That Southern Charm: /s/ Deletion in Southern Spain*

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Abstract
This paper explores final consonant deletion in Southern Spain. Deletion of final /s/ and /d/ are considered markers of the Southern Spanish accent in the eyes of the speakers. However, previous research by Hualde et al. (2010) and Harris-Northall (1990) conflicts on final /s/ deletion and fails to significantly touch on final /d/ deletion. I show that final /s/ deletion is not strongly correlated to southern Spanish accents, and final /d/ deletion is not correlated at all. These authors propose that /n/ velarization can occur word-finally, but labialization cannot. Lipski (1986) proposes a more specific pattern of /n/ velarization. I explore the range of /n/ realization found among my participants and show that realization as [ŋ] is more common than generally believed, and confirms Lipski’s account. I also briefly explore evidence that realization as [m] is also a possibility.

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1 Introduction

I went to Spain in the spring of 2016 intending to study ceceo, the well-studied phenomenon of realizing intervocalic /s/ as [ʃ]. Instead, I quickly found my interest hooked on what happened to /s/ word-finally: it very frequently deletes entirely in certain peninsular dialects. However, a little research revealed inconsistencies in the literature concerning what exactly happens to word-final consonants in peninsular Spanish. This study examines the phonology of native peninsular Spanish speakers through a series of interviews and attempts to resolve the debate and clarify the behavior of word-final consonants.

The best studied type of final consonant deletion is that of final /s/. Mason (1994) says that /s/ deletion is frequently misnamed aspiration, and Lipski (1986) adds that aspiration and deletion are part of the same process wherein [s] becomes [h] and then [Ø], or complete deletion. Therefore, I treat these two processes as one. Though all of my sources agree that final /s/ aspiration occurs in Andalucía, the southernmost territory of Spain, all are in conflict about the actual boundaries of the dialectical marker. Harris-Northall (1990) alone suggests that Castilla-La Mancha, generally considered a northern territory, also has final /s/ aspiration, while Lipski (1986) is the only one to imply that Galicia, in the far northwest, does as well.

Another oft-deleted final consonant is /d/. Hualde et al. (2010) conclude that the entire country is prone to deletion of intervocalic /d/, while northern Spanish restricts the environment of the same to /-ado/ and also deletes /d/ word-finally. None of my sources claimed that final /d/ deletion was a markedly Southern trait. However, in my documentation of 17 speakers of Iberian Spanish, I find that Southerners were overwhelmingly convinced that final consonant deletion of all types is characteristic of southern Spanish, while northern and central Spaniards do in fact pronounce all their final consonants, and often look down on Andalucía for precisely this variation.

Only a few other consonants appear word-finally in Spanish: /l/, /ɾ/, and /n/. None of these show any evidence of deletion. Final /n/, however, does undergo a phonological process of velarization in southern dialects. All word-final nasals, argue Hualde et al., neutralize to /n/, and certainly there is no word in Spanish that a speaker would say ends in /m/ or /ŋ/ (78). Harris-Northall (1990) backs up this claim: “Recent borrowings into Spanish which end in [-m] in their original form, have this nasal adapted to [-n] (sic)” (43). The realization, however,
does vary somewhat. Homorganic assimilation of nasals is expected; that is, /n/ in word-final position is expected to be realized as /m/ before bilabials and /ŋ/ before velars in a following word (Hualde et al. 78, Lipski 1986:140). Distinctly different from this is the tendency of some dialects to realize /n/ as [ŋ] in a weakening process (Lipski 141). Coloma (2012) defines velarization of /n/ as “the use of the velar nasal consonant [ŋ] as an allophone of /n/, not only when that phoneme appears before another velar consonant but also in a word-final position” (3). My participant data shows strong evidence that [ŋ] can appear in word-final positions before a following word, not just phrase-finally, and some evidence that [m] can do the same. I examine the phonological characteristics of Andalucian Spanish based on data from the aforementioned documentation and how it differs from the expectations set by the literature in aspirating and deleting final /s/ and /d/, as well as de-neutralizing final /n/.

