is discussed further in Section 3.1.2.

3.1.1 The development of sibilants in Spanish

Much ink has been spilled in describing sibilant consonants in Medieval Spanish. As we shall see below, Kiddle (1977) was correct when he described the Middle Spanish period (1450-1650) as one of "sibilant turmoil." Some of the main points that the literature considers is the inventory of the sibilant phonemes, the Latin articulation of /s/, Basque and Arabic substratum theories regarding phonological and lexical influences, chronology of sibilant change, textual documentation, the devoicing and merger of medieval sibilants, and sibilants in New World Spanish.

In Medieval Spanish, there were three pairs of phonemes distinguished by point of articulation: dental affricates /ts/ and /dz/, apicoalveolar fricatives /s/ and /z/, and prepalatal fricatives /ʃ/ and /ʒ/ (Lathrop and Cuadrado 1984:218). Thus, voicing

differentiated two groups of sibilants: voiced (/dz/, /z/, /ʒ/) and voiceless (/ts/, /s/, /ʃ/). Consider the following examples, listed along with their Latin etyma:

/ts/ *cinco* "five" *quinque*

/dz/ *dezir* "to say" *dicere*

/s/ *classe* "class" *classe*

/z/ *cosa* "thing" *causa*

/ʃ/ *dixe* "I said" *dixi*

/ʒ/ *jurar* "to swear" *jurare*

Resnick (1981:110) stated that these six sibilant phonemes existed in 1492; this date was chosen possibly because they were included in Nebrija's 1492 Castilian Spanish grammar. Resnick (1981:111) maintained that these six distinct sibilant phonemes were brought to the New World in the first voyages and since the voiced sibilants were devoicing in the peninsular varieties, the same sound change occurred in the New World. It is between the Medieval and Modern stages of Spanish that we find several changes in the structure of the sibilant system. According to Lathrop and Cuadrado (1984:223), a phonological readjustment in the sibilant system occurred, involving: (1) loss of the voicing distinction in favor of voiceless sibilants, resulting in the mergers of /ts/ ~ /dz/ > /ts/, /s/ ~ /z/ > /s/, and /ʃ/ ~ /ʒ/ > /ʃ/; and (2) deaffrication of the affricates /ts/ and /dz/ > /θ/. In the Modern period, the dental [s̪] of the South is the result of the merger and deaffrication of /ts/ ~ /dz/, the dental articulation maintaining the distinction from the apicoalveolar [s̺]. The voiceless interdental fricative [θ] derives from the deaffrication of the affricate /ts/.

The laminal/apical distinction seems to have had a long history, creating a southern/northern dichotomy. The south of Spain developed a laminal [s] and the north of Spain retained an apical [s̺] (Lapesa 1981). Lloyd (1987:338-41) maintains that the apicoalveolar [s̺] formerly existed in Andalusia since transcriptions of Spanish words using Arabic letters were represented generally with the *sin* or palatal sibilant [ʃ]. Lapesa

(1981), however, maintained that the /s/ in Southern Spain was always of the laminal or coronal type, making the Andalusian development different from the Castilian. Since the apical [s̻] articulation in Spanish is more likely to move toward the palatal region than the laminal [s], the apical [s̻] sounds like the [ʃ] used to represent the Spanish [s]. On the other hand, synchronic analysis of /s/ in southern Spain reveals a laminal [s]; this would mean one of two things: the [s] in southern Spain was always laminal or derived from an apical [s̻]. The loss of distinction of voiced/voiceless and fricative/affricate in Andalusian was similar to this same loss in Castilian. In both Castilian and Andalusian varieties, /ʃ/ and /ʒ/ merged to /ʃ/ as in other varieties of Spanish, /ʃ/ then retracted to velar /x/. The Andalusian and American Spanish laminal [s] is most likely derived from the voiceless dental affricate /ts/. Lloyd (1987:341) stated that "there can be no serious doubt that the *seseo* of American Spanish is derived from the *ceceo* of Andalusia."

In summary, the voiced consonant series /dz/, /z/, and /ʒ/ merged with the corresponding voiceless phonemes, /ts/ > /θ/ and /ʃ/ > /x/. In Andalusia, one finds several *ceceo* zones with /θ/ for /s/, a further development from the affricate /ts/ according to Lathrop and Cuadrado (1984:223-4). Recall that *ceceo* is considered substandard. The sibilant developments for standard Castilian and American Spanish are summarized in Table 3.2.

Normally in dialects of Spanish, one finds the exclusive use of /s/ (*seseo*). Castilian *distinción* (/s/ versus /θ/) and Andalusian *ceceo* (exclusive or indiscriminate use of /θ/) are less frequent phenomena. Theories vary for the origin of *seseo* in New World Spanish. Izzo (1984), among others, had addressed the theory of Andalusian origins of this phenomenon. One classification divides New World Spanish into two main dialect areas: highlands and lowlands. The highland areas settled by the Castilians have retained

Medieval Spanish				Castilian Spanish	American Spanish
ts, dz	>	θ		θ	s
s, z	>	s		s	
ʃ, ʒ	>	ʃ	>	x	x

Table 3.2 Development of Spanish sibilants

consonants but have weakened or devoiced vowels. Nevertheless, the /θ/ was not one of the consonants retained in New World Spanish. Lowland Spanish has a tendency for weak final consonants but stable vowels (Henríquez Ureña 1921). If this characterization is accepted, then central Mexican or Andean Spanish should have a stable /s/ and areas of the coast and Caribbean world would have [h], [ʔ], or ø for /s/, which is precisely what occurs. Of course, these features may date back to the New World Spanish of the Colonial period.

Furthermore, in an analysis of the chronology of sibilant changes in Spanish America, Canfield (1952) outlined the use of various /s/ types, explaining their origins. I will focus on the apicai versus laminal articulations and retention versus aspiration/deletion. In this area, Canfield (1952:25) reported that "apicoalveolar S is the sound that has been lost in Southwestern Spain and in America since colonial times." He also mentioned four different /s/ types, three of which are used in Andalusia and the Americas and one in most of Spain. His four /s/ types are given in Table 3.3. (Canfield offered no descriptive information about their allophones other than their phonetic classification).

America/Andalusia	Spain excluding Andalusia
s predorsal	*s* apicoalveolar
s apicodental plana	
s coronal-dental	

Table 3.3 /s/ allophones in Spanish according to Canfield 1952

Canfield (1952:25) also reported on two distinct trends that have been affecting the Spanish sibilants since the middle of the sixteenth century. The first he calls a Castilian "refuerzo" that encourages *distinción* and differentiation. The second he calls Andalusian "relajo" that encourages leveling or *igualación*. Canfield (1952) proposed that the principle of least effort,which was discussed in Chapter 2, may explain sibilant usage in Southern Spain and a tendency to avoid the apicoalveolar [s̻]. This tendency would be attributed to the fact that the laminal [s] is presumably an easier articulation than the apical [s̻]. In addition, the laminal [s] is normally the s-type found in Andalusian Spanish as outlined above.

A discussion of voicing of prevocalic /s/ within Modern Spanish is found in Torreblanca (1986). While the Medieval variety of Spanish had both /s/ and /z/ as phonemes (at least in intervocalic position), in most modern varieties of Spanish there has been a loss of voicing of /z/ resulting in /s/ as the sole sibilant phoneme. Some dialects of Judeo-Spanish maintain the phonemic distinction between /s/ and /z/ as do a few peninsular varieties (Torreblanca 1986:68-9), although this has been disputed.

Torreblanca (1986:61-2) explained that the devoicing of the medieval Spanish voiced sibilants began in the northern part of the Iberian peninsula. By the middle of the sixteenth century, the voiced sibilants had already devoiced in Castilla la Vieja but were still maintained in Toledo and Andalusia. According to Torreblanca (1986:62), the voicing of syllable-initial /s/ and /θ/ was a rather recent phenomenon in Andalusia without any connection whatsoever to the voiced sibilants of Medieval Spanish. Torreblanca reported occurrences of laminal [z] and apical [z̻] in the northwestern part of the province of Toledo in syllable-initial position.

3.1.2 Aspiration and deletion in the New World

Resnick (1981:112) explained the aspiration and deletion of final /s/ in Andalusian Spanish as found in eighteenth century Spanish. At the beginning of the colonial period, the American population was comprised mainly of Andalusian immigrants and thus the aspiration and deletion was imported with these speakers to the New World. Even after the Andalusians settled in the New World, they continued to have contact with Andalusia in the eighteenth century. The Andalusian theory for American Spanish maintains that Andalusian traits are the source for American varieties of Spanish. This includes consonant allophones of /l/, /s/, /y/, and /r/, /ɾ/, *seseo* or lack of *distinción*, and s > h > ø, among other features. Resnick (1981:112) claimed that "las últimas modalidades del habla andaluza, como la aspiración de la /s/, no tardaban sino un par de meses en llegar a las orillas del Nuevo Mundo."

Continuing to characterize American Spanish, Resnick (1981:112-113) explained that the colonizers who settled in mountainous regions of Mexico, Central America, and South America were isolated from Spain and thus did not experience the same linguistic changes as other areas. One must remember, however, that Lima and Mexico City were viceregal capitals having direct contact with Spain (cf. Lapesa 1981). Retention of /s/ in Lima, Bogotá, San José, and Mexico City is considered a conservative feature. Aspiration and deletion, on the other hand, is considered an innovative trait because in previous centuries the /s/ was consistently retained.

Fontanella de Weinberg (1990:207) summarized the situation of syllable- and word-final /s/ in Buenos Aires Spanish throughout time as follows: "la situación de /s/ final de sílaba y de palabra, cuya alternancia con aspiración y cero parece haberse incrementado en los siglos XVI y XVII y luego haberse mantenido relativamente estable a lo largo de los casi tres siglos posteriores."

3.1.3 The development and causality of aspiration/deletion in Spanish

Linguists have reported several factors in the history of the Spanish language that may serve to explain the change of s > h > ø. The main causes for aspiration/deletion processes can be summarized as follows: a) possible Leonese influence; b) weakening of final consonants; c) continuation of the weakening of /s/ that started in Latin, the parent language; d) an analogy to the historical phonological change f > h; and e) result of law of minimal effort.

According to Walsh (1985), the aspiration of final /s/ in Andalusian Spanish may be attributed to a heavy Leonese influence whereby the /s/ > /ʃ/ > /h/. However, Torreblanca (1987:155) questioned the importance of the Leonese repopulation in Andalusia, pointing to the improbability that the Leonese were more numerous than the Castilians throughout Andalusia (158). Let us outline in more detail Walsh's theory and Torreblanca's valid reservations with Walsh's theory.

Walsh (1985) maintained that due to a Leonese influence in southern Spanish there was a change with respect to /s/ in that region. Walsh (1985:233) pointed out that other varieties spoken within Spanish borders exhibit aspiration of final s. While the apicoalvelar [s̻] was the /s/ type found in speakers of Catalonia, Aragon, and Old Castile, a more palatal articulation of -s was likely in the late Medieval speakers in the western half of Spain or, more specifically, in Leonese speakers. The palatalization of -/s/ due to its automatic nature would not be readily reflected in orthography in texts of the period (Walsh 1985:236). The palatal [ʃ] is found in most dialects of contemporary peninsular Portuguese (Walsh 1985:235).

Walsh (1985:238-9) maintained that Leonese phonological features cropped up in southern Spanish because many of the colonizers of Andalusia were either native speakers of Leonese or of a Spanish variety with heavy influences from Leonese.

If [ʃ] < -s was a frequently found feature in southern Spanish in the late Middle Ages, then when all instances of Old Spanish /ʃ/ as in baxo [baʃo] "low" is supposed to have been a change that applied in all cases and from all sources in all dialects of Spanish. Thus, aspiration of -/s/ is really a subcase of the glottalization of all instances of Old Spanish /ʃ/. Thus, Walsh (1985:244) concluded that aspiration of final -s in dialects spoken in southern Spain was part of the major transformation that affected the Spanish sibilants in the sixteenth century.

Walsh's hypothesis was refuted by Torreblanca (1987) for several reasons, although Torreblanca admitted that Walsh's basic theory was quite simple and original. Torreblanca focused his comments mainly on the Leonese influence and the pronunciation of final /s/ in the period before aspiration occurred. Additionally, Torreblanca (1987:155-158) maintained that Walsh exaggerated the importance of Leonese immigration in Andalusia and that it was improbable that the Leonese outnumbered the Castilians in Andalusia. Thus, if a Leonese feature had been introduced, it would be unlikely for it to have exhibited an influence since the Castilians were much more prominent in Southern Spain. Torreblanca (1987: 161) also pointed to a lack of documentation of the palatalization of -/s/ in Leonese when most of central and southern Spain was being repopulated.

Torreblanca (1987:161) also emphasized that while aspiration of /s/ did occur in Western Spain in the territory near the old kingdom of León, it also occurred in a much more extensive territory of Spain where a Leonese population was nonexistent. Therefore, aspiration of /s/ due to Leonese influence would not be justifiable.

Over time, a gradual weakening in Andalusian and Latin American /s/ occurred. An example is the word *este* realized as [éhte], with the tongue retracting but never completely losing the constriction responsible for the fricative sound. Caribbean and Southern Cone dialects have supposedly been subject to the aspiration process for several centuries, but in Costa Rica and Guatemala, the spread of aspiration appears to be more

recent as reported in synchronic investigations because more and more conservative dialects are beginning to aspirate and delete /s/, especially in final position (Lipski 1984b).

Determining the approximate beginning of /s/ aspiration in Spanish has been controversial. The aspiration of /s/ may be traced back several centuries. Widdison (1991:29) noted that Alonso, Navarro Tomás, Canfield, and Torreblanca (cf. Torreblanca 1989) affirmed that /s/ aspiration was a recent development that dated back no further than the 18th century. Other linguists, such as Menéndez Pidal, Lapesa, Boyd-Bowman , Terrell, and Lafford believed that /s/ aspiration dateed back to the 16th century or even earlier. Linguists generally consider spelling modifications in historical texts as evidence for verifying sound change differences. Lipski (1984b) also reported that aspiration of syllable- and word-final /s/ in Spanish dates back at least to the early sixteenth century.

Spanish documents show no systematic evidence of weakening of /s/ in any position until the sixteenth century. At that time, a few scribal indications may be found that suggest that /s/ was being aspirated in final position when followed by another consonant (e.g. *las casas* [lahkásas]. Golden Age dramatists and poets in literary attempts to depict the Spanish of poor black slaves gave these subjects a pronunciation in which word final /s/ was frequently eliminated, especially in the first person plural verb ending *-mos*. There is no evidence that black speakers originated this change. It was most likely a change among the lower classes in Andalusia. Furthermore, an analysis of Golden Age literary texts does not provide any systematic evidence of a process of aspiration or loss of /s/ in syllable-final position. For written evidence of systematic reduction of /s/ in syllable- and word-final positions, one must wait until the eighteenth century. Yet, the change occurred earlier nevertheless in certain areas among less cultured speakers (Lipski 1984b). The evidence is based on scribal errors in the texts analyzed from previous centuries.

The development of final /s/ in Romance-speaking regions was discussed by Politzer (1972:414). He reported that the loss or retention of final /s/ in Latin was a principal feature of early dialectalization. The loss was first attested in Archaic Latin. Therefore, it is not difficult to explain its introduction into the Romance daughter languages. Evidence for a reintroduction of /s/ during the classical period of Latin has been reported. In Spanish, Sardinian, and some Italian dialects, the trend of rapid reduction toward a single case was widespread; final /s/ was maintained because it became the only distinction between singular and plural.

Emphasizing the importance of the apical/laminal articulatory distinction in explaining the phenomenon of /s/ aspiration, Politzer (1972:421) stated:

> The apical /s/ of the Iberian peninsula which in final position was completely palatalized in Portuguese, has resisted effacement to the present day. Wherever final /s/ of Spanish is in process of disappearing, as for instance in Andalusia and a great part of Latin America, it has first lost its apical, palatal quality, and become a normal pre-laminal /s/.

Politzer (1972:420) confronted the phonetic nature of this distinction of /s/ in the Iberian peninsula:

> The Spanish *s* is distinctly different from any other Indo-European *s*. A strongly pronounced, slightly palatal sound, the apical [s̻] resists effacement far more vigorously than the more common pre-laminal [s]. It is the apical [s̻], not laminal [s], that normally is retained.

Phonetically, Politzer (1972:422) made the following important observation regarding the strength of /s/ in modern Sardinian and Castilian Spanish: In both Castilian and Sardinian, final consonants including /s/ are carefully pronounced; in addition, in Castilian Spanish, /s/ has a distinctive apical quality. Both of these elements in the two languages appear to prevent loss of /s/. The [s̻] is also apical in Catalan. Aspiration of final /s/ in Catalan has not been reported, probably due to its apical articulation. Of course, I am not suggesting that a universal tendency exists for retention of apical [s̻], but rather, this may be a characteristic of Ibero-Romance varieties that have an apical [s̻] in final position.

The Castilian and Catalan apicoalveolar [s̻] once existed throughout the Iberian Peninsula (Torreblanca 1987:172). The older Hispano Latin /s/ changed from dental to alveolar. Torreblanca (1987:232) also described the origin of the aspirated /s/:

> Las hablas hispanoamericanas modernas prueban, inequivocamente, que en el s. XVI la aspiración de la sibilante implosiva no era un fenómeno general del castellano medieval, y que la aspiración procede de una sibilante alveolar o dental.

Several scholars including Torreblanca (1987), Chlumsky (1956), and Straka (1964) discussed retention versus reduction of /s/ related to s-type. According to Torreblanca, the palatalization and aspiration of apicoalveolar /s/ were phonetically opposite phenomena. The first involves (according to Torreblanca's account) an increase in articulatory tension; the second is a result of relaxation, at least in the supralaryngal cavity. Therefore, it is impossible that both phenomena began simultaneously in the same contexts.

On the other hand, Chlumsky (1956) claimed that all later evolutions of laminoalveolar Spanish [s], whether originally laminoalveolar or the result of an intermediary apicoalveolar, were dominated by "un debilitamiento progresivo de la actividad de la lengua, sobre todo de su parte anterior, debilitamiento que está caracterizado por un cierto hundimiento de la lengua, y por el retroceso del cuerpo de la lengua."

In a discussion of s > h > ø in Old French, Straka (1964) compared this change to Spanish. He contrasted the apicoalveolar and laminoalveolar articulations of Spanish /s/ and stated that the laminal [s] was the type that normally altered in final position, i.e., changed to [h] or ø (Straka 1964:607). Malmberg (1947:94) had made a correlation between apical [s̻] and retention and between laminal [s] and aspiration and deletion. Straka maintained that the apical [s̻] could weaken by an initial transition to a laminal [s]. This is summarized in Table 3.4.

apical [s̪] > laminal [s] > [h] > ø

Table 3.4 Evolution of /s/ in Spanish

Marrero (1990) stated that [h] might occur as a result of the weakening of /s/, as an allophone of /x/, or as a result of the historical phonological change f > h. Still, Marrero's key issue pertains to why the /s/ is aspirated. Several explanations have been given for /s/ aspiration (Malmberg 1940): the tendency toward open syllables, the influence of the preceding vowel affecting the aperture of the /s/, and assimilation to a following consonant phoneme, e.g., in the word *buscar* "to look for", the [s] may change to [h] and then be deleted, resulting in a concomitant gemination (> [bukkár]). Perhaps the laminoalveolar articulation is the first consequence of a weakening of an apicoalveolar [s̪], which then proceeds to aspiration of the laminoalveolar [s]. If so, the laminoalveolar articulation may be considered the point of departure of the aspiration without being its cause (Marrero 1990). But if the apicoalveolar [s] first becomes a laminoalveolar and then [h], we would expect to find acoustic evidence that the laminal [s] is somehow "weaker" than the apical [s̪], a point upheld by Widdison (1991:234) (See section 2.3.1). One might expect the acoustic signal to show that apicoalveolar [s̪] has a more intense or stable acoustic signal than the laminoalveolar [s]. Intensity was discussed in 2.2 and 2.2.1 because it was the one acoustic feature that could potentially explain the retention of apical [s̪] and the aspiration/deletion of laminal [s]. No such acoustic experimental data for intensity differences have been reported in the research for Spanish apical and laminal /s/ articulations, although Widdison did report that the apical [s̪] was louder than the laminal [s]. This, of course, does not mean that a difference cannot be found through experimental verification.

In earlier research, Hammond (1978) speculated that the motivation for the change from [s] to [h] most probably was the law of minimal effort; i.e., that the change led to an easier articulation. Ease of articulation is one hypothesis commonly used to

explain certain sound changes in world languages, not only in Spanish. Seklaoui (1989) also claimed this to be the case not only for Spanish but also for Italian and French.

For example, it is generally claimed that rapid speech leads to articulatory weakening and consequent articulatory undershoot,which might-in an extreme case-result in transforming [s] into [h]. However, we cannot be certain that there is a simple relationship between rapid speech and relaxed articulation (Klatt 1974; Shockey 1987). Clearly the outcome of rapid speech and its effects on Spanish /s/ have not been thoroughly explained.

The weakening of /s/ in Spanish and its compensatory adjustments were viewed within a Romance context by Seklaoui (1989), who analyzed the parallel processes of sibilant weakening in Italian, French, and Spanish. Seklaoui (1989:vii-viii) proposed that efficiency is a key factor in the /s/ weakening and is seen in three areas: (1) articulation (resulting from assimilation or deletion so that the movement of articulators, mainly the tongue) is minimized, (2) grammatical signaling whereby redundant marking is reduced, and (3) regularization in which mental effort in storing linguistic information is reduced. These three types of efficiency are manifested in two sequential steps: sound change and morphological compensation. The sound change results in greater articulatory efficiency and grammatical signaling and also becomes more efficient when patterns are reduced or regularized. Seklaoui (1989:13) concluded that the weakened reflexes of /s/ in the Romance languages were the result of articulatory economy in which articulatory movements are assimilated, transitions between sounds are made easier, and total deletion of sounds occurs. These changes have not affected all dialects of Spanish, but the potential for these changes exists for all dialects. Seklaoui (1989) differentiated between the innovative "weakening" dialects of Central America, South America, the Caribbean, and Andalusia and the conservative /s/ retention dialects in the highlands of South America and Castile. (Recall that Castilian has apicoalveolar [s̻] while the South American highlands dialects have for the most part laminoalveolar [s] with the exception

of Antioquia and Caldas in Colombia.) The innovative lowland or coastal dialects all have laminoalveolar [s] articulations that tend to be aspirated or deleted in syllable- and word-final positions.

In a diachronic analysis of /s/ in Buenos Aires Spanish, Fontanella de Weinberg (1990:198) compared the presence or absence of final /s/ according educational level of the speaker, gender, and age. She found that:

(1) less educated speakers deleted the /s/ 70% of the time, while more educated speakers deleted the /s/ only 20% of the time,

(2) women retained /s/ more than men,

(3) age differences in /s/ usage were not significant.

Fontanella de Weinberg also traced the /s/ through four centuries (along with the palatals [ʒ] and [ʃ], /l/, and /r/) using written documents from various dates. /s/-loss appears to date back to the sixteenth and seventeenth centuries. She reported that documents from 1581 and 1612 revealed aspiration/deletion of /s/ (Fontanella de Weinberg 1990:199). She also emphasized that in the eighteenth century, the phenomenon was accentuated even more, as evidenced by its occurrence in authors of different origins. Scribal evidence includes omissions of grapheme *s* or hypercorrections. Fontanella de Weinberg (1990:200) pointed out that aspiration was more difficult to detect than deletion in texts since the resulting [h] (< /s/) was never written as such as it was still perceived as a simple variant of /s/. The omission and hypercorrection of final /s/ continued into the nineteenth century. Hypercorrection would occur when speakers say an /s/ where it does not belong since they are aware (consciously or not) that they drop /s/, e.g., *gasto* instead of *gato*.

3.1.4 Causality of s > h change in Spanish

Walsh (1985) asserted that the *explanation* that phoneticians within Spanish studies gave for the aspiration of Spanish /s/ was more of a description than an explanation. He also questioned the term "weakening" to describe the s > h change because it shed no light on the historical origin of the sound change. Nevertheless, s > h in Spanish may indeed be a case of weakening when comparing laminal and apical articulations of /s/ if the apical is found to be retained, because the apical exhibits a stronger, less variable articulation and acoustic structure and the laminal exhibits the opposite (cf. Sekłaoui 1989).

In addition, it is important to take into consideration Marrero (1990) which was discussed in Chapter 2. In this acoustic study it was argued that the aspiration of /s/ is not solely due to the weakening of a syllable- or word-final consonant, and it affects not only the laminoalveolar [s] but ultimately the apicoalveolar [s̺]. The apical [s̺] either remains stable in Castilian Spanish or may be ultimately aspirated, by first becoming laminal before aspirating or deleting. Conversely, the laminoalveolar [s] may be retained as [s], or may be realized as [h] or deleted in syllable- and word-final positions. This suggests that a particular phonetic feature of apicoalveolar [s̺] prevents it from going directly to [h] or ø. The transition to a laminoalveolar articulation is the first consequence of weakening of an apicoalveolar [s̺], which then proceeds to aspiration of the laminoalveolar [s]. Therefore, the cause of s > h > ø would be possibly due to a two stage articulatory weakening; (apical [s̺] >) laminal [s] > h > ø.

3.1.5 Aspiration/deletion as an ongoing process in Spanish

After looking at the s > h change diachronically, one could suggest that the change will continue to exert influence on dialects of Spanish. One scholar, in particular has made suggestions regarding the s > h change in modern Spanish. Based on the diachrony of /s/ in Romance and specifically in Spanish, Seklaoui (1989:212-4) outlined her projections. Similarities between the "Romania" (Romance language systems) and the "Hispania" (the Spanish-speaking world) may be seen, in particular for the phonological evolution of [s]. Seklaoui speculates that differentiation within dialects of Spanish would continue, albeit more slowly in educated speakers due to the standard model, although in some prestigious styles, deletion and aspiration were not necessarily stigmatized.

Citing Wartburg (1967), Seklaoui found that the weakening of /s/ in the Romania was coming full circle in Spanish. Wartburg (1967:25) described the fragmentation of Hispania as follows: "De toutes les différenciations phonétiques apparues à l'intérieur de la [Hispania], celle qui est la plus nette, la plus significative et la plus lourde de conséquences provient sans aucun doute du traitement de l's finale." Seklaoui (1989:214) justifiably believed that this phenomenon described by Wartburg would continue to occur in dialects of Spanish.

According to Penny (1983), /s/ aspiration was typical in southern Spain as well as a few northern areas. Retention of Spanish /s/ in the syllable-final position is characteristic of "those areas of America which were under the greatest central Peninsular influence, namely Mexico (except the far south), Peru, Bolivia and Andean Ecuador " (Penny 1991:19). Judaeo-Spanish, which was not influenced by Castilian, does not show weakening of /s/ either (Penny 1991:93). Most other areas not under Central Peninsular

influence show weakening and/or loss of the phoneme, as in Andalusian and Canarian Spanish.

Furthermore, the s > h phenomenon in Spanish has brought about changes in the grammar of the language, as in the case of number marking. In reference to Andalusian Spanish Seklaoui (1988:281) explained that "context must be included in assessing the ambiguity resulting from /s/ deletion and, consequently, in considering the future direction of number marking in Spanish." The data for Seklaoui's study were based on a forty-five minute conversation with a housewife from Puente Genil (in Central Andalusia in the province of Cordoba). All number markers in five hundred nouns in the recording were noted by type and frequency. Seklaoui (1988:282-3) identified three categories of number markers: (1) determiners, (2) the suffix |e| in consonant-final nouns and adjectives (e.g.,*una canción popular/una(s), canciones(s) populare(s)*), and (3) the verb when the plural noun is the grammatical subject (e.g., *mi amigo es/mi(s) amigo(s) son.*) Seklaoui (1988:282-3) reported that the deletion of /s/ significantly reduced redundant number marking in Spanish. When /s/ was not pronounced, there was an average of one marker per noun. If the /s/ had been pronounced, there would have been two and a half markers per noun. She reported that speakers must decide to express plurality (using the -*s*) depending on whether they believe the distinction was relevant to the message and whether they believed the hearer already knew that a given noun was singular or plural. Seklaoui (1988:283) stated: "By deleting /s/, speakers avoid indicating more information than is necessary in signaling number, a process in line with the principle that speakers say no more than they must." Seklaoui found that speakers can generally signal number without /s/.

