Sadowsky, S. 2023. Sociophonetics and Spanishes. In: C. Strelluf (ed.), The Routledge Handbook of Sociophonetics, 1st ed. London: Routledge. 582–614. DOI: 10.4324/9781003034636-30

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SOCIOPHONETICS AND SPANISHES

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Introduction

This chapter surveys the sociophonetic literature on the Spanish language, a relatively small but growing body of linguistic knowledge. We operationally define this as primary quantitative studies of fluent L1 speakers of Spanish which analyze the behavior of one or more phonetic or phonological dependent variables (e.g., acoustic characteristics of a given phone, allophone selection for a certain phoneme, vowel formants) in terms of at least one social independent variable (e.g., speaker socioeconomic status, sex, age) in addition to geographic provenance, if this variable is used.

These criteria thus exclude handbooks and textbooks, works based solely on authors' impressionistic reflections, language attitude surveys which happen to include phonetic or phonological variables, studies of heritage speakers, and studies of learners of Spanish as a second language. These criteria also exclude studies which simply limit their speaker sample to people with shared values for one or more social variables without examining the effects of these variables on the linguistic ones—regardless of whether or not the studies claim to be sociolinguistic or sociophonetic in nature. Thus, an investigation of intervocalic /d̪/ lenition in upper-class women from Pelotillehue would be excluded, as it is a classic phonetic study with no sociolinguistic analysis. In contrast, a study of this same linguistic phenomenon that compares and contrasts its manifestations in upper-class men and women, or in upper- and lower-class women, for example, would be included. Finally, studies that analyze the effects of geographical provenance without considering any other social variable are not included, as this is the domain of classic dialectology.

In all, we examine 123 publications written in Spanish or English which meet the criteria outlined here. While every effort was made to be exhaustive, both space restrictions and imperfections in search strategies make it inevitable that some otherwise deserving works will be excluded.

We begin with a quantitative review of the sociophonetic literature by country. We then examine early Spanish sociophonetics (1890s–1980s) chronologically, with emphasis on its origins, influences, and methods. Subsequently, we explore what might be termed contemporary Spanish sociophonetics (1990s–present) in a thematic fashion: its central research questions, key theories and frameworks, and prominent methods and approaches are examined in turn. We then present a sociophonetic study of Chilean Spanish vowels, analyzed in terms of speaker sex and SES, as well as lexical stress, and close with some brief reflections on the future of Spanish-language sociophonetics.

 DOI: 10.4324/9781003034636-30

Note that the phonetic symbols used to represent Spanish vary immensely (and often confusingly) between authors. This chapter standardizes their representation using the International Phonetic Alphabet (International Phonetic Association 2015).

Spanish sociophonetics by country

The extent to which different varieties of Spanish have been researched in sociophonetic terms varies greatly. In absolute numbers, the Spanishes of Spain and Chile lead with 28 and 20 studies, respectively. A second tier is formed by Mexico (15 studies), Argentina (14), and Puerto Rico and Venezuela (11 each). From there, the amount of research declines steeply. A third tier is made up of Peru (4 studies); Colombia and Cuba (3 each); Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Panama, and the United States excluding Puerto Rico (2 each); and Nicaragua (1 study). No studies that met our inclusion criteria could be found for other countries where Spanish is a de facto or de jure official or auxiliary language, including Equatorial Guinea, Guatemala, Honduras, Paraguay, Uruguay, or the Philippines.

These absolute numbers shed a certain amount of light on the extent to which each national variety of Spanish has been studied through a sociophonetic lens. However, the number of speakers of each of these lects varies enormously, and it is not unreasonable to assume that there is, on the whole, more variation to account for in a variety of Spanish with 100 million speakers than in one with 5 million. Thus, an examination of the relative numbers is warranted. These are presented in Table 27.1, in terms of the number of studies per 10 million inhabitants, a fairly accurate proxy for the number of speakers except in the case of the United States.

Table 27.1 Sociophonetic studies by country or territory, in absolute numbers and per 10 million inhabitants

Studies			
Country/territory	*n*	*Per 10 million inhabitants*	*Inhabitants*
Puerto Rico	11	38.9	2,829,812
Chile	20	10.4	19,250,195
Spain	28	6.0	46,719,142
Panama	2	4.5	4,446,964
Costa Rica	2	3.9	5,182,354
Venezuela	11	3.8	29,266,991
El Salvador	2	3.1	6,550,389
Argentina	14	3.0	46,010,234
Cuba	3	2.7	11,305,652
Dominican Republic	2	1.8	11,056,370
Bolivia	2	1.7	11,992,656
Nicaragua	1	1.5	6,779,100
Peru	4	1.2	33,684,208
Ecuador	2	1.1	18,113,361
Mexico	15	1.1	131,562,772
Colombia	3	0.6	51,512,762
United States	2	0.1	334,805,269

Note. Countries with no studies are not shown. Population data are taken from https://worldpopulationreview.com/countries.

The picture that emerges from the relative numbers is a rather different one. Puerto Rican Spanish turns out to be the most sociophonetically well-researched variety of the language by far, with 38.9 studies per 10 million inhabitants. Chilean Spanish occupies a distant second place with slightly more than a quarter as many studies (10.4 per 10 million). The third most researched variety, Peninsular Spanish, has slightly more than half as many studies as Chilean Spanish (6.0 per 10 million). From there, only five varieties have been examined in three or more sociophonetic studies per 10 million speakers: those of Panama, Costa Rica, Venezuela, El Salvador, and Argentina.

While it is clear that sociophonetics has been gaining ground in the Spanish-speaking world, its development has been highly uneven, and a number of national varieties of the language are still nearly or completely unstudied in sociophonetic terms.

Early Spanish sociophonetics (1890s–1980s)

There is a long tradition of phonetic and phonological research on Spanish, with its modern phase perhaps beginning with German-Chilean linguist Rudolf Lenz's *Chilenische Studien* (Lenz 1892, 1893a, 1893b, 1893c, 1940 [reprint in Spanish]), a series of seven studies of different aspects of Chilean Spanish phonetics and phonology, as well as his *Beiträge zur Kenntnis des Amerikanospanisch* (Lenz 1893d), which in part examines the potential influence of Mapudungun, Chile's largest indigenous language, on the Spanish spoken in the country (a Spanish translation of these works is available in Lenz 1940).

Lenz was an unflinching and militant descriptivist in an academic culture that would remain largely prescriptivist for at least another century. In part as a result of his adherence to this modern, scientific principle, these works may well also constitute the first sociophonetic studies of Spanish, as they examine language variation between upper-, middle-, and lower-class speakers, the urban and rural lower classes, and occasionally the sexes, while also exploring language contact and, to a much lesser degree, speech style. This is particularly noteworthy given that what little research on language variation was being performed at the time focused mainly on elderly rural males, in the European dialectological tradition.

Unfortunately, Lenz's early forays into sociophonetics were largely ignored by the Hispanic linguistics establishment. It would not be until the early 1970s that research of this nature would finally take off.

Perissinotto's (1971) dissertation on the speech of 110 Mexico City speakers is one of the first such investigations. It explores six different linguistic phenomena: syneresis versus hiatus, final stop neutralization, /s/ voicing before voiced consonants, /f/ allophony, and /r/ and /ɾ/ fricativization. These phenomena are analyzed in terms of speakers' age, sex, and socioeconomic status (SES; in this case based on educational level, occupation, wealth, and "consciousness of the world around them"). Perissinotto cites Labov's (1966a) *Social stratification of English in New York City* as the model for his sociolinguistic analysis—which is unsurprising in light of the fact that he did his doctoral work at Columbia, where Labov was assistant professor until 1970. The investigation of /ɾ/ and /ɾ/ fricativization was published the next year as Perissinotto (1972), and a Spanish version of his dissertation was published several years later in book form as Perissinotto (1975).

Two years later, Cedergren's (1973) much-cited Cornell dissertation on sociophonetic variation in 79 Panamanian Spanish speakers was published. This work, carried out within the variable rule framework (Labov 1966b, 1969, 1972; Sankoff 1989[1974]), examines coda /s/ allophony in terms of speaker age, sex, SES (based on educational level, occupation, and neighborhood), and region,

as well as contextual style. Methodologically, it is particularly notable for using a rigorous, census-based sampling strategy, for developing a new, multiplicative probability model for variable rule analysis, and for utilizing the Varbrul software package (Cedergren & Sankoff 1974).

In the same year, Fontanella de Weinberg's (1973) study of coda /s/ allophony in 60 speakers from Bahía Blanca, Argentina was published. This investigation, also rooted in the variable rule framework, examines variation in terms of age, sex, occupational level, and style, though without computational support or the sophisticated math of Cedergren (1973). In addition to Labov (1966a), Fontanella de Weinberg bases her work in part on Shuy, Wolfram & Riley (1967) and Wolfram (1969).

Five years later, Terrell (1978) published a new study of coda /s/ allophony in Argentina, using a sample of 24 speakers from Buenos Aires. Results are analyzed in terms of speaker sex and age, and allophone counts are tabulated with the assistance of a computer. While Terrell, who was affiliated with UC Irvine at the time of publication, cites none of the foundational sociolinguistic studies of English-language speech communities, she does cite Cedergren (1973) and Fontanella de Weinberg (1973). This may be the first evidence of the spread of the nascent Spanish-language sociophonetic tradition. It could be said, however, that Terrell's study was only coincidentally sociophonetic in nature. It is grounded principally in Spanish dialectology, with a small contribution from historical linguistics. Furthermore, it uses a speaker sample deliberately designed to reflect (and perhaps appease) prescriptivist prejudices, in which speakers were required to be exclusively upper-middle class and university educated. This class bias, which is anathema to all types of sociolinguistic research, is common in Hispanic linguistics.

Argentina's early leadership in sociophonetic research was further established by Wolf & Jiménez's (1979) study of /ʝ/ allophony in four different samples, made up of a combined 298 speakers from Buenos Aires. Using the variationist approach, with specific reference to Labov (1972), the authors focus on the devoicing of [ʒ] to [ʃ] (a phenomenon sometimes labeled *sheísmo*; cf. *zheísmo* 'merger of /ʝ/ and /ʎ/ to [ʒ]' and *yeísmo* 'merger of /ʝ/ and /ʎ/ regardless of the phonetic outcome') and seek to determine the social origins of what they consider to be a change-in-progress. Results are analyzed in terms of age, sex, impressionistic SES, and speech style. Neighborhood, occupation, educational level, and birth order among siblings were also examined in specific samples. This same phenomenon would later be studied by Wolf (1984) using the both the real-time and apparent-time paradigms.

At around the same time, Bobadilla & Bobadilla (1979, 1980) published reports of a study of /t͡ɾ̪/, /t͡ʃ/ and /r/ allophony in 144 speakers from Rancagua, a small city just south of the Chilean capital, Santiago (see Sadowsky 2015 for additional detail on the complexity of /t͡ɾ̪/ in Chilean Spanish). The authors analyze the production of these phonemes in terms of age, sex, SES (based on income, educational level, occupation, and "key assets"—such as owning a telephone, car, or home, and having a maid), and speech style. Bobadilla & Bobadilla (1980) is unusual in that it includes an in-depth discussion of variation as a linguistic concept, with emphasis on Labov's variable rules paradigm, while also taking inspiration from Wolfram (1978), Trudgill (1974), and Hymes (1971). It provides a defense of sociolinguistics as a legitimate approach to studying language, especially vis-à-vis the European structuralism that dominated Hispanic linguistics and the generativism that was fast taking the discipline by storm in United States. Furthermore, it includes a discussion of sociolinguistic research methodology, including speaker stratification methods and the statistical treatment of results, which refers to two unreferenced publications by Labov (most likely Labov 1966a and Weinreich, Labov & Herzog 1968), and cites Shuy, Wolfram & Riley (1967). No mention of prior sociophonetic research on Spanish is made in this paper.

Bobadilla & Bobadilla (1980) is thus a sort of primer on the theory and method of the sociolinguistic investigation of speech, and it is cited in Chilean sociophonetic literature to this day. It is not unreasonable to think that it helped spark the current strong interest in the field in Chile.

Unfortunately, the authors report almost none of the results of their investigation. They provide only a single table with the relative frequencies of two allophones of /t͡ɾ/, three of /r/, and two of /t͡ʃ/ for the overall speaker sample, along with the results of a "linguistic insecurity test." They state that they will provide a full analysis in future publications, but this apparently did not occur.

Peninsular Spanish is examined in sociophonetic terms in Holmquist's (1985) study of word-final /o/ raising (→ [u]) in 49 speakers from the rural village of Ucieda. The author's goal in this paper is to shed light on social changes caused by the Spanish Civil War and the Franco regime. To this end, he examines not just the by-then common social variables of sex, age, and occupation, but also ownership of mountain animals (which turned out to correlate with local low-prestige variants) and political orientation. Methodologically, this paper is one of the first to perform a statistical analysis of its data, using ANOVA and the SPSS statistical package. The author draws a parallel between his results and those of Labov's (1963) study of Martha's Vineyard, arguing that in both cases certain groups signal an "independent and protective attitude" toward their locality by means of the retention of an older form of a linguistic feature that is undergoing change.

The Spanish of the Dominican Republic is examined in sociophonetic terms in Alba's (1988) study of word-final /ɾ/ and /l/ in 12 speakers from Santiago, in the region of Cibao. Speakers are grouped into two SES levels, high and low, and those belonging to the lower SES group are further divided into two age groups. No mention is made of sex, including in the description of the speaker sample. However, the fact that the eight low-SES speakers are manual laborers suggests that they are men, and the four upper-SES "professionals" likely are, too, to prevent speaker sex from becoming an uncontrolled or confounding variable. This is in line with the not uncommon practice in Hispanic linguistics of only taking into account men's speech. Alba's study is firmly rooted in the dialectological tradition of Spain, and no sociolinguistic literature is mentioned. Results are presented as percentages without token counts, and no statistical analysis of the data is performed. The author would later reexamine these linguistic variables, along with /s/, in much more sociophonetic terms, after a stint as a Fulbright Scholar at the University of Pennsylvania with Labov and Gillian Sankoff (Alba 1990).