2 Phonemes of Spanish

Hualde et al. say that Spanish consists of 17-19 consonants and five vowels. The ambiguity arises from two situations in which the phonemes exhibit contrast only in some parts of Spain. The first pair is /ʝ/ and /ʎ/, which are not relevant to this paper, and the second is /s/ and /θ/ (82, 88). These two phones originated as separate phonemes, distinct as late as the 16th century (Mexicano 2009), and remain so today in northern Spain, where minimal pairs such as /rosa/ ‘pink’ and /roθa/ ‘s/he contacts’ exist as shown in Hualde et al.(74). In southern Spain, the two phonemes have merged, so generally the two phones are allophones of /s/ and can be interchanged without confusion, but the distinction is maintained in the orthography. Words that used [s1], to become /s/, were spelled with <s>, but words that used [s2], to become /θ/, were spelled with <z> (Mexicano 2009). This latter category, words ending with [s2], has very few examples, which were not included in summaries of tokens of /s/. For several participants, their only use of this category was the word luz ‘light’, which was elicited in a word list, and almost all the other such words that appeared were place names. Five phonemes can appear word-finally: /s/, /d/, /n/, /l/, and /ɾ/. Only the first three of these will be examined in this paper. Below, I break each of them down.
2.1 /s/

The phoneme /s/ has five or six allophones: according to Burt (1980), these include [ʂ], which appears before /t/; [ɕ], which appears before /d/; [z], which appears before /r/; [ʐ], which appears before all other voiced consonants, and [ʂ]; which appears everywhere else (48-9). Burt does not mention [θ] as an allophone of /s/, but Hualde et al. and my own practical experience show that it is a common allophone in certain dialects of Iberian Spanish. In phonetic descriptions, I will distinguish between [s], [z], [θ], and [ʐ] only, as Burt’s uber-close transcription does not serve my needs.

2.2 /d/

According to Burt (1980), the phoneme /d/ has two allophones: [ɖ] after a pause, a nasal, or a lateral; and [ʂ] in all other positions (42-3). Hualde et al. elaborate that all the voiced stops in Spanish come in stop and fricative-approximant forms in complementary distribution, and agree with Burt on the exact distribution. I will also distinguish between these two phones in phonetic transcription. Although there is a phoneme /t/, word-finally it neutralizes with /d/, and Harris-Northall (1990) says that “voiced stops and fricatives are devoiced in Spanish in [word-final] position” (47).

2.3 /n/

The phoneme /n/ has six allophones. One of these, [ŋ], appears as a place assimilation before velars, but also “in free variation before a pause” (Burt 58). The other five differ only in place assimilation and are near-indistinguishable: [ɳ], which appears before dentals; [ɲ], which appears before interdentals in Iberian Spanish; [n'],\(^1\) which appears before palatals, [n], which appears before /r/, and [ŋ], which appears everywhere else. I will distinguish between [ŋ] and [n] only, with the final five phones transcribed as [ŋ], since simple place assimilation without free variation does not affect my analysis.

\(^1\)Alveolo-palatal nasal, distinct from the fully palatal n.
3 Dialects of Spanish

The number of perceived Iberian Spanish dialects varies anywhere from two to 29,² depending on who you ask, but all agree that the Spanish spoken in the Americas is different from Iberian Spanish, and within Spain, that the two main dialects are the northern-central, Castilian,³ and the southern, which is spoken mostly in Andalucía. The majority of my participants, when asked to separate a map of Spain by dialect, drew a line separating Castilla-La Mancha from Andalucía, which I take as the dividing line between northern-central and southern Spain. See Figure 1 for the blank map with which I presented my participants, and a division into dialects prototypical of my participants. Murcia and parts of Extremadura and Valencia are also occasionally classified as southern. I will refer to this dialect as Andalucían, and to the Spanish spoken in the country as a whole as Iberian Spanish. I will refer to northern-central Spain as Castilla for the sake of consistency and brevity.⁴

3.1 Deletion of /s/

Regarding final /s/ aspiration, Coloma (2012) lists dialects in far-southern and central-western Spain as well as the Canary Islands as examples, but Harris-Northall (1990) mentions final /s/ aspiration as a phenomenon occurring throughout large areas of the southern two-thirds of Spain, including Castilla-La Mancha, which, along with Castilla y León, gave its name to the northern-central dialect. Hualde et al. say that final /s/ aspiration is characteristic of the southernmost territory Andalucía and the Caribbean, but that it has “ample geographic distribution” (75)⁵ including the centrally located Madrid (326-7), while Lipski (1986) puts final /s/ aspiration occurring everywhere in Spain except for central and northeastern dialects. Figure 2 shows the contrast between these descriptions.