Seklaoui (1988:284) explained that failure to mark number did not affect communication for three reasons: (1) number of the noun in some constructions is not crucial to the message, (2) context indicates the number of the noun, and (3) the number of the noun is not necessarily essential to the topic of conversation (although number may

be relevant and not shown by the context). The difference between 1 and 3 is not made clear. Seklaoui (1986:62) argued that a reduction of articulatory movement is likely to be the motivating factor for the aspiration/deletion of /s/. This economy in articulatory terms is then taken one step further by eliminating unnecessary number marking (Seklaoui 1988:290). In terms of general number marking in Spanish, Seklaoui (1988:290) concludes that /s/ is a redundant and unnecessary number marker. Even after the *-s* is lost, number is still sometimes marked for the speaker's purposes. Thus, number marking in /s/ deleting Spanish dialects will rely on both contextual and linguistic markers. One problem with the findings is that they are based on only one subject. It would be important in future research to analyze additional subjects that might reveal variations in number marking in Andalusian Spanish.

3.2 Summary

In this chapter, a diachronic overview of sibilants in Latin, Romance languages, and Spanish has been provided. Studies indicate that throughout the history of Spanish apical [s] is retained and laminal [s] has a tendency to be aspirated or deleted.

Table 3.5 summarizes the development of /s/ in Latin, Romance, and Spanish.

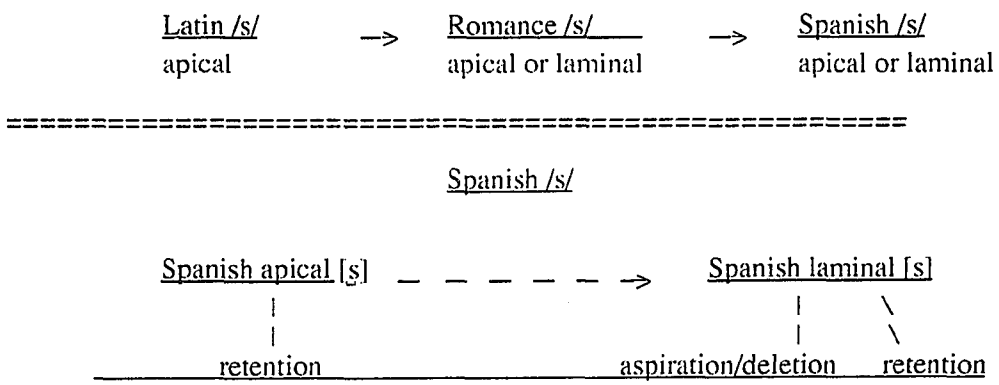


Table 3.5 Development of /s/ in Latin, Romance, and Spanish

Aspiration of /s/ in Spanish continues to be widespread in both Peninsular and New World Spanish dialects, and it is clearly the laminoalveolar, not the apicoalveolar, that tends to go directly to aspiration or deletion. Historically, northern Spain tended to have apical [s̻] while southern Spain tended to have laminal [s]. This continues to the present day. This distinction is the end result of simplification of Old Spanish sibilants. In more modern times, the apical [s̻] has been reported to have changed to a laminal [s] in some speakers and then aspirated to [h] or totally deleted. But the important factor is that the apical [s̻] has not been aspirated directly without first passing through a laminal stage.

Diachronically, the [s̻] as found in Castilian speakers in Spain appears to be a conservation of an apical [s̻] in Latin since early Latin grammars indicate that the [s] was apical in terms of the articulatory descriptions provided. Scholars report that the /s/ in Spain was consistently apical throughout the land in most areas and that a laminal [s] was normally a later development of the apical [s̻].

An additional piece of the puzzle, however, that still needs our attention is why the apical [s̻] is not as affected by this backing process, a process that has affected the laminal [s]. Another puzzling issue deals with the position in the syllable in which sound changes occur. Syllable onsets and codas may both exhibit the s > h change although the coda appears to be more frequently affected in the modern language, not only as s > h, but also for lateralization of /r/, rhotacism of /l/, and velarization of /n/. The aspiration and deletion of final laminal /s/ in Spanish may be placed within a more general context in the diachronic development of Spanish sounds. The s > h change is an example of a backing process that has affected other voiceless fricatives in Spanish. Nevertheless, consonantal backing did occur in syllable- and word-initial position in Spanish, for example ʃ > x ([muʃér] > [muxér]), f > h ([fablár] > [hablár]). Thus, it is not odd for the s > h change to have occurred because other voiceless fricatives in Spanish have also been affected by this tendency toward backing.

A careful look at the behavior of /s/ and other final position consonants in Spanish in the past few centuries provides evidence that the aspiration/deletion of /s/ will continue into the twenty-first century. Phonological tendencies found in earlier stages of a language are likely to repeat in the later stages of a language's development; this is clearly the case since aspiration/deletion of /s/ is an increasingly common feature of modern dialectal Spanish.

The studies gathered and examined in this chapter provides us with a historical perspective of the s > h > ø change in progress in the Spanish language. However, the picture may seem sketchy because few studies are available. In the future it would be useful to conduct more research of literary and non literary sources, in order to understand fully the diachronic development of /s/ aspiration and deletion in Spanish.

The diachronic data reveal tendencies for /s/ aspiration and deletion which we may also document synchronically in dialectal and sociolinguistic analyses, as discussed in Chapter 4.

Notes to Chapter 3

[1]Several studies deal with diachronic aspects of /s/ aspiration/deletion but are better categorized as dialectal or sociolinguistic studies. For this reason, these studies are reviewed in Chapter 4.

[2]Ford (1900), a published version of his 1897 Ph.D. dissertation from Harvard University, treats the Old Spanish sibilants. This book does not; however, treat the aspiration and deletion of /s/ because this phonological change began in the modern variety of Spanish, not in the Old or Medieval varieties. Thus, this book is not included in the review.

CHAPTER 4

DIALECTAL AND SOCIOLINGUISTIC ASPECTS OF /s/ ASPIRATION/DELETION

4.0 Introduction

This chapter provides an overview of /s/ realizations in dialects of Spanish with an emphasis on the aspiration/deletion phenomenon. The following sections outline precisely which of the two /s/ types (laminal or apical) occurs in the various Hispanic dialects as well as those dialects that retain or aspirate/delete the /s/.[1] In this section, I briefly discuss apical [s̻] and laminal [s] in the dialects of Spanish. It should be pointed out that dialectal studies address the apical/laminal distinction surprisingly little. In some cases apical and laminal are specified as allophonic variants of /s/; Resnick for example, (1975:36-37) outlines five different possibilities for /s/ realization in Latin American Spanish (1) apicoalveolar [s̻], (2) laminoalveolar [s], (3) semisibilant [θ], (4) voiced [z] in word-final position before following vowel, and (5) voiced [z] in intervocalic position within a word.

The bulk of the chapter, section 4.1, presents the dialectal review arranged according to the country in which the dialect is spoken. (This is because most of the published studies are country-specific in nature.) Additional sections for Caribbean Spanish and Central American Spanish accommodate those studies that deal with the /s/ in those two geographical zones as a whole and not in individual nations. Finally, in section 4.2, I summarize the dialectal and sociolinguistic manifestations of /s/.

The Spanish-American geographical zones used here are not based on any one model (as outlined by Henríquez Ureña 1921, for example). However, the grouping of dialects allows for a more succinct and comparative treatment of /s/ in the various dialects of Spanish. Of course, the division of Spanish into dialectal areas is controversial as well as problematic since linguistic classification differs according to the criteria used for classification (cf. Rona 1964).

The aspiration and deletion of Spanish /s/ in dialectal terms was explained quite succinctly by Ferguson (1990:68):

> One of the most salient phenomena of dialect differentiation in modern Spanish is the variable pronunciation of standard /s/. Most striking, however, is the variation between [s] and [h] or zero which is widespread in Andalusia (southern part of Spain) and in the Caribbean and coastal areas of Central and South America. It is still not clear whether this is all one change which diffused as a result of Andalusian migration to the New World or is a set of independent changes (perhaps some kind of drift phenomenon?); certainly the changes are now progressing relatively independently in the various areas although also continuing to show common features.

Ferguson's observations justified a careful overview and comparison of the dialectal and sociolinguistic research on Spanish /s/ aspiration and deletion.

In comparison to dialectal treatments of /s/ aspiration and deletion in Spanish, fewer purely sociolinguistic treatments of the subject exist.[2] This is no doubt related in part to the fact that sociolinguistics is a far newer field than dialectology or historical linguistics. Nevertheless, more studies have been undertaken within a sociolinguistic framework in the last 20 years than in the past. Included in this body of research are studies with a sociolinguistic focus on /s/ aspiration/deletion. For example, Silva-Corvalán (1989:74-5) stated:

> "La variable (s) es sin duda la más estudiada en el mundo hispánico, especialmente en Hispanoamerica. Son numerosísimos los lingüístas que han examinado el condicionamiento lingüístico y/o social de las variantes de (s) en una variedad de puntos geográficos."

Relatively little research in Hispanic sociolinguistics was undertaken in the 1970's although some of the groundwork pioneered during that decade led to further

sociolinguistic investigation by a number of scholars and has assisted in advancing the field (cf. Ma and Herasimchuk 1971, for example). Lavandera (1974) provided an extensive overview of Hispanic sociolinguistic research conducted in the early 1970's. A follow-up review article by Lavandera (1981) treated not only Hispanic sociolinguistics but Romance sociolinguistics with discussions of sociolinguistic research other Romance-speaking countries such as France, Italy, Portugal, Brazil, and Rumania. López Morales (1980) discussed Hispanic sociolinguistics in terms of outlining prospects for future research.

More recently, two book-length treatises which synthesize the field of Hispanic sociolinguistics have appeared: López Morales (1989) and Silva-Corvalán (1989). Both volumes treat the sociolinguistic phonological literature and will be considered within the various sections of 4.1.

Table 4.1 serves as an overview of dialectal and sociolinguistic research studies available for various countries and Hispanic geographical zones, all of which are reviewed in 4.1.1 through 4.1.25. The sections for New World and General apply to several or all dialects of Spanish within these regions. Other countries in Central and South America have not been analyzed and are in need of investigation in order to provide a more complete picture of the sociolinguistic factors that govern /s/ aspiration/deletion.

4.1 Dialectal and sociolinguistic treatments of Spanish /s/ aspiration/deletion

Synchronically, apical [s̻] is not as widespread in Spanish as laminal [s]. While Spaniards of many regions exhibit an apical [s̻], the apical articulation is consistently used in northern and central Spain. In terms of New World Spanish, the apical [s̻] is also the normal articulation of Colombian speakers in the Antioquia and Caldas regions (Dalbor 1980:86, Zamora Munné and Guitart 1982:96). Lipski (1988) also reported that apical [s̻] is found in emphatic speech in Caribbean speakers. Other scholars also report

General references	**Cuba**
López Morales 1980	Terrell 1979
Lavandera 1981	Hammond 1979
D'Introno, Guitart, and Zamora 1988	Canfield 1981
Silva-Corvalán 1989	**Dominican Republic**
Klee 1991	Terrell 1986
Spain and Canary Islands	**Colombia**
Penny 1991	Lafford 1980, 1982, 1986
Felix 1979	Becerra 1980
García Marcos 1987	Canfield 1981
López Morales 1989	Flórez 1978
Samper Padilla 1990	**Venezuela**
New World	Terrell 1977a, 1978c
Lavandera 1974	**Peru**
Lipski 1986a, 1991	Canfield 1981
United States	Caravedo 1983
Poplack 1980	Hundley 1986, 1987
Canfield 1981	**Ecuador**
Gutiérrez 1981	Toscano Mateus 1953
Hammond 1980	Canfield 1981
Lavandera 1981	**Bolivia**
Lipski 1985b, 1990	Boynton 1981
Uber 1989	Canfield 1981
Mexico	**Chile**
López Chávez 1977	Wigdorsky 1978
Hidalgo 1990	Valdivieso and Magaña 1988
Central America	Valdivieso, Magaña, Tassara, and Duque 1988
Lipski 1985a	Cepeda 1990
Guatemala	Tassara 1991
Lipski 1985a	Valdivieso, Magaña, and Tassara 1991
Costa Rica	**Paraguay**
Canfield 1981	Cassano 1972
El Salvador	Canfield 1981
Canfield 1981	Granda 1982
Lipski 1985a	**Argentina**
Honduras	Fontanella 1967
Lipski 1983, 1986b, 1987	Fontanella de Weinberg 1973, 1974
López Scott 1983	López Morales 1989
Nicaragua	Terrell 1978b
Lipski 1984c	Sanicky 1982-3
Panama	**Uruguay**
Cedergren 1978	Canfield 1981
Caribbean	**Equatorial Guinea**
Samper Padilla 1990	Lipski 1984a, 1985c
Terrell 1977b, 1986	
Terrell and Tranel 1979	
Puerto Rico	
Terrell 1978d	
Hochberg 1986	

Table 4.1 Dialectal and sociolinguistic studies of /s/ in Spanish

apical articulations in New World Spanish (e.g., Canfield 1981). The Castilian apical [s̺] remains stable in all positions, but is normally aspirated, deleted, or voiced to [z] before a trilled [r]. This occurs in most dialects of Spanish, whether the /s/ be apical or laminal. In 4.1.1 and 4.1.16, I address the apical [s̺] as the normal /s/ type in Castilian Spanish, as well as in the Antioquian and Caldan Spanish of Colombia.

The laminal articulation of /s/ is widespread in dialects of Spanish; more native Spanish speakers use laminal [s] than apical [s̺]. In many areas, the laminal [s] tends to be retained in syllable- and word-final position. This is the case in most of Mexico, the highland regions of South America, which include Mexico, Peru, Ecuador, the Andean Region of Colombia, and Bolivia, and also in formal styles in all dialects of Spanish. On the other hand, more than half of all native speakers of Spanish tend to aspirate or delete syllable- and word-final laminal /s/. This occurs in lowland areas of South America and Central America (parts of Mexico, Honduras, El Salvador, Nicaragua, Panama, Paraguay, Uruguay, Argentina, and Chile), the Caribbean Area (coastal areas of Colombia and Venezuela, Cuba, Puerto Rico, and the Dominican Republic), the Canary Islands, and Southern Spain (Andalusia and Extremadura).

In several dialects, aspiration occurs in initial position, whether it be word initial or syllable initial. This had been reported by Lipski (1985a) for El Salvador and Honduras. It is also found to be true in some regions of Colombia (see section 4.1.16). As mentioned earlier, initial aspiration is interesting because normally reduction of sounds occurs mainly in the syllable coda in dialects of Spanish, not in the syllable onset. Initial aspiration will be discussed in more detail in sections 4.1.5 (Central America), 4.1.8 (El Salvador), and 4.1.9 (Honduras).

It should be noted at the outset that the coverage reported in the present chapter is unavoidably uneven for the various country and geographical sections in 4.1. This is a reflection of the uneven coverage of /s/ in dialects of Spanish as found in the available literature. The strengths, weaknesses, and discrepancies between the claims of the various

investigators will be apparent in the present overview. Whenever investigators include data, especially quantitative results, I present these data in table form along with their significance.

Each of the dialectal studies reviewed in section 4.1 may be classified into one of the following three categories:

(1) **Studies based on researchers' own observations**. These studies are generally more subjective and must be considered with caution. These studies are often, but not always, brief articulatory descriptions (although not based on articulatory experiments) or impressionistic perceptual characterizations of how the /s/ allophones sounded to the researcher. No quantitative or experimental information is provided.

(2) **Studies based on only one speaker**. These studies must be interpreted with caution, given the difficulty of characterizing a specific feature of a language using only one of its speakers. In these cases, data may or may not be included.

(3) **Studies based on a number of speakers**. Data are collected (usually tape recorded), presented, and discussed, often in quantitative terms. For example, the researcher reports the percentage of speakers who used the [s], [h], or ø.

In general, category 3 studies are considered more informative than those from categories 1 and 2 because they are based on repeated observations from several subjects and are reported using statistical methods.

I will now proceed to a review of dialectal studies as well as sociolinguistic studies. In terms of dialectal investigations of Spanish /s/ aspiration/deletion, two scholars deserve special mention. Tracy Terrell did many ground-breaking studies in the 1970's and 1980's using a quantitative data-driven framework. He focused mainly on Caribbean dialects including Puerto Rican, Cuban, Dominican, and Venezuelan Spanish. Studies on Spanish /s/ aspiration/deletion cite Terrell's earlier research in their discussion and his works are considered yardsticks with which to measure later research. John M. Lipski had

undertaken many studies on the s > h change in a number of dialects of Spanish including Central American, Nicaraguan, Honduran, Latin American, Guinean, Puerto Rican, Cuban, and United States Spanish. Both of these scholars' research is given careful consideration throughout the subsections of 4.1.

In addition to geographic factors, research that treats social factors such as age, gender, socioeconomic level, education, or profession is discussed in the following sections divided by country. A discussion of specific quantitative data, collected from a varying number of subjects (12-83 informants), is included for the different studies in order to provide a complete depiction of /s/ realizations. These quantitative data are characteristic of sociolinguistic studies and thus a careful consideration of the data is crucial.

This section includes a survey of the sociolinguistic research that may be applied to Spanish in general in terms of /s/ aspiration/deletion. In her introduction to a collection of papers presented at a Hispanic sociolinguistics conference, Klee (1991:1) offered a chronological view of research in Hispanic sociolinguistics. She reported, "Over the past twenty years, research on Spanish has had an impact on the field of sociolinguistics, beginning with Rubin's (1968) work on Paraguay, National Bilingualism in Paraguay, and Fishman's (1971) seminal study of Spanish-English language contact in the United States, Bilingualism in the Barrio." Due to the variety of contexts in which Spanish is spoken around the world, Klee (1991:1) stated "the sociolinguistic study of Spanish provides a fertile ground for research on the effects of social, political, and economic contexts on language use and has contributed to the advancement of sociolinguistic theory and field methods."

López Morales (1980:60-1) discussed the possibilities of plural marking in Spanish and summarized them as follows: (1) /s/ (different types of sibilants), (2) /h/ (different types of aspiration), (3) vowel + deletion of /s/, and (4) total deletion. López Morales pointed out that these realizations corresponded to different sociolects and that the speakers

were linguistically conscious of them. In the majority of cases, he stated that there existed a strong association between the indeterminate realization of /s/ and sociolect or style. It is this type of correlation that is consistently considered in sociolinguistic research and merits our close consideration.

Much of the work in sociolinguistics that was undertaken in the United States and Canada was pioneered by William Labov. In addition, Hymes, Gumperz, Fishman, Ervin-tripp, and Ferguson have also helped define sociolinguistic research in the Romance field (Lavandera 1981:130). The quantitative paradigm within sociolinguistics requires attention. Lavandera (1981:143) explained the development of this framework (as in Labov 1966, 1972a, 1972b) that had sparked the study of language in use. Quantitative correlations of reported free linguistic variation of extralinguistic social dimensions such as age, socioeconomic status, ethnic group, gender, etc. have uncovered underlying patterns that regulate variation.

Of particular importance in the field of Romance sociolinguistics, especially in the United States, was Labov (Lavandera 1981:143). Especially important to the field has been Labov's model for the analysis of variation. It has been extensively used within the Latin American research for phonological variation. This will become quite evident in the remaining sections of this chapter.

D'Introno, Guitart, and Zamora (1988:204) explained that the social variety of a speaker did not depend solely on socioeconomic factors (such as occupation or education) that define his level or class. Other factors including age, gender, religion, and ethnicity of the speaker are also important. These latter factors superimpose themselves on the former ones producing a class of extralinguistic variables. At all socioeconomic levels there are generational groups and possibly religious and ethnic groups that determine for each speaker or social group specific linguistic social varieties that exist in a community and to what they correspond. According to D'Introno, Guitart, Zamora (1988:207) another consequence of the evaluations of the variety of linguistic forms is hypercorrection - that is

the incorrect use of prestigious forms within a nonprestigious variety. The loss of final *s* is a common process in some nonprestigious varieties of Spanish, especially in Caribbean varieties where it has a negative stigma. Speakers who elide their *s* frequently, nevertheless, pronounce the *s* in formal situations imitating the prestigious pronunciation, but often it intrudes in words where -*s* does not belong, and therefore, they use *fisno* in place of *fino*. This also occurs in varieties of English where an intrusive *r* is inserted where it does not belong (as in *túner* instead of *túna* or *sóder* instead of *sóda*).

Silva-Corvalán (1989:60) outlined the difference between a linguistic and a sociolinguistic description of the /s/ variable in Spanish, both of which are reviewed in the present chapter. She explained that typically, a phonetic study that was non-sociolinguistic, described the phoneme /s/ and its allophones and established the linguistic context in which the allophones occur, for example, whether it was in free variation or complimentary distribution. It frequently gives other more general information about its distribution. In the case of phoneme /s/, the allophonic variation that is most interesting occurs in word final position, that is the position in which a high functional load occurs (for example the plural morpheme as in *la casa* versus *las casas* and as a verbal morpheme as in *canta* versus *cantas*). A sociolinguistic study may illustrate, for example, that the aspiration is typical of popular classes while more educated people tend to retain the sound. A sociolinguistic study therefore proposes to give precise information (statistically valid) about the influence of a factor, whether linguistic or extralinguistic, that has a possible affect on one or another allophone of a given phoneme.

Nine factors to be considered in sociolinguistic research are offered by Silva-Corvalán (1989:61), and these apply specifically to Spanish /s/:

1. morphological category, for example whether the /s/ form under study is a determiner as in *las*, an adjective, *altas*, or as a noun, *lomas*
2. morphological function, whether the form of /s/ is a monomorphemic *s* as in *dos* or morphemic as is *lomas* or *suenas*,

3. /s/ position within the word, internal as in *mismo* or final as in *mes*
4. phonetic context, whether /s/ appears between a consonant or near a consonant as in *costa*, before a vowel as in *las ocho*, or before a pause as in *fueron todos*
5. age of informants
6. gender of informants
7. origin of informants - urban or rural
8. socioeconomic class of informants
9. style of discourse - formal or informal.

The majority of the Spanish /s/ aspiration and deletion studies are dialectal and many of them contain sociolinguistic findings and observations. These studies are reviewed in the various subsections of 4.1 below.

4.1.1 Spain (including the Canary Islands)

The Spanish of Spain deserves particular attention because there exists a number of realizations of /s/: *seseo* (the exclusive use of [s] for /s/), *ceceo* (the exclusive use or indiscriminate use of [s] and [θ]), *distinción* (a phonemic distinction between [s] and [θ] (which would distinguish words like *casar* "to marry" from *cazar*, "to hunt"), aspiration of /s/ (the use of [h] in syllable-final or word-final position instead of [s]), and deletion.

The two principle dialect areas of modern peninsular Spanish are Castilian and Andalusian. Castilian Spanish is spoken in the northern central region of Spain. Speakers of Castilian use an apicoalveolar articulation, with aspiration occurring in final position in a very small part of the southernmost region. This apical may have indeed converted to a laminal before as discussed in Chapter 3.

Andalusian Spanish shows considerable variability in /s/ pronunciation. With some speakers, the observer hears *distinción*, in others *seseo*, with a laminoalveolar articulation, while still others show *ceceo*. Aspiration and deletion of /s/ are also common.

Penny (1991:93-4) described the effects that /s/ deletion has on preceding vowels in Eastern Andalusian Spanish. He stated, "A vowel which belongs to a syllable ending in a consonant (such as /s/) often is Spanish has a slightly different quality from a vowel which is syllable-final, the syllable-final vowel usually being a little more close than its non-final counterpart" (94). For this reason, the mid vowels /e/ and /o/ of other dialects of Spanish have split into four vowel phonemes: /e/, /ɛ/, /o/, and /ɔ/. This would create contrasts between *vienes* [bjéne] and *viene* [bjéne] and between *bolos* [bólɔ] and *bolo* [bólo]. Additionally, there exists a contrast between a fronted [æ] where -/s/ formerly existed and [a] (when the vowel was syllable-final). This creates contrasts such as *las palas* > [læpála] and *la pala* > [lapála]. Because these vowel contrasts are meaningful, the vowel system in Eastern Andalusian Spanish has an eight phoneme vowel system as follows:

/i/	/u/
/e/	/o/
/ɛ/	/ɔ/
/æ/	/a/

It is common to find this system in some American varieties of Spanish, especially in the Caribbean (see sections 4.1.12, 4.1.13, and 4.1.14).

Aspiration and deletion of /s/ in Canarian Spanish, the variety of Spanish spoken on the Canary islands off the west coast of Morocco, was described by Felix (1979:359). She suggested that the Spanish spoken in Las Palmas de Gran Canaria was undergoing a very specific sound change that affected a number of important aspects of the language system as a whole. Felix based her analysis on the recorded speech of eight informants ranging in age from 9 to 74. Three basic procedures for observing speech were followed which, for each informant, included: (1) reading a passage; (2) an interview with the author; and (3) conversation with other informants. Felix did not state the exact phonetic nature of /s/, in Canarian, however, Zamora Vicente (1967:345) reported that /s/ is of the laminal type. Felix reported a strong tendency in Las Palmas to use [h] in pre-consonantal position and

word-final position and to delete /s/ under two conditions, including the joint occurrence of: (1) monosyllabics with non-morphemic final /s/ and all plurals (e.g., *más, perros*), or (2) polysyllabics with non-morphemic final /s/ and second person singular present tense verb forms (*tú*) (e.g., *adiós, hablas*) (1979:364). She predicted that all pre-consonantal and word-final occurrences of /s/ would eventually be lost, and suggested that the ongoing sound change was best described as s > h > ø, with h being an intermediate stage (377). Felix's observation for Canarian Spanish also applies to other dialects in which the s > h > ø has also occurred.

Several Spanish locales are the subject of investigation in terms of sociolinguistic patterns of /s/. García Marcos (1987) analyzed the vowel plus /s/ sequence in eight locations of the Grenadine coast. His analysis was based on thirteen hours of recordings of 48 speakers undertaken between February and June, 1985. García Marcos (1987:178) stated that through textual analysis, the loss of final /s/ appeared to be a change initiated in the lower sociolects. Documentation in spoken language shows that loss of /s/ has been resisted in the high sociolects even until recent years.

In a discussion of sibilants in Toledo and Las Palmas, Spain, López Morales (1989:53-4) stated:

> En varias zonas del mundo hispánico, aun en aquellas en las que el desgaste fónico es grande y por ello la variación suele ser mayor, encontramos a menudo la misma alofonía. Las realizaciones de -/s/, por ejemplo, suelen ser sibilantes, aspiradas y elididas en muchos sociolectos: los de Toledo y Las Palmas, entre otros.

He noted that the high sociolect in Toledo is the most conservative.

	1	2	3
[s]	66.8%	45.1%	43%
[h]	11.8%	22.2%	19.4%
ø	7.8%	19.4%	15.9%

Table 4.2 Variant distribution of -/s/ in Toledo
(Table 2.1 taken from López Morales 1989:53)
(Data from Angeles Calero 1986:62)

Table 4.2 summarizes the distribution of /s/ in three sociolects of Toledo, where 1 represents the most prestigious sociolect and 3 the least. One can see that the sibilant allophone is most common in the high sociolect and aspiration is most found in the middle sociolect as is total deletion.

The /s/ of the Canary Islands was analyzed by López Morales (1989) and Samper Padilla (1990). A discussion of sibilants in Las Palmas was provided by López Morales (1989:53-4). Table 4.3 summarizes the three most common allophones in four sociolects (1 being the highest stratum and 4 being the lowest):

	1	2	3	4
[s]	5.4%	4.1%	4.2%	2.6%
[h]	63.7%	55.1%	45.7%	39.1%
ø	23.2%	32.5%	41.8%	50.3%

Table 4.3 Variant distribution of -/s/ in Las Palmas
(Table 2.2 taken from López Morales 1989:54)

It appears that in this dialect, aspiration is not stigmatized, as its highest frequency occurs in the upper sociolects. Here, there is a growing tendency, as one moves down the social strata, to replace aspiration with deletion. Also, relatively little fluctuation in the occurrence of [s] is noted. This phenomenon, combined with the atypically low retention frequencies, identifies the Spanish of Las Palmas as a more innovative dialect, with trends differing from those of typical aspiration/deletion dialects. Preservation of sibilants in the four sociolects of Las Palmas is quite rare, whereas aspiration is widespread as is total deletion, especially in the lowest stratum.