Sanicky (1988) investigated /f/ allophony in 129 speakers from Argentina's Misiones province, where this phoneme has a series of voiced, labialized, bilabial, and velar allophones. Results are analyzed in terms of speakers' age, "cultural level" (based on educational level, occupation, "interests," and "social circle"), and region within the province. There is no indication of whether the sample is made up of men, women, or a combination of the two. Results are presented as allophone counts and percentages, with no statistical treatment. Although this investigation is predominantly based on the Spanish dialectology tradition, it does cite one work from the nascent Spanish-language sociophonetic literature, Perissinotto (1975).

Dorta (1989) examines /ɾ/ and /l/ in onset consonant clusters, between vowels and in coda in 12 speakers from La Perdoma, Spain. Speakers are stratified using three social variables: sex, age, and "sociocultural level." This study is firmly rooted in the Spanish dialectological tradition; though it does make reference to certain sociolinguistic works, including López Morales (1983) and an unreferenced publication by Cedergren, it does so only to compare overall allophone counts. The results reported include these counts and their corresponding percentages. No statistical analysis is performed.

Finally, Rissel (1989) analyzes /r/ and /ɾ/ fricativization in a sample of 56 speakers from San Luis Potosí, Mexico, with the goal of shedding light on the processes that drive language change. Note that although this paper refers only to /r/, Rissel follows Harris's (1969) analysis in which Spanish has a single rhotic phoneme, and thus the coda "/r/" she refers to is in fact /ɾ/ in most analyses. The speakers, who were between 12 and 22 years of age, were stratified by sex and "sociocultural level" (calculated using speakers' school type and parents' occupation and educational levels), plus an innovative ideological variable: speakers' attitudes toward traditional male and female roles. Two speech styles were examined. This paper is methodologically innovative due to its use of computers not just to tabulate results but also to assist in coding the data. A three-way ANOVA was used to determine if social variable interactions were significant. The author finds "striking" similarities between her results and those of Fontanella de Weinberg's (1979) study of /ʒ/ devoicing in Argentina. In both cases, an innovative change appeared first in middle- and upper-class women, and subsequently spread to lower-class women, with lower-class men largely rejecting the change. Lower educational levels favored adoption of the change. Agreement with traditional sex roles favored the change in women while disfavoring it in men. Rissel's (1989) investigation, which was published while she was affiliated with SUNY Buffalo, is firmly rooted in the sociolinguistic tradition of authors such as Labov (Labov 1966a, 1972), Labov, Yaeger & Steiner (1972), Milroy (1981), and Trudgill (1972). At the same time, she also cites Perissinotto (1972) and Fontanella de Weinberg (1973), two authors from the Spanish-language sociophonetics tradition.

This overview of some of the key early works in the field shows that Spanish sociophonetics arose independently from two different traditions: American sociolinguistics and Spanish dialectology. The sociolinguistic tradition was for the most part transmitted through both Latin American and US researchers who were trained in the United States. The Spanish dialectological tradition, on the other hand, was home-grown and arose gradually, as mostly Spanish and Latin American authors added additional variables to classic dialect research, often under the influence of the burgeoning field of sociolinguistics.

Central research questions

Spanish-language sociophonetic research has focused largely on describing the same phonological phenomena that classic Spanish dialectology has studied for over a century (see, among many others, Henríquez Ureña 1921, 1930, 1931; Wagner 1927; Alonso 1930; Navarro Tomás 1945; García de Diego 1946; Rona 1958, 1964; Zamora Vicente 1960; Canfield 1962; Lapesa 1964; Resnick 1969, 1976; Montes 1970; Zamora Munné 1980; Lope Blanch 1992; Moreno Fernández 1993). These phenomena consist mainly of consonant allophony, although some work has been done on certain aspects of vowels, and a few investigations of suprasegmental processes have been performed. The number of studies which analyze each is presented in Table 27.2. Note that the number of studies exceeds the number of publications reviewed because many publications examine more than one phenomenon.

By far the most researched topic among the 123 sociolinguistic publications we have reviewed is /s/ variation, which has been studied some 43 times (see also Chappell, García & Davidson this volume). Most studies focus on coda /s/ lenition or elision. This phoneme has been examined in Argentina in terms of age, sex, SES, and style (Fontanella de Weinberg 1973), age and sex (Terrell 1978), and age, sex, and SES (Sanicky 1996); in Chile in terms of age and sex (Cepeda 1990b), age, sex, and SES (Cepeda 1990a; Bolyanatz 2017; Rogers 2020), and sex and SES (Perdomo-Pinto & Sadowsky 2019); in Colombia in terms of age and sex (Ramírez & Almira 2016), age, sex,

Table 27.2 Number and percentage of 123 Spanish-language sociophonetic studies which analyze each linguistic variable

Linguistic variable	*Studies*	
	n	*%*
/s/	43	35.0
/ɾ/	23	18.7
/r/	17	13.8
/d̪/	16	13.0
vowels	14	11.4
/l/	10	8.1
/ʝ/	8	6.5
/k/	7	5.7
/t͡ʃ/	7	5.7
/b/	6	4.9
/p/	6	4.9
/ɡ/	4	3.3
/t̪/	4	3.3
/t̪ɾ/	4	3.3
/f/	3	2.4
seseo	3	2.4
/n/	2	1.6
suprasegmental	2	1.6
/ɲ/	1	0.8
/x/	1	0.8
/ʎ/	1	0.8
/m/	0	0.0
/θ/	0	0.0

and SES (Correa 2017), and age, sex, educational level, occupation, and region of origin (Colina 2018); in Costa Rica in terms of sex (Calvo Shadid 1997) and sex, SES, perceived educatedness, and sexual orientation (Chappell 2016); in Cuba in terms of age, sex, SES, and urban/rural provenance (Alfaraz 2000); in the Dominican Republic in terms of age, sex, SES, and educational level (Alba 1990); in Ecuador in terms of age and sex (García 2015) and age, sex, regional origin, and perceived status and pleasantness (García 2019); in El Salvador in terms of age, sex, educational level, region, and urban/rural provenance (Brogan 2018; Brogan & Bolyanatz 2018); in Mexico in terms of sex (Schmidt & Willis 2011), age and sex (Schmidt & Willis 2011), and age, sex, and SES (Perissinotto 1971); in Nicaragua in terms of age, sex, and SES (Chappell 2013); in Panama in terms of age, sex, and SES (Cedergren 1973); in Peru in terms of sex (Bernate 2016) and sex, educational level, occupation, social network, migratory origin, and migrant generation (Klee et al. 2018); in Puerto Rico in terms of sex (Holmquist 2011), age, sex and SES (Emmanuelli 2000), age, sex, educational level, and years lived in Puerto Rico (Mumin 2017), and age, sex, and level of bilingualism (Mohamed & Muntendam 2020); in Spain in terms of educational level (Fernández de Molina Ortés 2016), sex (Henriksen & Harper 2016), age and sex (Tejada Giráldez 2012), age, sex, and "sociocultural level" (Calero 1990; Pérez Martín 1995), and age, sex and educational level (Tejada Giráldez 2015; Vida-Castro 2015, 2016; Kapović 2017); in the United States in terms

of sex, SES, and country and region of origin (Erker 2012); and in Venezuela in terms of sex and SES (Ruiz Sánchez 2004), age, sex, and educational level (Carrasquero 2010), and age, sex, educational level, occupation, and region of origin (Colina 2018).

The second most commonly researched phenomenon is /ɾ/ allophony, which has been examined by 23 studies, slightly more than half as many as /s/. This line of inquiry focuses on three main topics: fricativization of word-final /ɾ/, neutralization of the contrast between /ɾ/ and /l/, and general allophony. This phoneme has been analyzed in Argentina in terms of age, sex, and SES (Sanicky 2001); in Cuba in terms of age and sex (Alfaraz 2007) and age, sex, SES, and urban/rural provenance (Alfaraz 2000); in the Dominican Republic in terms of age and SES (Alba 1988) and age, sex, SES, and educational level (Alba 1990); in Mexico in terms of age and sex (Mazzaro & González de Anda 2019), age, sex, and SES (Perissinotto 1971, 1972, 1975), age, sex, and educational level (Lastra & Martín Butragueño 2006), and age, sex, and attitudes toward traditional sex roles (Rissel 1989); in Panama in terms of age, sex, SES, and attitudes toward the capital (Broce & Torres Cacoullos 2002); in Peru in terms of age, sex, and SES (Alvord, Echávez-Solano & Klee 2005); in Puerto Rico in terms of age and sex (Beaton 2015, 2016), age, sex, and SES (Prosper-Sánchez 1995; Emmanuelli 2000), age, sex, educational level, and years lived in Puerto Rico (Mumin 2017), and age, sex, educational level, and level of bilingualism (Santiago Molina 2017); in Spain in terms of age, sex, and SES (Dorta 1989); in the United States in terms of age and sex (Mazzaro & González de Anda 2019); and in Venezuela in terms of age, sex, and educational level (Ugueto 2016) and age, sex, and SES (Ugueto 2007; Molina Boscán 2010; Díaz-Campos, Fafulas & Gradoville 2011).

Variation in /r/ follows in frequency, with 17 studies, most of which focus on allophone variation or fricativization. It has been studied in Argentina in terms of age, SES, and region (Sanicky 1992); in Chile in terms of sex and "sociocultural level" (Figueroa 2011) and age, sex, and SES (Zepeda-Pallero 2019); in Mexico in terms of age, sex, and SES (Perissinotto 1971, 1972, 1975), age, sex, and educational level (Lastra & Martín Butragueño 2006), and age, sex, and attitudes toward traditional sex roles (Rissel 1989); in Peru in terms of sex, SES, urban/rural provenance, social network, bilingualism, and various attitudes (Diez Canseco 1997) and age, sex, and SES (Alvord, Echávez-Solano & Klee 2005); in Puerto Rico in terms of age, sex, and SES (Emmanuelli 2000); in Spain in terms of sex and region (Henriksen 2014), age and region (Zahler & Daidone 2014), and age, sex, and educational level (Melero 2015); and in Venezuela in terms of age, sex, and SES (Ugueto 2007; Díaz-Campos 2008).

The allophones of /d̪/ are the fourth most researched phenomenon, with 16 studies, almost all of which analyze intervocalic lenition or elision. It has been examined in Chile in terms of sex (Verdugo 2019) and age and sex (Rogers 2016); in Mexico in terms of sex and educational level (García Ponce & Mora 2018) and age, sex, and SES (Perissinotto 1971); in Puerto Rico in terms of age, sex, and SES (Emmanuelli 2000); in Spain in terms of age and sex (Villena et al. 2011; Jiménez-Fernández 2020), sex and occupation (Cruz Ortiz 2019), age, sex, and educational level (Uruburu 1994; Samper Padilla & Samper Hernández 2020), age, sex, and "cultural level" (Uruburu 1996), and age, sex, and bilingualism (Gómez Molina & Gómez Devís 2010); and in Venezuela in terms of age, sex, and SES (Bongiovanni 2013) and age, sex, and educational level (Malaver & Perdomo-Pinto 2016).

The fifth most studied phenomenon is vowels, with 14 investigations. The research that exists in this area is mostly exploratory, having little previous work on which to build. The social stratification of vowels has been studied in Chile in terms of "sociocultural level" (Salamanca & Valverde 2009) and sex and SES (Sadowsky present volume); and in Spain in terms of sexual orientation (Osle Ezquerra 2015). Vowel raising has been studied in Mexico in terms of age, educational

level, occupation, mobility, and social network (Barajas 2014); and in Puerto Rico in terms of age, occupation, and social network (Holmquist 2005), age, sex, occupation, and social network (Holmquist 2008), and age, sex, occupation, mobility, and social network (Oliver 2008). Final /o/ raising to [u] has been examined in Spain in terms of age, sex, and occupation (Holmquist 1985) and sex, educational level, occupation, bilingualism, and familiarity with interlocutors (Barnes 2016). Vowel reduction has been studied in Bolivia in terms of age and sex (Sessarego 2012, 2013); and in Mexico in terms of age, sex, and SES (Dabkowski 2018). And hiatus resolution has been examined in Mexico in terms of age and sex (Vuskovich 2006) and age, sex, and educational level (Hernández 2009).

Variation in /l/ has been examined by 10 investigations, which focus almost exclusively on the allophony of this phoneme in coda position, often in tandem with /ɾ/ for the purpose of analyzing the neutralization of the two. It has been studied in Cuba in terms of age and sex (Alfaraz 2007) and age, sex, SES, and urban/rural provenance (Alfaraz 2000); in the Dominican Republic in terms of age and SES (Alba 1988) and age, sex, SES, and educational level (Alba 1990); in Panama in terms of sex, SES, and attitude toward the capital (Broce & Torres Cacoullos 2002); in Puerto Rico in terms of age and sex (Beaton 2015, 2016) and age, sex, and SES (Prosper-Sánchez 1995); in Spain in terms of age, sex, and SES (Dorta 1989); and in Venezuela in terms of age, sex, and SES (Molina Boscán 2010).

The phoneme /ʝ/ has been examined in eight studies, which focus on the social stratification of its allophony, and often specifically on devoicing. It has been studied in Argentina in terms of age, sex, and region (Chang 2008), age, sex, and SES (Sanicky 2008; Rohena-Madrazo 2011; Rohena-Madrazo 2015), and age, sex, SES, educational level, and occupation (Wolf & Jiménez 1979); in Chile in terms of sex and "sociocultural level" (Figueroa 2011); and in Spain in terms of age, sex, and "sociocultural level" (Calero 1990).

Variation in /k/ production is studied in seven publications, most of which focus on spirantization and/or voicing. It has been examined in Chile in terms of age, sex, and SES (Rogers & Mirisis 2018; Sadowsky & Verkijk forthcoming) and age, sex, educational level, and a series of perceptual variables (Bolyanatz & Rogers 2019); in Colombia in terms of age and SES (Correa 2017); in Mexico in terms of age, sex, and SES (Perissinotto 1971) and age, sex, and bilingualism (Michnowicz & Carpenter 2013); and in Venezuela in terms of age, sex, and SES (Bongiovanni 2013).

The phoneme /t͡ʃ/ has been examined in seven studies, all regarding fricativization. In Chile, it has been studied in terms of age and "sociocultural level" (Figueroa 2011), age, sex, SES, and educational level (Valdivieso 1998), and age, sex, SES, educational level, occupation, and urban/rural provenance (Bobadilla & Bobadilla 1980); in Mexico in terms of age and sex (Mazzaro & González de Anda 2019) and age, sex, SES, educational level, and bilingualism (Méndez 2017); and in Spain in terms of age, sex, and educational level (Melguizo 2007).