3.2 Deletion of /d/

Hualde et al. (2010) bring up intervocalic d-deletion as a marker of Andalucían Spanish. Specifically, they say that the deletion of /d/ in word-final /ado/, both

²Speaker judgments from Eva Martín García and Javier Martínez de Velasco, respectively.
³N.B. The Spanish word castellano is a false cognate, and refers to the Spanish of Spain, not just the northern-central part of it.
⁴This is not quite accurate, as Castilla-La Mancha and Castilla y León are but two of the autonomous territories that make up northern-central Spain.
⁵Original quote: “amplia distribución geográfica”
Figure 1: Above: Each participant was asked to divide a blank map by ‘how people speak differently’. Below: Eva Martin García’s completed map of Spain. This is a prototypical example of the choices most of the participants made. Emphasis on the prototypical north-south division mine.
in words where it is a suffix like cantado⁶ ‘sung’ and where it is simply part of the word like lado ‘side’, is a widespread phenomenon, but that Andalucian Spanish goes so far as to delete intervocalic /d/ in other contexts as well, like comido ‘food’ (70-1). In Latin America, they say, /d/ deletion has become stigmatized, but it has garnered acceptance in Spain (328). However, they mention word-final /d/ deletion only as phrase-final, not before a following a word, and that as a phenomenon specifically of Castilian Spanish. Spanish overall, says Harris-Northall, has a constraint against word-final stops. Latin, he adds, lost all its final stops in the process of becoming Spanish, and Old Spanish had none (39-40). He quotes Navarro Tomás as saying that word-final /d/ is eliminated in ‘vulgar’ Spanish, but in the Castilian-speaking areas, it relaxes into [θ]. He goes on to quote Menéndez Pidal that, in the autonomous territories Castilla-La Mancha, Madrid, and Andalucía, as well as in America, word-final /d/ is realized as [ð] in careful pronunciation, and disappears entirely in running speech; in the territories La Rioja, Cantabria, and Castilla y León (49) it turns into [θ] in lieu of disappearing.

⁶cant-ado
sing-past.participle
‘sung’
3.3 Realization of /n/

Lipski (1986) describes the velarization process of final /n/ in detail. First, he mentions the existence of phrase-final velarization (140). This much is confirmed by my other sources. In phrase-final or prevocalic word-final positions, Hualde et al. say, /n/ is realized as [ŋ] in lower sociolects (78), but Lipski maintains that velarization is less constrained by sociolinguistic pressures than final /s/ aspiration (149). Harris-Northall cites Asturias as an example of northern /n/ velarization, and adds that in places such as parts of Andalucía, the /n/ deletes entirely, leaving only “a nasal resonance on the preceding vowel” (43). He goes as far as to say that in dialects where the velarized final nasal occurs, it is the only allowable nasal (44). Coloma (2012) performs a statistical analysis of ten prominent phonological variations7 for the purpose of classifying the Spanish-speaking world into eleven dialect areas. He describes a difference between Western Andalucían and Eastern Andalucían, based on whether or not they velarize word-final /n/. In mapping the statistical ‘distance’ between dialects of Spanish, he finds Western and Eastern Andalucían to be further from each other than either is from, among other dialects, Eastern Mexican. In all other aspects, his proposed two dialects of Andalucían are identical. However, this seemingly minor discrepancy gains more potential significance when Coloma shows that final /s/ aspiration is most highly correlated to /n/ velarization among phonological characteristics (11).

Velarization, says Lipski, is also permissible word-finally before a following vowel, though rare outside Galicia (140, 149). He posits that this is a process of weakening in the nasal, which ends up as complete deletion (141). Although phrase-final velarization is fairly common, says Lipski, pre-consonantal word-final velarization is somewhat rarer (146).

Labialization of final /n/ is all but unheard of. It is a strengthening of /n/ rather than a weakening, and so seems to go against all observed processes (Harris-Northall 1990). Hualde et al. do mention it as a much less common phenomenon than velarization, but cites only Latin American locations for its existence. Harris denies its existence altogether, saying, “the labial has been eliminated historically and is still not admitted in the modern language” (43-4).

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7He chooses four as the most important variables. These include /s/ aspiration and /n/ velarization, as well as /x/ aspiration and /x/ uvularization.
4 Materials and Methods

I interviewed 17 adults in Granada, a major city on the southern coast of Spain. Each participant in my study completed three tasks: reading a word list, dividing a map of Spain by dialect, and answering a series of sociolinguistic-based and demographic questions. These questions were designed to reveal the speaker’s particular dialect and yield information on cultural perceptions of different accents.