Samper Padilla (1990) analyzed 5 consonant phonemes, /s r l n d/, in the Spanish of the capital city of Gran Canaria, Las Palmas. The /s/ analysis was redirected to syllable-final position. Each informant was recorded for ten minutes. The informants fell into three generational groups: (1) 20-34 years of age, (2) 35-54 years of age, and (3) 55 years of age or older. The speech sample of each informant includes between 191 and 504 realizations of /s/ in final position.

Samper Padilla (1990:63-4) specified four variants of -/s/ in the Spanish of Las Palmas: (1) [s] (not specified whether it is apical or predorsal); (2) [h]; (3) assimilated [s̄] (i.e., aspiration and then gemination of a following consonant); and (4) the deleted allophone ø. In total, 28,003 realizations of -/s/ were considered in the quantitative analysis. The [h] emerged as the most common variant of /s/ in Las Palmas, occurring 58% of the time. The second most common variant was total deletion. Samper Padilla found the assimilated [s] in use only 7% of the time and the sibilant [s] was found a mere 3% of the time.

4.1.2 New World

Several scholars address the sociolinguistics of New World Spanish including discussions of /s/ aspiration/deletion. In her review article of New World Spanish sociolinguistic research, Lavandera (1974:247) stated, "sociolinguistics has had a warm welcome among scholars working on New World Spanish and there is a good deal of activity going on in Latin America related to this field."

Lavandera (1974:258) characterized many of the earlier works dealing with the sociolinguistics of Latin American Spanish as follows:

> Quantitative studies of the sociolinguistic structure of variability are attracting the bulk of linguistic workers in Latin America. None of their studies as yet attempt more than a direct application of the methodology developed by Labov up to 1966.... However, and this should be made clear, Latin American scholars who work on New World Spanish, struggling to put some order in all the variability they encounter in their data of actual use, have accomplished a great deal of what we would like to see done: they are providing the indispensable linguistic data obtained together with the extra-linguistic data on the community from which any study of actual language use must take off.

In a study on Central American Spanish in the United States with an emphasis on the Salvadoran community, Lipski (1986a:91) pointed out that Latin American immigration to the United States was not a new phenomenon. He pointed out, however, that the

geographical areas of Hispanic America that were represented by this migration had shifted over time. Lipski explained that the changing migration patterns of Hispanics were always compared to Mexican immigration probably because so many Mexicans immigrated due to the close proximity between Mexico and the U.S. Though the major population shifts have come from Puerto Rico and Cuba, immigration from Central America may one day equal immigration of Caribbean groups (as reported in Peñalosa 1984).

According to Lipski (1986a:91-2), those areas in the United States with the largest Central American population included the Honduran population of New Orleans, and the Nicaraguan and Salvadoran communities of Los Angeles (as reported in Peñalosa 1984). Lipski also pointed out that Miami had experienced a large influx of Central Americans, as have Houston and Chicago. In addition to a number of Hondurans in Houston, there are some Guatemalans and Nicaraguans and a massive immigration of Salvadoran refugees through clandestine channels. The number of Salvadoran refugees has been estimated at well over 100,000.

By focusing on the phonological aspects of Salvadoran Spanish, Lipski (1986a:115-117) outlined several key features that set Salvadoran Spanish apart from other Spanish dialects. One characteristic of Salvadoran Spanish is the weakening of several consonantal articulations. The consonant most associated with this weakening is /s/. This weakening differs when compared with Mexican dialects, especially those conservative Northern and Central ones in which consonants remain relatively stable. Lipski (1986a:115) stated that, "Northern and Central Mexican dialects are among the relatively few Latin American Spanish dialects where syllable- and word-final *s* is systematically retained as a sibilant /s/."

Lipski (1986a:115-7) offered a comparative analysis of /s/ weakening in various dialects of Spanish. He explained that El Salvador ranked toward the middle of a continuum for aspiration and deletion of /s/ near the Caribbean nations. He placed Panama and Nicaragua along with the Caribbean nations as well. Lipski analyzed the Spanish of

several New World regions including El Salvador, Mexico, Cuba, and Puerto Rico in order to fully ascertain the /s/ erosion phenomenon. Lipski found that Salvadoran Spanish more closely approximates Caribbean dialects with regard to the pronunciation of /s/, and when Salvadorans were asked which of the Spanish dialects commonly heard in Houston, Texas came closest to their own, they indicated Cuban even though they felt a greater cultural lexical tie with Mexico (Lipski 1986a:115-7). This selection was probably made because many Mexicans retain a laminal [s] whereas Salvadoreans generally exhibit aspiration of syllable and word-final laminal [s].

Another feature of Salvadoran and Honduran Spanish that separates these dialects from Mexican is the frequent aspiration of word-initial and word-internal intervocalic [s]; for example, [lahemána] and [ɛlprehiðɛ́nte]. Lipski ascertained that this phenomenon occured occasionally in other areas of Latin America, but not nearly as much as in the Central American region (Lipski 1983, 1985a).

The Spanish of announcers, normally considered a conservative standard variety, was analyzed by Lipski (1991:118). He recorded broadcasts of announcers living in various Hispanic countries. Lipski found that the Radio Caimán announcers make no effort to hide their Cuban origin, and generally use popular phonetic variants throughout their programs, including the aspiration and loss of /s/. In contrast, Lipski (1991:119) reported that the Salvadoran announcing of Radio Venceremos and Radio Farabundo Martí is generally free of popular tendencies. For example, the weakening of word-initial /s/ as in *la semana* is absent in the announcers' speech.

Lipski (1991:126-7) suggested that the best phonological indicator demonstrating the degree of approximation of broadcast language to normal speech was the behavior of phoneme /s/ in syllable and word-final context. Lipski (1991:126) pointed out that Cuba and Nicaragua are clearly the most radical group of dialects in terms of the weakening of syllable- and word-final /s/. El Salvador turns out to be an intermediate dialect since many peasants and poor urban residents aspirate or delete /s/ as much as in Nicaragua while

middle and upper-class Salvadorans retain /s/ as a sibilant in a greater number of cases. Lipski (1991:126-7) stated:

> Within each dialect zone, the general tendencies are toward increased reduction of /s/ as one descends the sociocultural scale, and also in contexts of increased informality, urgency or colloquiality, although with the noteworthy idiosyncratic exceptions. In particular, the most significant differentiator of registers within a given sociocultural stratum, as well as across strata, is the realization of word-final /s/ before unstressed vowels (*los amigos*), where aspiration to [h] or elision is common in the popular speech of the regions under consideration, but where carefully monitored speech (particularly broadcast language) exhibits much lower rates of reduction of /s/. Previous research has shown this to be one of the most useful stylistic and sociolinguistic variables characterizing Spanish dialects and discourse modes.

International broadcasts from Cuba and Nicaragua tend to use more formal patterns of pronunciation, including retention of /s/ as a sibilant (Lipski 1991:129). The retention of /s/ is found much more in daily speech and is similar to the broadcasts of Spain and other prominent Latin American countries. Salvadoran Spanish is less stratified sociolinguistically in terms of phonology, although Lipski insists that precise diction is the norm for educated formal speech. Middle and professional class Salvadorans tend to consider the loss of /s/ and other phonological distortions as being "vulgar" or "uneducated." He stated, however, that colloquial speech of the latter groups often exhibited these same "vulgar" or "uneducated" patterns (Lipski 1991:131).

4.1.3 United States

The varieties of Spanish spoken in the United States include Southwest Spanish (Chicano), Miami Spanish (Cuban), and New York Spanish (Puerto Rican), making it difficult to characterize /s/ in this diverse group. Nevertheless, one can find references to U.S. Spanish in the literature and the data used for these studies did come from speakers residing in U.S. territory. These varieties are dialects of the three most predominant Hispanic groups in the United States. General tendencies found in United States Spanish

varieties are outlined by Canfield (1981:80-85). New Mexican Spanish speakers tend to aspirate syllable-final /s/; the border strip between California and Texas aspirate less than in New Mexico. Tampa Spanish has three possibilities for /s/: (1) a phonemic distinction of /θ/ and /s/ (which is apicoalveolar), as in northern Spain, (2) a laminoalveolar [s] instead of apicoalveolar [s̻], and (3) a Spanish very similar to that of Havana, Cuba, including aspiration of syllable-final /s/. The first possibility could simply be a transported feature due to immigration from the Castilian region of Spain.

Gutiérrez (1981) analyzed /s/ productions of twelve informants (all forty years of age or older) from the northern part of the state of New Mexico. Each was recorded in natural speech situations. From each tape, a random sample of 50 consecutive occurrences of /s/ was analyzed. When realized as a sibilant, he found the /s/ to be laminoalveolar. /s/ was retained as [s] 74.5% of the time, [h] 24% of the time, and [θ] 1.5% of the time. The [s] realization occurred more in the speech of females whereas [h] more frequently appeared in male speech.

Hammond (1980) analyzed the /s/ realizations in a rapid style of Miami Spanish and identified three allophones: |s|, |h|, and ø. He recorded twenty-one subjects, all residents of southern Florida, using a normal informal conversational style. Thirteen were women and eight were men, ranging in age from 22 to 55 (average age being 26). Hammond (1980:12) reported the breakdown of the three allophones in three contexts. These data appear in Table 4.4.

	|s|	|h|	ø
Absolute-final	3.8%	21.8%	74.4%
Word-final	2.8%	43.0%	54.2%
Syllable-final	9.3%	70.3%	20.3%

Table 4.4 /s/ variants in three positions in Miami Spanish
(Derived from Hammond 1980:12)

Deletion was most frequent in absolute final position; but still occurred over half the time in word-final position. Aspiration was most frequent in syllable-final position. Hammond

(1980:132) also reported syllable and word initial aspiration, offering examples such as *dice* [díhe], *casa* [káha], and *susto* [húhto]. He posited this rule as /s/ --> [h] $___, i.e., /s/ becomes aspirated to [h] in syllable initial position. Hammond (1980:14) speculated that if this initial aspiration continues, it may become common in the Cuban Spanish of the future.

An analysis of Puerto Rican Spanish based on the speech of Philadelphia and island informants was presented in Poplack (1980:56). Poplack focused on plural formation and the effect that /s/ deletion had on it as follows: "although the plural marker might disappear some or most of the time, the notion of the plural remains alive in Puerto Rican Spanish, and the phenomenon of deletion does not appear to impede communication among native speakers." Poplack (1980:56) also explained that quantitative studies of /s/ in other Caribbean dialects verified that in spite of possible ambiguity, the ø realization was the preferred variant.

In a description of the results of a plural discrimination test, Poplack (1980:56-7) revealed that less than half the informants in her study were able to identify occurrences of [s] as a plural marker. This verified that the sibilant allophone is infrequent. These results also revealed that speakers were unable to identify the ø realization of the plural once a noun phrase was extracted from the larger discourse context. Still, this finding does not contradict the above mentioned claim that deletion in no way impedes communication. Here, Poplack was testing /s/-identification out of context; normal speech would provide additional plural markers. Poplack's results did, however, contradict other claims that vowel tensing, vowel lengthening, or lengthening of a following consonant were compensatory processes for deletion. She admited that this was the case specifically for Puerto Rican Spanish. In terms of plural forms such as *cosas* versus monomorphemic singular forms such as *mes*, Poplack (1980:57) reported that more deletion occured in plural forms than in monomorphemic forms. She stated that "These results suggest that the constraints governing marker deletion are more complex than those that have been examined in the literature" (Poplack (1980:57). This observation would hold for all

additional research that focuses on the precise constraints that trigger the retention or reduction of plural markers.

Aspiration and deletion of laminal [s] in United States Spanish has been reported and it is likely that the sound change will continue to spread as it has in other dialects of Spanish. The growth of this trend in the United States is hastened yearly by the influx of immigrants already aspirating/deleting /s/ in their native dialects.

Lavandera (1981:147-8) discussed sociolinguistic aspects of United States Spanish, especially Mexican-American Spanish and Puerto Rican Spanish. She admited that for these two varieties of Spanish, the social and cultural aspects described in the research had been of an exploratory nature. Lavandera (1981:150) supported Fishman's claims, that the deletion of final -/s/ in Spanish was primarily attributed to contextual-situational variation along a formality-informality continuum. Therefore, deletion of /s/ is more prevalent in informal situations and contexts.

The "norma culta" versus the "broadcasting norm" in the United States was examined by Lipski (1985b). Although few Spanish announcers normally receive formal training in pronunciation, there is a surprising homogeneity in broadcasting styles in various Latin American dialects. The /s/ in broadcasters' Spanish tends to be pronounced as [s] in all radio contexts. Lipski discussed /s/ usage by broadcasters and reported that "the /s/ is retained with remarkable consistency" (Lipski 1985b:223). In sports announcing, because of the breathtaking speed that announcers deliver comments, /s/ dropping is allowed, although it rarely reaches the level of deletion of popular speech. Lipski (1985b:224) tabulated the rate of /s/ weakening in four groups of broadcasters, Cubans, Cuban-Americans, Puerto Ricans, and Puerto Rican Americans, and these findings are given in Table 4.5.

	sC	s#C	s##	s#V´	s#V
Cuba news	25	20	0	0	0
Cuba music	24	35	5	1	3
Cuba sports	40	67	6	2	22
Cuba speech	97	98	39	53	90
Cuba-Am news	6	4	0	0	0
Cuba-Am music	20	45	3	2	4
Cuba-Am sports	33	29	2	2	5
Cuba-Am speech	97	98	39	53	90
PR news	4	5	0	0	0
PR music	23	55	2	1	3
PR sports	45	75	7	2	15
PR speech	94	96	54	55	84
PR-Am news	7	9	0	0	0
PR-Am music	25	58	6	5	11
PR-Am sports	37	63	8	7	19
PR-Am speech	96	99	72	71	96

legend: C = consonant; V´ = stressed vowel;
V = unstressed vowel; # = word boundary; ## = pause

Table 4.5 /s/ aspiration and deletion in broadcasters' speech.
Numbers refer to percentages.
(Derived from Lipski 1985b:224)

Cuban-American announcers retain /s/ more than Cuban announcers while Puerto Rican American announcers weaken or drop /s/ slightly more than island announcers. Lipski (1985b:225-6) also commented on broadcaster speech of nine Latin American countries (Argentina, Chile, the Dominican Republic, El Salvador, Honduras, Nicaragua, Panama, Paraguay, and Venezuela). He reported an artificial restoration of /s/ in radio broadcasting in these countries. Thus the Cuban and Puerto Rican broadcasting speech of the United States falls in the same range as Latin American broadcasting speech. Lipski (1985b:225) states that "the artificial style of radio pronunciation is being successfully maintained in United States Hispanic broadcasting."

The Spanish spoken in Northwestern Louisiana (Sabine and Natchitoches Pansheo) and Northeastern Texas (Nacogdoches county) was analyzed by Lipski (1990) who observed that these speakers were isolated from the remainder of the United States Spanish

speakers. The Spanish speakers in these areas tend to be the oldest in the community with ages ranging from the sixties to over one hundred. In his section on phonological characteristics, Lipski (1990:3) explained that in Sabine Spanish, there existed general retention of consonants and the lack of wholesale neutralizations found in other dialects. Lipski (1990:4) reported that the syllable- and word-final /s/ was generally retained as [s] although [h] did occur in this position also. He did not specify the frequency of use of the allophones but did report that syllable-initial aspiration occured in Sabine Spanish as in *lojotros* for *nosotros*. Lipski (1990:7) argued that Sabine Spanish needed further research since it was on the verge of extinction and could provide more information about the growth and spread of Spanish in North America.

A closer look at Mexican /s/ could provide even more insight into what is happening in the Southwestern region of the U.S. Mexican /s/ is discussed in the next section, considering both the Mexico City areas as well as other regions in this vast country.

Uber (1989) presented findings regarding the Spanish of Cuban Mariel entrants, a wave of immigrants who arrived in 1980. Uber recorded 20 Cuban informants, yielding 15 hours of interviews (45 minutes for each interview). Most of them were residing in Union City and West New York, New Jersey, the second-largest Cuban population in the United States. Seventy percent of the informants were male and ranged in age from 25 to 74. Their educational background ranged from fourth grade to doctorate levels. Uber analyzed plural markers in 4790 noun phrases: 1770 phrases were feminine (e.g., *las casas grandes*) and 3020 phrases were masculine (e.g., *los primeros trabajos*). She found virtually no difference between the pluralization of feminine and masculine phrases and that very few phrases were ambiguous in terms of number (singular versus plural).

4.1.4 Mexico

The varieties of Spanish in Mexico are heterogeneous. While many parts of Mexico still retain laminal [s], other parts tend to aspirate and delete final /s/. Canfield (1981:61) indicated only two southeastern areas on a linguistic map of Mexico where /s/ was aspirated or lost: one near Veracruz, the other southwest of Oaxaca. Those studies that discuss laminal aspiration or deletion are reviewed here.

There is great variation in the description of Mexican /s/. When /s/ is articulated as a sibilant, it is normally laminoalveolar. Mexico City speakers and those of surrounding areas retain a laminoalveolar [s] and do not aspirate or delete [s] in syllable initial or final positions. On the other hand, there is not complete uniformity concerning the place of articulation of the Mexican laminal [s] as reported in the published literature (Torreblanca 1978:498). For example, in studies by González Moreno (1935), Marden (1938), Revilla (1938), Matluck (1951), Canellada and Zamora (1960), Alvar (1966-67), Henríquez Ureña (1938), King (1952), and Harris (1969), the laminal [s] had been described as dental, alveodental, or alveolar. Therefore, observational data rather than experimental data must be considered with caution. Torreblanca noted, however, that experts in Spanish phonetics maintained that the laminal [s] was more anterior than the apical [s̻]. This was supported by what several other studies report; Quilis (1981), Dalbor (1980), and Martínez Celdrán (1984) all indicated that the apical [s̻] may go back as far as the prepalatal or palatal regions.

One phonetic feature that makes a Mexican easily recognized is a tendency to lengthen the articulation of /s/ (Canfield 1981:60). Rosario (1970:99) depicted Mexican /s/ as frontal, arranged on a convex line that has an acute and quite long timbre based mainly on impressionistic data. In Jalisco and surrounding areas, word-final /s/ is regularly nasalized when followed by a pause; this nasalization of final aspirated /s/ was also reported by Lope Blanch (1972:15).

Aspiration and deletion processes apply in areas other than Mexico City and its surrounding areas. For example, aspiration of /s/ in the northwestern town of La Cruz in Sinaloa was reported by López Chávez (1977) who based his studies on four recorded interviews and three written questionnaires that the informants completed. López Chávez (1977:335-337) reported that /s/ aspiration was more likely: (1) in male speech and in younger speakers, (2) in non-final phonetic contexts, and (3) before voiced sounds. In addition, intervocalic /s/ aspiration is as frequent as absolute final /s/ aspiration. When the sibilant is retained, it is reported to be a convex laminoalveolar fricative. Aspiration was only found to occur in 19.38% of /s/ realizations in absolute final position, while the [s] was retained 80.69% of the time. While the methodology that López Chávez used was not faulty, the number of subjects that he analyzed was rather low (four subjects) and not representative of the speech population. A future study on the same population could consider more subjects in order to represent the speech community more accurately.

Hidalgo (1990:527) reported /s/ aspiration in the Mexican states of Sinaloa, Veracruz, Tabasco, Guerrero, and Oaxaca. Hidalgo attributed the underreporting of /s/ aspiration to the fact that Mexico City and its surrounding areas retained a tense articulation of [s] in which the /s/ was not aspirated or deleted. She stated: "La información sobre la aspiración de la *s* mexicana es más bien escasa, dado que la retención de la *s* tensa parece ser la norma que rige la Ciudad de México y poblaciones circunvecinas" (Hidalgo 1990:527).

Hidalgo based her analysis of /s/ in Mazatlán, Sinaloa, on recordings of 15 informants, six women and nine men. The number of informants is large enough to get a representative sample. She found five realizations of /s/: (1) a flat, tense, and long [s], (2) a convex laminoalveolar [s] that may be tense and long or relaxed and short, (3) a laryngeal aspiration [h], (4) the deletion of [s], and (5) an interdental [θ]. Despite this variability, all speakers use the tense flat or laminoalveolar [s] similar to the [s] in other regions of Mexico. It is not clear whether the articulatory descriptions given are based on

observations or actual articulatory experiments. Because Mexico is such a large country, further research is needed in order to characterize its /s/ realizations. This could verify the exact status of retention versus aspiration/deletion throughout the country. Neighboring Central American speakers also may retain, aspirate, or delete laminal [s] as evidence by data reported mainly by Lipski. These data are considered in the following sections (4.15-4.1.11).

4.1.5 Central America

Research on Central American Spanish is scarce in comparison with other Spanish dialect areas. According to Lipski (1985a:143):

> Of all the areas of Latin American Spanish, the Central American isthmus is the least studied in terms of dialectological investigations. During the Spanish colonial empire, Central America was culturally isolated from the mainstream of Spanish America, with the exception of the capital of Guatemala. As a result, Central American Spanish constitutes a linguistic microcosm with a certain coherency in its own right as opposed to other main currents of Hispanic dialectology, but with the same tantalizing ephemeral characteristics which form the spirit of Central American solidarity.

The /s/ in Central American Spanish is normally laminoalveolar with sporadic occurrences of an apicoalveolar articulation. In his careful quantitatively based study, Lipski (1985a) analyzed /s/ in the speech of informants from the five Central American capital cities: Guatemala City, San Salvador, Tegucigalpa, San José, and Managua. According to Lipski, Guatemalan, Salvadoran, and Nicaraguan phonologies were in general homogeneous, while Honduran and Costa Rican phonologies were much more varied. The central highlands dialect of Costa Rica differs from those varieties near the Nicaragua and Panama borders.

The informal conversational speech of 50 informants, ten from each of the five capital cities, was recorded by Lipski (1985a). He distinguished between three realizations of /s/ ([s], [h], ø) in five phonetic environments: before a consonant (sC); word-finally

before a consonant (s#C), word-finally before a pause (s#), word-finally before a stressed vowel (s#V´), and word-finally before an unstressed vowel (s#V).

	sC			s#C			s##			s#V´			s#V		
	s	h	ø	s	h	ø	s	h	ø	s	h	ø	s	h	ø
Guatemala	93	7	0	62	30	8	93	3	3	100	0	0	99	1	0
Costa Rica	92	8	0	69	29	2	96	2	2	98	2	0	96	4	0
Honduras	63	34	3	19	58	23	83	15	2	82	16	2	59	36	5
El Salvador	54	44	2	10	65	25	85	10	5	46	43	1	28	69	3
Nicaragua	13	83	4	2	86	12	35	59	6	28	70	2	7	90	3

legend: C = consonant; V´ = stressed vowel;
V = unstressed vowel; # = word boundary; ## = pause
Table 4.6 /s/ allophones in Central American Spanish
(Derived from Lipski 1985a:144)

Guatemalan and Costa Rican Spanish both retained /s/ more than the other three dialects; Honduran and Salvadoran aspirated and deleted more in the s#C environment than in the other four contexts; Nicaraguan had the fewest /s/ realizations and therefore the most occurrences of aspiration of all five dialects, with relatively little deletion. When deletion did occur, it was most prominent in the s#C context. In this context, Nicaraguan exhibited more aspiration than Honduran and Salvadoran (compare Nicaraguan 86%, with Honduran 58%, and Salvadoran 65%). Lipski found aspiration in medial and intervocalic positions as well as in initial position in Central American, especially in Honduran and Salvadoran speakers, e.g., *nosotros* [no-hó-tros] and *centavo* [hɛn-tá-βo]. He concluded that "the relatively isolated Central American area has developed patterns of weakening of /s/ which parallel those found in other Spanish-speaking areas, but at the same time exhibit essential differences, some of which represent unique innovations" (1985a:148). Based on this information, it would be safe to say that the aspiration and deletion phenomena are much more complex than had previously been reported, since much variation exists within the five contexts in the five Central American dialects. Table 4.6 summarizes Lipski's findings, which fill a lacuna in the available research within this area.

In brief, aspiration in certain phonetic contexts is regular in most Central American speakers except for those in Guatemala and Costa Rica. In coastal, Caribbean, and lowland speakers, /s/ is normally aspirated or deleted in syllable- and word-final positions. In Honduras and El Salvador, /s/ tends to be aspirated more in syllable- and word-initial positions.

One general observation concerning /s/ in Central American Spanish is that syllable- and word-final /s/ are unstable and are aspirated or deleted in informal speech. Lipski (1986b) explained that closer investigation reveals this observation to be more or less accurate. Nevertheless, the details and percentages differ widely among the countries and even within the countries and social class differences are noteworthy. Lipski (1986b:27) stated "it is therefore necessary to study each country individually in order to integrate the regional portrayals into a unified paradigm of Central American dialectology." His comments are also valid for Spanish speaking countries other than the Central American ones.

4.1.6 Guatemala

Lipski (1985a) refered to Guatemalan Spanish as "conservative." Overall, /s/ is retained in most contexts, although it is usually aspirated when it occurs word finally before a consonant. When realized as a sibilant, the /s/ is laminal. Canfield (1981:55) wrote that "Guatemalans generally pronounce the /s/ with clarity as a tense, grooved sibilant, as in Mexico (except the Gulf coast) and in the Andes."

4.1.7 Costa Rica

In addition to Lipski's (1985a) study, Canfield (1981:39) briefly described /s/ in Costa Rican Spanish. He reported that San José, Heredia, Cartago, and territories settled

from the central valley articulated a clear sibilant. In Guanacaste, and to some extent on the whole Pacific coast, -/s/ tends to be aspirated.

4.1.8 El Salvador

Canfield (1981:52-53) reported syllable-final aspiration as well as an interdental [θ] for some speakers of Salvadoran Spanish. The latter lacks the tenseness of the [θ] in Spain, and is flat and ungrooved. Many speakers utilize the following allophones for /s/ in syllable- and word-final positions: [h], [ɦ], [z], [θ], [z] or [s]. Some cases of initial /s/ as [h], e.g., [hánta ána], have been noted. /s/ in absolute final position is most often [s], but sometimes [h], and least often deleted.

Aspiration of /s/ in Salvadoran Spanish is reported in initial as well as in intervocalic positions, usually before unstressed vowels, e.g., *casa* [káha], *nosotros* [nohótros] (Lipski 1985a:147). In terms of frequency of aspiration and deletion, Salvadoran speakers are second after Nicaraguans (in Central America) in frequency of aspirating or deleting /s/ across phonetic contexts.

4.1.9 Honduras

Little was mentioned about the Honduran dialect by Canfield (1981), which he blamed on "a paucity of information on the phonology of Honduras" (58-9). However, in subsequent research, Lipski (1985a:144) reported high rates of /s/ weakening on the Caribbean coast of Honduras, near Trujillo and also in Honduras' small Pacific region.

An earlier study of Honduran Spanish /s/ by Lipski (1983) utilized eighty recorded interviews. The informants, 15 to 70 years of age, were grouped into three categories according to their educational background: (1) high (college level), (2) mid (secondary level), and (3) low (little or no contact with formal education). Lipski reported two sibilant

allophones for /s/: an apicoalveolar fricative (like that of Castilian Spanish), and a laminoalveolar fricative [s]. The apicoalveolar [s] appears to be an idiolectal rather than a regionally or socially defined feature. Aspiration (voiced [ɦ] or voiceless [h]) also occurs for /s/ which Lipski (1983:276) described as glottal or pharyngeal and not velar like the [x] of Peninsular Spanish or South American Spanish. This normally occurs in syllable or word initial positions. "The frequency is high enough to be of potential significance as a phonological variable" (Lipski 1985a:147). Also reported is an extension of aspiration to intervocalic contexts, almost always before unstressed vowels, e.g., *casa* [káha] "house," *presidente* [prehiðɛnte] "president," and *nosotros* [nohótros] "we." In similar contexts, complete deletion is also found.

Lipski (1983:279) described the Honduran Spanish /s/ as follows:

> Podemos observar esencialmente la misma jerarquía de debilidad de /s/ final de palabra que ha sido observada en los dialectos antillanos, es decir, la presencia de una consonante siguiente representa un ambiente favorable para la aspiración o elisión, mientras que una vocal acentuada ofrece un fuerte obstáculo, igual que una pausa. Al mismo tiempo, la tasa de aspiración y elisión crece a medida que descendemos en la escala socio-económica, observación corroborada en otras partes del mundo hispánico.