The phoneme /b/ has been examined in six publications. Most focus on lenition or elision. It has been studied in Chile in terms of sex (Verdugo 2019) and age and sex (Rogers 2016); in Mexico in terms of age, sex, and SES (Perissinotto 1971); and in Venezuela in terms of age, sex, and SES (Bongiovanni 2013; Long & Baldwin 2013). One study, however, examines the use of the voiced labiodental fricative [v] as the main allophone of /b/ in Chile, in terms of age and literacy (Vergara-Fernández 2013).

Variation in /p/ production has also been examined in six studies, most of which focus on lenition or elision. In Chile, it has been analyzed in terms of sex and SES (Sadowsky & Yáñez-Valdenegro forthcoming), age, sex, and SES (Rogers & Mirisis 2018), and sex, region, and migratory status (Sadowsky & Aninao 2019); in Mexico in terms of age, sex, and bilingualism (Michnowicz &

Carpenter 2013) and age, sex and SES (Perissinotto 1971); and in Venezuela in terms of age, sex and SES (Bongiovanni 2013).

The variation of /g/ has been analyzed by four studies, which focus on lenition or elision. It has been examined in Chile in terms of sex (Verdugo 2019) and age and sex (Rogers 2016); in Mexico in terms of age, sex, and SES (Perissinotto 1971); and in Venezuela in terms of age, sex, and SES (Bongiovanni 2013).

The phoneme /t̪/ has been examined in four publications: in Chile, in terms of age, sex, and SES (Rogers & Mirisis 2018); in Mexico in terms of age, sex, and bilingualism (Michnowicz & Carpenter 2013) and age, sex and SES (Perissinotto 1971); and in Venezuela in terms of age, sex, and SES (Bongiovanni 2013).

The variation of /t̪ɾ/ or [t̪ɾ] has been examined in four studies: in Argentina in terms of age, SES, and region (Sanicky 1992); and in Chile in terms of sex and "sociocultural level" (Figueroa 2011) and age, sex, SES, educational level, occupation, and urban/rural provenance (Bobadilla & Bobadilla 1980). In addition, various studies of /ɾ/ examine [t̪ɾ] separately from [ɾ] in general.

Variation in /f/ production has been studied in three publications: in Argentina in terms of age, SES, and region (Sanicky 1988) and in Mexico in terms of age, sex, and educational level (Robles-Puente & Vilches-Aguado 2019) and age, sex and SES (Perissinotto 1971).

Seseo—the merger of /s/ and /θ/ to [s] (the merger is referred to as *ceceo* when it resolves to [θ]) has been explored in three investigations in Spain: in terms of age, sex and "sociocultural level" (Uruburu 1996), age, sex, and educational level (Ruiz Sánchez 2017), and perceived sex, SES, educational level, urban/rural provenance, and some other variables (Regan 2019).

The phoneme /n/ has been studied in two investigations: in Cuba in terms of age, sex, educational level, and occupation (Darías, Ruisánchez & Dohotaru 1997); and in Spain in terms of age, sex, and SES (Martín Morales 2018).

Suprasegmental phenomena have also been examined in two studies. Prosody patterns were examined in Argentina in terms of age and sex (Enbe & Tobin 2008); and [ʔ] as a word boundary marker was explored in Nicaragua in terms of age, sex, and educational level (Chappell 2013).

Finally, the loss of the /ɲ/ phoneme (→[nj]) was studied in Argentina in terms of age and sex (Bongiovanni 2019); /x/ palatalization was studied in Chile in terms of age, sex, and audience (Flores 2016); and /ʎ/ allophony in Peru was studied in terms of sex, SES, urban/rural provenance, social network, bilingualism, and various attitudes (Diez Canseco 1997). There were no sociophonetic studies of /m/ variation, nor of /θ/ except in the context of *seseo* or its absence.

Key theories and frameworks

Early sociophonetics tended to be split between the Labovian variable rule framework and traditional Spanish dialectology, as described above. By the 1980s, the variable rule framework was giving way to a more modern quantitative variationism. Research done in this school tends to elicit speech through interviews, stratifies speakers using SES or a proxy thereof (in addition to other variables), sometimes includes a statistical analysis, and often (but by no means always) seeks to contribute to the understanding of language variation and change, in addition to describing language variation.

Sociophonetics performed in the Spanish dialectological tradition added a quantitative approach to traditional dialectology, which tended to characterize entire regions in rather absolute terms based on one or a small handful of speakers. It also added some social variables to the dialectological repertoire. Otherwise, it remained largely true to its roots. Studies done in this school frequently elicit speech through the recitation of word lists, tend to focus on speaker age and sex

as social variables, rarely use any sort of statistical analysis, and often aim to shed light on the historical development and geographic spread of Spanish.

In the last two decades, sociophonetics from the sociolinguistic tradition has made great advances, and looks poised to largely replace the dialectological tradition, except perhaps in Spain, where dialectology still enjoys prestige and institutional support.

The vast majority of Spanish-language sociophonetic studies are carried out (wittingly or not) within the framework of first-wave sociolinguistics, which is characterized by the analysis of variation in terms of broad demographic categories. This trend shows no sign of abating, likely because social class in most Spanish-speaking countries continues to be rigid and largely resistant to mobility, making it a useful and powerful predictor of linguistic behavior if measured accurately.

Five of the studies examined (4.1 percent) use a second-wave social network focus (see Milroy 1980). These are Diez Canseco (1997), Holmquist (2005, 2008), Barajas (2014) and Klee et al. (2018). The small number of studies of this type indicates that this framework has not prospered.

The study of style was present from the very beginning of the field, in Cedergren (1973), Fontanella de Weinberg (1973), and Wolf & Jiménez (1979), and it continues to be examined to this day with moderate frequency. However, it is normally treated as one more social variable within the first-wave paradigm, without the focus on its social meaning that characterizes the third wave of sociolinguistics.

In phonetic terms, the overwhelming majority of sociophonetic studies of Spanish analyze speech production. However, a small handful of perception investigations have begun to appear recently, including Rohena-Madrazo (2011), García (2015), Chappell (2016), Bolyanatz & Rogers (2019), and Regan (2019). Chappell's (2019) edited volume contains many such studies.

Methods and approaches

Sample size

As Spanish-language sociophonetics has developed over time, the speaker samples used by researchers have grown steadily smaller, as shown in Table 27.3 and Figure 27.1. Mean and median sample sizes have decreased every decade, from a high of 112.8 and 69.5, respectively, in the 1970s, to just 40.4 and 30.0 in the most recent period. Minimum sample sizes have also trended downward, from 24 in the 1970s to just 4 at present, with an exceptional uptick to 11 in the 2000s. Maximum sample sizes dropped from the 1970s (288) to the 1990s (129), before the trend reversed, reaching 179 in the most recent period.

Table 27.3 Number and sample sizes of sociophonetic studies over time

		Sample size			
Years	*Studies*	*Mean*	*Median*	*Minimum*	*Maximum*
1970–1979	5	112.8	69.5	24	288
1980–1989	7	67.0	52.5	12	144
1990–1999	13	58.2	49.0	8	129
2000–2009	20	45.3	33.5	11	165
2010–present	77	40.4	30.0	4	179

Note. Lenz's works from the 1890s are not included.

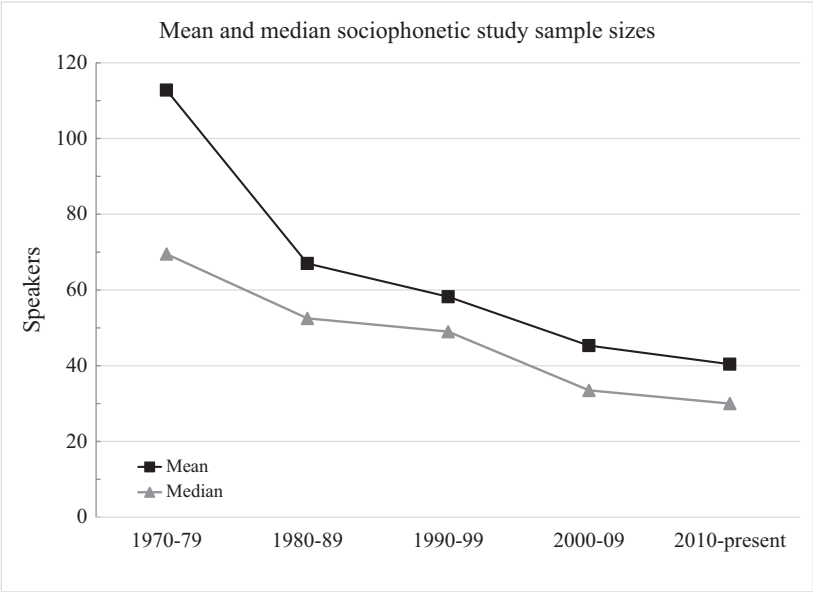

Figure 27.1 Mean and median sample sizes of sociophonetic studies over time

Considering that the reel-to-reel tape recorders, manually calculated statistics, expensive mechanical or electronic sonograph machines, and scarce mainframe computers of yore have been replaced by cheap and light digital recorders, freely available statistical and phonetic analysis software, and ubiquitous, powerful personal computers, this situation is rather counterintuitive. One would expect that the vastly increased convenience, affordability, power, and speed with which modern sociophonetic studies can be performed would lead to larger and larger sample sizes, in a quest to increase representativity, generalizability, and detail. But this is not the case. It should be noted that perception studies, which normally generate stimuli by eliciting recordings from just a small handful of speakers, are not responsible for this downward trend in sample sizes (except for the minimum sample size), as they account for only a small number of the publications examined (8.1 percent). While an exploration of the possible reasons for this phenomenon is out of the scope of this chapter, research funding levels and increasing pressure to maximize publication numbers would seem likely to play a role.

Table 27.3 also shows the number of studies published per decade. The pattern that emerges is one of very slow growth for the first 30 years of the discipline (1970–1999), followed by a 54 percent increase in publications between the 1990s and 2000s, and an impressive 285 percent jump between the 2000s and the most recent period.

Sample characteristics

On the whole, Spanish-language sociophonetic studies use a speaker sample design that is more or less balanced in terms of the social variables they analyze. However, there are two exceptions to this that deserve comment.

Firstly, in the early days of the discipline, and occasionally into more recent times, a certain proportion of studies used samples made up exclusively of men, while some others reported no

information on speakers' sex, and presumably included only male speakers. These studies are mostly from the Spanish dialectological tradition. This type of sample design not only reduces new knowledge of the varieties under study but may also corrupt the scientific record by incorrectly presenting phenomena that are predominantly or exclusively present or absent in male speakers as being so in all speakers.

Secondly, a nontrivial number of studies suffer from a strong class bias. These studies limit their speaker samples to upper-middle and/or upper-class speakers, either overtly or using some sort of euphemism for these classes (e.g., "educated speakers," "professionals," "university-educated speakers," "speakers of the educated norm"), all of which refer to statuses to which access is still strongly mediated by wealth in most of the Spanish-speaking world. While the origins of this bias cannot be explored here, Lope Blanch's (1968) highly influential Project for the Coordinated Study of the Educated Linguistic Norm in the Main Cities of Ibero-America and the Iberian Peninsula, founded in 1964, doubtlessly played a significant role in normalizing it. This project, which organized and oversaw the creation of early speech corpora throughout the Spanish-speaking world, limited its speaker samples to "speakers of the educated language norm." To be considered as such, speakers were required to have a university degree, know at least one foreign language, have read "relevant literature," and (if possible) have traveled abroad (Rabanales 1992). In practice, this limited samples to members of each country's economic elite. As a result of this bias, much less is known about the speech of lower-, lower-middle-, and middle-class Spanish speakers than about the speech of the upper-middle and upper classes. Once all of society is systematically included in investigations of Spanish, it would be unsurprising if generalizations made about particular varieties of the language proved to be incorrect and new phenomena were discovered.

Elicitation

Many early Spanish-language sociophonetic studies used the reading of word lists to elicit speech, in the dialectological tradition. Although this practice is being superseded by the use of interviews, or of a series of elicitation methods aimed at obtaining different speech styles, it has not completely disappeared. This should be kept in mind when comparing otherwise similar studies.

Data coding

Impressionistic coding of speech data was predominant during the first three to four decades of Spanish-language sociophonetics. However, acoustic measurements from Praat (Boersma & Weenink 2022) have begun to dominate. One problematic practice in this area which is still fairly common is that of deciding beforehand what allophones will be analyzed, and then either forcing the allophones that are found into one of these predefined categories, or discarding unanticipated allophones entirely from the study. This can skew results and hinder the discovery of new phenomena.

Social variables

The two most common social variables in Spanish-language sociophonetics are speaker sex and age, which are used by 91.9 percent and 77.2 percent of studies, respectively (Table 27.4).

While most English-language sociophonetic studies attempt to codify speakers' socioeconomic characteristics with a single variable typically referred to as "socioeconomic status," which is largely congruent with the classic concept of social class, attempts to do the same in research on

Table 27.4 Number and percentage of 123 Spanish sociophonetic publications which analyze each listed social variable

Social variable	*Publications*	*%*
Sex	113	91.9
Age	95	77.2
Educational level	44	35.8
Socioeconomic status	35	28.5
Occupational level	16	13.0
Region/country	11	8.9
Sociocultural level	10	8.1
Other	8	6.5
Bilingualism	7	5.7
Rural/urban	6	4.9
Social network	5	4.1
Migration status	4	3.3
Other socioeconomic variables	3	2.4
Ethnicity	3	2.4
Income	3	2.4
Neighborhood	3	2.4
Sexual orientation	2	1.6
Literacy	1	0.8
Possessions	1	0.8

Spanish are highly idiosyncratic and deeply heterogeneous. The most common variable used to classify speakers in terms of social class is educational level (used in 35.8 percent of studies), despite the fact that the correlation between the two is far from certain. The second most commonly used variable, referred to by authors as "socioeconomic status" (28.5 percent), is in reality a cover term for myriad other variables, sometimes taken singly, other times used as part of an ad hoc formula, and still other times used both individually and as part of such a formula. Furthermore, many authors simply assign socioeconomic status values to speakers impressionistically. The third most utilized variable for these purposes, occupational level (13 percent), suffers from similar problems, with each author using their own ad hoc classification of economic activities. A mysterious construct known as "cultural level" or "sociocultural level" (8.1 percent) is also used in some studies, not infrequently without being defined by the authors. A handful of further variables have also been used for quantifying social class, including income (2.4 percent), neighborhood (2.4 percent), possessions (0.8 percent) and several others (2.4 percent).