4.1 Participants

I sought out participants from the staff, faculty, and assistants of the Institute for the International Education of Students, better known as IES Abroad—specifically, their branch in Granada. As a student there, I had connections to the community already. I also recruited a few acquaintances from other aspects of my life in Granada. This biases my sample toward the well-educated, middle to upper class, which must be taken into consideration when extrapolating from the results. It also means that I had far more speakers of Andalucian Spanish than Castilian. A total of 17 participants was analyzed. One of these was omitted from the data for multiple reasons, including loss of some of the data and outlier status as a native of Ecuador rather than Spain.

4.2 Process

I speak a dialect of Spanish taught in American schools, which is a mix of natural dialects. This American Academic Spanish was my main contact language, but all of my materials were revised by a translation student at the Universidad de Granada, a native Iberian Spanish speaker, before use. All participants were recruited using a prepared speech introducing myself and the project. All participants were presented with a consent form first, which they read and signed. I signed it within their sight, made a copy for my records, and gave them the original. I filmed them using my iPhone 6s on a makeshift tripod, with the screen angled away to minimize distraction. My second participant advised me to directly ask my participants to speak naturally, as so many of them were used to standardizing their speech for the ease of non-native speakers such as myself, and I did so with all the following participants. Graphs were generated in R. See the appendices for copies of my research materials and code. Phonetic and phonemic representations are written in the International Phonetic Alphabet.
4.3 Word list

When I created the word list, I cast a wide net to home in on several interesting phonological variations. I chose words with word-initial, intervocalic, and word-final examples of /s/, /d/, and /b/, all of which exhibit some degree of variation. I also elicited the word robot 'robot', as the only example I could find of word-final [t], which I believe in retrospect to be a loanword and therefore treated as /d/ in accordance with the evidence presented in Section 2.2. I asked participants to read each of the words three times out loud. Three elected to read the entire list three times through instead of each word three times together.

4.4 Map

I used a map division exercise to get participants’ perspectives on where accent boundaries lay, following Sullivan (2006). I presented participants with a map of Spain (see Figure 1), with autonomous territories denoted, so as to make the results easier to codify, since participants were likely to use the lines given to them. I asked participants to divide\(^8\) the map into sections to show where people spoke differently. To those who wanted clarification, I said the question was open-ended on purpose.

4.5 Sociolinguistic and demographic questions

For the purpose of demographics, I asked participants to list the places they lived and at what ages, whether they considered themselves to have an accent, and what that accent would be. I also asked them to explain their map to me. The rest of the questions served as a sociolinguistic tool and an example of spontaneous speech. I asked them about commentary they received on their accent, whether there was a part of Spain without an accent or that spoke ‘correct’ Spanish, whether there was a part of Spain whose accent was associated with a lack of education, if there were other widespread opinions about specific accents, and what opinion the Northerners held of the Southerners and vice versa.

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\(^8\)The Spanish verb dividir does not seem to be a perfect translation of the English divide, as several participants asked how I wanted them to mark their maps, and several drew Xs on their maps rather than divide it up.
5 Data

I used Elan to make partial transcriptions of the interviews, starting at or shortly before the beginning of the word list and continuing for 8 minutes (the length of my shortest interview). I made initial observations from the word list, and then combined the data from the word list with data from the spontaneous speech accrued in the third part of the interview to get adjusted percentages of deletion and consequently a more accurate picture of each participant's accent. I noticed a discrepancy between /s/ deletion and /d/ deletion, as well as an unusual range of /n/ realizations. I will report on these three angles separately. When I asked participants whether they grew up in Andalucía and whether they considered themselves to have an Andalucian accent, the answers displayed imperfect positive correlation; that is, several people did not have the same answer to both questions. Therefore, I performed my analyses on both background and self-reported accent in each case.

5.1 Deletion of word-final /s/

For exploratory data analysis, I compared the percentages of /s/ deletion in the word list alone to self-reported answers about whether each participant's accent was Andalucian and whether they grew up in Andalucía. Each analysis showed a trend toward Andalucians (Figure 3, left) and Andalucian accents (Figure 3, right) having higher deletion rates. Deletion of /s/ appeared to be a better indicator of self-reported accent than of actual background, so the data will be sorted according to accent in all further discussions of /s/ deletion. Several outliers appeared, as shown in Figure 4. I examined the outliers by studying participants' /s/ deletion during an 8-minute segment of spontaneous speech and produced more accurate percentages of /s/ deletion.