Lipski (1987:113) also reported on word-initial /s/ aspiration and reports that for Tegucigalpa, the most frequently aspirated words are as follows: *se* (reflexive pronoun), *centavo* "cent," *situación* "situation," *cincuenta* "fifty," *sesenta* "sixty," *setenta* "seventy," *San Pedro Sula* (city name), *central* "central," *señor/señora* "Mr./Mrs.," and *semana* "week." The rate of aspiration ranges from only 2.5% up to 11.7%. Of all the Central American dialects, Honduran Spanish is at present the most similar to Caribbean dialects in terms of /s/ due to its high rate of aspiration and deletion.

In a chapter of his book on Honduran phonetics and phonology, Lipski (1987) discussed the behavior of /s/ in quantitative terms. He focused on the retention, aspiration, and deletion of /s/ in three classes in Tegucigalpa, the capital city. His findings for preconsonantal and prepausal positions appear in Table 4.7.

	sC			s#C			s ##		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	77.6	21.2	1.2	21.8	67.2	10.9	80.0	16.7	3.3
Middle Class	60.2	33.2	6.6	14.0	71.3	14.7	63.7	24.6	11.7
Lower Class	37.9	40.2	21.8	11.2	52.0	36.7	53.3	35.6	11.1

Legend: C = consonant; ## = pause; # = word break; Numbers represent percentages

Table 4.7 Prepausal and preconsonantal realizations of /s/ in Tegucigalpa (Derived from Lipski 1987:108)

The /s/ tends to be retained before consonants word internally and before a pause in all classes except for the lower class. Aspiration is more prevalent in the lower class in preconsonantal position but sibilant retention tends to be exhibited in prepausal position. Lipski (1987:108) reported on /s/ in six prevocalic positions as well. His data are listed in Table 4.8.

	s#V´			s#V			V#sV´		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	66.7	33.3	0	34.1	58.5	7.3	100	0	0
Middle Class	60.3	39.7	0	29.9	60.5	9.6	100	0	0
Lower Class	57.1	28.6	14.3	25.9	50.0	24.1	100	0	0

	V#sV			VsV´			VsV		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	90.2	9.8	0	100	0	0	96.6	3.4	0
Middle Class	82.3	17.7	0	93.4	6.6	0	95.2	4.8	0
Lower Class	74.3	25.7	0	90.9	9.1	0	95.4	4.6	0

Legend: V = unstressed vowel; V´ = stressed vowel; # = word break; Numbers represent percentages

Table 4.8 Prevocalic realizations of /s/ in Tegucigalpa (Derived from Lipski 1987:108)

In intervocalic positions, the /s/ tends to be retained in all three classes. Aspiration occurs much less frequently and total deletion does not occur at all. In final position before a stressed vowel (s#v'), the /s/ is again most often retained, followed by aspiration, then deletion. By contrast, in final position before an unstressed vowel (s#v), aspiration is the most common frequent realization; followed by /s/ retention, and then deletion.

Two studies, the first a dissertation, the second an article, addressed the sociolinguistics of /s/ in Honduran Spanish. López Scott (1983) addressed the sociolinguistics of /s/ variation in San Pedro Sula, Honduras. She offered data on /s/ variation in both syllable-initial and syllable-final positions. Her speech sample was based

on 43 personal interviews with inhabitants of the city, each lasting approximately forty-five minutes. Four socioeconomic groups, three age groups, and the two genders were represented. Informants were recorded in their home for the most part except for a few cases in which the informant's office was used.

Since López Scott (1983) utilized a sociolinguistic framework for both her methodology and data collection and analysis, she considered contextual styles when analyzing her data. She reported that stylistic variation was not very evident in Sampedrano Spanish. Retention of both syllable-final and syllable-initial /s/ remained almost constant in the various styles. According to López Scott (1983:89), the /s/ varied "only ten percentage points from the lowest to the highest incidence of [s]." Additionally, in terms of socioeconomic stratification of /s/ variation, López Scott (1983:92) reported that it was not as evident in Sampedrano Spanish as in other dialects of Spanish. She characterized the position of aspiration/deletion in the dialect as follows:

> syllable-initial /s/ retention was essentially the same for the two higher status groups and then decreased slightly, and regularly, through each of the lower social classes. Syllable-initially, as well as syllable-finally, the weakened /s/ variants showed an inverse pattern across the stylistic axis of that seen for the realization of [s]. Except for the upper-middle status group, syllable-final /s/ retention rates were equally high for all the social classes. The upper-middle status group was characterized by a higher rate of /s/ retention...

Because speaker gender can affect linguistic use, López Scott (1983:105) controlled for gender in her data analysis. She reported that generally women retained the /s/ more than men and that men favored /s/ weakening especially in final position. Upper-middle class women retained the /s/ in syllable-final position.

Age also contributes as an extralinguistic variable because it can indicate a linguistic change (López Scott 1983:105). Aspiration and deletion of /s/ were used more by younger speakers than by older speakers in Sampedrano Spanish. López Scott (1983:107) summarized the age issue as it pertains to /s/ as follows: "...Sampedrano Spanish showed

age stratification in the form of a linearly ascending pattern of syllable-final /s/ retention as age increased."

In terms of characterizing when the initial aspiration occurs, López Scott (1983:67-8) gave two rules:

> (a) syllable-initially, aspiration is most favored in an unstressed intervocalic environment, then intervocalically when the preceding vowel is stressed, next postvocalically across a word boundary, then intervocalically when the following vowel is stressed, and, finally after a pause, while (b) syllable-initial deletion occurs most intervocalically when the preceding vowel is stressed, then in an unstressed intervocalic environment, and least, intervocalically when the following vowel is stressed.

Although syllable-initial weakening was found in Honduran Spanish, López Scott (1983:71) explained that it was not as common as sibilant retention. She further explained that this followed the tendency for weakening to occur in syllable-final segments and for strengthening to occur in syllable-initial position. Much evidence for this is found in the Romance languages in which consonants undergo changes including deletion in final position (López Scott 1983:72). Other scholars such as Malmberg (1965), Navarro Tomás (1946), and Catalán (1971) have also reported the tendency for consonant weakening in syllable codas.

López Scott (1983:128) argued that the extension of /s/ aspiration/deletion to initial position is evidence that the overall process is undergoing change because dialects of Spanish generally exhibit aspiration in final position. For this reason, she classified Sampedrano Spanish as a conservative dialect along with Buenos Aires Spanish which also retains final /s/ regularly. Lipski (1986b) offered a different theory to explain initial /s/ aspiration and deletion in Honduran Spanish: He observed that, of the major dialect regions of Spanish America, Central America was the least described, noting that the least studied area of Central America was Honduras. Lipski pointed out that there was only one single major lexicographic work for Honduran Spanish and no recent phonological or sociolinguistic works. He also explained that limitations within the research literature for Central American Spanish existed because Honduras was usually grouped together with

Nicaragua and El Salvador in terms of phonetic tendencies and significant differences between the three nations were usually not indicated. López Scott (1983:42) reported a lower rate of /s/ aspiration in final position in San Pedro Sula than in many other dialects of Spanish.

As in other Spanish dialects, three allophones of /s/ were found in San Pedro Sula speakers: [s], [h], and ø. The distribution of these variants in syllable-initial position are as follows:

	[s]	[h]	ø
V_V	72.7%	22.5%	4.6%
V´_V	79.6%	16.6%	3.6%
V_V´	92.2%	6.5%	1.2%
C$_	100%	0%	0%
##_	96.3%	3.2%	0.3%
C#_	100%	0%	0%
V#_	86.3%	13.0%	0.6%

Table 4.9 Syllable-initial /s/ allophones in San Pedro Sula dialect
(Derived from Table 5 in López Scott 1983:65)

The [s] was the norm, while aspiration was also found in prevocalic and prepausal positions. The [s] was found always (100%) in preconsonantal position (López Scott 1983:65). These generalizations are not reflected in the data in Table 4.9.

Lipski (1986b:28) also observed that the overall impression of Honduran Spanish was that the /s/ in general was weak in all environments and tended to be aspirated or deleted. Syllable- and word-final /s/ tends to be pronounced weakly, and since the weakening of /s/ tends to be found mostly in lower social strata that form the bulk of the Honduran population, weakening of /s/ is quite common. Some individuals, university educated ones in particular, make a conscious effort to pronounce the /s/ clearly in all environments. The spoken style typical of radio and television broadcasting and public speeches also tends to conserve the /s/ to a much greater extent than in normal conversation. Lipski noted, however, that the discrepancy between use and non-use of /s/ was not as great as had been observed in other Latin American nations. Lipski (1986b:29)

reported that the weakening of /s/ in Honduras was most prominent in the normal coastal region.

The estimated literacy level in Honduras is between 40% and 50% (1986b:30). Lipski assumed that, for this reason, the awareness of linguistic details in sociolinguistic connotations of other Hispanic dialects was virtually nonexistent in the population. According to Lipski, this could explain why public figures, regardless of stature, tend to weaken /s/ even in formal speech. This makes it virtually impossible to identify aspiration or deletion of /s/ as being socially unacceptable.

While aspiration of /s/ is frequent in many environments, total deletion of /s/ is relatively rare in Honduran Spanish when compared to the dialects of the Antilles, Nicaragua, Panama, and Venezuela. Lipski (1986b:30) depicted the environment in which /s/ was generally weakened: the /s/ is generally weakened in syllable-final environments before a consonant, and to a lesser degree before a pause. Also, /s/ is frequently weakened word-finally when the following word begins with a vowel, especially when the vowel in unstressed as in *los amigos* [lohamíɣos]. In addition to the weakening of /s/ in final position, which is quite common in Latin American Spanish dialects, Honduran Spanish often aspirates and occasionally deletes /s/ in word-internal intervocalic environments as in *presidente* [prehiðénte] and also word-initially in intervocalic contexts as in *la semana* [lahemána]. This phenomenon has also been reported for other American Spanish dialects, but is not as common as in Honduran Spanish and is usually limited to a few lexical items. Loss of intervocalic /s/ has also been found sporadically in Spain, especially among lower class speakers. An exception to the tendency is the word *nosotros*, which has been lexicalized as the word [nohótros] for speakers of many Spanish dialects, including those of Honduras.

Honduran aspiration of word-initial and word-internal intervocalic /s/ is very common, even in the speech of well educated or socially prestigious individuals. It is heard in public speeches, interviews, and other formal contexts. At the lower social

classes, weakening of intervocalic /s/ reaches even greater proportions and in certain words, it is lexicalized as the allophone [h] for many speakers.

Tegucigalpa, the capital of Honduras, represents the major cultural influence of the country (Lipski 1986b:31). It is also the principle population center and focus of demographic influx. For each social category, Lipski selected ten informants and collected approximately one-half hour of transcribed material per informant. Lipski (1986b:31-2) also analyzed three hours of taped radio news broadcasts to demonstrate the somewhat artificial nature of radio diction as compared to normal conversation styles. The broadcasts came from HRN and Radio América, the two largest stations in Honduras. Lipski reported that word-final /s/ was significantly weaker, that is, more likely to be aspirated, than word-internal or syllable-final /s/.

Lipski (1986b:32-4) indicated that the most interesting data were those relating to word-initial and word-internal intervocalic /s/, for these are the environments in Honduran Spanish in which aspiration occurs at a much higher frequency than in most Latin American Spanish dialects. Word-initial /s/ is particularly unstable before an unstressed vowel. This means that the aspiration of word-final /s/ has been generalized on both sides of the word boundary. Lipski further explained that there appeared to be a process of lexical spread involving aspiration of word-initial /s/. He found some evidence to support the claim that the word *centavos* was one of the major motivating forces for initial aspiration. Other words that frequently undergo the same process as *centavos* are the numerals *cincuenta*, *sesenta*, and *setenta*. All of these have to do with the monetary system of Honduras, which Lipski stated "is a result of a number of combinations which occur frequently enough to have become stereotyped" (33-4).

Lipski found that the word *centavos* occured much more often in Honduras than in Nicaragua, El Salvador, Costa Rica, and Guatemala due to the Honduran rate of exchange requiring the use of the word *centavos*. The monetary unit in Nicaragua, for example, is the *córdoba*, making the word *centavos* virtually nonexistent in ordinary discourse.[3]

Lipski argued that, consequently, aspiration of word-initial /s/ is extremely rare in Nicaraguan Spanish even among lower social strata. Lipski also argued that Honduras might have more initial aspiration because of the word *centavos* [hɛn-tá-βos]. Thus, other initial-position aspiration would be analogical to *centavos*.

4.1.10 Nicaragua

The phonology of Nicaraguan Spanish is similar to that of El Salvador, with one difference being the articulation of the word-final /s/: Nicaraguans tend to aspirate more than Salvadorans, a statistic reported in Table 4.6. In fact, compared to the rest of Central American Spanish, weakening of /s/ occurs most in Nicaragua (Lipski 1985a:143). Lacayo (1954:268) offered a brief description of Nicaraguan /s/. He maintained that there were two similar allophones in initial position and a third allophone found in the final position. The first two he described as predorsal (laminal), one used by the lower classes and close to the Castilian interdental [θ]. The precise realization of the third allophone, [h], is determined by the vowel that precedes it and the consonant that follows it, if any.

In a more extensive study of Nicaraguan /s/, Lipski (1984c) reported on three allophones, [s], [h], and ø from 45 subjects in three socioeconomic groups varying in educational level. Thirty subjects were from Managua and fifteen from other regions, because Lipski found little or no significant geographical variation with respect to /s/ realizations. Both genders were equally represented, and ages ranged from the late teens to late seventies. Each subject was recorded for 20 to 30 minutes. Lipski (1984c:174-5) reported /s/ realizations in nine contexts. Table 4.10 summarizes preconsonantal and prepausal positions, and Table 4.11 outlines prevocalic and intervocalic positions. Aspiration was the most common realization of /s/ in preconsonantal and prepausal positions in all three groups.

	sC			s#C			s ##		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	13.4	83.0	3.7	1.9	86.0	12.1	35.0	59.0	6.0
Middle Class	12.6	85.8	1.6	1.4	86.1	12.5	25.0	68.0	7.0
Lower Class	11.4	80.9	7.7	1.4	78.7	19.8	8.0	77.0	15.0

Legend: C = consonant; ## = pause; # = word break

Table 4.10 Preconsonantal and prepausal /s/ in Nicaraguan Spanish
(Derived from Lipski 1984c:175)

	s#V´			s#V			V#sV´		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	27.7	70.2	2.1	7.4	90.4	2.2	100	0	0
Middle Class	29.0	65.8	5.3	4.8	88.4	6.8	100	0	0
Lower Class	22.6	62.8	13.1	1.6	90.2	8.2	100	0	0

	V#sV			VsV´			VsV		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Upper Class	100	0	0	99.3	0.7	0	99.0	1.0	0
Middle Class	100	0	0	99.1	0.9	0	98.6	1.4	0
Lower Class	98.7	1.3	0	95.7	4.3	0	95.5	4.5	0

Legend: V = unstressed vowel; V´ = stressed vowel; # = word break

Table 4.11 Prevocalic realizations of /s/ in Nicaraguan Spanish
(Derived from Lipski 1984c:175)

In intervocalic positions, /s/ was retained over 95% of the time and deletion was nonexistent. In final position, /s/ was more often aspirated before an unstressed vowel than before a stressed vowel in all three groups. Therefore, vowel stress played an important role in whether retention or aspiration of /s/ took place.

In his conclusion, Lipski (1984c:180) stated that the erosion of /s/ had reached an advanced state in Nicaraguan Spanish that had affected all social strata. He maintained that the Nicaraguan data helped in delimiting the dialectal boundaries of Central America more accurately and in developing and differentiating phonological processes affecting Spanish.

4.1.11 Panama

The Spanish of Panama resembles that of Cuba, Puerto Rico, Venezuela (except the Andean region), and the coastal regions of Colombia (Canfield 1981:67). In terms of /s/ articulation, Canfield (1981:67) reported that Panamanians generally aspirated /s/ in syllable

final position. Panamanian /s/ had been extensively analyzed by Cedergren (1978) using a quantitative driven sociolinguistic approach.

Cedergren (1978) reported that although traditional descriptions making reference to sociocultural characteristics of speakers who aspirated or deleted final /s/ were much less frequent than dialectal studies, all authors were in agreement that the alteration in the pronunciation of /s/ did carry strong social connotations. This consensus motivated her sociological study of Panama City. Seventy-nine individuals born in Panama served as subjects for the study. Cedergren assigned the subjects to four socioeconomic groups and four generational groups (14-20 years of age, 21-35 years of age, 36-50 years of age, and 51+ years of age). Cedergren, in addition, assigned each subject into four other groupings: those subjects born and raised in Panama City, informants that arrived in the city during infancy, those that arrived as adolescents, and those that immigrated to the city as adults. Cedergren (1978:38) identified three possible variants of final /s/ in the Spanish of Panama City: a sibilant realization, an aspirated realization (she did not distinguish in her analysis the different allophones of aspiration - for example the glottal stop or voicing), and deletion. Cedergren grouped glottal stops with total deletion. Glottal stops are more difficult to hear than aspiration, however, a glottal stop could have been easily categorized with aspiration or deletion because a glottal stop and [h] are both glottal and the presence of sound is not equivalent to the absence of a sound. Cedergren (1978:38-9) found that the sibilant realization was favored above all before a pause and before a vowel. On the other hand, aspiration was found mainly before a consonant. In terms of the total deletion of /s/, Cedergren found no specific context in which that was most favorable.

Cedergren (1978) reported /s/ deletion to be more common in Panama City for the following groups: (1) older speakers; (2) male speakers; and (3) speakers not born in Panama City. Cedergren concluded that her quantitative analysis demonstrated that the population is not divided into homogeneous groups that only aspirate or delete /s/, but rather are differentiated by the extent to which these phenomena occur. Cedergren

(1978:49) also noted that /s/ variation is, as other investigators have found, influenced by grammatical as well as social factors.

Commenting on the socioeconomic groups as well as the age factor, Cedergren (1978:41) found that lower classes tended to aspirate more while the upper classes tended to aspirate less and totally delete the /s/ instead. Cedergren also found that the younger people tended to aspirate more than the older subjects in her study. Gender differences were minimal, although women tended to aspirate more then men (Cedergren 1978:41). According to geographical groupings of the study, the groups that arrived in Panama City in their infancy and adolescence were those that aspirated final /s/ more. Thus in terms of phonetic context, Cedergren found that a pause was the factor that most brought out total deletion. One of Cedergren's most important conclusions was the belief that her findings significantly matched those of other investigators. The /s/ variation depends on the combined influence of grammatical factors such as phonetic context of the /s/, position within the word, morphological conditioning, morphological category of the word itself (e.g., verb form, noun, adjective), social factors (e.g., class, age, origin, and gender) and stylistic factors. Each of these factors contributes to determining the alternation of /s/.

4.1.12 Caribbean

In comparison to other dialect areas of Spanish, Caribbean Spanish is one of the most widely studied in terms of /s/ analysis. Terrell (1982a, 1982b), Guitart (1981), Hammond(1979, 1982), Uber (1981, 1984), and Alba (1982), among others, have described /s/ in Cuban, Puerto Rican, Dominican, and Venezuelan Spanish. The majority of these studies deal with aspiration/deletion phenomena, and Uber (1981) included acoustic data. Quantitative and theoretical aspects of phonology, including extensive discussion of /s/ were treated by Terrell (1976-77, 1979, 1980, and 1983). The country-specific studies are reviewed in the appropriate sections.

Samper Padilla (1990: 68-9) in a study on the Canary Islands presented a comparison of -/s/ in Caribbean Spanish dialects in Table 4.12. His table is reproduced below:

		[s]	[h]	ø
Santiago (R.D)	(Alba, 1980)	6%	14%	80%
Sto. Domingo	(Núñez C., 1980)	7%	18%	75%
Panamá	(Cedergren, 1973)	11%	41%	48%
Mérida	(Longmire, 1976)	19%	18%	63%
Cartagena	(Lafford, 1982)	26%	38%	36%
San Juan	(López M., 1983)	9%	51%	38%

Table 4.12 Distribution of -/s/ variants in Caribbean dialects in percentage (Table 3.2 taken from Samper Padilla 1990:69)

Total deletion is most frequent in the Dominican Republic (75-80%), followed by Mérida, Venezuela (63%). Other Caribbean dialects, those of Cartagena, San Juan, and Panama (of course investigators may characterize dialects differently), have total deletion less frequently. Samper Padilla found little distinction between the distribution of -/s/ variants among both genders.

In a detailed quantitative analysis of aspiration and deletion in Puerto Rican and Cuban Spanish, Terrell (1977b:35) characterized the aspiration of /s/ or *comerse la ese* as one of the most complicated and least understood features. Aspiration and deletion processes are systematic, and essentially identical in Puerto Rican and Cuban Spanish (49-50). These processes include: (1) [s] retention is controlled, i.e. before a pause it is retained, less before a vowel, and least before a consonant, (2) the [s] of pronominal nominals is almost always retained before a stressed vowel, (3) deletion is governed mainly by grammatical categories (i.e., noun, adjective, verb), (4) the [s] is rarely deleted in first position noun modifiers, but does get deleted frequently in nouns (especially if modified), and in adjectives (when their number indicator is redundant), and (5) deletion is rare for *es*, *más*, and *nos*; and /s/ is often deleted in *nosotros* /mos/ forms, being the morphological ending for first person plural verb forms in all tenses, and in *entonces*. (These findings for Caribbean Spanish should be verified in other dialects of Spanish that exhibit /s/ aspiration

or deletion.) The frequency of retention, aspiration, and deletion of medial /s/ in Cuban and Puerto Rican Spanish, based on Terrell (1977b), is presented in Table 4.13.

	[s]	[h]	ø
Cuban	3%	97%	0%
Puerto Rican	6%	89%	5%

Table 4.13 /s/ allophones in word-internal position in the Caribbean dialects (Derived from Terrell 1977b:37)

The sibilant and total deletion are slightly more common in Puerto Rico than in Cuba. In final position, Puerto Rican and Cuban /s/ realizations are even more similar as seen in Table 4.14.

	[s]	[h]	ø
Cuban	22%	52%	26%
Puerto Rican	20%	51%	29%

Table 4.14 /s/ allophones in word-final position in two Caribbean dialects (Derived from Terrell 1977b:37)

In an article comparing liaison in French and aspiration/deletion in Caribbean Spanish, Terrell and Tranel (1979:32) offered a comparative chart of final /s/, given in Table 4.15 in three Caribbean dialects: Puerto Rican, Cuban, and Venezuelan (PR, CU, and VE, respectively).

	[s]			[h]			ø		
	PR	CU	VE	PR	CU	VE	PR	CU	VE
sC	2%	2%	3%	73%	75%	65%	25%	23%	31%
sV	18%	18%	12%	50%	48%	51%	31%	34%	36%
s##	40%	61%	41%	27%	13%	19%	33%	26%	41%

Table 4.15 Total phone distribution of word-final /s/ in three Caribbean dialects (Derived from Terrell and Tranel 1979:32)

As can be seen, aspiration occurs mainly preconsonantally and less prevocalically, both in and across word boundaries, and least in prepausal position. Vowel stress is not differentiated in their data presentation. Sibilants are retained more in Cuban in prepausal position than in the other two dialects, while deletion occurs in Venezuelan more in prepausal position than in the other two dialects.

Caribbean Spanish speakers tend to weaken, aspirate or delete syllable- and word-final laminoalveolar [s] in informal styles but tend to retain the laminoalveolar [s] in more

formal styles. Terrell (1986:118) offered a helpful table of data that summarizes the use of [s], [h], and ø in final position in popular Caribbean speech. These data were considered comparable because they all considered three allophones and were treated quantitatively. Table 4.16 is derived from his Table 2.

	[s]	[h]	ø
San Juan, (b)[1]	10%	44%	47%
Panama, (b)[2]	14%	36%	50%
Puerto Rico, (c)[3]	5%	44%	51%
Cartagena, (b)[4]	28%	38%	36%
Santiago, DR, (a)[5]	11%	36%	54%
Cuba, (c)[6]	3%	38%	59%
Philadelphia, (c)[7]	3%	35%	61%
San Juan, (c)[8]	5%	26%	69%

a = educated class; b = all; c = lower class

1. López Morales, 1982
2. Cedergren, 1973
3. Hammond, 1980, 1981
4. Lafford, 1982
5. Alba, 1980, 1982a
6. Hammond, 1979
7. Poplack, 1979, 1980
8. Terrell, 1980

Table 4.16 Final /s/ in popular Caribbean speech
(Derived from Terrell 1986:118)

The [s] retention is most common in Cartagena, Colombia and the least common in Cuba and the Philadelphia variety of Puerto Rican. The [h] is found mostly in Puerto Rico (San Juan overall and lower class speech) although Terrell (1980) reported it to be less frequent in San Juan lower class speech. Deletion was reported the highest in San Juan and lowest in Cartagena, Colombia.

Perhaps a future investigation could include additional data from other Caribbean locations that have been analyzed since 1986 when Terrell compiled his comparative table.

4.1.13 Puerto Rico

> Puerto Rican /s/, according to Canfield (1981:78), is described as:
>
> dorsoalveolar as far back as the blade of the tongue is concerned, and apicodental with regard to the point. There is generally little grooving, and at times it becomes so *plana* that there is a lisping effect. Syllable final /s/ tends to be aspirated or dropped entirely. This is true to such an extent that speakers will hypercorrect, adding /s/ where there is none.

Two types of /s/ in articulatory phonetic terms were reported by López Morales (1971:123): A voiceless prelaminodentoalveolar fricative and a voiceless prelaminodental fricative. Both are realizations of the laminoalveolar type typical of New World Spanish varieties.

In a very detailed study of final /s/ in Puerto Rican Spanish, Terrell (1978d) analyzed /s/ in four phonetic contexts: word-internal before a consonant, word-final before a consonant, word-final before a vowel, and word-final before a pause. /s/ is retained most often when prepausal and least often when preconsonantal. Terrell concluded that aspiration and deletion of syllable- and word-final /s/ in the educated class of Puerto Rico is systematic and subject to regular conditioning factors, the distinction between aspiration and sibilance is governed principally by phonetic context, and deletion is determined by functional-morphological conditioning factors.

I have extracted some of the quantitative data for discussion here. Table 4.17 presents Terrell's (1978d:28) data for retention, aspiration, and deletion in interior and final position.

	[s]	[h]	ø
Internal	3%	92%	5%
Final	15%	56%	29%

Table 4.17 /s/ allophones in interior and final positions in Puerto Rican Spanish (Derived from Terrell 1978d:28)

Total deletion occurs more in final positions in internal position as does the sibilant. Aspiration occurs more in internal position than in final position. Terrell (1978d:29) then defines more specifically the phonetic context for each allophone as shown in Table 4.18.

	[s]	[h]	ø
Internal sC	3%	92%	5%
Final sC	2%	73%	25%
Final sV	18%	50%	31%
Final s#	40%	27%	33%

Table 4.18 Context determined /s/ in interior and final positions in Puerto Rican Spanish (Derived from Terrell 1978d:29)

Aspiration is most common in internal position before a consonant and least common in absolute final position. Retention and deletion are most common in absolute final position as is total deletion.

As many have observed, the retention or deletion of /s/ is often not solely a consequence of its position relative to surrounding sounds. Rather, the word itself carries an intrinsic tendency resulting from syllable structure or even its meaning within the sentence. A lexical /s/ is one in which the /s/ forms part of the original stem morpheme. Terrell (1978d:32) quantified the loss of lexical /s/ as seen in Table 4.19.

entonces	70%
pues	31%
names (first and last)	28%
polysyllabic words	
monosyllabic words	20%
más	8%
	4%

Table 4.19 Loss of lexical /s/ in Puerto Rican Spanish
(Derived from Terrell 1978d:32)

Loss of lexical /s/ occurs more in polysyllabic words than in monosyllabic words. The word *pues* was an exception. Loss of verbal /s/ was most common in polysyllabic *tú* endings. Loss of *-s* in the *-mos* ending was also quite frequent. Table 4.20 summarizes these losses quantitatively. Note that the third singular of *ser* is included as a separate category, but the second singular of ser (*eres*) is not. It could be that eres was considered part of the second -s category.