This profound lack of standardization makes it doubtful that any Spanish-language sociophonetic study of a given phenomenon can be validly compared with any other in terms of socioeconomic status, except perhaps those carried out by the same author(s) using the same socioeconomic variables. This will increasingly become an issue as the discipline matures and questions about Spanish sociophonetic variation around the world and language change over time become more pressing. Sadowsky (2021) developed a standardized method for stratifying speakers of Chilean Spanish, but it is likely not transferrable to speakers of other national varieties. It would therefore be advantageous if similar efforts were undertaken in other countries.

The remaining social variables are utilized only sporadically. These include region or country of origin (used in 8.9 percent of studies); bilingualism (5.7 percent; these typically refer to

Spanish and English, but a few studies refer to Spanish and another language spoken in the Iberian Peninsula); rural or urban origin (4.9 percent); social network, usually in terms of its density (4.1 percent); migration status (3.3 percent); ethnicity (2.4 percent); sexual orientation (1.6 percent); literacy (0.8 percent); and a series of others (6.5 percent).

Statistical analysis

The statistical analysis of results was rare during the first 40 years of Spanish-language sociophonetics, but has become fairly common in the last decade. Most authors who perform a statistical analysis now do so with R (R Core Team 2022) and a series of packages, often Rbrul (Johnson 2009, 2019).

CASE STUDY Sex, socioeconomic, and stress variation in Chilean Spanish vowels

Socially stratified consonant allophones were first observed in Chilean Spanish by Lenz (1892–1893) and have continued to be explored (e.g., Bobadilla & Bobadilla 1980; Valencia 1993; Figueroa, Soto-Barba & Ñanculeo 2010; Sadowsky 2015). Additional sociolinguistic variation has been found in the Chilean lexicon (Contardo 2008), clitic system (Silva-Corvalán 2001), and *voseo* verb forms (González 2002), among others. The rich and diverse correlations between social variables and consonant allophony suggests that similar patterns are likely to manifest themselves in the vowel system, as well.

The research presented here examines the interaction of two social variables, sex and socioeconomic status, with the vowel allophones produced by Chilean Spanish speakers. It also examines the effects of a phonological variable, lexical stress, on vowel production. Examining stress was deemed necessary because a preliminary analysis of the data showed that, contrary to the commonly held belief that Spanish vowels are stable and not particularly subject to reduction, Chilean Spanish vowels vary based on the stress of the syllable they occur in.

Methods

The speaker sample consists of 61 young adults (16–19 years of age) from the province of Concepción, a conurbation of some 1 million inhabitants located approximately 440 km south of Chile's capital, Santiago. All are native, monolingual Chilean Spanish speakers, and are life-long inhabitants of Concepción, having spent no more than one year of their lives living elsewhere. Speakers' socioeconomic status (SES) was calculated with the EMIS method (Sadowsky 2021), and a fixed-quota sample was established and filled. The final speaker sample contains 30 female and 31 male speakers belonging to one of five SES levels: Extreme Upper (A), Upper (B), Upper-Middle (Ca), Lower-Middle (Cb), and Lower + Extreme Lower (D+E; these two strata were combined due to the difficulty of recruiting participants from the Extreme Lower stratum). All cells but two contain at least five speakers; the remaining two cells contain four.

Speech was elicited by means of a 900-word reading task made up of six narrative texts. While the use of reading activities in vowel research is almost unprecedented in the English-speaking world, it is the most common method used in Spanish linguistics, likely due to the fact that most such studies seek

to establish reference values rather than account for variation. This elicitation method was thus chosen, as it allows our results to be compared with those of the bulk of Spanish vowel studies.

Vowel F1 and F2 values were measured in Praat (Boersma & Weenink 2022). The central 30 ms of the stable portion of 6547 monophthong vowel tokens found in polysyllabic words were identified, segmented, and tagged for vowel phoneme, left environment, right environment, and syllable stress (pre-stressed, stressed, post-stressed). Acceptable left and right environments were any combination of /p t̪ k b d̪ g ɾ f s x/, utterance-initial position, and utterance-final position. Devoiced and creaky-voiced vowels, vowels produced while laughing, yawning, or coughing, and vowels with any appreciable background noise were excluded. Tokens of /i/ and /e/ after /x/ were also excluded due to the possible effects of the strong palatalization that /x/ undergoes in this environment in Chilean Spanish (Tapia & Valdivieso 1997; Flores 2016).

During the vowel tagging process, the optimal "maximum formant (Hz)" and "number of formants" settings for each vowel and speaker were determined through trial and error in Praat and stored in an ad hoc metadata segment of the Praat text grid. A custom script was then used to measure the F1 and F2 values of each token and calculate their average value in the measured segments. This script made use of the optimal formant analysis settings mentioned above in order to produce maximally accurate measurements.

For the statistical analysis, vowels were normalized using the Nearey 1 formula as implemented by the vowels package (Kendall & Thomas 2014) for R (R Core Team 2022). A mixed-effects linear regression analysis was then performed for each combination of vowel phoneme and stress (henceforth, "vowel classes") with the Rbrul package (Johnson 2019) using the Nearey-normalized F1 and F2 values as dependent variables; speaker SES, speaker sex, left phonological context, and right phonological context as independent variables; and speaker as a random effect.

Results

Vowel variation by lexical stress

All five vowel phonemes vary significantly by lexical stress in at least one of their formants, and most do so in both, as seen in Table 27.5. This indicates that Chilean Spanish vowels are indeed subject to reduction processes.

Table 27.5 Linear regression model *p*-values for within-sex vowel variation by lexical stress

Vowel	*Females*		*Males*	
	p (F1)	*p (F2)*	*p (F1)*	*p (F2)*
i		<0.001		<0.001
e	0.042	0.025	0.003	0.012
a	<0.001	0.039	<0.001	<0.001
o	0.008	<0.001		0.002
u	0.033	<0.001		<0.001

Note. Blank cells were not significant.

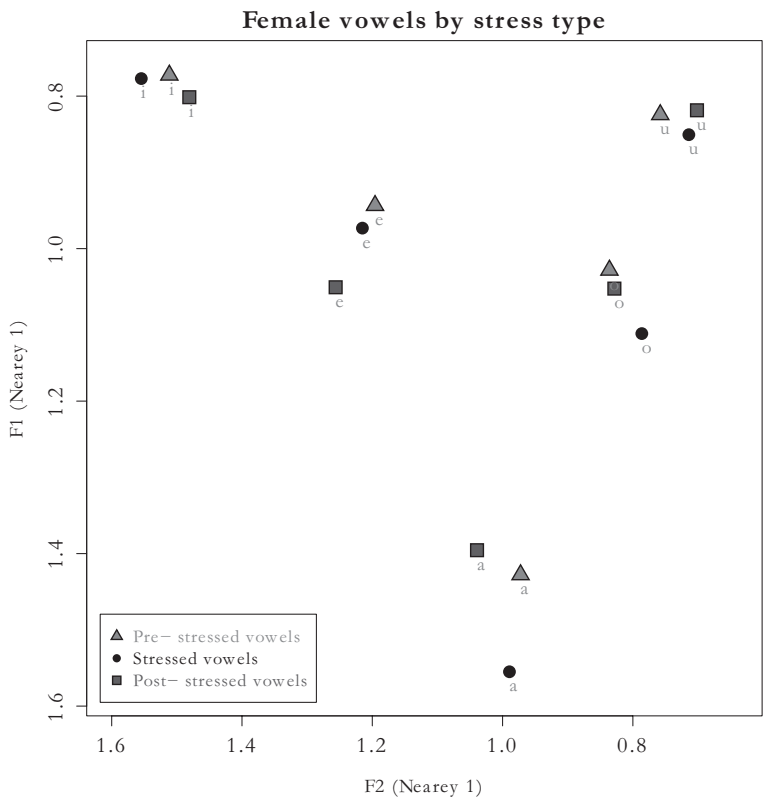

Figure 27.2 Vowels of female speakers by type of stress

The pre-stressed, stressed, and post-stressed vowels produced by female speakers are shown in Figure 27.2. Pre- and post-stressed /i/ are centralized (the slight lowering of post-stressed /i/, which corresponds to changes in F1 values, was not significant). The pre- and post-stressed allophones of /a/ are raised. Additionally, the former is slightly backed while the latter is somewhat fronted. Pre-stressed /e/, pre- and post-stressed /o/, and pre-stressed /u/ show a different pattern: they are both raised and centralized. Post-stressed /u/ is also raised, but is backed rather than centralized. Post-stressed /e/, for its part, is unique: it is lowered and fronted.

Figure 27.3 shows the pre-stressed, stressed, and post-stressed vowel allophones of male speakers. These manifest most of the same patterns found in female speakers (though often to a more moderate degree): centralization of pre- and post-stressed /i/, pre-stressed /e/, pre- and post-stressed /o/, and pre-stressed /u/; lowering and fronting of post-stressed /e/; and raising of pre- and post-stressed /a/. Male vowels differ from female ones in not undergoing statistically significant raising of pre-stressed /e/, pre- and post-stressed /o/, and pre- and post-stressed /u/.

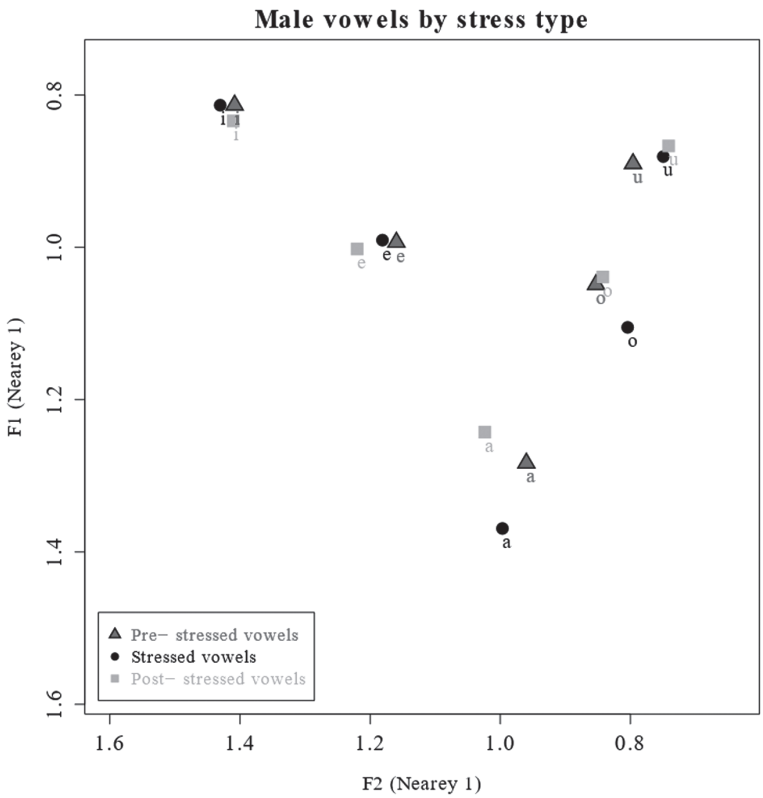

Figure 27.3 Vowels of male speakers by type of stress

Vowel variation by speaker sex

Vowel allophones differ by speaker sex in a statistically significant manner in 12 of 15 vowel classes, as indicated by the linear regression model *p*-values shown in Table 27.6. This variation occurs in F1 alone in four cases, in F2 alone in one case, and in both formants in seven cases.

As shown in Figure 27.4, male speakers' pre-stressed /i/, /e/, /a/, and /u/ are mid-centralized in comparison with the equivalent vowels of female speakers, which are consequently more peripheral. In the case of /i/, /e/, and /u/, both F1 and F2 vary significantly, while F1 alone does so in /a/. Pre-stressed /o/ does not vary significantly by speaker sex.

Male speakers' stressed vowels are likewise more mid-centralized than those of female speakers, as shown in Figure 27.5. Stressed /i/ and /u/ differ significantly in both F1 and F2, while stressed /a/ does so in F1 alone. Stressed /e/ and /o/ do not vary significantly by speaker sex.

Figure 27.6 shows the post-stressed vowel allophones of female and male speakers. The pattern of males having more mid-centralized vowels than females continues here. Post-stressed /i/ and /u/ vary significantly in both F1 and F2, and post-stressed /a/ does so in F1 alone, as is also the case when these vowels are pre-stressed and stressed.

Table 27.6 Linear regression model *p*-values for vowel class variation between the sexes

Vowel	*Stress*	*p (F1)*	*p (F2)*
i	Pre-stressed	<0.001	<0.001
	Stressed	0.008	<0.001
	Post-stressed	0.004	0.002
e	Pre-stressed	<0.001	0.028
	Stressed		
	Post-stressed	<0.001	
a	Pre-stressed	<0.001	
	Stressed	<0.001	
	Post-stressed	<0.001	
o	Pre-stressed		
	Stressed		
	Post-stressed		0.003
u	Pre-stressed	<0.001	<0.001
	Stressed	0.034	0.002
	Post-stressed	0.006	0.002

Note. Blank cells were not significant.