5.2 Deletion of word-final /d/

Natural occurrences of words that end in /d/ were quite rare, so much so that not every participant had any in their spontaneous speech, and I was forced to rely solely on their word list data to obtain a percentage of final /d/ deletion. I analyzed this percentage in terms of self-reported accent and background. Deletion of /s/ does not parallel deletion of /d/ in this dataset. That is, several people deleted
Figure 3: Distribution of /s/ deletion percentages among participants using the word list, according to background (left) and self-reported accent (right). Participants from Andalucía deleted final /s/ more often than those from Castilla, but overlap renders the significance debatable. A clearer trend exists between a self-reported Andalucian accent and /s/ deletion.

Figure 4: Participants' individual /s/ deletion rates using the word list, according to self-reported accent.
comparatively many /s/ tokens and comparatively few /d/ tokens, and a few vice versa (see Figure 5).

![Comparison of /s/ and /d/ deletion](image)

Figure 5: Each participant's percentage of /s/ deletion and percentage of /d/ deletion.

5.3 **Realization of word-final /n/**

Only one token on the word list, *bien*, 'good', ended with /n/. It came to my attention because, alone among the words, *bien* was pronounced exactly the same way each time by any given participant. All the other words showed free variation in the final consonant at least some of the time, but the final /n/ of *bien* showed no variation within a given participant's data. Some participants left it as [n], some velarized it, and some even labialized it, but each one pronounced their three tokens of *bien* with the same final consonant. I plotted the realization of /n/ in *bien* against self-reported accent and background in Figure 6. While realization of /n/ as [ŋ] or [m] seems to be a good indicator that someone is Andalucian, realization of /n/ as [n] predicts nothing, as many Andalucians also realize their /n/s this way, as do Castilians.
Realization of /n/ by background

![Bar chart showing the realization of /n/ by background.](chart1)

Realization of /n/ by accent

![Bar chart showing the realization of /n/ by accent.](chart2)

Figure 6: Above: Each group, those from Castilla and those from Andalucía, separated by how they realize the final /n/ in the word *bien*. Castilians realized it mostly as [n], with one participant using [r]. Andalucians also realized it mostly as [n], but with a significant number of realizations of [1] and also two participants realizing it as [m]. Below: Each group, those with a Castilian accent and those with an Andalucian accent, separated by how they realize the final /n/ in the word *bien*. Both groups had a significant amount of realization as [n], and the Andalucian accents also had a significant amount of realization of [1] and even a few realizations as [m].
6 Results

6.1 Deletion of word-final /s/

After a preliminary look at the realizations of the tokens from the word lists, I found that the majority of participants either had an /s/ deletion rate above 70% or one below 30%. I re-evaluated with the addition of data from spontaneous speech, and compared the new percentages (Figure 7). Self-reported accent continued to be a notably better predictor of /s/ deletion rate than actual background. Figure 8 shows the new distribution. Several participants displayed a large register effect, and had very different deletion percentages between their word list and their spontaneous speech, as seen in Figure 9. I will now examine the outliers.

6.1.1 Register effect

Two participants had a high deletion rate based on the word list, but a low rate based on spontaneous speech. One participant experienced the opposite effect. Both participant #102, Patrícia Molina, and participant #105, Beatriz Arenas Ibarro, had a high /s/ deletion rate at 88.9% based only on the word list, which dropped to 34.62% and 20.78% respectively upon analysis of spontaneous speech. Both deleted /s/ phrase-finally and before consonants, but not before a vowel. A possible reason for this is that both work with non-native Spanish speakers such as myself, and are used to modifying their speech to help us understand. The register effect might then be caused by them slipping back into their habitual, Castilla-like
Figure 8: Each participant's level of /s/ deletion of spontaneous speech, color-coded according to self-reported accent. Participants with an Andalucian accent delete /s/ more than those without.

Figure 9: Each participant's final deletion rate while reading the word list and from spontaneous speech.
‘work accent’, once we have moved away from the word list and they aren’t paying as much attention to their speech. Participant #110, Salvador Ruiz Pérez, had a 55% deletion rate based solely on the word list. However, an analysis of spontaneous speech revealed a 80.64% deletion rate. Figure 10 shows that, after initially pronouncing several /s/-final tokens on the list with realized /s/, Mr. Ruiz’s rate of /s/ retention tapered off almost completely, with only two more occurrences of /s/ retention over a period of eight minutes. Since Mr. Ruiz also stated that Andalucians (and, by extension, himself, as a lifelong Granada resident) speak incorrect Spanish, a possible hypothesis is that he, consciously or unconsciously, tried to speak ‘correctly’ at the beginning of his interview, but slipped back to his natural accent as he grew more comfortable. Mr. Ruiz deletes in all word-final environments.