-s, (≈ tú) monosyllabic words	4%
es	16%
-mos	48%
-s, polysyllabic words (≈ tú)	53%

Table 4.20 Loss of verbal /s/ in Puerto Rican Spanish
(Derived from Terrell 1978d:33)

The plural /s/ was analyzed according to the corresponding part of speech of the word involved, position within the phrase, and redundancy. Redundancy referred mainly to redundant subject pronouns (Terrell 1978d:34). Table 4.21 summarizes loss of plural /s/.

initial position	8%
nonredundant pronouns	16%
second position adjective	26%
redundant adjective	47%
redundant pronouns (nosotros)	71%
nominal	41%

Table 4.21 Loss of plural /s/ in Puerto Rican Spanish
(Derived from Terrell 1978d:33)

Plural /s/ was heavily affected by redundancy in two instances: adjectives and pronouns (*nosotros*). Loss of plural /s/ occurred the least in the first position of the noun phrase. This was because the first word in the noun phrase marked with -s would trigger plurality while aspiration or total deletion in subsequent words would not matter because plurality was already indicated. Thus, other /s/ markers are redundant in Spanish.

The exceptionally high use of subject pronouns with second person singular verb forms in Puerto Rican Spanish is explained by the deletion of /s/ in *tú* forms, the use of the pronoun *tú* being necessary to distinguish the second person singular from the third person singular verb form (Hochberg 1986).[4] For example: *hablas* "you speak" (familiar) with /s/ deleted versus *habla* "you speak" (formal), and "he, she speaks." In addition, in the imperfect, /s/ deletion creates a loss of distinction between first and second singular as well as between second and third singular forms. For example,

vendía	"I sold"
vendías	"you sold" (familiar)
vendía	"he sold"
	"she sold"
	"you sold" (polite)

Finally, Terrell (1978d:35) offered an overall breakdown of [s] retention in Puerto Rican Spanish. Table 4.22 summarizes [s] retention in four phonological contexts. The sibilant is retained more frequently in absolute final prepausal position than in any other position. Retention is also more likely to occur before a vowel than before a consonant. The sibilant is seldom retained before consonants in both word internal and final positions.

Internal sC	3%
Final sC	2%
Final sV	18%
Final s#	40%

Table 4.22 Retention of sibilant according to phonological contexts in Puerto Rican Spanish
(Derived from Terrell 1978d:35)

A subdialect of Puerto Rican Spanish, known as Jíbaro, refers to a variety spoken by individuals of the lower class and who reside mainly in rural areas (Hammond 1982:158). The /s/ in Jíbaro Puerto Rican Spanish has five possible allophones: [s], [z], [h], [θ], and ø. The [h] occurs in 48.3% of the cases and total deletion in 44.2% of the cases.

4.1.14 Cuba

In an analysis of final /s/ in Cuban Spanish, Terrell (1979) analyzed the speech of 22 informants representative of the speech community. They were between the ages of 25 and 50, middle class, and natives of Havana. They were recorded in Miami and lived no more than three months in the United States before being recorded for analysis. The interviews were considered relaxed by the investigator but were not completely informal. The overall results of Terrell's study are presented in Table 4.23.

[s]	[h]	ø
18%	61%	21%

Table 4.23 Total distribution of /s/ allophones in Cuban Spanish
(Derived from Table 1 in Terrell 1979:601)

As Terrell (1979:601) stated, "Clearly the phonetic norm for word- and syllable-final /s/ for educated middle class speakers is some sort of aspiration." Aspiration is especially prevalent in syllable-final /s/ position.

[s]	[h]	ø
3%	97%	0%

Table 4.24 Syllable-final /s/ in Cuban Spanish
(Derived from Table 2 in Terrell 1979:601)

In word-final /s/ position, whether [s] or [h] predominates depends on the following context:

	[s]	[h]	ø
preconsonantal	2%	75%	23%
prevocalic	18%	48%	34%
prepausal	61%	13%	26%

Table 4.25 Word-final /s/ in Cuban Spanish according to phonological context (Derived from Terrell 1979:602)

Hammond (1979) also studied deletion of /s/ in Cuban Spanish and questioned the validity of Terrell's Cuban findings because the informants studied by Terrell were political refugees who were part of the Norma Culta project. This project, initiated by Lope Blanch, is an ongoing investigation of the principal characteristics of Spanish dialects, with an emphasis on highly populated cities of Latin America and Spain. These informants were approached by a "foreigner" (i.e., a linguist with a taperecorder and a microphone) creating an unnaturally formal situation, thereby giving rise to inappropriate data. Nevertheless, Hammond (1979) argued that such speech situations, while formal, were still "natural." At the present time, most sociolinguistic approaches to data collection attempt to collect only natural speech, not artificial or formal speech. Alternatively, one might argue that *all* registers need to be taken into account, because by considering a variety of registers, one would gain further insight into the retention versus reduction of Spanish /s/.

Another problem that Hammond identified in Terrell's Cuban studies was a lack of evidence for the proposed functional uses. Of the ten conditions for /s/ deletion proposed by Terrell, Hammond (1979:42) explicitly mentioned only five of them in his analysis: (1) *-mos*; (2) second person singular verbs (*tú*); (3) attributative complements (e.g. *Las muchachas están enfermas*); (4) *entonces*; and (5) *nosotros*. Future analyses should focus on the differences in conditions which Terrell and Hammond have in order to come up with a "definitive" list of conditions.

An apicoalveolar sibilant in the speech of Havana is described as a voiceless retroflex fricative (Guitart 1980:42-43). Canfield (1981:42) offered an interesting

perspective on Cuban /s/ aspiration and deletion. He wrote that three members of the same family, a lawyer, an actor, and a housewife, had differing /s/ behavior. The actor pronounced all his sibilants and gave an apicoalveolar articulation to some; the lawyer aspirated about half of his syllable-final sibilants; and the housewife aspirated or deleted most /s/'s in these same contexts. Thus, /s/ articulation is not so much a regional consequence as a result of socioeconomic or educational influences.

4.1.15 Dominican Republic

The /s/ may be aspirated, but is more commonly deleted, in Dominican Spanish. Consequently, there appears to have been a concomitant restructuring of the lexicon and reorganization in the way of signalling and interpreting the plural, with the current generation of Dominican speakers acquiring Spanish in a relexicalized form without word final /s/ (Terrell 1981:2). This appears to be especially true for speakers in the lower socioeconomic classes of Santo Domingo and Santiago. In support of this position, Terrell (1982b, n.d.) and Guitart (1981) have reported hypercorrection in Dominican Spanish: Dominicans tend to insert an /s/- where it does not belong presumably because they possess no underlying phoneme /s/, e.g., *gasto* for *gato* "cat", *esquipo* for *equipo* "team", *vivos* for *vivo* "I live" (Terrell n.d.:7). This phenomenon occurs because Dominicans acquire Spanish without an /s/ as an underlying phoneme, due to its low incidence in the spoken language. Thus, in the case of Dominican Spanish, we find the most extreme case of /s/ deletion of all the dialects of Spanish.

Terrell (1986) studied the speech of 31 Dominican Spanish speakers less than 30 years of age and found that total deletion was the most commonly occurring phenomenon, followed by the sibilant [s], and lastly [h]. (probably because [h] had already become ø) Table 4.26 summarizes his findings according to informants' educational background.

	[s]	[h]	ø
Primary education Semi-literate	4%	0%	96%
Primary education Literate	7%	0%	93%
Secondary education Literate	15%	2%	83%
University education Males	13%	3%	84%
University education Females	27%	6%	68%

Table 4.26 Pronunciation of /s/ in conversational speech of Dominican Spanish (Derived from Terrell 1986:119)

Terrell (1986:133) concluded: (1) -/s/ is not in the underlying lexical forms in lower class Dominican youths; (2) there is an insertion rule for -/s/ according to stylistic criteria governed by reading written text out loud with the orthographic *s* and very formal speech situations; (3) -/s/ as a number marker is not used to clarify noun phrases; and (4) the lack of plural -/s/ does not cause ambiguity in speech. Therefore, Dominicans have adopted a morphosyntactic-lexical system for interpreting the idea of plurality (Terrell 1986:134).

The /s/ of educated Dominican speakers is described by Terrell (1986:117-8) as follows: "Si nos restringimos a los hablantes cultos, encontramos que la norma para la manifestación del fonema /s/ implosivo es un sonido aspirado..." Although the norm for final /s/ is an aspirated variant, there are also occurrences of total deletion. Table 4.27 summarizes the data that Terrell cited from his earlier research that characterize word-final /s/ in educated Caribbean speakers. Terrell (1986:117-9) reported a higher occurrence of the aspirated allophone in educated Caribbean speech followed by total deletion, and lastly, a sibilant allophone. Total deletion appears to be conditioned by two factors: the number of syllables in a word (monosyllabic words tend to lose /s/ less than polysyllabic words) and the redundancy factor (an article or other determiner that is normally the first word in a nominal phrase tends to preserve the /s/). Terrell (1986:120) found that the aspirated allophone of /s/ is rather scarce in the speech of young Dominicans of the popular class.

He also found that the use of the sibilant corresponds positively with educational level and the ability to read. In addition, women were found to use the sibilant more than men.

	[s]	[h]	o
La Habana, educated[1]	18%	61%	21%
San Juan, educated[2]	15%	56%	29%
Caracas, educated[3]	14%	51%	35%

1. Terrell, 1979
2. Terrell, 1978d.
3. Terrell, 1978c.

Table 4.27 Word-final -/s/ in educated Caribbean speakers
(Derived from Table 1 in Terrell 1986:117)

Terrell (1986:123) argued that his data demonstrated that the informants who knew how to read normally did not experience difficulty in pronouncing a sibilant when they saw the letters *s* or *z*. For this reason, the /s/ is pronounced when it is a lexical /s/ as in *antes*, *entonces*, and when it is a plural /s/ as in *buenos*, and *hoteles*. The use of aspiration for the grapheme *s* was found to be sporadic, which supported the idea that aspiration plays no systematic role in popular Dominican speech.

4.1.16 Colombia

Realizations of /s/ vary in Colombia. Both apical and laminal articulations are present as are retention, aspiration, and deletion of /s/. Apical [s̻] and laminal [s] are found in Antioquia (Flórez 1957) and Caldas, Colombia and word-initial or syllable-initial aspiration is reported in various regions of Colombia. Flórez (1957, 1978) did not indicate whether both /s/ types aspirated in this position. It would be very important to verify in future research whether both /s/ types aspirate. It could be that only the laminal [s] aspirates and the apical [s̻] is retained. Or else, both /s/ types are aspirated, but perhaps laminal initial aspiration as found in the Bogota region has spread to other regions and affected the apical [s̻]. Flórez (1978:211-215) discussed the Colombian /s/ and pointed out the complexity of the situation, especially as compared to other dialects. He stated:

> En general, Colombia es un páis con mucha variedad de eses, en cuanto a detalles articulatorios y timbre se refiere. Es muy notable el polimorfismo: un mismo hablante pronuncia voces con "s" apical y voces con "s" predorsal en el transcurso de una conversación. A ésta se parece la de muchos antioqueños y caldenses (Flórez 1978:211).

Thus, there is a clear mix between apical [s̪] and laminal [s] in Colombian Spanish that blurs the apical retention and laminal aspiration/deletion issue. The Colombian data reported by Flórez (1957, 1978), however, do not contradict my original statements concerning apical retention and laminal aspiration/deletion as they stand. Why does this dialectal difference exist between Castilian and Colombian dialects? Several answers are possible to this question, all of which require further investigation. It is possible that in initial position, /s/ is actually a laminal [s] in Antioquin and Caldan (although this is pure speculation) and as we know, laminal [s] is more likely to aspirate than apical [s̪]. Another possibility is that the initial /s/ for some Antioquian and Caldan speakers is truly apical, but that the apical [s̪] may aspirate in a similar manner to the laminal [s] in speakers that exhibit aspiration in initial position in the same geographic region. This initial aspiration of apical [s̪] would thus be due to dialect mixing. If the initial aspiration in laminal dialects were transferred to the Antioquia and Caldas regions, the result could be the aspiration of an apical [s̪], even though the apical tends to be retained in Castilian Spanish. Future research needs to address the Colombian /s/ in order to clarify this issue.

Many world languages tend to have CV syllable types. Literature on CV phonology upholds the theory that consonants demonstrate their strongest realizations at the syllable onset and can be significantly weakened at the syllable coda (Clements and Keyser 1983). Consequently, aspiration or deletion phenomena are more easily explained when in the final position than in the initial position. Therefore it is not solely an issue of the /s/ being apical in Antioquia and Caldas dialects, but rather an issue of aspiration in initial position (Flórez 1964). The /s/ in the Andean and Colombian regions is laminoalveolar with the exception of Antioquia and Caldas in which both apical and laminal articulations are found.

Five dialects of Colombian Spanish were outlined by Canfield (1981:36): those of Eastern Cordillera, Tomila-Cauca, Nariño, Antioquia-Caldas, and *costeño* (coastal). In Nariño, the /s/ tends to be apicodental, tensely grooved, and strongly sibilant. Canfield believed that this trait, among others, corresponds to highland Mexico and Bolivia, and somewhat to Peru. As in parts of highland Ecuador, voicing of word-final /s/ before a vowel and intervocalically is found. Coastal Colombian Spanish is generally similar to Caribbean Spanish; there is aspiration or loss of laminal [s].

The speech of Cartagena, located on the northern coast of Colombia, was analyzed by Lafford (1980, 1982). Cartagenian is classified as a coastal variety similar to Caribbean varieties. Reviewing previous quantitative studies of /s/, Lafford reported that Cartagenian was the most conservative variety of the Caribbean dialects studied to date in terms of the change s > h > ø (1980). This difference is attributed to a change of attitude in which [s] retention is valued and deletion is stigmatized. This attitudinal change may be linked to an increase of education in the last twenty years as well as more contact with the capital, Bogotá. Generally, capital cities exhibit influences on language use in a given country because urban linguistic varieties are normally considered more prestigious.

The sociolinguistics of Colombian /s/ in the literature deals with coastal varieties instead of inland varieties. Becerra (1980:100) explained that not only in Cartagena, but in the interior of Colombia, a tendency exists for the speakers to chop off words producing "*habla golpeada,*" a localized equivalent of "*comer las s's*". Becerra (1980:101) explained that the phonetic changes found in the speech of Cartagena were not isolated cases, but rather they formed an important part of what is called Coastal Spanish, often referred to as "*Español Marítimo*" or "*Español Atlántico.*" For the selection of subjects, Becerra (1980:101) considered primarily: economic standing, education, social environment, and neighborhood of residence as an indication of class level. Table 4.28 summarizes the percentage of speakers in each social group.

Social Group	Percentage of Informants
Upper Class	8.0%
Middle Upper Class	17.9%
Middle Class	22.3%
Lower Class	51.8%

Table 4.28 Four social groups in Cartagena, Colombia
(Derived from chart in Becerra 1980:101)

Becerra conducted his investigation in Cartagena for six months between 1970 and 1971. He interviewed sixty informants and conducted fifty hours of recordings. Both genders and several generations were represented in the sample. In addition to the main informants, representatives of other social levels were added as anonymous informants. The results of Becerra's study showed that final /s/ in Cartagena Spanish has variable pronunciation, ranging from voicing to deletion of the aspirated element without any compensatory change in the vowel system. Voicing of /s/ in Cartagena Spanish occurs often before a voiced consonant, as in other dialects of Spanish. Aspiration in syllable-final position before a consonant is the most frequent realization, although it does alternate with other processes such as consonantal assimilation and total deletion. Becerra (1980:104) stated that complete assimilation or gemination were quite common in formal style, for example: [oßíppo], for *obispo*; and [kótta], for *costa*.

After describing aspiration, complete assimilation, and loss, Becerra (1980:105) also noted that in some cases a vowel was nasalized when it preceded aspiration, as reported for Mexican Spanish. The vowel assimilates first to the following nasal and then the nasal is velarized: *mismo* [míhmo] -> [mĩhmo] -> [mĩŋmo] -> [mĩmo]. In a comparison of the Spanish of Cartagena with the Spanish of Andalusia, the Canaries and other American dialects of Spanish, Becerra (1980:109) affirmed that the neutralization of syllable-final consonants was shared in all these varieties of Spanish, which indicates a process whereby the loss of syllable-final phonemes is a universal feature in Andalusian dialects and those which have been Andalusianized. As we saw in Chapter 3, many features of American Spanish are attributed to Andalusian influence as many Andalusians immigrated from the south of Spain to the New World.

Four different styles of Cartagena, Colombian Spanish as spoken by 83 subjects were analyzed by Lafford (1986). The majority of the subjects (60) were natives of the city. The 23 remaining subjects were born in other cities along the coast of Colombia and had immigrated to Cartagena after six years of age. The subjects were divided into five social classes and three age groups. The sample was comprised of an almost equal number of men and women, 40 and 43 respectively. Social class was determined by the following factors: level of instruction, profession, last name, and income. Each interview lasted thirty minutes and was comprised of four speech styles: spontaneous, semi-formal, reading and a word list. Lafford (1986:58) discussed several speech sounds regarding whether they were prestigious or stigmatized. She reported that the sibilant variant of /s/ was quite common in the very formal style since it was a prestigious variant associated with high social position. The variant [h], which acts as an [s] in styles A and B (spontaneous and semiformal speeches, respectively), ends up being the most neutral allophone. Lafford claimed that it was possible that the use of [h] was not widely associated with any specific social group in Cartagena and for that reason had neither a specific value nor prestige or stigma. The [s] is preferred by speakers in the middle, upper middle, and the upper classes in all styles (Lafford 1986:59). She maintained that the /s/ was a prestigious variant that became an effective social marker indicating high socioeconomic position. In terms of aspiration, the situation is a little more complicated than for the [s] allophone. Aspiration appears to be a neutral variant accepted in spoken style and not limited to one specific class. In terms of formal styles, i.e., the reading and the word list, all social classes appear to stigmatize the use of [h]. That is the [h] is used much less in formal styles than in spoken styles. In style C, reading style, the middle class appears to be the group that most stigmatizes the use of [h] while in style D, the word list, it appears that the upper class prefers not to use the [h]. In conclusion, the data collected demonstrated that the [h] is a neutral variant in spoken styles and a stigmatized variant in the reading styles, but it is not specifically a marker characteristic of only the lower class.

In terms of generation, one sees a correlation between age and aspiration and deletion of /s/. In the more formal styles, the reading and the word list, young people avoided the use of aspirated and deleted variants and exhibited more retention than their parents' generation. Lafford (1986:71) attempted to explain the possible factors that might cause this generational difference, proposing that: (1) the young people have received better instruction and have greater social mobility than the previous generation; (2) contact between educated speakers and other dialect zones has increased over the last thirty years for the inhabitants of Bogota (who tend not to aspirate or delete final /s/ as a general rule); and (3) there exists a concomitant inferiority complex on the part of the speakers of Cartagena toward their own dialect in a desire to better their speech and thus have more retention of /s/ in formal situations. The research that Lafford had undertaken for the final /s/ of Cartagena Spanish indicated the following in terms of the possible allophones used: the use of the [s] is a prestigious variant, is more common in formal styles, and its frequent use shows a moderate correlation with a high socio-economic level. The ø is a stigmatized variant, is more common in informal styles, and its frequent use demonstrates a correlation with people of the lower social class. The [h] allophone is considered a neutral variant in spoken styles, but it is stigmatized in formal styles making a correlation with the lower social class. The [h] cannot be considered, therefore, a social marker with much significance due to its weak or uncertain correlation to any one specific social group. Lafford (1986:84) believed that social factors had an impact on the social value of [s], [h], and ø in the speech of Cartagena, and therefore it had affected the diachronic process of s > h > ø in this Caribbean dialect.

4.1.17 Venezuela

The behavior of final /s/ in the coastal areas of Venezuela, being part of the Caribbean region, is similar behavior to that of Cuban, Puerto Rican, and Dominican

Spanish varieties. Terrell (1977a, 1978c) studied the /s/ of Caracas in various contexts (as he has done for other Caribbean Spanish varieties) and his findings were parallel to those found in his studies of Puerto Rican and Cuban Spanish. The corpus comprised 20,000 cases of word final /s/ produced by twenty-four informants, twelve men and twelve women. Three age groups were represented. The interviews were comprised of informal free conversations. Terrell did not specify the duration of each interview.

Terrell (1978c:4) reported [s] usage in three contexts. His data are summarized in Table 4.29. Regarding total deletion, Terrell (1978c:6) reported the breakdown in three contexts, which also appears in Table 4.29.

	[s]	ø
preconsonantal	50%	32%
prevocalic	25%	36%
absolute final	25%	41%

Table 4.29 [s] usage in Caracas in three contexts

In summary, the data of educated speakers of Caracas show similarities to educated speech of other Caribbean areas. Canfield (1981:91) and Terrell (1977a, 1978c) both characterize Venezuelan phonology as similar to Caribbean phonology. Exceptions are the Andean states of Mérida, Táchira, and Trujillo, that differ from the Caribbean pattern. Andean regions tend to retain a laminoalveolar [s].

4.1.18 Peru

Peruvian Spanish, according to Canfield (1981:73), tends to have a tense grooved laminoalveolar [s] except in some coastal areas in which /s/ is aspirated or deleted in syllable- and word-final positions. In his recordings of Lima schoolchildren, he found aspiration of syllable-final /s/. In contrast, adult speakers in Lima normally retain the /s/. The Spanish of the Andean region of Peru tends to maintain /s/ as well.

Caravedo (1983) also analyzed the /s/ of Lima. His analysis was based on interviews with twelve Lima informants, six men and six women. All had lived at least

three-fourths of their life in Lima and were well educated. Three age groups were represented.

Caravedo (1983:88-9) reported six possible allophones of /s/ in three phonological contexts: retention of [s], aspiration [h], deletion ø, interdental [θ], voiced [z], and relaxed [ˢ] in prevocalic, preconsonantal, and prepausal positions. The frequency of five of these allophones, regardless of context, was reported in Caravedo (1983:94) and appears in Table 4.30.

[s]	77.94%
[h]	13.00%
ø	4.72%
[z]	1.05%
[ˢ]	3.26%

Table 4.30 Frequency of /s/ allophones in Lima
(Derived from Caravedo 1983:94)

Caravedo (1983:106) reported a difference between what he found in Lima and what Terrell (1975c, 1978a) found in Caribbean Spanish. While the two varieties exhibit aspiration more in preconsonantal position, they differ in that the prevocalic position tends to have /s/ retention in Lima whereas in Caribbean Spanish, the prepausal position tends to have /s/ retention.

In a study of Peruvian Spanish, Hundley (1986) analyzed /s/ aspiration/deletion and vowel weakening and deletion. He analyzed eighteen subjects, nine from Lima and nine from Cuzco. Hundley argued that syllable structure was being affected in opposite ways in these dialectal areas. /s/-weakening and deletion on the coast (i.e., Lima) is leading to syllable simplification: CVC-->CV. On the other hand, vowel weakening and deletion in the mountains (i.e., Cuzco) is leading to syllable complication: CVC-->CC. This is true for both stressed and unstressed vowels. The resulting consonant clusters are not allowed in standard Spanish such as initial /sp/, /st/, /sk/ and final /ps/, /ts/, /ks/. Hundley (1986:666) observed that the aspiration and deletion of /s/ followed universal tendencies for consonant reduction in syllable final position; i.e., CVC--> CV, which is quite common in

dialects of Spanish and does not only affect /s/. The vowel reduction, on the other hand, does not follow from universal constraints on syllable structure, but rather creates less-preferred structures. Hundley (1986:666-7) maintained that the change in the mountain regions was due to substratal influence from Quechua in which there was evidence for vowel weakening. This weakening often leads to deletion, especially in rapid speech and is due apparently to timing or rhythm. Thus, Hundley (1986:667) reported that a need existed to clarify whether Quechua and the mountain dialect of Peruvian Spanish should be considered stress-timed languages like English, not syllable-timed languages like Spanish.

In a later study, Hundley (1987) analyzed the factors that condition the deletion of plural /s/ in Peruvian Spanish. Normally, in dialects of Spanish, /s/ is retained in plural forms such as *niñas*, where it has a heavy functional load. It is more likely that /s/ be deleted in monomorphemic or lexical forms such as *Dios* where it has no functional load, since the /s/ is simply an inherent part of the word.

Hundley presented data from Peruvian Spanish that were contrary to those found in other dialects of Spanish. The data were collected from nine adult speakers from Lima (1,304 tokens of plural /s/ from tape-recorded interviews). The interviews each lasted approximately 45 minutes and were considered informal. No formal elicitation procedures such as reading word lists and texts were used.

The percentage of deletion of monomorphemes or lexical /s/ was reported as 12% whereas the percentage of this occurrence for verbal /s/ was registered at 26% (Hundley 1987:891). Other studies such as Ma and Herasimchuk (1971), Terrell (1977b), and Poplack (1980) also report that plural /s/ is deleted more often than monomorphemic /s/ in Peruvian Spanish. These data from Peru contradict the functional hypothesis of Kiparsky (1972) that states that a tendency exists for semantically relevant information (such as plural /s/) to be retained in the surface structure. Hundley (1987:892-3) reported relevant functional factors including location within noun phrase inflection, morphological inflection (within or outside the noun phrase), semantic factors, syntactic factors, or a combination of

morphological, syntactic, or semantic factors. Nevertheless, these factors cannot be held responsible for all occurrences of deletion. Hundley (1987:893) concluded that no functional explanation accounted for 27% of plural marker /s/ deletions, even in contexts in which inflection on some element in the noun phrase was the only manner to distinguish singular from plural. Hundley's findings suggest that further research regarding the precise motivation for this phenomenon will be necessary before a full explanation is available.

4.1.19 Ecuador

Few studies have investigated Ecuadoran /s/, especially in terms of data-based quantitative analyses. The most discussed theme tends to be the voicing of /s/. Voicing of [s] > [z] intervocalically (e.g., *desayuno* [dezayúno] "breakfast", *es el* [ezel] "it is he", and before voiced consonants, *mismo* [mízmo] "same"), had been noted by Toscano Mateus (1956:78-9), Lipski (1989), and Robinson (1975, 1979); the latter phenomenon being found in many other Spanish dialects. Robinson (1979:137) had proposed that this intervocalic voiced [z] only occured in highlands Ecuadoran Spanish and some varieties of Spanish in Spain.

In the Sierra Interandia territory of Ecuador, /s/ is a retained laminal articulation (Canfield 1981:48). The /s/ voices to /z/ prevocalically (e.g., *las aguas* [lazágwas] "the waters" (Canfield 1981:49). Aspiration or deletion is not reported in the literature for the /s/ of Ecuador because the Andean regions of South America exhibit consonant retention but vowel reduction.

Toscano Mateus (1953:77) described Ecuadorian /s/ as "prealveolar, plana, de fricación suave y timbre muy agudo." The /s/ of the coast when pronounced is the same as that of the *Sierra* but of a less acute timbre. He also explained how coastal speakers perceive the Ecuadorian highland /s/:

> El costeño reprocha al serrano la *s* chicheante, y en general, los hispanoamericanos distinguen la pronunciación del quiteño por esa característica más que por otra. Posiblemente el tipo quiteño de *s* resulta en parte de la costumbre de abrir muy poco la boca para articular. Hispanoamericanos de diversas nacionalidades consultados al respecto convinieron en que la pronunciación serrana del Ecuador era como un 'cuchicheo en voz alta: impresión que también puede deberse a la *s* sonora quiteña.'

In the *Sierra* variety, all occurrences of /s/ are pronounced. In relaxed pronunciation, the vowel may be lost but not the final /s/ (e.g., *Túquerres* > *Túquerrs*). In the coastal area of Ecuador, as in other coastal regions of Latin America, final /s/ is normally aspirated.

4.1.20 Bolivia

No detailed data-based quantitative analyses exist that describe /s/ behavior in Bolivian Spanish. Both Canfield (1981) and Gordon (1979) reported that many people from the highlands of Bolivia used an apicoalveolar sibilant as in central and northern Spain. In support of this claim, Canfield mentioned his own recordings of people from La Paz and Potosí that contained apicoalveolar [s̻], although he did not indicate the percentage of speakers that exhibited this articulation. However, acoustic analysis of the apicoalveolar [s̻] would be helpful to see how similar or different it is from peninsular Spanish [s]. A geographical map in Canfield (1981:29) indicated that more than half of Bolivia spoke dialects that aspirated or deleted /s/. However, he stated "the highlands still have [s] for the syllable-final sibilant" (28).