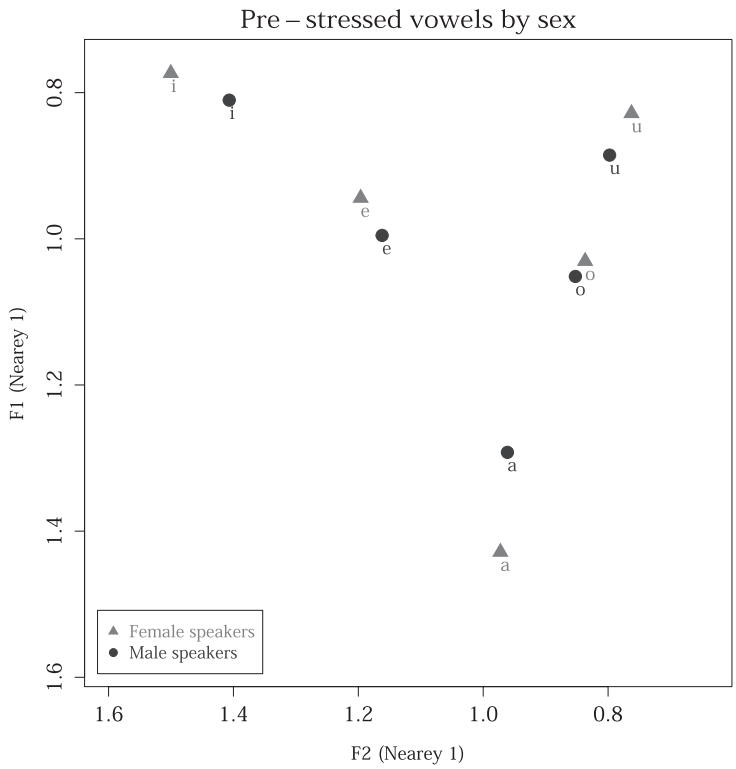

Figure 27.4 Pre-stressed vowels by speaker sex

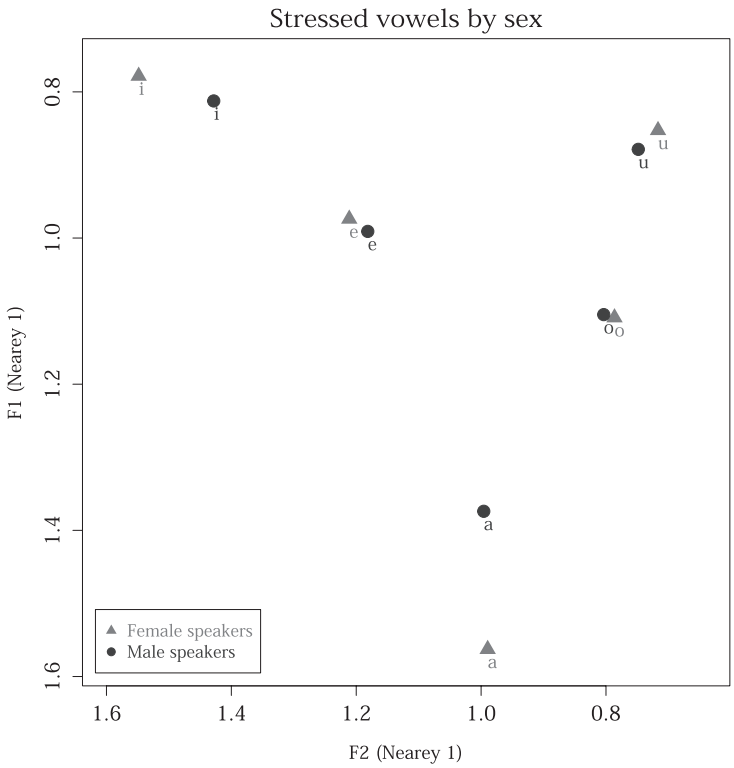

Figure 27.5 Stressed vowels by speaker sex

Post-stressed /e/ varies significantly by speaker sex in F1, and is lower in female speakers, though males' post-stressed /e/ continues to be located within the space used by the female vowel system. Finally, although post-stressed /o/ does vary significantly by speaker sex, the articulatory and acoustic distance between male and female speakers' allophones is negligible.

Vowel variation by speaker SES

Vowel allophones vary significantly by SES in three cases per sex: pre-stressed /i/, stressed /e/, and post-stressed /u/ in female speakers, and post-stressed /i/, pre-stressed /a/, and pre-stressed /u/ in male speakers. In the three female vowels, this variation occurs in F2, while in the male equivalents it occurs in F1. The *p*-values from the linear regression model are provided in Table 27.6.

Figures 27.7 and 27.8 show the values, in Nearey 1 units, of the significant formants of each of the six vowel classes whose allophones vary by SES. An underlying linear distribution is apparent in all cases (for reference, a perfectly linear distribution is marked by the dotted line in these figures). This is accompanied by movement away from the linear distribution by one or two strata in all six vowel classes.

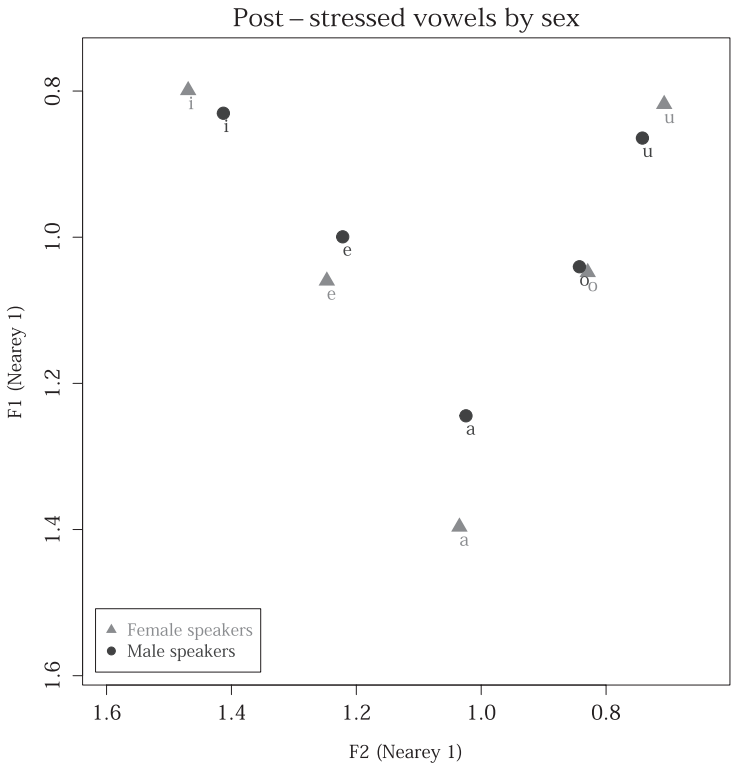

Figure 27.6 Post-stressed vowels by speaker sex

Table 27.7 Linear regression model *p*-values for vowel class variation by speaker SES

		p-value (formant)	
Vowel	*Stress*	*Females*	*Males*
i	Pre-stressed	0.008 (F2)	
	Stressed		
	Post-stressed		0.018 (F1)
e	Pre-stressed		
	Stressed	0.026 (F2)	
	Post-stressed		
a	Pre-stressed		0.026 (F1)
	Stressed		
	Post-stressed		
o	Pre-stressed		
	Stressed		
	Post-stressed		
u	Pre-stressed		0.006 (F1)
	Stressed		
	Post-stressed	0.021 (F2)	

Note. The significant formant is given in parentheses. Blank cells were not significant.

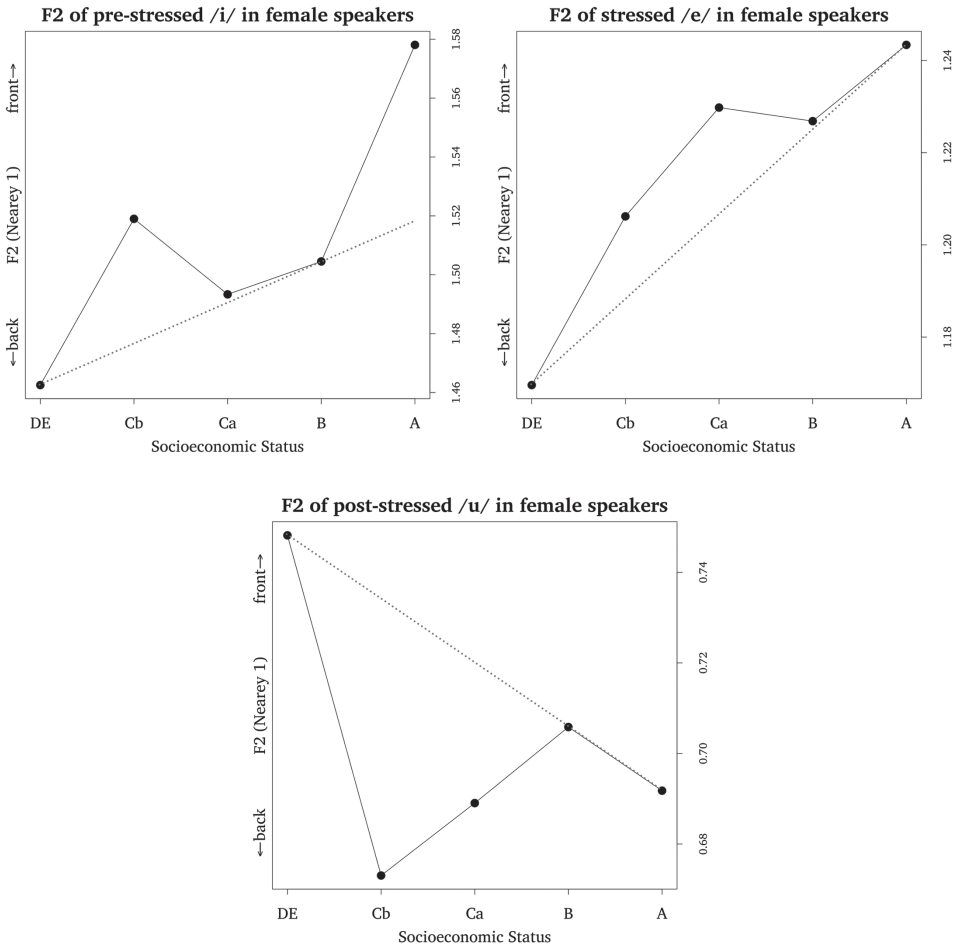

Figure 27.7 F2 of significantly varying vowels in female speakers by SES
Figure 27.7a Pre-stressed /i/
Figure 27.7b Stressed /e/
Figure 27.7c Post-stressed /u/

In female speakers' pre-stressed /i/ (Figure 27.7a), the linear distribution is evidenced by the DE, Ca, and B strata. The interior Cb stratum's allophone, in contrast, is more fronted than this distribution would predict, as is the exterior A stratum's allophone.

In female speakers' stressed /e/ (Figure 27.7b) and post-stressed /u/ (Figure 27.7c), the linear distribution is manifested by the DE, B, and A strata, while the allophones of the interior Cb and Ca strata are more peripheral than this pattern would predict (stressed /e/ is more fronted; post-stressed /u/ is more backed).

With regard to male speakers, both post-stressed /i/ (Figure 27.8a) and pre-stressed /u/ (Figure 27.8b) allophones are distributed in a linear fashion in all strata except Cb. This stratum departs from the linear pattern with a more close post-stressed /i/ and a more open pre-stressed /u/.

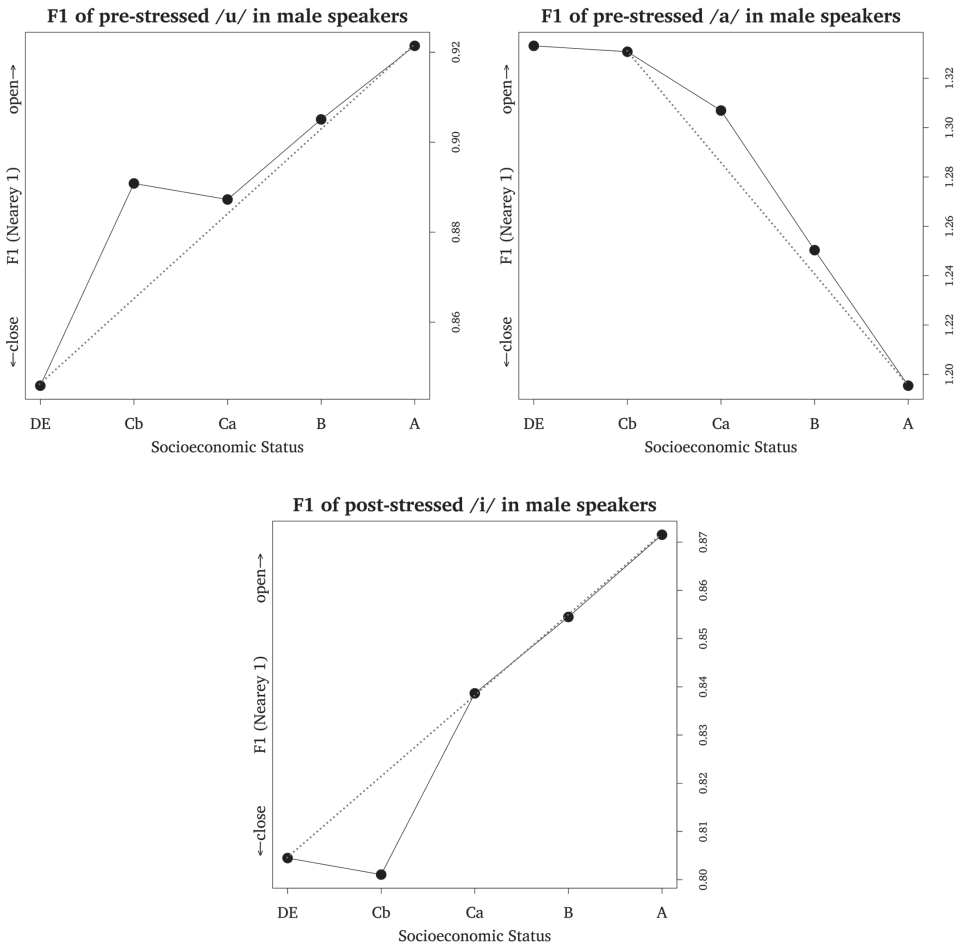

Figure 27.8 F1 of significantly varying vowels in male speakers by SES

Finally, male speakers' pre-stressed /a/ (Figure 27.8c) exhibits an essentially linear distribution between the Cb and A strata. The DE stratum deviates from the linear pattern in having a more close allophone than would be expected.

Discussion

Lexical stress

Unstressed vowels in Chilean Spanish exhibit neither the stability traditionally attributed to Spanish vowel systems nor the typologically common vowel reduction process consisting of movement toward the center of the vowel space. Instead, six of eight noncentral unstressed vowels in speakers of both sexes are centralized (/a/ cannot undergo this process, as it is already located in the approximate center

of the vowel space). Likewise, seven of 10 unstressed vowels are raised in female speakers, while two are raised in male speakers. Although the movement of pre- and post-stressed /a/ allophones could be interpreted as either reduction or raising, as the location of this vowel in articulatory space means that both processes produce the same result, the predominance of raising among other Chilean Spanish vowels suggests that raising is the more plausible interpretation.