6.1.2 Other outliers

Two participants identified as having Andalucían accents, as well as having grown up in Andalucía, but had comparatively low /s/ deletion rates. One participant was Andalucían, but does not identify as having an Andalucían accent; these three all provided reasons for their accent to have changed. One participant was from Castilla, but had a comparatively high /s/ deletion rate. The earlier analyses of background and accent based on word list data shared two outliers. One of these is #112, who preferred not to be identified by name. #112 deletes at an 11.11% rate, and in all environments. She grew up in Granada until age 15, and then traveled the world. She spends much of her time in Madrid for work, and thus describes her accent, more specifically, as Andaluz tainted by Madrileño, or the dialect of Madrid. She says that her friends in Madrid tell her she sounds very Andalucían, but makes no comment on the opinions of her friends from elsewhere.

The other outlier in both the early analyses is #115, Eduardo Cuenca García, who deleted /s/ exactly once despite growing up in far-south Málaga and considering his accent Andalucían, but he also traveled the world for 20 years, which may have had an effect on his accent. Participant #101, Virginia González, grew up in Granada but claims her accent has changed due to her work. In fact, she only has a 21.43% /s/ deletion rate. She deletes in free variation in almost all instances, in

9Specifically, she deletes in the environments e,a, e,k, and a, one each prevocally, preconsonantly, and phrase-finally, but the low deletion rate prevented me from gathering a more complete dataset.
both phrase-final and preconsonantal position, but not prevocally.
Participant #107, Mario Rodríguez Medina, had a strong register effect. Mr. Rodríguez grew up in Barcelona and Madrid, and then traveled to Granada. His /s/ deletion rate based on the word list is a whopping 77.78%, extremely high for a non-native of Andalucía. In spontaneous speech, it drops to 65.38%, which is still rather high. While he self-identifies as having an Andalucían accent, he specifies that it isn’t very strong and not particularly Granadino. This may lend some credence to Harris, Hualde labeling of Madrid as a location of high /s/ deletion. Mr. Rodríguez deletes in free variation in all environments.

![Figure 10: Mr. Ruiz’s /s/ deletion over time. Three tokens of /s/ retention overlap early on in the interview, but retention recurs only twice later in the selected timeframe.](image)

6.1.3 Ex-[s2]

One item on the word list, luz ‘light’, falls in the ‘ex-[s2]’ category described above, and shows strong resistance to final consonant deletion. Only one participant ever deleted the /s/ in luz. That is, among the tokens of luz, I encountered 45 tokens of /s/ retention and 3 tokens of /s/ deletion. Every other word-final consonant on the elicitation list varied among speakers more than that, the next most skewed word being ciencias ‘science’ with 31 tokens of deletion, 19 tokens of retention, and 1 token of weakening as seen in Figure 11.

Since this is a relatively uncommon ending in Spanish, some participants’ ex-[s2] data was restricted to the word list. The word Andaluz ‘from or of Andalucía’ occurred in the spontaneous speech of eleven participants, and shows less resistance to deletion: six of those participants deleted the final consonant on at least one token of the word, and five did not (see Table 1). If it was not deleted, it was realized as [θ] or [ð]. The place name Cádiz also occurred in three participants’ speech, in which the final consonant was realized equally as [θ] and [ð]. One participant
Figure 11: Each word on the word list, by relative amount of deletion. The word luz varies markedly less than any other word. Retention: [d] or [t] for the stop-final words, [s] for the [sl]-final words, and [θ] or [ð] for luz, the only [s2]-final word. Weakening: unreleased stops and glottal stops for the stop final-words, and [θ] for the [s1]-final words. Deletion included both full deletion and realization as [h].

Table 1: Pronunciation of eleven participants’ tokens of Andaluz.

used the word [badahoð] Badajoz, another place name, and one the word [kruθ] cruz ‘cross’. The phoneme seems to be either realized as an interdental or deleted, but its previous status as its own phoneme causes it never to be realized as [s] or [z]. One exception to this was the word dies ‘ten’, which on one occasion was realized with a final [s]. In analysis of this data, participant #112 was omitted, as she pronounced so many tokens with a final [s] or [z] so dentalized that it cannot be properly categorized into either the normal dental or the interdental fricative. See Figure 12 for a summary of realizations of the two phonemes.