The speech of informants from La Paz, Bolivia served as the basis for analysis by Boynton (1981), and is taken to be representative of so-called "Andean Spanish" with a "great degree of similarity between the Spanish of Quito and that of La Paz, lending credence to the idea of an Andean dialect of Spanish" (199). The /s/ is described as a voiceless alveolar fricative, having "strong sibilation." The /s/ has a laminoalveolar articulation in southwestern Bolivia, which occurs in syllable-initial and syllable-final

positions. The /s/ may also be more channeled in word initial position; e.g., [silbáz] "whistle". This is common in *Paceño* (La Paz) Spanish. As in standard Spanish, [s] changes to [z] when in syllable final position before a voiced consonant; e.g., /mísmo/ [mízmo] "same." Canfield (1981:29) reported aspiration or deletion of final /s/ in the northern, eastern, and southeastern portions of Bolivia.

4.1.21 Chile

Several studies discuss Chilean Spanish /s/. Canfield (1981:31) and Oroz (1964, 1966) observed that in Chile there was the coastal tendency to aspirate syllable-final /s/. In an analysis of several consonant phonemes of Santiago, Wigdorsky (1978) includes a discussion of /s/. The investigator tape-recorded ten subjects (five men and five women), professionals aged between 29 and 40. Five hours of interviews were conducted in total. Further recordings were done using three additional groups. The groups were organized as follows:

(1) Three high school students between 16 and 19;

(2) Three students from the working class with a 7th grade education;

(3) Three adults from the working class aged between 30 and 42.

Wigdorsky (1978:54) stated that due to the low number of subjects in these three groups, statistically significant conclusions were difficult to obtain. Wigdorsky (1978:57) reported that, overall, /s/ was aspirated 88% of the time. His analysis of /s/ in four contexts is summarized in Table 4.31. As in other dialects of Spanish, preconsonantal aspiration was greater than prevocalic or prepausal although in the CsC context, aspiration was markedly lower. The laminal [s] tends to be aspirated or deleted in final position in the informal styles of Chilean Spanish and retained in more formal styles. This area tends to display phenomena found in other lowland and coastal areas where Spanish is spoken.

VsV	[s]	[h]	ø
Formal	18.5%	79.0%	2.5%
Informal	22.1%	74.7%	3.2%

Vs#	[s]	[h]	ø
Formal	10.5%	89.0%	0.5%
Informal	16.5%	81.0%	2.5%

VsC	[s]	[h]	ø
Formal	2.7%	96.9%	0.4%
Informal	0.8%	96.4%	2.8%

CsC	[s]	[h]	ø
Formal	11.5%	31.1%	57.4%
Informal	0.0%	25.0%	75.0%

Table 4.31 /s/ realizations in Santiago, Chile
(Derived from Wigdorsky 1978:59)

Three Chilean cities are the subject of investigation for the sociolinguistics of /s/: Concepción, Valparaíso, and Valdivia. Final /s/ was analyzed sociolinguistically in the Spanish of Concepción by Valdivieso and Magaña (1988). They found a correlation between the retention and sociocultural strata, with retention increasing with sociocultural status. /s/ variation has a special function because aspiration/deletion indicates a level of familiarity while the sibilant is associated with a more formal situation (Valdivieso and Magaña 1988:92). "El estudio de la variación fonética de ese constituye un capítulo importante en la lingüística hispánica" (92). Valdivieso and Magaña (1988:92) maintained that final /s/ had been described within the Chilean literature and had been the topic of various observations, descriptions, and interpretations.

Valdivieso and Magaña accounted for several sociocultural factors in their data collection: level of formality of a speech situation, age of speaker, gender, and profession. Sixteen subjects were used, eight men and eight women, all university professionals from Concepción. Two age groups were used for the study, those subjects from 25-36 years of age and those from 35-55 years of age. The actual collection of data included two speech situations: reading and spontaneous speech. The subjects were also divided by their profession. Half of these belonged to a profession that corresponded to the humanities: lawyers, social workers, philosophy professors, history professors, musicians, and painters. The other subjects had more scientific professions: engineers, biologists,

doctors, biology professors, economists, physiology professors, and biochemists. Valdivieso and Magaña (1988:102) reported a noticeable difference between the two groups corresponding to professional differences. Those of the humanistic professions had a greater preference for the sibilant articulations at 56.4% and those of the scientific professions had more of a preference for aspiration and deletion, showing only 39.2% retention of /s/. The investigators did not find that morphological context, gender, or age had a significant influence on their findings and did not report such breakdowns in their data analysis or results. Overall, the Spanish of Concepción has more or less an equal usage of the sibilant and aspirated allophones, but a quite low occurrence of total deletion.

The sociolinguistic variation of /s/ in well-educated speakers in Concepción and Valparaíso was analyzed by Valdivieso, Tassara, Magaña, and Duque (1988). They describe the Chilean /s/ as follows: "Dans le cas du Chili, de même que dans la plupart des autres pays hispanophones, le /s/ présente des réalisations phonétiques très diverses allant d'une fricative prédorso-alvéolaire sourde et tendue à une fricative glottale trés faible et même, dans certains cas, à la disparition totale du segment phonique" (Valdivieso, Tassara, Magaña, and Duque 1988:132). The investigators analyzed sixteen subjects from each of the two cities, all professionals aged between 25 and 55. Half were male and half were female. Both reading style and spontaneous speech were analyzed. Two readings were done, one more formal and one more informal and relaxed. A twenty minute conversation along with various readings were recorded.

As in other dialects of Spanish, three allophones of /s/ were identified, [s], [h], and ø. Table 4.32 summarizes the usage of these three allophones in Concepción and Valparaíso in a reading style. The sibilant was used somewhat more in Concepción than in Valparaíso; total deletion was identical in both dialects. In both cities, Valdivieso, et al. (1988:135) reported a more frequent use of [s] before a pause (s##) or vowel (sV) whereas the [h] occurred more before a consonant (sC). Total deletion was not significant in either city.

	[s]	[h]	ø
Concepción	47.8	49.6	2.6
Valparaíso	42.7	54.5	2.6

Table 4.32 Distribution of /s/ allophones in Concepción and Valparaíso (Table 1 taken from Valdivieso, Tassara, Magaña, and Duque 1988:135)

Table 4.33 summarizes the use of /s/ before a pause, a vowel, and a consonant. The investigators compared /s/ usage between the genders. Men used [h] more than [s] in Concepción while for women the opposite was true.

	sC			*sV*			*s##*		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Concepción	25.9	71.2	2.9	79.5	18.5	2.0	89.9	7.9	2.2
Valparaíso	18.5	79.3	2.1	84.3	13.5	2.1	83.3	13.2	4.3

Table 4.33 Distribution of /s/ allophones according to phonetic context (Derived from Table 2 in Valdivieso, Tassara, Magaña, and Duque 1988:136)

In Valparaíso, both men and women used the [h] more than the [s]; however, the women aspirated more than the men. (Valdivieso et al, 1988:139). Table 4.34 shows the distribution of /s/ allophones according to speaker gender.

	[s]		[h]		ø	
	M	F	M	F	M	F
Concepción	41.2	54.4	56.1	43.0	2.7	2.6
Valparaíso	45.7	39.8	51.1	58.0	3.2	2.2

Table 4.34 Distribution of /s/ allophones according to speaker gender (Derived from Table 5 in Valdivieso, Tassara, Magaña, and Duque 1988:139)

In their conclusions, Valdivieso, et al. (1988:141) reported that phonetic context (s##, sV, sC) was the linguistic factor that exerted the greater influence on the distribution of /s/ variants. They found that the sibilant was used more in formal styles and the [h] more in familiar speech situations. Morphological context and speaker gender did not have a distinct influence on the distribution of /s/ allophones.

Focusing on speaker gender and age, Cepeda (1990) addressed /s/ variation in Valdivia. Twelve people ranging from age 14 to 78 served as informants. Subjects were of both genders from the middle socioeconomic level. The ages of the subjects were as follows: six were between the ages of 14 and 19, four adults were between 35 and 42 years of age, and the other two adults were 71 and 78 years of age. The linguistic corpus

was comprised of 14,006 tokens of /s/ extracted from the twelve interviews (each of which lasted 30 minutes). She found that /s/ allophones were not differentiated according to age or gender, reflecting a rather homogeneous community (236). However, men tended to use voiced allophones whereas women tended to use voiceless allophones. This trend is similar to the /j/ usage in *Porteño* Spanish in which men use a voiced [ʒ] allophone and women use voiceless [ʃ]. The voiceless allophones produced by women are considered more prestigious as evidenced by sociolinguistic studies that report that women's speech is generally considered more prestigious, more conservative, and more grammatically correct (cf. Trudgill 1974, Silva-Corvalán, 1989). Men's speech is normally found to be less grammatical, more colloquial, and more likely to contain taboo expressions. Cepeda also reported that older speakers tend to use affricated allophones of /s/ in syllable- and word-final positions, and that younger speakers tend to use [h] instead of a sibilant. Moreover, when compared to data for /s/ in Concepción and Valparaíso, the Valdivian dialect has a greater occurrence of sibilant retention and total deletion, and little aspiration, and sibilant retention is virtually equal between male and female speakers.

Final /s/ of Valparaíso was analyzed by Tassara (1991) within a semiformal speech style. Sixteen university professionals, 8 men and 8 women between 25 and 55 years of age served as subjects. Interviews were no less than twenty minutes; approximately 8000 tokens of /s/ comprised the corpus used for quantitative analysis. As in the other studies, Tassara (1991:132) too reported that phonetic context is the major linguistic factor affecting variation of final /s/.

The /s/ was analyzed in three phonetic contexts: before a pause, before a vowel, and before a consonant. Speakers of Valparaíso used the [h] 69.5% of the time, while [s] was used only 16% of the time and total deletion 14% of the time. In terms of the prepausal context, aspiration was used 37.4%, sibilance 33.0%, and deletion 29.6% and was not considered substantially different. In the prevocalic position (66.8%), the [h] was used principally while sibilant retention was significant (26.0%), and deletion was low

(7.2%). For the preconsonantal position, aspiration occurred with the greatest frequency (81.7%) while sibilant retention was quite low (7.2%), and deletion only slightly more common than the sibilant (11.1%) (Tassara 1991:133-4).

Differences between male and female use of /s/, as reported by Tassara (1991:138), were not significant. Tassara (1991:139) concluded that "Lo expuesto más arriba permite afirmar que el sexo no es un factor influyente en la variación de /s/."

Final /s/ in the Spanish of Concepción and in Valparaíso was analyzed by Valdivieso, Magaña, and Tassara (1991). They analyzed the speech of subjects from a higher sociocultural level in two speech styles: reading and conversation. Thirty-two individuals served as subjects, professionals in the two cities under analysis. Each interview lasted 20 minutes and was tape recorded and orthographically transcribed. Before a pause, the following allophones were found: the [h] (37.3%), the sibilant (31.9%), and total deletion (30.8%). Before a vowel: the aspirated [h] (62.2%), the sibilant [s] (22.7%), and total deletion ø (15.1%). Before a consonant, the aspirated realization was the most frequently found at 83.1%. Deletion was a mere 11.7% and the sibilant, 5.2%. Total deletion was found mainly in word-final position, as in "Muchos niños rubios" (Valdivieso, et al. 1991:123). Table 4.35 summarizes this usage. Overall, [h] was the most common variant.

	-C	*-V*	*-//*
[s]	11.7%	22.7%	31.9%
[h]	83.1%	62.2%	37.3%
ø	5.2%	15.1%	30.8%

Table 4.35 The use of [s], [h], and ø before a pause, vowel, and consonant (Derived from Valdivieso et al. 1991)

The analysis also considered the gender of the subjects. Women used the aspirated allophone somewhat more than men (74.1% versus 67.6%), as seen in Table 4.36.

	[s]	ø
Men	14.3%	18.1%
Women	12.0%	13.9%

Table 4.36 Use of sibilants and total deletion by speaker gender (Derived from Valdivieso et al. 1991)

The authors concluded, however, that the gender of the subjects did not appear to have a decisive influence in the selection of one of the three allophones of /s/.

4.1.22 Paraguay

There exists little research on Paraguayan /s/, although Canfield (1981:70-71) and Cassano (1972) have reported that syllable-final /s/ aspirates. Canfield included a map of Paraguay but did not specify exactly where aspiration occurs. He stated "Paraguay shares with the *Porteño* region the aspiration of /s/ in syllable-final position, a development that apparently followed the first settlements in America" (70). Cassano (1972:282) reported that there was syllable- and word-final aspiration and deletion in the Guaranian zones of Argentina and Paraguay. He correlated this to other dialects of Spain and America that exhibited the same change. Cassano (1972:283) refuted theories of Guaraní or Italian influence on the /s/ reduction for marking plurals, maintaining that the reduction occured in Spanish-speaking regions in which neither Guaraní or Italian was spoken.

Granda (1982:166) described /s/ aspiration and deletion in the Spanish of Paraguay. He outlined several factors that influence the reduction of /s/: bilingualism related to Guaraní, rural location, inferior urban sociolects, informal situation, masculine gender, phonetic context in word-interior position, and syntactic context regarding redundant cases of plurality. The retention of /s/ is found in the cases of monolingualism in Spanish or subordinate bilingualism with Spanish as the primary language, urban location, middle- or upper-class sociolects, formal situations, feminine gender, phonetic context in word-final position, syntactic context without plural redundancy.

Granda (1982:166-7) reported that total deletion was virtually nonexistent in syllable-final and word-internal position in rural areas, and in lower-class urban sociolects in informal situations. In the same social conditions and in internal position in informal

speech of middle- and upper-class urban sociolects, aspiration is greater in absolute final position; however, Granda did not specify quantitatively the exact incidence of aspiration.

Retention of /s/ is found formal speech of the middle- and upper-class urban sociolects in word-internal position, and retention is slightly greater in word-final position. Feminine speech in both formal and semi-formal circumstances is more conservative than masculine speech and thus females retain the /s/ more than males. Total deletion of syllable-final /s/ particularly in the Guaraní-speaking area is greater than in other areas.

Granda (1982:168) reported that /s/ aspiration in Paraguay can occur in intervocalic position including both syllable- and word-final positions as in Argentina, Chile, and other areas.

4.1.23 Argentina

In Argentine Spanish, /s/ has been analyzed not only articulatorily, but acoustically as well. Gurlekian (1981) and Manrique and Massone (1981) analyzed Argentine Spanish fricatives in acoustic terms which were discussed in section 2.2.1. Beym (1963) listed five allophonic variants of /s/ in *Porteño* (the dialect of the Buenos Aires area): voiceless alveolar [s]; voiceless glottal [h]; voiced glottal [ɦ]; voiceless velar [x], and ø. A voiced alveolar [z] is not reported for Argentine Spanish (although Standard Latin American has this allophone as a result of voicing assimilation). Beym outlined the phonetic environment comprising syllable- and word-final positions in which aspiration or deletion might occur based on the speech of monolingual native speakers of Buenos Aires. Besides describing the fact that these all options exist in *Porteño*, it is impossible to report any quantitative data since Beym did not present such data in his study.

In analyzing the aspiration and deletion of /s/ in upper middle class *Porteño*, Terrell (1978b) used a methodology similar to that used in his Cuban Spanish studies (Terrell 1975a-c, 1976, 1977b, 1978a, 1979). He analyzed 24 subjects from the upper middle

class between 25 and 75 years of age. The style was semiformal conversational and subjects were recorded in Buenos Aires. Terrell (1978b:46) further specified the three /s/ allophones in four phonological contexts. His data appear in Table 4.37.

	[s]	[h]	ø
Internal sC	12%	80%	8%
Final sC	11%	69%	20%
Final sV	88%	7%	5%
Final s#	78%	11%	11%

Table 4.37 /s/ variants according to phonological context
(Derived from Terrell 1978b:46)

The [s] was retained mainly before a vowel or pause in word-final position and aspiration occurred mostly before consonants in both syllable-and word-final positions.

Fontanella (1967) reported the aspiration and deletion of postapical [s̻] in Buenos Aires Spanish. She also reported the same change for two dorsal articulations that she described as "predorsodental" and "predorsoalveolar" (Fontanella 1967:395). The possible manifestations are retention of the sibilant or [h], [ɦ], or ø. However, Fontanella did not report the frequency of each allophone.

Final /s/ in the northeastern Argentine province of Misiones was discussed by Sanicky (1982-83). She interviewed 129 informants in various towns in the province; far exceeding the number of subjects used in most other studies dealing with /s/ aspiration/deletion. The speech was informal and was elicited through conversations about planting and harvesting, recipes, and descriptions of work, family, and the town. She reported both laminoalveolar [s,z] and *ciceante* semisibilant (θ) wherever it is retained, both initially and finally. The latter was described as being similar to the [θ] of Castilian Spanish. The /s/ was also realized as [h], [ɦ] in syllable- and word-final positions (the voiced [ɦ] occurs more often), bilabial [ɸ] before [b], and velar [x] before [g]. Sanicky (1982-83) noted that aspiration of /s/ is preferred in the 20-39 age group, whereas deletion occurs more often in informants over 56 years of age. This differs from many aspirating/deleting dialects.

The /s/ in two Argentine locales, Bahía Blanca and Rosario, has been the focus of sociolinguistic research. Fontanella de Weinberg (1973:50) stated: "La caída y aspiración de *-s* final de sílaba constituye uno de los fenómenos que presentan mayor variación en español actual, ya sea en su diferenciación geográfica o en los distintos subgrupos sociales dentro de una misma región dialectal." For this reason, she analyzed several aspects of the use of /s/ in Bahía Blanca, a city located about 700 kilometers from Buenos Aires. Fontanella de Weinberg (1973) analyzed the speech of sixty subjects, all natives of Bahía Blanca or residents since before 8 years of age. The sixty subjects were divided into six occupational groups, ten within each group. Thirty women and thirty men were selected as subjects. To avoid discrepancies in the data analysis, five subjects of each gender belonged to each occupational group. Furthermore, subjects were chosen from two age groups: those older than 41 years of age and those between 15 and 41. Fontanella de Weinberg (1973:53) analyzed four different styles: (A) spontaneous; (B) formal; (C) reading; and (D) word list. Women used /s/ in these four styles more than men as shown in Table 4.38.

	A	B	C	D
Men	57%	73%	74.5%	90%
Women	71.5%	87%	90%	97.5%

Table 4.38 Percentage of final -/s/ in four speech styles according to gender in Bahía Blanca (cf. Fontanella de Weinberg 1973:53)

Fontanella de Weinberg (1973:52) described the [s] as predorsodental or predorsoalveolar when retained. The sibilant realization alternates with total deletion (ø). In less than 1% of the cases, an [h] or a glottal stop [ʔ] was heard.

In her conclusion, Fontanella de Weinberg (1973:57) ascertained that her data support the notion that a general preference exists for prestigious features in female speech more than in male speech. This applies not only to phonetic features, but also to grammatical and lexical features. Men tend to use more stigmatized forms than women (cf. Trudgill 1974). While age was considered in determining the two groups studied, the investigator did not report specific data for age differences in her presentation.

In another article based on the same corpus as her 1973 study, Fontanella de Weinberg (1974) also analyzed final /s/ in the Spanish of Bahía Blanca. Her study was based on recorded interviews of sixty subjects who were either natives of the city or had been residents since eight years of age. The sixty informants were divided into six occupational groups as follows: (1) domestic service personnel, (2) qualified workers, (3) unskilled workers and those who worked for commercial enterprises and industry, (4) highly skilled employees, (5) personnel of intellectual, technical, or university backgrounds including those in public and private administration, and (6) administrative classes of the highest level. An equal number of men and women, thirty each, were chosen as subjects, five of each gender belonging to each of the six occupational groups. Once again, four speech styles were analyzed: (1) spontaneous speech, (2) formal speech, (3) reading speech or style, and (4) a word list.

According to Fontanella de Weinberg (1974:92-3), the analysis demonstrated a strong correlation between the use of [s] and speech style and the use of [s] and occupational level. With respect to speech style, the most noticeable differences in /s/ aspiration and deletion were between spontaneous speech and formal speech and between the reading and the word list. By comparing [s] usage by occupational grouping and educational level, one can delineate three groups on a social continuum. The first group included the two levels corresponding to the lower stratum and the middle and upper-middle strata. The lower-middle stratum formed a third group. Fontanella de Weinberg (1974:98) concluded that the fine stratification of /s/ usage by socioeducational levels reflects a use by a population in which the various groups have a high amount of contact. The more education speakers had, the more likely they would retain the /s/. The lower strata aspirated and deleted /s/ more in all four speech styles. While the upper strata were more likely to retain the /s/ in all four styles analyzed. If the /s/ was aspirated or deleted, it occurred mostly in spontaneous speech.

Sibilant usage in Rosario was presented by López Morales (1989:88-9). Table 4.39 presents his results for /s/ allophones in three positions: preconsonantal, prevocalic, and prepausal.

	sC	*sV*	*s##*
[s]	36.5	66.7	62.8
[h]	30.8	16.8	4.2
ø	32.5	16.3	32.8

Table 4.39 Contextual realizations of -/s/ in Rosario, Argentina
(Table 3.2 from López Morales 1989:88)
(data taken from Donni de Mirande 1987:38)

Vowel stress is a determinant of sibilant retention versus aspiration/deletion in Rosario. While [s] is the most common realization of /s/ before both stressed and unstressed vowels, retention is more common in stressed contexts, as seen in Table 4.40.

	V´	*V*
[s]	79.2	58.4
[h]	9.3	31.9
ø	11.4	19.6

Table 4.40 Realizations of-/s/ in prevocalic context in Rosario, Argentina
(Table 3.3 from López Morales 1989:89)

4.1.24 Uruguay

Detailed accounts of /s/ behavior in Uruguayan Spanish are few. According to Canfield (1981:88), "The phonology of Uruguayan Spanish is virtually identical to that of the *Porteño* region of Argentina." Canfield observed that syllable-final /s/ might be realized as a *palatal* fricative [ç]. The only detailed account of /s/ in Uruguayan Spanish was provided by Vásquez (1953). He reported seven allophonic realizations of /s/: voiceless velar [x], voiced velar [ɣ], voiceless glottal [h], voiced alveolar [z], voiceless postalveolar [ʃ], ø or almost nothing [ˢ], and voiceless alveolar [s]. These variants are contextually conditioned allophones involving assimilation in point of articulation or voicing to the following sound (s > z). Frequency of aspiration and deletion of these allophones could not be determined from the data in his study.

4.1.25 Equatorial Guinea

Lipski (1984a, 1985c) considered the linguistic features of the Spanish employed in Equatorial Guinea and the theory of African influence on Latin American Spanish, providing a detailed quantitative analysis of /s/. Guinean /s/ is described as laminoalveolar and rarely apicoalveolar. "The /s/ is occasionally lost, ...but almost never aspirated to [h]" (Lipski 1984a:80). This differs from the usual progression of s > h > ø. Lipski (1985c:76) pointed out the frequent retention of /s/ in Guinean in comparison with the dialects of Andalusia and the Caribbean; in all contexts /s/ normally underwent reduction in the Andalusian and Caribbean varieties. In the Spanish of Guinean Malabo, /s/ reduction is not as frequent as in other dialects of Spanish. This is because the Ibero-Romance varieties (Castilian, Valencian, and Mayorcan) present in Guinea were those that used apical [s̻] which resists aspiration or deletion. Lipski (1985c:76; 1986c:215) specifies that the pronunciation influences were from central and eastern Spain. Lipski (1985c:76; 1986c:215) reported three /s/ allophones in four contexts, as seen in Table 4.41.

	[s]	[h]	ø
medial sC	92.5%	4.8%	2.7%
final s#C	76.5%	8.5%	15.0%
final s#V	92.1%	0.0%	7.9%
final s##	87.7%	1.9%	10.4%

Legend: C = consonant; V = vowel; # = word boundary; # # = phrase boundary

Table 4.41 /s/ realizations in Malabo Spanish
(Derived from Lipski 1985c:76)

As in other dialects of Spanish, aspiration occurs most frequently in preconsonantal position. Lipski (1985c:76) stated that "It is striking that /s/ is extraordinarily resistant in comparison with the dialects of Andalusia and the Caribbean, in all contexts where /s/ normally undergoes reduction." He also pointed out that when /s/ was deleted, it rarely passed through a stage of aspiration as in other dialects of Spanish. No explanation is given for this phenomenon.

4.2 Summary

The review provided in this chapter reveals uneven coverage of dialects in the research literature. Several dialects have received extensive coverage: those of Spain, the Canary Islands, the United States, Puerto Rico, the Dominican Republic, Honduras, Panama, Colombia, Chile, and Argentina. Additionally, there are some recent studies of areas such as Central America, Equatorial Guinea, and Ecuador. However, other dialect areas, including those of Paraguay, Bolivia, and Uruguay, need further investigation. The preceding survey of dialectal and sociolinguistic studies concerning Spanish /s/ aspiration/deletion gives rise to several generalizations. The generalizations can be classified into two divisions: dialectological and sociolinguistic findings.

Two types of /s/ are present in Spanish dialects: laminal and apical. Apical [s̻] is found in all positions in Castilian Spanish (and in some Andalusian speakers), and in the speakers of Caldas and Antioquia regions of Colombia. It is uncertain whether the apical is aspirated in initial position in Caldas and Antioquia regions (Flórez 1957, 1978). Laminal [s], much more widespread than apical [s̻] in dialectal Spanish, is found in most Andalusian speakers and most New World Spanish varieties. Based on the studies reviewed, of all the possible allophones of laminal /s/ in Spanish, the three most commonly reported are [s], [h], and ø. For aspiration, one also finds [ɦ] and [ʔ] in some dialects, the first before voiced consonants due to voicing assimilation and the latter as an alternate glottal phone documented in Puerto Rican and Chilean dialects. The [ʔ] is probably also found in other aspirating dialects in both the New World and Spain.

The different manifestations of laminal [s] indicate a high degree of variability and, as a result, dialectal differentiation. Additionally, laminal [s] is normally retained in formal styles in all varieties of Spanish that use a laminal [s]. These different manifestations of laminal [s] have resulted in three types of Spanish dialects in Latin America: dialects that

have a tendency to retain laminal [s], dialects that have a tendency to aspirate laminal [s], and dialects that have a tendency to delete laminal [s]. Of course, there is much overlap of these three possibilities in that almost all dialects have each of the three possibilities at least in one context.

Most highland varieties of New World Spanish retain laminal [s]. These areas include the Mexico City area, the highlands of Peru, Colombia, Bolivia (North, East, Southeast), and Ecuadorian Highlands. Retention of /s/ is also present in Costa Rica and Guatemala. When the /s/ is prepausal, we also find retention in Peru, Uruguay, Honduras, and El Salvador. Syllable- and word-initial laminal [s] is often aspirated in Honduras, El Salvador, and the Bogota area of Colombia. Aspiration is most common in Cuba and Puerto Rican in final position. Deletion is the most widespread in the Dominican Republic and also in Panama in prepausal position.

The studies reviewed in this chapter provide essential information about the position in which aspiration and deletion of /s/ occurs. In general, /s/ is retained much more in prevocalic position across word boundaries and prepausal position than in preconsonantal position. Laminal [s] may be aspirated or deleted in syllable initial or final position, depending on the dialect. Aspiration/ deletion is more common in preconsonantal position. Final aspiration occurs much more often than initial aspiration.

In a discussion of /s/ aspiration and deletion in dialectal Spanish, Lipski (1985c:74) outlined the phonetic environments in which /s/ reduction occured most frequently and classified the specific dialects according to the three phenomena summarized in Table 4.42. The occurrence of each phenomenon is not exactly clear; however, the table does provide a general comparative overview of dialectal Spanish.

Over half of all native speakers of Spanish tend to make this syllable- and word-final aspiration and deletion of laminal [s], especially in informal styles or contexts. Aspiration and deletion occur in lowlands Spanish, coastal regions of South America and

Central America, the Caribbean, Southern Spain, the Canary Islands, and the Southern Cone (Argentina, Chile, Paraguay, and Uruguay).

Aspiration and deletion of final /s/ is much more frequent in preconsonantal position than in prevocalic and prepausal positions. Aspiration and deletion of /s/ occur more before unstressed vowels than before stressed vowels. Aspiration and deletion of /s/ are much

Phonetic Environments	Dialects
Regular preconsonantal /s/ aspiration and General prevocalic /s/ retention	Argentina, Murcia, Uruguay, La Mancha, and Coastal Peru
Frequent preconsonantal /s/ reduction and Less frequent prevocalic /s/ reduction	Paraguay, lowland Bolivia, some Central American and Canary Island dialects, Chile, coastal Colombia, and Ecuador
Widespread prevocalic /s/ reduction	The Antilles, Panama, Venezuela, Canary Islands, Andalusia, and Extremadura

Table 4.42 Retention versus reduction of word-final /s/ in dialects of Spanish (derived from Lipski 1985c)

more prevalent in syllable- and word-final positions than in syllable- and word-initial positions. Final deletion occurs much more often than initial deletion. While [s] is the most common realization of /s/ before both stressed and unstressed vowels, retention is more common in stressed contexts. Vowel stress is a determinant of sibilant retention versus aspiration/deletion in Rosario, Argentina, for example.