Notably, these unusual unstressed vowel centralization and raising processes also occur in Mapudungun (Sadowsky et al. 2013), the most commonly spoken indigenous language in Chile. It is thus possible that these phenomena were transferred from Mapudungun to Chilean Spanish.

In more general terms, Chilean Spanish pre-stressed and post-stressed vowels have been shown to behave quite differently from each other. This suggests that researchers of Spanish vowels of any regional variety would do well to be wary of the traditional stressed/unstressed vowel dichotomy, as the latter category may well obfuscate meaningful linguistic behavior and produce meaningless results when analyzed together.

Speaker sex

Chilean Spanish speakers exhibit statistically significant sex-based stratification in a full 80 percent of the 15 vowel classes. This suggests that signaling sex linguistically plays a meaningful role in the creation and communication of their social identities.

Additionally, female speakers' vowel allophones are without exception more peripheral than those of male speakers. The acoustic consequence of this is that their vowels use a greater proportion of the available acoustic space, and are therefore more distinct from each other, than the equivalent male vowels. This can be expected to make female vowels easier for their interlocutors to identify, which is in line with key sociolinguistic findings that indicate that women tend to adhere more closely than men do to community speech norms and expectations of "speaking well" (Labov 2001).

Socioeconomic status

The Chilean Spanish vowel system appears to reflect two different moments in this geolect's development. The underlying SES-based linear distribution of the allophones of all six significantly varying vowel classes is in line with the country's traditionally rigid, class-based social structure (see Sadowsky & Aninao 2019 for more details). Such a distribution could only have arisen after the traditional social classes developed in Chile toward the end of the nineteenth century.

The departures from the linear distribution (Table 27.8) appear to reflect a much more recent process of innovation, likely triggered by the erosion or destruction of many class-based institutions during the Pinochet dictatorship (1973–1990), and strengthened by the decreased socioeconomic segregation and increased social mobility that subsequent democratic governments achieved (see Sadowsky 2015 for a more in-depth account).

Female speakers from the interior Cb stratum participate in all three of the innovative processes that occur among women, while the adjacent Ca stratum participates in two. These speakers' vowels would seem to have moved from their expected position in the linear distribution to one that is closer to the vowels of higher-SES speakers, suggesting that this is a linguistic change motivated at some level by the quest for greater status or prestige.

Table 27.8 Participation in vowel allophone departures from the linear distribution, by sex and SES

		Socioeconomic status					
Sex	*Vowel class*	*A*	*B*	*Ca*	*Cb*	*DE*	*Total per sex*
Female	Pre-stressed /i/	●			●		
	Stressed /e/			●	●		
	Post-stressed /u/			●	●		
	Subtotal	*1*	*0*	*2*	*3*	*0*	***6***
Male	Post-stressed /i/				■		
	Pre-stressed /u/				●		
	Pre-stressed /a/					●	
	Subtotal	*0*	*0*	*0*	*2*	*1*	***3***
	Total per SES	**1**	**0**	**2**	**5**	**1**	**9**

Note. A circle represents movement toward higher-SES allophones; a square represents movement toward lower-prestige allophones.

In the single case in which a vowel allophone of female speakers from an exterior stratum departs from the linear distribution (pre-stressed /i/ of the A stratum), it is located where the allophone of a hypothetical SES higher than A would be positioned. This movement has the effect of increasing the articulatory and perceptual distance between this allophone and that of the next lower stratum, B, which is likely the motivation for this change. While relatively rare, this same pattern of stratum A changing its linguistic behavior to increase its distance from stratum B has also been observed in the prevalence of verbs conjugated in the *voseo* paradigm in female speakers from the cities of Arica, Concepción, and Santiago (Sadowsky 2021).

With regard to male speakers, the interior Cb stratum is the only one participating in two of the three innovative processes that occur among men. One of the affected vowel classes, pre-stressed /u/, involves movement toward a higher SES's allophone. The other, post-stressed /i/, moves in the opposite direction, toward the allophone of the lower-status DE stratum, likely motivated by covert prestige (Trudgill 1972). The third vowel which departs from the linear distribution, pre-stressed /a/, exhibits a fairly uncommon phenomenon: movement in the direction of a higher-prestige group by males of the lowest SES, the DE stratum.

The innovative departure from the linear SES distribution that is occurring in Chilean Spanish vowels appears to be a change from below, as speakers seem to be almost entirely unconscious of vowel allophony of any sort. Although we are aware of one exception to this lack of awareness, it occurs with a single vowel in a single word, and only with extreme upper-SES male speakers, who do not appear to be participating in the sound change described here (the vowel in question is the /i/ in ⟨sí⟩, which is sometimes written as ⟨sé⟩ by those imitating or mocking this group, indicating that at least some speakers are conscious of one aspect of the strong mid-centralization of this SES's vowel system). We have seen nothing to indicate that speakers are conscious of any other vowel-related phenomena.

This process of change is being led by women, who—when broken down by SES—are seen to participate in it at twice the rate as men (six cases vs. three). This is very much in line with the majority of other sociophonetic studies performed around the world, which show that female speakers tend to lead changes from below (Labov 2001:280, 283).

In terms of SES, the lower interior Cb stratum leads in the adoption of this innovation with five cases, followed by the upper interior Ca stratum with two cases. These are the socioeconomic strata which tend to lead in change from below processes, as per Labov's Curvilinear Principle (Labov 2001: 188). At the same time, the exterior A and DE strata show deviation from the underlying linear pattern in one case each. The participation in this sound change of male speakers from the lowest stratum, DE, suggests that this innovation is expanding beyond its initial socioeconomic origins, but requires further study.

The motivation for the departure from the linear pattern appears to be the obtention of greater overt prestige in four of the six cases. In the fifth, male speakers' post-stressed /i/, increasing covert prestige would seem to be the reason for the change. In the final case, the pre-stressed /i/ of female speakers, although the vowel movement is in the direction of increased overt prestige, as is the general tendency of this change, the motivation here is likely subtly different. Rather than increasing its prestige, which is already maximal withing the socioeconomic hierarchy, the A stratum seems to be attempting to make its speech more distinct from that of its only potential social competitor, the B stratum.

In closing, this study strongly suggests that the vowels of the different national varieties of Spanish, which are currently understudied in sociophonetic terms, are a potentially fruitful topic for future investigation.

The future of Spanish-language sociophonetics

Spanish-language sociophonetics is a burgeoning field with an exciting future. The fourfold increase in the number of studies published between the 2000s and 2010s indicates that the field is experiencing explosive growth, and the increasingly sophisticated technical and statistical methods being employed promise even more reliable results in the future. The trend of ever-decreasing speaker sample sizes warrants some concern, however, as does the chaotic situation of socioeconomic stratification techniques. It is to be hoped that the class and sex biases that have existed since the beginning of discipline will be definitively overcome in the near future. The abandonment of the vestiges of the Spanish dialectological approach seems all but assured, as does the continued predominance of the first-wave sociolinguistic focus.

References

Alba, Orlando. 1988. Estudio sociolingüístico de la variación de las líquidas finales de palabra en el español cibaeño. In Robert M. Hammond & Melvyn C. Resnick (eds.), *Studies in Caribbean Spanish Dialectology*, 1–12. Georgetown University Press.

Alba, Orlando. 1990. *Variación fonética y diversidad social en el español dominicano de Santiago*. PUCMM.

Alfaraz, Gabriela. 2000. *Sound change in a regional variety of Cuban Spanish*. PhD dissertation, Michigan State University.

Alfaraz, Gabriela. 2007. Effects of age and gender on liquid assimilation in Cuban Spanish. In Jonathan Holmquist, Augusto Lorenzino & Lotfi Sayahi (eds.), *Selected proceedings of the Third Workshop on Spanish Sociolinguistics*, 23–29. Cascadilla Proceedings Project.

Alonso, Amado. 1930. Problemas de dialectología hispanoamericana. In A.M. Espinoza (ed.), *Estudios sobre el español de Nuevo Méjico I: Fonética*. Imprenta de la Universidad de Buenos Aires.

Alvord, Scott M., Nelsy Echávez-Solano & Carol Klee. 2005. La (r) asibilada en el español andino: un estudio socio lingüístico. *Lexis* 29(1). 27–45. https://doi.org/10.18800/lexis.200501.002

Barajas, Jennifer. 2014. *A sociophonetic investigation of unstressed vowel raising in the Spanish of a rural Mexican community*. PhD dissertation, The Ohio State University.

Barnes, Sonia. 2016. Variable final back vowels in urban Asturian Spanish. *Spanish in Context* 13(1). 1–28. https://doi.org/10.1075/sic.13.1.01bar

Beaton, Mary Elizabeth. 2015. *Coda liquid production and perception in Puerto Rican Spanish*. PhD dissertation, The Ohio State University.

Beaton, Mary Elizabeth. 2016. Revisiting incomplete neutralization: The case of Puerto Rican Spanish. *University of Pennsylvania Working Papers in Linguistics* 22(1). 31–40. https://repository.upenn.edu/pwpl/vol22/iss1/5

Bernate, Emily. 2016. La aspiración de la /s/ en las hablas femenina y masculina de los limeños en los Estados Unidos. *Íkala, Revista de Lenguaje y Cultura* 21(3). 267–279. https://doi.org/10.17533/udea.ikala.v21n03a02

Bobadilla, Félix & Gustavo Bobadilla. 1979. El comportamiento de las variables lingüísticas /tɾ/, /r/ y /t͡ʃ/ en el área urbana de Rancagua. *Cuadernos de Lenguas Modernas* 2. 18–24.

Bobadilla, Félix & Gustavo Bobadilla. 1980. El estudio de tres variables sociolingüísticas en Rancagua: problemas preliminares. *Boletín de Filología* 31(2). 721–741.

Boersma, Paul & David Weenink. 2022. *Praat: Doing phonetics by computer* [Computer program]. www.praat.org/

Bolyanatz, Mariška. 2017. *Plural production and perception in Santiago Spanish*. PhD dissertation, University of California.

Bolyanatz, Mariška & Brandon M.A. Rogers. 2019. The social perception of intervocalic /k/ voicing in Chilean Spanish. In Chappell, 211–234.

Bongiovanni, Silvina. 2013. "¿Tomas [pepsi], [peksi] or [pesi]?": A variationist sociolinguistic analysis of Spanish syllable coda stops. *IULC Working Papers* 13(1). 43–61.

Bongiovanni, Silvina. 2019. An acoustical analysis of the merger of /ɲ/ and /nj/ in Buenos Aires Spanish. *Journal of the International Phonetic Association* 51(2). 1–25. https://doi.org/10.1017/S0025100318000440

Broce, Marlene & Rena Torres Cacoullos. 2002. "Dialectología urbana" rural: La estratificación social de (r) y (l) en Coclé, Panamá. *Hispania* 85(2). 342–353. https://doi.org/10.2307/4141096

Brogan, Franny. 2018. *Sociophonetically-based phonology: An Optimality Theoretic account of /s/ lenition in Salvadoran Spanish*. PhD dissertation, University of California.

Brogan, Franny D. & Mariška Bolyanatz. 2018. A sociophonetic account of onset /s/ weakening in Salvadoran Spanish: Instrumental and segmental analyses. *Language Variation and Change* 30(2). 203–230. https://doi.org/10.1017/S0954394518000066

Calero, María Ángeles. 1990. Distribución y estratificación de /s/ implosiva y /j/ intervocálica en el habla de la ciudad de Toledo. *Sintagma* 2. 29–44.

Calvo Shadid, Annette. 1997. El fonema fricativo /s/ en el habla culta de San José: Implicaciones teóricas en el sistema fonológico de las coronales. *Revista de Filología y Lingüística de la Universidad de Costa Rica* 23(1). 235–246. https://doi.org/10.15517/rfl.v23i1.20399

Canfield, D. Lincoln. 1962. *La pronunciación del español en América*. Instituto Caro y Cuervo.

Carrasquero, Viktor. 2010. Un caso de variación sociofonética: /-s/ posnuclear en el español actual de Caracas. *Letras* 52(81). 87–116.

Cedergren, Henrietta. 1973. *The interplay of social and linguistic factors in Panama*. PhD dissertation, Cornell University.

Cedergren, Henrietta & David Sankoff. 1974. Variable rules: Performance as a statistical reflection of competence. *Language* 50(2). 333–355. https://doi.org/10.2307/412441

Cepeda, Gladys. 1990a. La alofonía de /s/ en Valdivia (Chile). *Estudios filológicos* 25. 5–16.

Cepeda, Gladys. 1990b. La variación de /s/ en Valdivia: sexo y edad. *Hispania* 73(1). 232–237. https://doi.org/10.2307/343011

Chang, Charles. 2008. Variation in palatal production in Buenos Aires Spanish. In Westmoreland & Thomas, 54–63.

Chappell, Whitney. 2013. *Social and linguistic factors conditioning the glottal stop in Nicaraguan Spanish*. PhD dissertation, The Ohio State University.

Chappell, Whitney. 2016. On the social perception of intervocalic /s/ voicing in Costa Rican Spanish. *Language Variation and Change* 28(3). 357–378. https://doi.org/10.1017/S0954394516000107

Chappell, Whitney (ed.). 2019. *Recent advances in the study of Spanish sociophonetic perception*. John Benjamins.

Colantoni, Laura & Jeffrey Steele (eds.). 2008. *Selected proceedings of the 3rd Conference on Laboratory Approaches to Spanish Phonology*. Cascadilla Proceedings Project.

Colina, Andreina. 2018. *La elisión de la /-s/ en el español del Caribe y los Estados Unidos*. MA thesis, Louisiana State University.

Contardo, Óscar. 2008. *Siútico*. Vergara.

Correa, Leonardo. 2017. *Variación y cambio en el español de Bogotá: Análisis de dos variables sociofonéticas*. PhD dissertation, University at Albany, State University of New York.

Cruz Ortiz, Rocío. 2019. Mantenimiento y elisión de la /d/ intervocálica en los políticos andaluces en Madrid. *Tonos Digital* 37. 1–26.

Dabkowski, Meghan. 2018. *Variable vowel reduction in Mexico City Spanish*. PhD dissertation, The Ohio State University.

Darías, José Luis, María del Carmen Ruisánchez & Puica Dohotaru. 1997. El proceso de la velarización del fonema nasal distensivo en el español de Pinar del Río — Enfoque sociolingüístico. *Romanistisches Jahrbuch* 48(1). 287–295. https://doi.org/10.1515/roja-1997-0143

Díaz-Campos, Manuel. 2008. Variable production of the trill in spontaneous speech: Sociolinguistic implications. In Colantoni & Steele, 47–58.