6.2 Deletion of word-final /d/

Deletion of word-final /d/ does not appear to correlate to anything, especially when compared to /s/ deletion. Neither self-reported accent (Figure 13, left) nor
Comparison of realization by orthography

Figure 12: Orthographical representation by realization.
background (Figure 13, right) is a good indicator of final /d/ deletion.

![Boxplot of /d/ deletion percentage compared to background. Right: Percentage of /d/ deletion compared to self-reported accent.]

Figure 13: Left: Boxplot of /d/ deletion percentage compared to background. Right: Percentage of /d/ deletion compared to self-reported accent.

### 6.3 Realization of word-final /n/

Since /n/ realization based on the word list did not appear to correlate strongly to accent or background, I examined final /n/ realization in a five-minute span of spontaneous speech for each participant, and found that, despite the linearity of realization in the word list, no such neat patterning occurred in spontaneous speech. Figure 14 shows the distribution of /n/ realization across participants, sorted roughly by self-reported accent. Since [ŋ] is known to appear before velars, and [m] before bilabials (Hualde et al. 2010), I took into account the phone that began the next word, unless a significant pause separated them. The appearance of word-final [ŋ] before a velar or [m] before a bilabial was taken to be part of normal distribution, as was [n] in any word-final position. Recall that the previous analysis had only five users of [ŋ], those who ended their realization of bien with the velar. With the new information, I found that eight participants pronounced word-final [ŋ] phrase-finally, and seven pronounced [ŋ] in nonstandard phrase-medial positions. Four of these pronounced bien with final [n] in the word list, and so had not entered into my earlier analyses as [ŋ] users at all. One participant
realized bien with final [m], but realized no other word-final /n/ as [m]—including before bilabials. A closer look at the [ŋ] realization environments shows that, of the eight participants who velarized /n/, one did so only phrase-finally, four did so both phrase-finally and preconsonantally word-finally, and two did so in both of these environments as well as prevocally word-finally. The remaining one deleted only prevocally and preconsonantally, and was raised in Galicia, a territory singled out by Lipski as being prone to prevocical word-final velarization. This decreasing order of likelihood of velarization, phrase-finally > preconsonantally > prevocally, follows Lipski's prediction in his 1986 article.

There was very little data of word-final bilablization, but four participants used a phrase-final [m], one used a prevocalic word-final [m], and one a preconsonantal word-final [m] before [f]. Since no literature mentions Iberian Spanish final [m] realization, this is certainly cause for further study.

Figure 14: Realization of /n/ by participant. Most participants used all three realizations over the course of five minutes of conversation.

7 Conclusion

Coloma (2011) classifies Spanish dialects based on five phonological characteristics, including /s/ aspiration. His resultant table classes Andalucian Spanish as far from ‘traditional’ Iberian Spanish as it is possible to be. “What’s perfect Span-
ish?” asks Patricia Molina rhetorically. “The one we learn from books? Or the one that helps you communicate with people in the street when you go out? I don’t know.” Andalucían Spanish is known to delete final /s/, but quite apart from their self-admitted stereotype as ‘bad’ Spanish speakers who pronounce no ‘eses’, perceived Andalucían accents do not strongly parallel /s/ deletion, and even less so does actual speaker background. Deletion of /s/ can be strongly influenced by register, and potentially also by travel. Furthermore, some Andalucians experience a weakening process of their word-final /n/, resulting mainly in velarization, which follows a hierarchy of ease of deletion, but so do Castilians, if less often. A few Andalucians also experience a strengthening. Andalucian speakers’ poor reputation is less deserved still for the fact that Spaniards across the country appear to delete final /d/. Overall, I believe the distinction between accents to be less pronounced than the people believe, which may account for the discrepancies in the literature.

10 Exact quote: “¿Qué es el español perfecto? ¿El que se aprende los libros, el que está en los libros? O, cuando sales a la calle, ¿qué te ayuda al comunicar con la gente? No sé.”
Appendix A: Recruitment speech

Hola,

Estoy trabajando en una tesis como parte de mi licenciatura en lingüística en el Bryn Mawr College. La tesis consiste en el estudio de diferentes acentos castellanos, para lo que necesitaría ayuda de aproximadamente treinta hablantes nativos de la lengua española. En dicho estudio el/la hablante será entrevistado/a en una sesión presencial en un lugar conveniente para usted, que durará aproximadamente una media hora. La entrevista se grabará en video y consistirá en pronunciar una lista de palabras, en señalar un mapa de los acentos diferentes de España, y en contestar preguntas sobre los mismos.