In reference to laminal [s] in Latin America, Lipski (1984b:35) provided a comprehensive overview of 15 dialects, and he focuses on three /s/ allophones, [s], [h], and ø, as in most other quantitative dialectal and sociolinguistic studies. His data appear in Table 4.43.

The laminal articulation of /s/ is much more widespread in dialects of Spanish than the apical articulation of /s/. Laminal [s] tends to be the /s/ type most often aspirated or

deleted, whereas apical [s̻] tends to be retained. Table 4.44 classifies /s/ in dialects of Spanish according to /s/ type (apical or laminal), retention versus aspiration/deletion, and position of /s/ within the syllable (initial or final).

	sC			s#C			s##			s#V´			s#V		
	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø	[s]	[h]	ø
Argentina	12	80	8	11	69	20	78	11	11	93	7	0	94	6	0
Chile	7	93	.5	4	88	8	63	33	4	90	10	0	76	22	2
Costa Rica	92	8	0	69	29	2	96	4	0	98	2	0	98	2	0
Cuba	3	97	0	2	75	23	61	13	26	48	28	25	10	53	37
Dom. Rep.	8	17	75	5	25	70	36	10	54	50	5	45	17	22	61
El Salvador	55	44	1	10	71	19	86	12	2	44	47	9	28	69	3
Guatemala	93	7	0	69	30	1	93	3	0	100	0	0	100	0	0
Honduras	63	34	3	19	58	23	83	15	2	90	10	0	61	38	1
Nicaragua	13	83	4	2	86	12	35	59	6	28	70	2	7	90	3
Panama	13	52	35	4	48	48	25	21	54	62	13	25	9	67	27
Paraguay	14	86	0	2	92	6	83	15	2	47	53	0	15	84	1
Peru	53	47	0	21	71	8	91	8	1	94	6	0	91	9	0
Puerto Rico	3	92	5	4	69	27	46	22	32	45	32	23	16	53	31
Uruguay	20	79	1	4	88	8	85	13	2	98	2	0	93	7	0
Venezuela	7	40	53	3	47	50	38	16	46	57	26	17	15	52	33

Legend: C = consonant; V´ = stressed vowel; V = unstressed vowel; # = word boundary; ## = pause. Numbers refer to percentages.

Table 4.43 /s/ realizations in Latin American Dialects
(Derived from Lipski 1984b:35)

Laminal [s]	Apical [s̻]
Complete Retention	**Complete Retention**
Mexico City and the surrounding areas Highland areas of Peru, Colombia, and Bolivia	Castilian (Spain) Andalusian (Spain, some speakers)
Initial Reduction	**Initial Reduction ?**
Colombia, El Salvador, Honduras	Antioquia and Caldas, Colombia
Final Reduction	**Final Reduction**
Lowland and coastal regions of Honduras, El Salvador, Nicaragua, Panama, Paraguay, Uruguay, Argentina, Chile, the Caribbean, Colombia, Venezuela, Cuba, Puerto Rico, the Dominican Republic, the Canary Islands, Southern Spain, and parts of Mexico.	Central America and the Caribbean

Table 4.44 Summary of /s/ realizations in dialects of Spanish

By means of comparison, let us look at other Ibero-Romance languages and compare them to Spanish in terms of the sibilants. In Portuguese one finds laminal [s] or a voiceless alveopalatal fricative [ʃ] in the Brazilian variety and a /ʃ/ in Peninsular varieties.

Guy (1981) reported that the laminal [s̻] of Brazilian Portuguese may become aspirated in final position, although not aspirated as much as in Caribbean Spanish. In dialects of Catalan, the /s/ is consistently produced as an apicoalveolar [s̺]. No aspiration is reported for the apicoalveolar [s̺] in any position in Catalan. Thus, Portuguese and Catalan exhibit patterns similar to Spanish. The laminal [s] may be aspirated or deleted in Brazilian Portuguese and in many dialects of Spanish. Catalan is like Castilian Spanish in that apicoalveolar [s̺] does not aspirate in final position. A strong argument exists both synchronically and diachronically for the retention of the apical [s̺], due to its stronger acoustic intensity and articulatory precision. One can also argue that the laminal [s], as a result of weaker intensity and less precision in articulation, tends to aspirate or delete.

The laminal [s] tends to be aspirated or totally deleted not only in Spanish, but also in Portuguese and other languages such as French and Italian in which the sound change has already been completed (cf.Seklaoui 1989). As already seen in Chapter 3, the diachrony of phoneme /s/ in Spanish may be summarized as follows: apical [s̺] > laminal [s] > h > ø. While the apical [s̺] statistically occurs less in modern Romance languages, it preserves the original /s/ type of Latin. Therefore Castilian, as a dialect of Spanish, is conservative in two interdependent ways: it has the older apical articulation of /s/ and it generally does not aspirate or delete. Other varieties of Spanish in which aspiration or deletion occur are considered more innovative for two related reasons: they have laminal [s] that tends to aspirate or delete.

The coverage of the various dialects within a sociolinguistic framework is uneven. Spanish speaking regions such as Ecuador, Equatorial Guinea, and Central America are receiving more attention by investigators and some areas such as Spain, the Canary Islands, the United States, Puerto Rico, the Dominican Republic, Honduras, Panama, Colombia, Chile, and Argentina are well investigated. Other countries in Central and South America require further attention in the research literature. All of the sociolinguistic studies reviewed in this chapter included a quantitative data analysis using the speech of a number

of subjects. The laminal/apical distinction of /s/ does not receive much attention in sociolinguistic studies since more attention is given to retention, aspiration, and deletion phenomena in general. The laminal/apical distinction of /s/ probably receives little attention because retention versus reduction is more sociolinguistically significant than s-type. The tendency to retain, aspirate or delete Spanish laminal /s/ may indicate different sociolects, because the different realizations mark the speech of a certain social class, group, and gender. With the exception of Caribbean Spanish speakers among whom aspiration or deletion of /s/ is universal, aspiration or deletion of laminal [s] does not indicate social class.

Most, if not all sociolinguistic studies of /s/ aspiration/deletion, especially those using a quantitative framework, have been undertaken within the last 25 years. Studies on the sociolinguistics of Spanish /s/ aspiration and deletion have generally treated several factors and their effect on /s/ usage: age, gender, socioeconomic level, education, speech style, and occupation. Table 4.45 outlines the sociolinguistic studies included in the discussion and the specific sociolinguistic factors included in the researchers' reports in quantitative terms. General overviews were discounted (Klee 1991, Lavandera 1981, D'Introno, Guitart and Zamora 1988, and Silva-Corvalán 1989). Although López Morales (1989) did include a review of previous sociolinguistic research, he also included original observations that merit inclusion in the tabulations. Nevertheless, all of the factors that he considered for several dialects were calculated as deriving from one source.

The percentage of each sociolinguistic factor was calculated from the table only for those studies with original data. After reviewing the research literature in this chapter, the percentages of five sociolinguistic factors were treated. Age and subject gender were discussed in 65% of the studies, socioeconomic level in 60%, education in 45%, and profession in 40%.

Sociolinguistically, the factors that play a definitive role in the retention versus aspiration/deletion of Spanish /s/ are age (including generation), socioeconomic level,

gender, and speech style. The following discussion addresses each of these factors in more detail.

Factors	age	gender	socioeconomic level	education	profession
Spain / Canary Islands					
García Marcos 1987	-	-	X	-	-
López Morales 1989	-	-	X	-	-
Samper Padilla 1990	X	X	-	-	-
New World					
Lipski 1986a	-	-	X	X	-
Lipski 1991	-	-	X	X	-
United States/ Puerto Rico					
Lipski 1985b	-	-	-	-	X
Lipski 1990	X	-	-	-	-
Dominican Republic					
Terrell 1986	X	X	X	X	-
Honduras					
López Scott 1983	X	X	X	-	-
Lipski 1986b	-	-	X	X	X
Panama					
Cedergren 1978	X	X	X	-	-
Colombia					
Becerra 1980	X	X	X	X	-
Lafford 1986	X	-	X	X	X
Chile					
Valdivieso and Magaña 1988	X	X	X	X	X
Valdivieso, Tassara, Magaña, and Duque 1988	X	X	-	X	-
Cepeda 1990	X	X	-	-	-
Tassara 1991	X	X	-	-	X
Valdivieso, Magaña, and Tassara 1991	-	X	X	-	X
Argentina					
Fontanella de Weinberg 1973	X	X	-	-	X
Fontanella de Weinberg 1974	-	X	-	X	X
López Morales 1989	-	X	-	-	-

Table 4.45 Factors considered in Spanish sociolinguistic research on /s/.

In general, younger speakers in many dialects of Spanish tend to aspirate or delete /s/. Older speakers have a tendency to retain the /s/, however, this depends upon whether the dialect has already completed the s > h sound change or whether the dialect is in the process of changing s > h . Thus, the s > h change may be considered generational in that older speakers may retain the /s/ more than younger speakers because the younger generation uses more innovative phonological segments. On the other hand, older speakers

may delete /s/ while younger speakers may aspirate /s/ because these same older speakers passed through a period of aspiration use in their younger days.

Socioeconomic status of speakers also plays a definite role in the retention versus aspiration/deletion of /s/. Throughout the sociolinguistic research literature, it is reported that speakers in the upper classes tend to retain the /s/ and those in the lower classes tend to aspirate or delete although variation does occur. This phenomenon, however, may vary for dialects in which the s > h sound change has been completed and therefore has affected all socioeconomic levels. One issue that overlaps with socioeconomic level is speech style or the formality or informality of the speech situation. In more formal contexts, such as in school, in the courtroom, at the doctor's office, during a public speech, or in television or radio broadcasts, the /s/ generally is retained. In more casual or informal contexts, such as, when speaking with friends and family members and when speaking out in the street or at a sporting event, the /s/ is generally aspirated or deleted in those dialects that exhibit these phenomena.

The gender of the speaker is another factor that overlaps with all the previously mentioned factors. Men tend to aspirate or delete /s/ more than women. In fact, the retention of the /s/ by men may even be considered an effeminate speech characteristic since women use the /s/ more than men. Silva Corvalán (1989:70) stated that women used more prestigious linguistic forms than men, that feminine speech was usually more conservative and "correct," and that men were expected to break grammar rules and behave in a rude, aggressive, or even vulgar manner. Thus, women generally are not the cause of linguistic change because of their use of conservative language.

Although coverage of certain dialects is badly needed to understand better aspiration/deletion of Spanish /s/ within the context of Hispanic dialectalology and sociolinguistics, the studies reviewed in this chapter provide useful information about the phenomenon.

Notes to Chapter 4

[1]The information found in dialectal studies overlaps somewhat with that of sociolinguistic studies. The main difference is whether societal factors are the primary focus or whether the variants themselves are of interest. Most sociolinguistic studies tend to also be dialectal but not all dialectal studies are sociolinguistic. Due to their overlap, both dialectal and sociolinguistic studies are reviewed in this chapter.

[2]Perhaps it would be safer to say that sociolinguistic information has often been incorporated into diachronic and dialectal studies in the past. The novelty is the quantitative framework propagated by Labov and others that stresses the importance of statistical significance and not solely qualitative and subjective reporting of linguistic facts.

[3] Lipski finds that the word *centavos* occurs much more often in Honduras than in Nicaragua, El Salvador, Costa Rica, and Guatemala due to the Honduran rate of exchange requiring the use of the word *centavos*. However, the monetary unit in Nicaragua is the *córdoba*, making the word *centavos* virtually nonexistent in ordinary discourse.

[4]The high use of the subject pronoun *tú* may be explained as a functional compensation for *s* deletion in second person singular verb forms. See also Poplack (1980, 1984), Flórez, Myhill, Tarallo (1983), López Morales (1980-81), Terrell (1981, 1982a, 1982b), and Uber (1989) for plural markers in Caribbean Spanish (Puerto Rican, Cuban, and Dominican).

CHAPTER 5

CONCLUSION

5.0 Summary

This investigation has reviewed the vast body of research literature written about Spanish /s/ with an emphasis on the aspiration/deletion phenomena, a phonological process that affects Spanish /s/ and that may be summarized as [s] > [h] (aspiration) > ø (deletion). The research on /s/ aspiration/deletion falls into five general linguistic frameworks, all of which were treated in this dissertation: phonetics, phonology, diachronic linguistics, dialectology, and sociolinguistics. Studies have addressed both diachronic and synchronic aspects of aspiration/deletion of /s/ in Peninsular and New World dialects of Spanish. In this study the key research on Spanish /s/ aspiration/deletion has been brought together for the first time. An attempt has been made to analyze and compare all the studies available. This effort allows us to describe better the Spanish /s/ and formulate hypotheses for explaining /s/ aspiration/deletion.

The main findings of this study can be grouped in several levels. For the phonetics of Spanish /s/, most of the articulatory literature about Spanish /s/ outlines the apical/laminal distinction although some phoneticians specify other articulatory possibilities such as coronal, convex, and concave. However, few of the articulatory accounts of Spanish /s/ are based on experimental data and thus must be considered with caution.

Several articulatory, acoustic, and perceptual issues have been addressed in this dissertation in order to provide possible phonetic explanations for the retention versus reduction of /s/ in Spanish. The principal issues considered were place of articulation, the tip/blade distinction, and syllable position. Acoustic-perceptual factors appeared to provide the most promising explanations (consistent with Widdison, 1991). In terms of the apical/laminal difference, observational data suggest that apical [s̻] is more intense (perceptually, louder) than laminal [s]. This increased intensity and presumably enhanced salience may make apicals resistant to deletion. Further investigation in experimental terms was recommended in order to verify the non-experimental observations.

In terms of syllable position, Mann and Soli (1991) found that certain phonetic information was less salient in VF syllables than in FV syllables, suggesting that syllable-final position or syllable coda may be a weaker position than syllable onset. Therefore, syllable-final /s/ reduction in Spanish may be linked to the lower acoustic energy and reduced perceptual information in VC sequences. Conversely, syllable-initial aspiration in Spanish should be far less frequent because of greater acoustic energy in CV syllables and greater perceptual salience.

Modern phonological accounts of /s/ aspiration/deletion in Spanish using the autosegmental and metrical frameworks attempt to characterize and explain this phonological process, not merely describe it as in the structuralist framework. The new notation attempts to improve upon the simplistic phonemic and allophonic statements made by structuralist linguists that describe but do not succeed in explaining the s > h > ø change in Spanish. Nevertheless, the phonological accounts all are based on articulation and since data from acoustics and perception offer more plausible explanations for Spanish /s/ aspiration/deletion, we must continue to question the explanatory validity of newer phonological accounts such as those outlined in Section 2.4 of this dissertation.

In diachronic terms, evidence exists that the /s/ of Latin was apical. This /s/ type continued into Romance and Spanish in addition to the development of a more innovative

laminal articulation. A possible correlation between apical [s̻] and /s/ retention, and laminal [s] and /s/ reduction, has been discussed in detail. The sound change seems to have progressed through several stages as follows: apical [s̻] > laminal [s] > [h] > ø. The aspiration/deletion of laminal [s] in Spanish is quite widespread and will continue to have an important effect on dialects of Spanish well into the twenty-first century and beyond.

Dialectal and sociolinguistic studies that present quantitative data are helpful in shedding light on this phenomenon; the overlap that exists in these studies requires us to consider regional and social variation together. Findings indicated that men aspirate and delete /s/ more than women because men tend to use more stigmatized linguistic features. Younger generations of speakers tend to aspirate or delete /s/ more than older speakers, especially in those dialects in which the s > h change is still in progress and has not developed to such a high frequency of erosion. The /s/ is more likely to be aspirated or deleted in casual speech than in formal speech and in speakers from the lower classes than those in the upper classes. Again, /s/ retention equates to a highly prestigious feature whereas /s/ aspiration/deletion is considered stigmatized in many dialects in Spanish.

5.1 Future research

While there exists an abundance of research treating the aspiration/deletion of Spanish /s/, there is still room for further investigation. This section outlines specific suggestions for research in this area that would help advance our knowledge of the s > h change in Spanish. The discussion is divided into the five linguistic areas in which all research on /s/ aspiration/deletion in Spanish may be categorized.

Experimental research is needed in all three branches of phonetics. Articulatory experiments are needed to verify place of articulation in the various dialects and whether the /s/ is apical or laminal. Since /s/ type appears to be a factor in whether aspiration/deletion will occur, perhaps experimental articulatory data could help explain

why apical [s̪] is usually retained and laminal [s] is often aspirated or deleted. This distinction has not been explored experimentally in Spanish. This would be especially important for the /s/ of Antioquia, Colombia where it is reported that both laminal and apical articulations of /s/ are used and that even both are used by the same speaker in the context of a single conversation. Research by Flórez (1957, 1978) did not clearly identify whether both the apical [s̪] and laminal [s] aspirated in initial position in Colombian dialects. Additionally, acoustic data could verify frequency ranges, duration, intensity, or transitions that might indicate why apical [s̪] is retained and laminal [s] is reduced. Dart (personal communication) indicated that she was certain that vowel + /s/ transitional differences between apical and laminal /s/ articulations should be found. Whether these transitional differences could help explain Spanish /s/ aspiration/deletion is yet another area that needs further explanation.

The most important finding within the phonetic research is that the often ignored areas of acoustics and perception appear to help answer the question of why /s/ aspirates and deletes in Spanish. Widdison (1991) conducted a series of perceptual experiments designed to verify whether perception could help explain Spanish /s/ aspiration and deletion. Future perceptual research needs to address whether the apical [s̪] is more accurately identified than laminal [s]. Phonological theory using autosegmental and metrical notation could be developed to explain initial aspiration/deletion in addition to final aspiration/deletion. Previous phonological accounts have focused on final /s/ aspiration/deletion, and, while new accounts would look the same for initial position, they do not address the motivation for initial reduction. We must remember that most consonantal reductions in Spanish occur in syllable- and word-final positions not in syllable- or word-initial positions.

Additional diachronic investigations are needed, especially in terms of verifying the chronology of aspiration/deletion of /s/ in various dialects of Spanish. Fontanella de Weinberg (1990), for example, traced the diachrony of aspiration/deletion in Argentine

Spanish. Similar studies replicating her procedure should be undertaken for other dialects of Spanish. As discussed in Chapter 3, scholars are divided in terms of the beginning of the s > h change, some placing it as early as the sixteenth century and others as late as the eighteenth century. Further diachronic investigation could also attempt to approximate when aspiration of /s/ began.

Many dialectal studies exist that describe the s > h > ø change in Spanish (cf. Ferguson 1990). Nevertheless, some areas have not been as carefully explored as others such as Paraguay, Bolivia, and Uruguay. Other areas such as Central America, Equatorial Guinea, and Ecuador are beginning to be investigated further (cf. Lipski 1983, 1984a, 1984c, 1985a, 1985c, 1989), and still other areas such as the Caribbean countries, Spain, Mexico, Colombia, and Venezuela, are well investigated. In general, dialectal studies must include carefully collected data with a preference for quantified results whenever possible to make the findings more valid, reliable, and verifiable. Many of the earlier studies are based on non-experimental observations instead of experimental data.

Several studies address the sociolinguistics of /s/ aspiration/deletion in Spanish (e.g., Fontanella de Weinberg 1973, 1974; Cedergren 1978; Valdivieso and Magaña 1988; Valdivieso, Magaña, Tassara, and Duque 1988; Samper Padilla 1990; Valdivieso, Magaña, and Tassara 1991; and Tassara 1991). These studies could be replicated or used as models for research on dialects that have not been analyzed sociolinguistically for /s/ aspiration/deletion. In addition, in those studies that considered only one or two sociolinguistic factors, perhaps follow-up research could consider other factors that might determine the retention or reduction of /s/.

In summary, many investigators have analyzed the aspiration/deletion of Spanish /s/ as reflected in the abundant literature and we already have many pieces of the puzzle that help explain the s > h > ø change in Spanish. Nevertheless, there is still more to learn about this sound change, especially in terms of dialectal variation, diachronic developments, sociolinguistics, and articulatory, acoustic, and perceptual phonetics as

outlined above. We would then be able to provide more definitive explanations about phonetic and phonological patterns found in the Spanish language such as syllable-final consonant reduction in general, and /s/ retention and aspiration/deletion phenomena in particular. Further investigations will enable phoneticians and linguists to characterize more fully the s > h > ø change or, as native speakers of Spanish describe it, *comerse las eses.*

REFERENCES

Adams, Douglas Q. 1975. The distribution of retracted sibilants in Medieval Europe. Language 51.282-92.

Aitchison, Jean. 1991. Language change: progress or decay?, 2nd ed. New York: Cambridge University Press.

Alba, Orlando. 1982. Función del acento en el proceso de elisión de la /s/ en la República Dominicana. El español del Caribe, ed. by Orlando Alba, 15-26. Santiago de los Caballeros: Universidad Católica Madre y Maestra.

Alvar, Manuel. 1966-67. Polimorfismo y otros aspectos fonéticos en el habla de Santo Tomás Ajusco. Anuario de Letras 6.11-42.

Becerra, Servio. 1980. Consonantes implosivas en el español urbano de Cartagena de Indias (Colombia): implicaciones sociolingüísticas. Dialectología hispano-americana. Estudios actuales, ed. by Gary E. Scavnicky, 100-12. Washington, DC: Georgetown University.

Behrens, Susan J. and Blumstein, Sheila E. 1988a. Acoustic characteristics of English voiceless fricatives: A descriptive analysis. Journal of Phonetics 16.295-98.

Behrens, Susan J. and Blumstein, Sheila E. 1988b. On the role of the amplitude of the fricative noise in the perception of place of articulation in voiceless fricative consonants. Journal of the Acoustic Society of America 84.861-67.

Bell, A.M. 1907. English visible speech in 12 lessons. Washington, DC: The Volta Bureau.

Beym, Richard. 1963. *Porteño* /s/ and [h] [ɦ] [s] [x] [ø] as variants. Lingua 12.199-204.

Boynton, Sylvia. 1981. A phonemic analysis of monolingual Andean (Bolivian) Spanish. The Aymara language in its social and cultural context. University of Florida monographs, social sciences 67, ed. by M. J. Hardman, 199-204. Gainesville, FL: University of Florida.

Canellada, María Josefa and A. Zamora. 1960. Vocales caducas en el español mexicano. Nueva Revista de Filología Hispánica 14.221-241.

Canfield, D. Lincoln. 1952. Spanish American data for the chronology of sibilant changes. Hispania 35.25-30.

Canfield, D. Lincoln. 1981. Spanish pronunciation in the Americas. Chicago: The University of Chicago.

Caravedo, Rocio. 1983. Estudios sobre el español de Lima, 1: Variación contextual de la sibilante. Lima: Pontífrica Universidad Católica del Perú.

Cassano, Paul. 1972. The Fall Of Syllable-and Word-Final /s/ in Argentina and Paraguay. Revue de Langues Vivantes 38.282-83.

Catalán, Diego. 1971. En torno a la estructura silábica del español de ayer y del español de mañana. Sprache und Geschichte, Festschrift Harri Meier, 78-110. Munich: Fink-Verlag.

Catford, J.C. 1977. Fundamental problems in phonetics. Bloomington: Indiana University.

Catrice, Valérie, and Henrietta Cedergren. 1986. Analyse parametrique de la chute du /s/ en espagnol. Presented at NWAVE XIV. Unpublished manuscript.

Cedergren, Henrietta. 1978. En torno a la variación de la *s* final de sílaba en Panamá: Un análisis cuantitativo. Corrientes actuales en la dialectología del Caribe hispánico. Actos de un simposio, ed. by Humberto López Morales, 37-50. Río Tiedras: Editorial de la Universidad de Puerto Rico.

Cepeda, Gladys. 1990. La variación de /s/ en Valdivia: Sexo y edad. Hispania 73.232-37.

Chlumsky, J. 1956. L'*s* andalouse et le sort de l'*s* indo-européenne finale en Slave. Slavia 7.750-3.

Chomsky, Noam, and Morris Halle. 1968. The sound pattern of English. New York: Harper and Row.

Clements, G.N., and S.J. Keyser. 1983. CV Phonology. Cambridge, MA: MIT.

Cressey, William W. 1989. A generative sketch of Castilian Spanish pronunciation: A point of reference for the study of American Spanish. American Spanish pronunciation: Theoretical and applied perspectives, ed. by Peter C. Bjarkman and Robert M. Hammond, 48-70. Washington, DC: Georgetown University.

Crystal, David. 1985. A dictionary of linguistics and phonetics, 2nd ed. New York: Basil Blackwell.

Dalbor, John B. 1980. Spanish pronunciation: Theory and practice, 2nd ed. New York: Holt, Rinehart and Winston.

Dart, Sarah N. 1991. Articulatory and acoustic properties of apical and laminal articulations. UCLA Working Papers in Phonetics 79.

D'Introno, Francesco, Jorge Guitart, and Juan Zamora. 1988. Fundamentos de lingüística hispánica. Madrid: Playor.

Felix, Sascha W. 1979. Anatomy of a sound change in Canarian Spanish (/s/ > /h/ > ø). Zeitschrift für romanische philologie 95.358-81.

Ferguson, Charles A. 1990. From *esses* to *aitches*: Identifying pathways of diachronic change. Studies in typology and diachrony: Papers presented to Joseph H. Greenberg on his 75th Birthday, ed. by William Croft, Keith Denning, and Suzanne Kemmer, 59-78. Philadelphia: J. Benjamins.

Fishman, Joshua. 1971. Sociolinguistics: A brief introduction. Rowley: Newbury House.

Flórez, Luis. 1957. Habla y cultura popular en Antioquia. Bogota: Caro y Cuervo.

Flórez, Luis. 1964. El español hablado en Colombia y su atlas lingüístico. Presente y futuro de la lengua española 1, 5-77. Madrid: Ofines.

Flórez, Luis. 1978. Sobre algunas formas de pronunciar muchos colombianos el español: Datos y problemas. Thesaurus 33.197-246.

Flórez, Luis, Fernando Tarallo, and John Myhill. 1983. Competing plural markers in Puerto Rican Spanish. Linguistics 21.897-907.

Fontanella, María Beatríz. 1967. La *s* postapical en la región bonaerense. Thesaurus 22.394.400.

Fontanella de Weinberg, María Beatriz. 1973. Comportamiento ante *-s* de hablantes femeninos y masculinos del español bonaerense. Romance Philology 27.50-8.

Fontanella de Weinberg, María Beatriz. 1974. Aspectos sociolingüísticos del uso de *-s* en el español bonaerense. Orbis 23.85-98.

Fontanella de Weinberg, Maria Beatriz. 1990. Variación y cambio lingüístico en el español bonaerense, II: Visión diacrónica (1580-1980). Homenaje a Jorge A. Suarez: Lingüística indoamericana e hispánica, ed. by Beatriz Garza Cuaron, and Paulette Levy, 197-210. Mexico City: Centro de Estudios Lingüísticos y Literarios, Colegio de México.

Ford, J.D.M. 1900. The Old Spanish sibilants. Boston: Harvard Studies in Philology and Literature.

Fry, D. B. 1979. The physics of speech. New York: Cambridge University Press.

Galmés de Fuentes, Álvaro. 1962. Las sibilantes en la Romania. Madrid: Gredos.

García Jurado, María Amalia. 1985. Los tipos silábicos del español. Revista Argentina de Lingüística 1(2). 133-146.

García Marcos, Francisco J. 1987. El segmento fónico vocal *+s* en ocho poblaciones de la costa granadina: Aportación informática, estadística y sociolingüística al reexamen de la cuestión. Revista de Filología 3.155-80.

Goldsmith, John. 1981. Subsegmentals in Spanish phonology: An autosegmental approach. Linguistic symposium on Romance languages 9, ed. by William W. Cressey and Donna Jo Napoli, 1-16. Washington, DC: Georgetown University.

González Moreno, Jesús. 1935. El español en México. Investigaciones Lingüísticas 3.176.