Díaz-Campos, Manuel, Stephen Fafulas & Michael Gradoville. 2011. Going retro. An analysis of the interplay between socioeconomic class and age in Caracas Spanish. In Jim Michnowicz & Robin Dodsworth (eds.), *Selected proceedings of the 5th Workshop on Spanish Sociolinguistics*, 65–78. Cascadilla Proceedings Project.

Diez Canseco, Susana. 1997. *Language variation: The influence of speakers' attitudes and gender on sociolinguistic variables in the Spanish of Cusco, Peru*. PhD dissertation, University of Pittsburgh.

Dorta, Josefa. 1989. La variación fonética de /r/ y /l/ en La Perdoma, norte de Tenerife. *Anuario de Letras. Lingüística y Filología* 27. 81–125.

Emmanuelli, Mirna. 2000. Valoración social y actuación lingüística hacia algunas variantes fonológicas del español puertorriqueño. *Revista de Estudios Hispánicos* 27(1). 209–218.

Enbe, Claudia & Yishai Tobin. 2008. Sociolinguistic variation in the prosody of Buenos Aires Spanish according to the theory of phonology as human behavior. In Colantoni & Steele, 140–154.

Erker, Daniel. 2012. *An acoustically based sociolinguistic analysis of variable coda /s/ production in the Spanish of New York City*. PhD dissertation, New York University.

Fernández de Molina Ortés, Elena. 2016. El nivel social como indicador de la variación de -/s/ en el habla de Mérida (Badajoz). *Dialectología* 16. 93–116.

Figueroa, Mauricio A. 2011. *El eje oclusión–fricción en el sistema sociofónico del castellano chileno*. MA thesis, Universidad de Concepción.

Figueroa, Mauricio, Jaime Soto-Barba & Marco Ñanculeo. 2010. Los alófonos del grupo consonántico /tr/ en el castellano de Chile. *Onomázein* 22(2). 11–42.

Flores, Tanya. 2016. Velar palatalization in Chilean public speech. *Glossa* 1(1). 1–17. https://doi.org/10.5334/gjgl.105

Fontanella de Weinberg, María Beatriz. 1973. Comportamiento ante -s de hablantes femeninos y masculinos del español bonaerense. *Romance Philology* 27(1). 50–58.

Fontanella de Weinberg, María Beatriz. 1979. *Dinámica social de un cambio lingüístico*. Universidad Nacional Autónoma de México.

García, Christina. 2019. Regional identity in Highland Ecuador social evaluation of intervocalic /s/ voicing. In Chappell, 125–152.

García, Christina Marie. 2015. *Gradience and variability of intervocalic /s/ voicing in Highland Ecuadorian Spanish*. PhD dissertation, The Ohio State University.

García de Diego, Vicente. 1946. *Manual de dialectología española*. Ediciones Cultura Hispánica.

García Ponce, Edgar & Irasema Mora. 2018. Análisis sociolingüístico de la elisión de /d/ en español de Toluca. *Cuadernos de Lingüística de El Colegio de México* 5(2). 45–78. https://doi.org/10.24201/clecm.v5i2.114

Gómez Molina, José Ramón & María Begoña Gómez Devís. 2010. Mantenimiento y elisión de la /d/ intervocálica en el español de Valencia. *Verba: Anuario Galego de Filoloxia* 37. 89–122.

González, Carlos. 2002. La variación "eríh" / "soi" en el voseo verbal de Santiago de Chile. Un estudio exploratorio. *Onomázein* 7. 213–230.

Harris, James. 1969. *Spanish phonology*. MIT Press.

Henriksen, Nicholas. 2014. Sociophonetic analysis of phonemic trill variation in two sub-varieties of Peninsular Spanish. *Journal of Linguistic Geography* 2(1). 4–24. https://doi.org/10.1017/jlg.2014.1

Henriksen, Nicholas & Sarah Harper. 2016. Investigating lenition patterns in south-central Peninsular Spanish / sp st sk / clusters. *Journal of the International Phonetic Association* 46(3). 287–310. https://doi.org/10.1017/S0025100316000116

Henríquez Ureña, Pedro. 1921. Observaciones sobre el español de América. *Revista de Filología Española* VIII. 357–390.

Henríquez Ureña, Pedro. 1930. Observaciones sobre el español de América II. *Revista de Filología Española* XVII. 277–284.

Henríquez Ureña, Pedro. 1931. Observaciones sobre el español de América III. *Revista de Filología Española* XVIII. 120–148.

Hernández, Edith. 2009. *Resolución de hiatos en verbos–ear: un estudio sociofonético en una ciudad mexicana.* PhD dissertation, The Ohio State University.

Holmquist, Jonathan. 1985. Social correlates of a linguistic variable: A study in a Spanish village. *Language in Society* 14(2). 191–203. https://doi.org/10.1017/S004740450001112X

Holmquist, Jonathan. 2005. Social stratification in women's speech in rural Puerto Rico: A study of five phonological features. In Lotfi Sayahi & Maurice Westmoreland (eds.), *Selected proceedings of the Second Workshop on Spanish Sociolinguistics*, 109–119. Cascadilla Proceedings Project.

Holmquist, Jonathan. 2008. Gender in context: Features and factors in men's and women's speech in rural Puerto Rico. In Westmoreland & Thomas, 17–35.

Holmquist, Jonathan. 2011. Gender and variation: Word-final /s/ in men's and women's speech in Puerto Rico's western highlands. In Manuel Díaz-Campos (ed.), *The handbook of Hispanic sociolinguistics*, 230–243. Blackwell.

Hymes, Dell. 1971. On communicative competence. In J.P. Pride & J. Holmes (eds.), *Sociolinguistics*, 269–293. Penguin.

International Phonetic Association. 2015. The International Phonetic Alphabet and the IPA Chart. www.internationalphoneticassociation.org/content/ipa-chart

Jiménez-Fernández, Rafael. 2020. Variación fonológica de la /d/ intervocálica en el sociolecto alto de Sevilla. *RILCE. Revista de Filología Hispánica* 36(2). 674–707. https://doi.org/10.15581/008.36.2.674-707

Johnson, Daniel Ezra. 2009. Getting off the GoldVarb standard: Introducing Rbrul for mixed-effects variable rule analysis. *Language and Linguistics Compass* 3(1). 359–383. https://doi.org/10.1111/j.1749-818X.2008.00108.x

Johnson, Daniel Ezra. 2019. Rbrul [R package]. www.danielezrajohnson.com/rbrul.html

Kapović, Marko. 2017. Variable within variable–Simultaneous stability and change. The case of syllable-final s in Ciudad Real. *Borealis* 6(2). 249–283. https://doi.org/10.7557/1.6.2.4223

Kendall, Tyler & Erik R. Thomas. 2014. *vowels: Vowel manipulation, normalization and plotting in R* [R package]. https://cran.r-project.org/web/packages/vowels/index.html

Klee, Carol, Brandon M.A. Rogers, Rocío Caravedo & Lindsey Dietz. 2018. Measuring /s/ variation among younger generations in a migrant settlement in Lima, Peru. *Studies in Hispanic and Lusophone Linguistics* 11(1). 29–57. https://doi.org/10.1515/shll-2018-0002

Labov, William. 1963. The social motivation of a sound change. *Word* 19. 273–309. https://doi.org/10.1080/00437956.1963.11659799

Labov, William. 1966a. *The social stratification of English in New York City*. Center for Applied Linguistics.

Labov, William. 1966b. The linguistic variable as a structural unit. *Washington Linguistics Review* 3. 4–22.

Labov, William. 1969. Contraction, deletion and inherent variability of the English copula. *Language* 45. 715–762. https://doi.org/10.2307/412333

Labov, William. 1972. *Sociolinguistic patterns*. University of Pennsylvania Press.

Labov, William. 2001. *Principles of linguistic change*, vol. 2, *Social factors*. Blackwell.

Labov, William, Malcah Yaeger & Richard Steiner. 1972. *A quantitative study of sound change in progress*. US Regional Survey.

Lapesa, Rafael. 1964. El andaluz y el español de América. In *Presente y futuro de la lengua española II*, 173–182. Ediciones Cultura Hispánica.

Lastra, Yolanda & Pedro Martín Butragueño. 2006. Un posible cambio en curso: el caso de las vibrantes en la Ciudad de México. In Ana María Cestero, Isabel Molina & Florentino Paredes (eds.), *Estudios sociolingüísticos del español de España y América*, 35–68. Arco/Libros.

Lenz, Rudolf. 1892. Chilenische Studien I. *Phonetische Studien* 5. 272–292.

Lenz, Rudolf. 1893a. Chilenische Studien II, III. *Phonetische Studien* 6. 18–34.
Lenz, Rudolf. 1893b. Chilenische Studien IV, V. *Phonetische Studien* 6. 151–166.
Lenz, Rudolf. 1893c. Chilenische Studien VI, VII. *Phonetische Studien* 6. 274–301.
Lenz, Rudolf. 1893d. Beiträge zur Kenntnis des Amerikanospanisch. *Zeitschrift für romanische Philologie* 17. 188–214.
Lenz, Rodolfo [Rudolf]. 1940. Estudios Chilenos I–VII. In Amado Alonso & Raimundo Lida (eds.), *El español en Chile. Trabajos de Rodolfo Lenz, Andrés Bello y Rodolfo Oroz*, 84–208. Instituto de Filología de la Universidad de Buenos Aires.
Long, Avizia Yim & Lisa Baldwin. 2013. A sociolinguistic analysis of intervocalic /b/ in Caracas speech. *IULC Working Papers* 13(1). 1–20.
Lope Blanch, Juan M. 1968. El proyecto de estudio coordinado de la norma lingüística culta de las principales ciudades de Iberoamérica y de la Península Ibérica. In *El Simposio de México*, 222–233. Universidad Nacional Autónoma de México.
Lope Blanch, Juan M. 1992. Diferenciación dialectal y polimorfismo lingüístico. *Boletín de Filología* 33. 71–77.
López Morales, Humberto. 1983. *Estratificación social del español de San Juan de Puerto Rico*. Universidad Nacional Autónoma de México.
Malaver, Irania & Lorena Perdomo-Pinto. 2016. La elisión de /d/ en posición intervocálica en la comunidad caraqueña. *Boletín de Filología* 51(2). 147–179. https://doi.org/10.4067/S0718-93032016000200006
Martín Morales, Miriam. 2018. Factores lingüísticos y sociales en el proceso de debilitamiento de /-n/ final de palabra y el uso de formas vulgares en la ciudad de Málaga. *ELUA. Estudios de Lingüística Universidad de Alicante* 32. 237–262. https://doi.org/10.14198/ELUA2018.32.11
Mazzaro, Natalia & Raquel González de Anda. 2019. The perception-production connection /tʃ/ deaffrication and rhotic assibilation in Chihuahua Spanish. In Chappell, 287–340.
Melero, Fernando. 2015. Análisis acústico de la vibrante múltiple en el español de Valencia (España). *Studies in Hispanic and Lusophone Linguistics* 8(1). 183–206. https://doi.org/10.1515/shll-2015-0007
Melguizo, Elisabeth. 2007. La fricatización de /ĉ/ en una comunidad de hablantes granadina. *Interlingüística* 17 . 748–757.
Méndez, Luis Alberto. 2017. The variant [ʃ] in the Spanish of Ciudad Juárez. *Borealis* 6(1). 243–260. https://doi.org/10.7557/1.6.1.4102
Michnowicz, Jim & Lindsey Carpenter. 2013. Voiceless stop aspiration in Yucatan Spanish: A sociolinguistic analysis. *Spanish in Context* 10(3). 410–437. https://doi.org/10.1075/sic.10.3.05mic
Milroy, Lesley. 1980. *Language and social networks*. University Park Press.
Milroy, Lesley. 1981. The effect of two interacting extralinguistic variables on patterns of variation in urban vernacular speech. In David Sankoff & Henrietta Cedergren (eds.), *Variation omnibus*, 161–170. Linguistic Research.
Mohamed, Sherez & Antje Muntendam. 2020. The Use of the glottal stop as a variant of /s/ in Puerto Rican Spanish. *Studies in Hispanic and Lusophone Linguistics* 13(2). 391–417. https://doi.org/10.1515/shll-2020-2035
Molina Boscán, Nancy. 2010. Las consonantes líquidas posnucleares en el habla cotidiana de la ciudad de Maracay. *Revista Ciencias de la Educación* 36. 15–33.
Montes, José Joaquín. 1970. *Dialectología y geografía lingüística. Notas de orientación*. Instituto Caro y Cuervo.
Moreno Fernández, Francisco. 1993. *La división dialectal del español de América*. Universidad de Alcalá de Henares.
Mumin, Zahir. 2017. *A study of sociolinguistic variation in a small community: Puerto Rican Spanish in Amsterdam, New York*. PhD dissertation, State University of New York at Albany.
Navarro Tomás, Tomás. 1945. *Cuestionario lingüístico hispanoamericano*, 2nd edn. Instituto de Filología de la Universidad de Buenos Aires.
Oliver, Julia. 2008. *Vowel raising in Puerto Rican Spanish*. PhD dissertation, University of Illinois at Chicago.
Osle Ezquerra, Angel. 2015. The impact of sexual orientation on the pronunciation of stressed vowels in Peninsular Spanish: An acoustic analysis. *Sociolinguistic Studies* 9(1). 137–150. https://doi.org/10.1558/sols.v9i1.18395
Perdomo-Pinto, Lorena & Scott Sadowsky. 2019. The ultra-high-frequency whistled /s/ of Southern Chilean Spanish: Socioeconomic and gender stratification of its spectral moments and prevalence. In Sasha Calhoun, Paola Escudero, Marija Tabain & Paul Warren (eds.), *Proceedings of the 19th International*

Congress of Phonetic Sciences, Melbourne, Australia 2019, 48–52. Australasian Speech Science and Technology Association.

Pérez Martín, Ana María. 1995. *Estudio sociolingüístico de la /s/ implosiva en el español de El Hierro*. BA thesis, Universidad de Las Palmas de Gran Canaria.

Perissinotto, Giorgio. 1971. *The phonology of the Spanish spoken in Mexico City*. F.H. Jungemann.

Perissinotto, Giorgio. 1972. Distribución demográfica de la asibilación de vibrantes en el habla de la Ciudad de México. *Nueva Revista de Filología Hispánica* 21(1). 71–79. https://doi.org/10.24201/nrfh.v21i1.2860

Perissinotto, Giorgio. 1975. *Fonología del español hablado en la Ciudad de México. Ensayo de un método sociolingüístico*. El Colegio de México.

Prosper-Sánchez, Gloria. 1995. *Neutralización homofonética de líquidas a final de sílaba: Aspectos sociolingüísticos en el Español de Puerto Rico*. PhD dissertation, University of Massachusetts Amherst.

R Core Team. 2022. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. www.R-project.org

Rabanales, Ambrosio. 1992. Fundamentos teóricos y pragmáticos del "Proyecto de estudio coordinado de la norma lingüística culta del español hablado en las principales ciudades del mundo hispánico." *Boletín de Filología* 33. 251–272.

Ramírez, Alexánder & Alina Almira. 2016. Variación del fonema /s/ en contextos de juntura de palabra en el español caleño: una mirada sociolingüística. *Lenguaje* 44(1). 11–33. https://doi.org/10.25100/lenguaje.v44i1.4628

Regan, Brendan. 2019. Dialectology meets sociophonetics. The social evaluation of ceceo and distinción in Lepe, Spain. In Chappell, 85–121.

Resnick, Melvyn. 1969. Dialect zones and automatic dialect identification in Latin American Spanish. *Hispania* 52. 553–568.

Resnick, Melvyn. 1976. Algunos aspectos histórico-geográficos de la dialectología hispanoamericana. *Orbis* XXV. 264–276.

Rissel, Dorothy A. 1989. Sex, attitudes, and the assibilation of /r/ among young people in San Luis Potosí, Mexico. *Language Variation and Change* 1(3). 269–283. https://doi.org/10.1017/S0954394500000181

Robles-Puente, Sergio & José Jesús Vilches-Aguado. 2019. Bilabial fricatives in Mexican Spanish: A sociophonetic analysis. *Borealis* 8(1). 143–161. https://doi.org/10.7557/1.8.1.4561

Rogers, Brandon M.A. 2016. The influence of linguistic and social variables in the spirantization of intervocalic /b,d,g/ in Concepción, Chile. *Studies in Hispanic and Lusophone Linguistics* 9(1). 207–237. https://doi.org/10.1515/shll-2016-0008

Rogers, Brandon M.A. 2020. The state of Spanish /s/ variation in Concepción, Chile: Linguistic and social trends. *Open Linguistics* 6(1). 132–153. https://doi.org/10.1515/opli-2020-0010

Rogers, Brandon M.A. & Christina Mirisis. 2018. Voiceless stop lenition and reduction as linguistic and social phenomena in Concepción, Chile. *Borealis* 7(2). 187–215. https://doi.org/10.7557/1.7.2.4401

Rohena-Madrazo, Marcos. 2011. *Sociophonetic variation in the production and perception of obstruent voicing in Buenos Aires Spanish*. PhD dissertation, New York University.

Rohena-Madrazo, Marcos. 2015. Diagnosing the completion of a sound change: Phonetic and phonological evidence for /ʃ/ in Buenos Aires Spanish. *Language Variation and Change* 27(3). 287–317. https://doi.org/10.1017/S0954394515000113

Rona, José Pedro. 1958. *Aspectos metodológicos de la dialectología hispanoamericana*. Universidad de la República.

Rona, José Pedro. 1964. El problema de la división del español americano en zonas dialectales. In *Presente y futuro de la lengua española, vol. 1*, 215–226. Ofines.

Ruiz Sánchez, Carmen. 2004. El comportamiento de la /s/ implosiva en el habla de Caracas. *Boletín de Lingüística* 21. 48–65.

Ruiz Sánchez, Carmen. 2017. Seseo, ceceo, and distinción in Andalusian Spanish: Free variation or sociolinguistic variation? *Linguistics Vanguard* 3(1). https://doi.org/10.1515/lingvan-2016-0075

Sadowsky, Scott. 2015. Variación sociofonética de las consonantes del castellano chileno [Sociophonetic variation in Chilean Spanish consonants]. *Sociolinguistic Studies* 9(1). 71–92. https://doi.org/10.1558/sols.v9i1.19927

Sadowsky, Scott. 2021. EMIS: Sistema de estratificación socioeconómica para la investigación lingüística. In Brandon M.A. Rogers & Mauricio Figueroa (eds.), *Lingüística del castellano chileno: Estudios sobre variación, innovación, contacto e identidad*, 367–396. Vernon Press.

Sadowsky, Scott & María José Aninao. 2019. Internal migration and ethnicity in Santiago. In Andrew Lynch (ed.), *The Routledge handbook of Spanish in the global city*, 277–311. Routledge. https://doi.org/10.4324/9781315716350

Sadowsky, Scott & Stella Verkijk. Forthcoming. "¡Estoy en la jasa, logo!" Ethnicity and non-canonical /k/ allophones in Chilean Spanish: Evidence for language change caused by contact with Mapudungun.

Sadowsky, Scott & Beatriz Yáñez-Valdenegro. Forthcoming. "¡No vuede ser!" Mapudungun /p/ allophones in Chilean Spanish: evidence of contact-induced systemic language change.

Sadowsky, Scott, Héctor Painequeo, Gastón Salamanca & Heriberto Avelino. 2013. Illustrations of the IPA: Mapudungun. *Journal of the International Phonetic Association* 43(1). 87–96. https://doi.org/10.1017/S0025100312000369

Salamanca, Gastón & Ana Valverde. 2009. Prestigio y estigmatización en variantes anteriorizadas y posteriorizadas de las vocales del español de Chile. *Literatura y Lingüística* 20. 125–140. https://doi.org/10.4067/S0716-58112009000100007

Samper Padilla, José Antonio & Marta Samper Hernández. 2020. The weakening of intervocalic /d/ in the Spanish of Las Palmas de Gran Canaria: Comparison with other speech communities. *Spanish in Context* 17(2). 221–246. https://doi.org/10.1075/sic.00057.sam.

Sanicky, Cristina. 1988. El comportamiento de /f/ en el habla misionera. *Bulletin of Hispanic Studies* 65(3). 273–278. https://doi.org/10.1080/1475382882000365273

Sanicky, Cristina. 1992. Las manifestaciones de [r] y [tr] en el habla de Misiones, Argentina. *Hispanic Review* 60(2). 195–205. https://doi.org/10.2307/474110

Sanicky, Cristina. 1996. Las variaciones de /s/ final en el habla de mujeres y hombres en Misiones, Argentina. *Bulletin of Hispanic Studies* 73(3). 311–324. https://doi.org/10.3828/bhs.73.3.311

Sanicky, Cristina. 2001. Influencias en el comportamiento de /r/ final en el habla dialectal de Misiones, Argentina. *Bulletin of Hispanic Studies* 78(2). 137–154. https://doi.org/10.3828/bhs.78.2.137

Sanicky, Cristina. 2008. Las variantes de /j/ en Misiones, Argentina: estudio diacrónico-sincrónico. *Bulletin of Hispanic Studies* 85(5). 599–608. https://doi.org/10.3828/bhs.85.5.1

Sankoff, Gillian. 1989. A quantitative paradigm for the study of communicative competence. In Richard Bauman & Joel Sherzer (eds.), *Explorations in the ethnography of speaking*, 2nd edn., 18–49. Cambridge University Press. [1st edn., 1974.]

Santiago Molina, Gloryfé. 2017. *Variación sociofonética en el español de Puerto Rico: vibrantes, líquidas y retroflejas*. PhD dissertation, University of Puerto Rico.

Schmidt, Lauren B. & Erik W. Willis. 2011. Systematic investigation of voicing assimilation of Spanish /s/ in Mexico City. In Scott M. Alvord (ed.), *Selected proceedings of the 5th Conference on Laboratory Approaches to Romance Phonology*, 1–20. Cascadilla Proceedings Project.

Sessarego, Sandro. 2012. Unstressed vowel reduction in Cochabamba, Bolivia. *Revista Internacional de Lingüística Iberoamericana* 10(2). 213–227.

Sessarego, Sandro. 2013. On the social and linguistic implications of unstressed vowel weakening in Cochabambino Spanish. *Sintagma* 25. 19–32.

Shuy, Roger, Walt Wolfram & William K. Riley. 1967. *Linguistic correlates of social stratification in Detroit speech*. Michigan State University.

Silva-Corvalán, Carmen. 2001. *Sociolingüística y pragmática del español*. Georgetown University Press.

Tapia, Mónica & Humberto Valdivieso. 1997. La palatalización de las velares. Análisis acústico. *Onomázein* 2. 135–149. https://doi.org/10.7764/onomazein.2.06

Tejada Giráldez, María de la Sierra. 2012. Los factores lingüísticos de la /-s/ implosiva en el nivel de estudios altos de Granada. *Normas: Revista de Estudios Lingüísticos Hispánicos* 2. 185–217.

Tejada Giráldez, María de la Sierra. 2015. *Convergencia y divergencia entre comunidades de habla a propósito de la /-s/ implosiva. Contribución al estudio de los patrones sociolingüísticos del español de Granada*. PhD dissertation, Universidad de Granada.

Terrell, Tracy. 1978. La aspiración y elisión de /s/ en el español porteño. *Anuario de Letras. Lingüística y Filología* 16. 41–66.

Trudgill, Peter. 1972. Sex, covert prestige and linguistic change in the urban British English of Norwich. *Language in Society* 1(2). 179–195. https://doi.org/10.1017/S0047404500000488

Trudgill, Peter. 1974. *Sociolinguistics. An introduction*. Penguin.

Ugueto, Marluis. 2007. Estudio sociolingüístico del archifonema vibrante en el español de Caracas, 2004–2008. *Lengua y habla* 11. 91–104.

Ugueto, Marluis. 2016. La variación de /r/ en posición final de palabra en el habla de Caracas: un estudio sociofonético. *Lingüística y Literatura* 37(70). 15–46. https://doi.org/10.17533/udea.lyl.n70a01

Uruburu, Agustín. 1994. El tratamiento del fonema /-d-/ en posición intervocálica en la lengua española hablada en Córdoba (España). *La Linguistique* 30(1). 85–104. https://doi.org/10.2307/30248708

Uruburu, Agustín. 1996. La lengua española hablada en Córdoba (España). *Revista Española de Lingüística Aplicada* 11. 225–250.

Valdivieso, Humberto. 1998. La variable fonológica /ĉ/ en Concepción. *Boletín de Filología* 37(2). 1199–1209.

Valencia, Alba. 1993. Realizaciones de /s/, /ĉ/ y /ĵ/ en el habla adolescente. *Nueva Revista del Pacífico* 38–39. 159–180.

Verdugo, Carlos. 2019. Deletion of voiced plosives in Chilean Spanish. *Onomázein* 46. 197–227. https://doi.org/10.7764/onomazein.46.09

Vergara-Fernández, Viviana. 2013. Relación entre alfabetización y producción de los alófonos de /b/: Estudio del habla cuidada de hablantes prealfabetizados y alfabetizados. *Onomázein* 27. 158–170.

Vida-Castro, Matilde. 2015. Resilabificación de la aspiración de /-s/ ante oclusiva dental sorda. Parámetros acústicos y variación social. In Adrián Cabedo (ed.), *Perspectivas actuales en el análisis fónico del habla. Tradición y avances en la fonética experimental*, 441–451. Departamento de Filología Española Universitat de València.

Vida-Castro, Matilde. 2016. Correlatos acústicos y factores sociales en la aspiración de /-s/ preoclusiva en la variedad de Málaga (España). Análisis de un cambio fonético en curso. *Lingua Americana* 38. 15–36.

Villena, Juan Andrés, Francisco Díaz, Antonio Ávila & María de la Cruz Lasarte. 2011. Interacción de factores fonéticos y gramaticales en la variación fonológica: la elisión de /d/ intervocálica en la variedad de los hablantes universitarios en la ciudad de Málaga. In Yolanda Congosto & Elena Méndez (eds.), *Variación lingüística y contacto de lenguas en el mundo hispánico*, 311–360. Iberoamericana Vervuert. https://doi.org/10.31819/9783865279095-015

Vuskovich, Matthew Anthony. 2006. *A sociolinguistic perspective toward hiatus resolution in Mexico City Spanish*. MA thesis, Louisiana State University.

Wagner, Max Leopold. 1927. El supuesto andalucismo de América y la teoría climatológica. *Revista de Filología Española* 14. 20–30.

Weinreich, Uriel, William Labov & Marvin Herzog. 1968. Empirical foundations for a theory of language change. In Winifred P. Lehmann & Yakov Malkiel (eds.), *Directions for historical linguistics: A symposium*, 95–195. University of Texas Press.

Westmoreland, Maurice & Juan Antonio Thomas (eds.). 2008. *Selected proceedings of the 4th Workshop on Spanish Sociolinguistics*. Cascadilla Proceedings Project.

Wolf, Clara. 1984. Tiempo real y tiempo aparente en el estudio de una variación lingüística: ensordecimiento y sonorización del yeísmo porteño. In Lía Schwarz & Isaías Lerner (eds.), *Homenaje a Ana Ma. Barrenechea*, 175–196. Castalia.

Wolf, Clara & Elena Jiménez. 1979. El ensordecimiento del yeísmo porteño: un cambio fonológico en marcha. In Ana María Barrenechea (ed.), *Estudios lingüísticos y dialectológicos*, 115–145. Hachette.

Wolfram, Walt. 1969. *A sociolinguistic description of Detroit Negro speech*. Center for Applied Linguistics.

Wolfram, Walt. 1978. Contrastive linguistics and social lectology. *Language Learning* 28(1). 1–28. https://doi.org/10.1111/j.1467-1770.1978.tb00302.x

Zahler, Sara & Danielle Daidone. 2014. A variationist account of trill /r/ usage in the Spanish of Málaga. *IULC Working Papers* 14(2). 17–42.

Zamora Munné, Juan. 1980. Las zonas dialectales del español americano. *Boletín de la Academia Norteamericana de la Lengua Española* 4–5. 57–67.

Zamora Vicente, Alonso. 1960. *Dialectología española*. Gredos.

Zepeda-Pallero, Sebastián. 2019. *Variación social de /r/ en el español hablado en Arica, Chile*. PhD dissertation, Pontificia Universidad Católica de Chile.