Gordon, Alan M. 1979. Notas sobre la fonética del castellano en Bolivia. Actas, Congreso Internacional de Hispanistas, Toronto.

Granda, Germán de. 1982. Observaciones sobre la fonética del español en el Paraguay. Anuario de Letras 20.145-194.

Guerra, Rafael. 1983. Estudio estadístico de la sílaba en español. Estudios de fonética. eds. Manuel Esgueva and Margarita Cantarero, 11-63. Madrid: Consejo Superior de Investigaciones Cientificas.

Guitart, Jorge M. 1981. En torno a la sílaba como entidad fonemática en los dialectos del Caribe hispánico. Thesaurus 36.457-63.

Gurlekian, Jorge A. 1979. On the recognition of the Spanish fricatives /s/ and /f/. Journal of the Acoustical Society of America 66(Suppl. 1).S 88.

Gurlekian, Jorge A. 1981. Recognition of the Spanish fricatives /s/ and /f/. Journal of the Acoustical Society of America 70(6).1624-27.

Gutiérrez, John R. 1981. An analysis of the phoneme /s/ in New Mexican Spanish. Proceedings of the Ninth Annual Southwestern Areal Language and Linguistics Workshop, ed. by Charles Elerick, 234-9. El Paso: University of Texas at El Paso.

Guy, Gregory R. 1981. Parallel variability in American dialects of Spanish and Portuguese. Variation omnibus, ed. by David Sankoff and Henrietta Cedergren, 85-95. Carbondale: Linguistic Research.

Hammond, Robert M. 1978. An experimental verification of the phonemic status of open and closed vowels in Caribbean Spanish. Corrientes actuales en la dialectología del Caribe Hispánico, ed. by H. López Morales, 94-143. Hato Rey: Editorial Universitaria, Universidad de Puerto Rico.

Hammond, Robert M. 1979. Restricciones sintácticas y/o semánticas en la elisión de /s/ en el español cubano. Boletín de la Academia Puertorriqueña de la Lengua Española 7.41-57.

Hammond, Robert M. 1980. Las realizaciones fonéticas del fonema /s/ en el español cubano rápido de Miami. Dialectología hispanoamericana - Estudios actuales, ed. by Gary E. Scavnicky, 8-15. Washington, DC: Georgetown University.

Hammond, Robert M. 1982. El fonema /s/ en el español jíbaro. Cuestiones teóricas. El español del Caribe. Ponencias del VI simposio de dialectología, ed. by Orlando Alba, 157-69. Santiago, DR: Universidad Católica Madre y Maestro.

Hammond, Robert M. 1989a. American Spanish dialectology and phonology from current theoretical perspectives. American Spanish pronunciation: Theoretical and applied perspectives, ed. by Peter C. Bjarkman and Robert M. Hammond, 137-50. Washington, DC: Georgetown University.

Hammond, Robert M. 1989b. Standard SPE phonological frameworks for describing American Spanish pronunciation. American Spanish pronunciation: Theoretical and applied perspectives, ed. by Peter C. Bjarkman and Robert M. Hammond, 31-47. Washington, DC: Georgetown University.

Harris, James W. 1969. Spanish Phonology. Cambridge, MA: MIT.

Harris, James W. 1983. Syllable structure and stress in Spanish. A nonlinear approach. Cambridge, MA: MIT.

Harris, K. S. 1958. Cues for discrimination of American English fricatives in spoken syllables. Language and Speech 1.1-17.

Henríquez Ureña, Pedro. 1921. Observaciones sobre el español en América. Revista de Filología Española 8.357-90.

Henríquez Ureña, Pedro. 1938. Datos sobre el había popular de Méjico. Para la historia de los indigenismos. Boletín de Dialectología Hispanoamericana 4.277-324.

Hidalgo, Margarita. 1990. Sobre las variantes de /s/ en Mazatlán, Sinaloa. Hispania 73.526-29.

Hochberg, Judith. 1986. Functional compensation for /s/ deletion in Puerto Rican Spanish. Language 62.609-21.

Hockett, Charles F. 1955. A manual of phonology. Baltimore: Waverly Press.

Hundley, James Edward. 1986. The effect of two phonological processes on syllable structure in Peruvian Spanish. Hispania 69.665-8.

Hundley, James Edward. 1987. Functional constraints on plural marker deletion in Peruvian Spanish. Hispania 70.891-4.

Izzo, Herbert J. 1984. Andalusia and America. The regional origins of New World Spanish. Romanitas, ed. by Ernst Pulgram, 109-31. Ann Arbor: Department of Romance Languages, The University of Michigan.

Jesperson, Otto. 1921. Language: Its nature, development and origin. New York: Norton (reprint 1964).

Joos, Martin. 1952. The medieval sibilants. Language 28.222-31.

Kiddle, Lawrence B. 1977. Sibilant turmoil in Middle Spanish (1450-1650). Hispanic Review 45.327-36.

King, Harold V. 1952. Outline of Mexican Spanish phonology. Studies in Linguistics 10.51-62.

Kiparsky, Paul. 1972. Explanation in phonology. Goals of linguistic theory, ed. by S. Peters, 189-225. Englewood Cliffs, NJ: Prentice-Hall.

Kiparsky, Paul. 1988. Phonological change. Linguistics: The Cambridge survey, vol. 1, ed. by F.J. Newmeyer, 363-415. Cambridge: Cambridge University.

Klatt, Dennis H. 1974. The duration of [s] in English words. Journal of Speech and Hearing Research 17.51-63.

Klatt, Dennis H. 1976. Linguistic uses of segmental duration in English: Acoustic and perceptual evidence. Journal of the Acoustical Society of America 59.1208-21.

Klee, Carol A. 1991. Introduction. Sociolinguistics of the Spanish-speaking world: Iberia, Latin America, United States, ed. by Carol A. Klee and Luis A. Ramos-García, 1-12. Tempe: Bilingual Press.

Krieg, Laurence John. 1980. Phonetic classification: The acoustic structure of strident fricatives. Unpublished Ph.D. dissertation, The University of Michigan, Ann Arbor.

Labov, William. 1966. The social stratification of English in New York City. Washington, DC: Center for Applied Linguistics.

Labov, William. 1972a. Language in the inner city. Philadelphia: University of Pennsylvania.

Labov, William. 1972b. Sociolinguistic patterns. Philadelphia: University of Pennsylvania.

Lacayo, Heberto. 1954. Apuntes sobre la pronunciación del español de Nicaragua. Hispania 37.267-68.

Ladefoged, Peter. 1982. A course in phonetics, 2nd ed. New York: Harcourt Brace Jovanovich.

Ladefoged, Peter, and Ian Maddieson. 1986. Fricatives. Some of the sounds of the world's languages (Preliminary version). UCLA Working Papers in Phonetics 64.57-94.

Lafford, Barbara A. 1980. El nuevo conservadurismo en el Caribe hispánico: El habla de Cartagena, Colombia. Boletín de la Academia Puertorriqueña de la Lengua Española 82.72-90.

Lafford, Barbara A. 1982. Dynamic synchrony in the Spanish of Cartagena, Colombia: The influences of linguistic, stylistic and social functions on the retention, aspiration, and deletion of syllable and word-final /s/. Unpublished Ph.D. dissertation, Cornell University.

Lafford, Barbara A. 1986. Valor diagnóstico-social del uso de ciertas variantes de /s/ en el español de Cartagena, Colombia. Estudios sobre la fonología del español del Caribe, ed. by Rafael A. Núñez Cedeño, Iraset Paez Urdaneta, and Jorge M. Guitart, 53-74. Caracas: La Casa de Bello.

Lapesa, Rafael. 1981. Historia de la lengua española, 9th ed. Madrid: Gredos.

Lathrop, Thomas A., and Juan Gutiérrez Cuadrado. 1984. Curso de gramática histórica española. Barcelona: Ariel.

Lavandera, Beatriz R. 1974. On sociolinguistic research in New World Spanish: A review article. Language in Society 3.247-337.

Lavandera, Beatriz R. 1981. Sociolinguistics. Trends in Romance linguistics and philology, vol. 2, ed. by Rebecca Posner and John N. Green, 129-228. The Hague: Mouton.

Lieberman, Philip, and Sheila E. Blumstein. 1988. Speech physiology, speech perception, and acoustic phonetics. New York: Cambridge University Press.

Lipski, John M. 1983. Reducción de /s/ en el español de Honduras. Nueva Revista de Filología Hispánica 32.272-88.

Lipski, John M. 1984a. Observations on the Spanish of Malabo, Equatorial Guinea: Implications for Latin American Spanish. Hispanic Linguistics 1(1).69-96.

Lipski, John M. 1984b. On the weakening of /s/ in Latin American Spanish. Zeitschrift für Dialektologie und Linguistik 51.31-43.

Lipski, John M. 1984c [1989]. /s/ in the Spanish of Nicaragua. Orbis 33(1-2).171-81.

Lipski, John M. 1985a. /s/ in Central American Spanish. Hispania 68.143-49.

Lipski, John M. 1985b. Spanish in United States broadcasting. Spanish language use and public life in the United States, ed. by Lucía Elías-Olivares, Elizabeth A. Leone, René Cisneros, and John R. Gutiérrez, 217-33. New York: Mouton Publishers.

Lipski, John M. 1985c. The Spanish of Equatorial Guinea: The dialect of Malabo and its implications for Spanish dialectology. (Beihefte zur Zeitschrift für romanische Philologie; Bd. 209). Tübingen: Niemeyer.

Lipski, John M. 1986a. Central American Spanish in the United States: Some remarks on the Salvadoran community. Aztlan 17(2).91-123.

Lipski, John M. 1986b. Instability and reduction of /s/ in the Spanish of Honduras. Revista Canadiense de Estudios Hispanicos 11(1).27-47.

Lipski, John M. 1986c. A test case of the Afro-Hispanic connection. Syllable-final /s/ in Equatorial Guinea. Lingua 68(2-3).209-22.

Lipski, John M. 1987. Fonética y fonología de Honduras. Tegucigalpa: Guaymuras.

Lipski, John M. 1988. Reduction of /s/ in Spanish: The Afro-Hispanic connection. On Spanish, Portuguese, and Catalan linguistics, ed. by John J. Staczek, 4-16. Washington, DC: Georgetown University.

Lipski, John M. 1989. /s/-voicing in Ecuadoran Spanish: Patterns and principles of consonantal modification. Lingua 79.49-71.

Lipski, John M. 1990. Sabine River Spanish: A neglected chapter in Mexican-American dialectology. Spanish in the United States: Sociolinguistic issues, ed. by John Bergen, 1-13. Washington, DC: Georgetown University.

Lipski, John M. 1991. Clandestine radio broadcasting as a sociolinguistic microcosm. Sociolinguistics of the Spanish-speaking world: Iberia, Latin America, United States, ed. by Carol A. Klee and Luis A. Ramos-García, 113-37. Tempe: Bilingual Press.

Lloyd, Paul M. 1987. From Latin to Spanish, vol. 1: Historical phonology and morphology of the Spanish language. Philadelphia: American Philosophical Society.

Lope Blanch, Juan M. 1972. Estudios sobre el español de México. Mexico: Universidad Nacional Autónoma de México.

López Chávez, Juan. 1977. El fonema /s/ en el habla de La Cruz, Sinaloa. Nueva Revista de Filología Hispánica 26.332-40.

López Morales, Humberto. 1971. Estudios sobre el español de Cuba. New York: Las Américas.

López Morales, Humberto. 1980. Sociolingüística hispánica: perspectivas futuras. Perspectivas de la investigación lingüística en hispanoamérica, 59-78. Mexico City: Universidad Nacional Autónoma de México.

López Morales, Humberto. 1980-81. Pluralidad dominal, elisión de -/s/ y ambigüedad en los sociolectos de San Juan. Homenaje a Ambrosio Rabanales. Boletín de Filología (Universidad de Chile) 32.851-63.

López Morales, Humberto. 1989. Sociolingüística. Madrid: Gredos.

López Scott, Leticia Alma. 1983. A socio-linguistic analysis of "s" variation in Honduran Spanish. Unpublished Ph.D. dissertation, The University of Minnesota.

Ma, Roxana, and Eleanor Herasimchuk. 1971. The linguistic dimensions of a bilingual neighborhood. Bilingualism in the barrio, ed. by Joshua A. Fishman, Robert L. Cooper, and Roxana Ma, 349-464. Bloomington: Indiana University.

Mackay, Ian. 1987. Phonetics: the science of speech production, 2nd ed. Boston: Little, Brown and Company.

Malmberg, Bertil. 1947. L'espagnol dans le Nouveau Monde problème de linguistique générale. Studia Linguistica 1(1). Lund: CWK Gleerup.

Malmberg, Bertil. 1965. La estructura silábica del español. Estudios de Fonética Hispánica, 3-28. Madrid: Consejo Superior de Investigaciones Cientificas.

Mann, Virginia, and Sigfried D. Soli. 1991. Perceptual order and the effect of vocalic context on fricative perception. Perception & Psychophysics 49.399-411.

Manrique, Ana M. Borzone de, and María Ignacia Massone. 1981. Acoustic analysis and perception of Spanish fricative consonants. Journal of the Acoustical Society of America 69.1145-53.

Marden, Charles C. 1938. La fonología del español en la ciudad de Méjico. Biblioteca de Dialectología Hispanoamericana 4.87-187.

Marrero, Victoria. 1990. Estudio acústico de la aspiración en español. Revista de Filología Española 70.345-97.

Martinet, André. 1952. Function, structure, and sound change. Word 9.1-32.

Martínez Celdrán, Eugenio. 1984. Fonética (Con especial referencia a la lengua castellana). Barcelona: Teide.

Matluck, Joseph. 1951. La pronunciación en el español del valle de México. Mexico: Universidad Nacional Autónoma.

McCasland, George P. 1980. Cues trade-offs of spoken fricatives: Duration and intensity of the noise and vocalic formant transitions. Journal of the Acoustical Society of America, Supplement 1, 67.S39.

Nartey, Jonas N.A. 1982. On fricative phones and phonemes: Measuring the phonetic differences within and between languages. UCLA Working Papers in Phonetics 55.1-178.

Navarro Tomás, Tomás. 1946. Estudios de fonología española. Syracuse, NY: Syracuse University Press.

Navarro Tomás, Tomás. 1957. Manual de pronunciación español. New York: Hafner.

Navarro, Tomás. 1968. Studies in Spanish phonology, translation by R. O. Abraham. Coral Gables, FL: University of Miami.

Nebrija, Antonio de. 1492. Gramática de le lengua castellana. Salamanca (reprint 1926, New York: Oxford University Press).

Núñez Cedeño, Rafael A. 1989. CV phonology and its impact on describing American Spanish pronunciation. American Spanish pronunciation: Theoretical and applied perspectives, ed. by Peter C. Bjarkman and Robert M. Hammond, 170-86. Washington, DC: Georgetown University.

Obaid, Carleton. 1973. The vagaries of the Spanish "s". Hispania 56.60-7.

Ohala, John J. 1981. The listener as a source of sound change. Papers from the parasession on language and behavior, ed. by C.S. Masek, R.A. Hendrick, and M.F. Miller, 178-203. Chicago: Chicago Linguistic Society.

Ohala, John J. 1990. The phonetics and phonology of aspects of assimilation. Papers in Laboratory Phonology I Between the Grammar and Physics of Speech. eds. John Kingston and Mary E. Beckman, 258-275. New York: Cambridge University Press.

Ohala, John J., and H. Kawasaki. 1984. Prosodic phonology and phonetics. Phonology Yearbook, 1.113-127.

Oroz, Rodolfo. 1964. El español de Chile. Presente y futuro de la lengua española 1, 93-109. Madrid: Ofines.

Oroz, Rodolfo. 1966. La lengua castellana en Chile. Santiago: Universidad de Chile.

Paul, H. 1891. Principles of the history of language, translation by H. Strong. Excerpt reprinted in P. Baldi and R. Werth, eds. Readings in historical phonology, 3-22. University Park: Pennsylvania State University Press.

Penny, Ralph. 1983. The peninsular expansion of Castilian. Bulletin of Hispanic Studies 60.333-8.

Penny, Ralph. 1991. A history of the Spanish language. New York: Cambridge University.

Peñalosa, Fernando. 1984. Central Americans in Los Angeles: Background, language, education. Los Alamitos: National Center for Bilingual Research.

Politzer, Robert. 1972. Final *-s* in the Romania. Readings in Romance linguistics, ed. by James M. Anderson and Jo Ann Creore, 414-22. The Hague: Mouton.

Poplack, Shana. 1980. The notation of the plural in Puerto Rican Spanish: Competing restraints on /s/ deletion. Locating language in time and space, ed. by William Labov and David Sankoff, 55-67. New York: Academic Press.

Poplack, Shana. 1984. Variable concord and sequential plural marking in Puerto Rican Spanish. Hispanic Review 52.205-22.

Quilis, Antonio. 1981. Fonética acústica de la lengua española. Madrid: Gredos.

Quilis, Antonio. 1984. Bibliografía de fonética y fonología españolas. Madrid: Consejo Superior de Investigación Científica.

Quilis, Antonio. 1985. El comentario fonológico y fonético de textos. Teoría y práctica. Madrid: Arco/Libros.

Quilis, Antonio, and M. Esgueva. 1980. Frecuencia de los fonemas en el español hablado. Lingüística Española Actual 2.1-25.

Resnick, Melvyn C. 1975. Phonological variants and dialect identification in Latin American Spanish. The Hague: Mouton.

Resnick, Melvyn C. 1981. Introducción a la historia de la lengua española. Washington, DC: Georgetown University.

Revilla, Manuel G. 1938. Provincionalismos de fonética en Méjico. Biblioteca de Dialectología Hispanoamericana 4.199-206.

Robinson, Kimball. 1975. Intervocalic voiced *s* in Ecuadorean Spanish. Purdue University Contributed Papers 5.24-9.

Robinson, Kimball. 1979. On the voicing of intervocalic [s] in the Ecuadorian highlands. Romance Philology 33.137-43.

Rona, José Pedro. 1964. El problema de la división del español americano en zonas dialectales. Presente y futuro de la lengua española 1.215-26. Madrid: OFINES.

Rosario, Rubén del. 1970. El español de América. Sharon, CT: Troutman Press.

Rubin, Joan. 1968. National bilingualism in Paraguay. The Hague: Mouton.

Samper Padilla, José Antonio. 1990. Estudio sociolingüístico del español de Las Palmas de Gran Canaria. Gran Canaria: Imprenta Pérez Galdós.

Sanicky, Cristina A. 1982-83. Las manifestaciones de la *s* final en el habla de Misiones. Boletín de Filología de la Universidad de Chile 32.29-39.

Scully, Celia, Eric Castelli, Eric Brearly, and Marion Shirt. 1992. Analysis and simulation of a speaker's aerodynamic and acoustic patterns for fricatives. Journal of Phonetics 20.39-51.

Seklaoui, Diana Ranson. 1988. The role of context in language change: Evidence from Andalusian Spanish. Georgetown University Round Table on Languages and Linguistics.280-92.

Seklaoui, Diana Ranson. 1989. Change & compensation: Parallel weakening of [s] in Italian, French and Spanish. Series: Currents in comparative Romance languages & literature 4. Peter Lang: Frankfurt.

Selkirk, Elizabeth O. 1984. Phonology and syntax: The relation between sound and structure. Cambridge, MA: MIT.

Shadle, Christine Helen. 1986. The acoustics of fricative consonants. RLE Technical Report No. 506. Cambridge, MA: Research Laboratory of Electronics, MIT.

Shadle, Christine Helen. 1990. Articulatory-acoustic relationships in fricative consonants. Speech production and speech modelling, NATO ASI Series D 55, ed. by W.J. Hardcastle and A. Marchal.187-209. Dordrecht: Kluwer.

Shockey, Linda. 1987. Rate and reduction: Some preliminary evidence. In honor of Isle Lehiste, ed. by R. Channon and L. Shockey, 217-24. Dordrecht: Foris Publications.

Silva-Corvalán, Carmen. 1989. Sociolingüística. Teoría y análisis. Madrid: Alhambra.

Solé, Carlos A. 1990. Bibliografía sobre el español de América (1920-1986). Bogotá: Caro y Cuervo.

Stevens, Kenneth N. 1971. The role of rapid spectrum changes in the production and perception of speech. Form and substance: Phonetic and linguistic papers presented to Eli Fischer-Jorgensen. L.L. Hammerich, R. Jakobson and E. Zwirner, eds., 95-101. Denmark: Akademisk Forlag.

Straka, Georges. 1964. Remarques sur la <<désarticulation>> et l'amüisement de l'*s* implosive. Melangues de Linguistique Romane et de Philologie Médiévale offerts à M. Maurice Delbouille, 607-28. Gembloux: J. Ducolot.

Sweet, Henry. 1890. A primer of phonetics. London: Oxford University.

Tassara, Gilda. 1991. Variación lingüística /s/ implosiva en el habla semiformal culta de Valparaíso. Signos: Estudios de Lengua y Literatura (Chile: Universidad Católica de Valparaíso) 24(29).131-9.

Terrell, Tracy D. 1975a. La aspiración en el español de Cuba. Anuario de Letras 13.257-71. Mexico: Universidad Nacional Autónoma de México.

Terrell, Tracy D. 1975b. Functional constraints on deletion of word final /s/ in Cuban Spanish. BLSI (Berkeley, California) 431-37.

Terrell, Tracy D. 1975c. The interaction of phonological and grammatical constraints on aspiration and deletion in Cuban Spanish. Unpublished manuscript.

Terrell, Tracy D. 1976. The inherent variability of word final /s/ in Cuban and Puerto Rican Spanish. Teaching Spanish to the Spanish speaking: Theory and practice, ed. by Guadalupe Valdés Fallis and Rodolfo García-Moya, 44-51. San Antonio, Texas: Trinity University.

Terrell, Tracy D. 1976-77. Consideraciones para una teoría fonológica dialectal datos del Caribe hispánico. Revista de Lingüística: Teoría y Aplicada (Concepción, Chile) 14-15.59-67.

Terrell, Tracy D. 1977a. Aspiration and deletion of word final /s/ in the Spanish of Caracas, Venezuela. Paper presented to the Hispanic Colloquium, University of Hawaii, July 1977.

Terrell, Tracy D. 1977b. Constraints on the aspiration and deletion of final /s/ in Cuban and Puerto Rican Spanish. The Bilingual Review 4.35-51.

Terrell, Tracy D. 1978a. La aspiración y elisión de /s/ en el español cubano: implicaciones para una teoría dialectal. Lingüística y educación: actas del IV congreso internacional de la ALFAL (1975) 627-37. Lima, Péru: Universidad Nacional Mayor de San Marcos: Dirección Universitaria de Biblioteca y Publicaciones.

Terrell, Tracy D. 1978b. La aspiración y elisión de /s/ en el español porteño. Anuario de Letras 16.41-66.

Terrell, Tracy D. 1978c. Aspiración y elisión de /s/ en el habla de Caracas, Venezuela. Unpublished manuscript.

Terrell, Tracy D. 1978d. La aspiración y elisión de /s/ implosiva y final en el español de Puerto Rico. Nueva Revista de Filología Hispánica 27.24-38.

Terrell, Tracy D. 1979. Final /s/ in Cuban Spanish. Hispania 62.599-612.

Terrell, Tracy D. 1980. The problem of comparing variable rules across dialects: Some examples from Spanish. A Festschrift for Jacob Ornstein. Studies in general linguistics and sociolinguistics, ed. by Edward L. Blansitt, Jr. and Richard V. Teschner, 303-13. Rowley, MA: Newbury House.

Terrell, Tracy D. 1981. La marcación del plural: evidencia del español dominicano. Boletín de Filología de la Universidad de Chile 31.923-36. (=Homenaje a Abrosio Rabanales).

Terrell, Tracy D. 1982a. Current trends in the investigation of Cuban and Puerto Rican phonology. Spanish in the United States: Sociolinguistic aspects, ed. by Jon Amastae and Lucía Elias-Olivares, 47-70. New York: Cambridge University.

Terrell, Tracy D. 1982b. Relexificación en el español dominicano: implicaciones para la educación. El español del Caribe, ed. by Orlando Alba, 301-18. Santiago, DR: Universidad Católica Madre y Maestra.

Terrell, Tracy D. 1983. Sound Change: The explanatory value of the heterogeneity of variable rule application (evidence from Caribbean Spanish). Paper presented to a symposium: Spanish in the US setting: Beyond the Southwest. University of Illinois at Chicago Circle.

Terrell, Tracy D. 1986. La desaparición de /s/ posnuclear al nivel léxico en el habla dominicana. Estudios sobre la fonología del español del Caribe, ed. by Rafael A. Núñez Cedeño, Iraset Paez Urdaneta, and Jorge M. Guitart, 117-34. Caracas: La Casa de Bello.

Terrell, Tracy D. n.d. Los efectos de la relexificación de /s/ en el habla dominicana. Unpublished manuscript, University of California, Irvine.

Terrell, Tracy D., and Bernard Tranel. 1979. Parallelism between liaison in French and /s/ aspiration and deletion in Spanish dialects. Études linguistiques sur les langues romanes. Montreal Working Papers in Linguistics 10.31-50.

Torreblanca, Máximo. 1978. El fonema /s/ en la lengua española. Hispania 61.498-503.

Torreblanca, Máximo. 1980. La sílaba española y su evolución fonética. Thesaurus 35. 506-515.

Torreblanca, Máximo. 1986. La "s" sonora prevocálica en el español moderno. Thesaurus 41.59-69.

Torreblanca, Máximo. 1987. Sobre la evolución de sibilantes implosivas en español. Journal of Hispanic Philology 11.153-73, 223-49.

Torreblanca, Máximo. 1989. La /s/ implosiva en español: sobre las fechas de su aspiración. Thesaurus 44.281-303.

Toscano Mateus, Humberto. 1953. El español del Ecuador. Madrid: Consejo Superior de Investigación Científica.

Trudgill, Peter. 1974. Sociolinguistics: An introduction. Harmondsworth, England: Penguin Books.

Uber, Diane Ringer. 1981. A perceptual and acoustic study of syllable and word-final *-s* and *-n* in Puerto Rican Spanish. Unpublished Ph.D. dissertation, The University of Wisconsin, Madison.

Uber, Diane Ringer. 1984. Phonological implications of the perception of *-s* and *-n* in Puerto Rican Spanish. Papers from the XIIth Linguistic Symposium on Romance Languages, ed. by Philip Baldi, 287-99. Philadelphia: J. Benjamins.

Uber, Diane Ringer. 1989. Noun-phrase pluralization in the Spanish of Cuban Mariel entrants. Hispanic Linguistics 3(1-2).75-88.

Valdivieso, Humberto, and Juanita Magaña. 1988. Variación lingüística: la /s/ implosiva en Concepción. Revista de Lingüística Teórica y Aplicada 26.91-103.

Valdivieso, Humberto, Gilda Tassara, Juanita Magaña, and Carlos Duque. 1988. Le /s/ implosif dans l'espagnol de Concepción et de Valparaíso (Chili). La Linguistique: Revue de la Societe Internationale de Linguistique Fonctionnelle 24(2).131-41.

Valdivieso, Humberto, Juanita Magaña, and Gilda Tassara. 1991. La variation du /s/ implosif dans l'espagnol du Chili. La Linguistique: Revue de la Societé Internationale de Linguistique Fonctionnelle 27(1).119-27.

Walsh, Thomas J. 1985. The historical origin of syllable-final aspirated /s/ in dialectal Spanish. Journal of Hispanic Philology 9.231-46.

Wartburg, Walter von. 1967. La fragmentation linguistique de la Romania, trans. by Jacques Allières and George Straka. Paris: Klincksieck [original: Die Ausglierderung der romanischen Sprachräume. Bern: A. Francke, 1950].

Whitney, W. 1868. Language and the study of language. London.

Widdison, Kirk Allen. 1991. The phonetic basis for *s*- aspiration in Spanish. Unpublished Ph.D. dissertation, University of California, Berkeley.

Wigdorsky, Leopoldo. 1978. Realización de algunos fonemas consonánticos en el castellano de Santiago: informe preliminar. Revista de Lingüística Teórica y Aplicada (Concepción, Chile) 16.53-60.

Zamora Munné, Juan C., and Jorge M. Guitart. 1982. Dialectología hispanoamericana. Salamanca: Almar.

Zamora Vicente, Alonso. 1967. Dialectología española, 2nd ed. Madrid: Gredos.