Le agradeceríamos enormemente su participación. En el caso de que pueda contribuir al estudio, por favor conteste a la siguiente dirección para concertar una entrevista: slittle@brynmawr.edu.

Muchas gracias,
Sally Little, promoción del 2017
Appendix B: Interview script

Hay tres partes a esta entrevista.

Parte 1:

Por favor, lea tres veces en voz alta cada una de las siguientes palabras:

- robot
- caber
- diamante
- paciencia
- gracias
- cultura
- quizás
- puedo
- zapato
- ciencias
- luz
- vale
- avaricia
- trompeta
- terrible
- bien
- salud

Parte 2:

Por favor, divida el mapa de España de la página siguiente en secciones para indicar en qué zonas las personas hablan de forma distinta.
Parte 3:

A continuación se le harán una serie de preguntas. Conteste cada pregunta antes de leer la siguiente.

1. Por favor, enumere las lugares donde ha vivido (ciudad, pueblo) y qué edad tenía cuando vivía en esos lugares.

2. ¿Considera que usted tiene un acento en particular? Si así lo considera, ¿cuál sería?

3. ¿Algun otro hablante nativo de español ha hecho algún comentario en alguna ocasión sobre el acento que tiene usted en español? ¿Qué dijo?

4. Por favor, describa cómo ha dividido su mapa. ¿Qué diferencias le vinieron a la mente? ¿Cuántos acentos diferentes ha señalado? ¿Qué acentos?

5. ¿Hay un lugar en España donde piense que no haya acento, o dónde diría que se habla el español más correcto? ¿Dónde?

6. ¿Hay acentos que se consideren ineducados en algún lugar de España? ¿Qué acentos, y qué zonas de España los consideran inadecuados?

7. ¿Hay otras opiniones extendidas sobre acentos específicos?

8. En su experiencia, ¿qué percepción tienen los nortenos en cuanto al acento de los sureños?

9. En su experiencia, ¿qué percepción tienen los sureños en cuanto al acento de los nortenos?

TERMINA DE ENTREVISTA
Appendix C: Consent form

Formulario de consentimiento
Bryn Mawr College

1) Título de estudio: Estudio de la fonología castellana

2) Objetivo y descripción general del estudio

Este estudio tiene como objetivo reunir información para la tesis universitaria de Sally Little y está supervisado por el departamento de lingüística del Bryn Mawr y Haverford Colleges. El objetivo de este estudio es reunir información sobre las diferencias existentes entre distintos dialectos castellanos. Participarán aproximadamente treinta personas elegidas de entre la facultad y voluntarios del Institute for the International Education of Students (IES) y también de entre las empresas y familias socias. El proceso de recopilación de la información comprenderá desde marzo hasta junio del 2016, y la tesis se publicará en diciembre de 2016.

3) ¿Qué conlleva la participación en el estudio?

Como participante, se le entrevistará de forma presencial durante una hora o menos. La entrevista se grabará en video y consistirá en pronunciar una lista de palabras, en marcar en un mapa los diferentes dialectos en España, en contestar preguntas sobre los mismos, y en contestar preguntas demográficas.

4) Confidencialidad

A cada participante se le facilitará una contraseña de tres números, y todo el material de la entrevista se registrarán con esa contraseña. Material de la entrevista incluyen la entrevista transcrita y un video de la entrevista. Toda el material se guardará en dos memorias flash protegidas con contraseña y, con permiso, archivarán públicamente al final del estudio para que otros investigadores puedan usar el información. Si eliges no permitir archivar los videos, puedes indicar al final del formulario. En este caso, serán borrado al finalizar el análisis de la información. Si eliges que use yo tu nombre real, o que use un nombre falso, también puedes indicar al final del formulario.

5) Riesgos al participar en el estudio

Los riesgos al participar en el estudio no son mayores que los que se viven en el día a día.

6) Beneficios para los participantes u otros

No hay beneficios directos para aquellos que participen en el estudio. Sin embargo, es probable que encuentre interesante hablar sobre los temas que se tratan en el estudio y puede resultar útil tanto para el campo de estudio.

7) Retribución

No habrá retribución por la participación en este estudio.
8) **Engaño**

No hay engaños en este estudio.

9) **Participación voluntaria**

Su participación es totalmente voluntaria. Puede abandonar del estudio en cualquier momento. Puede no contestar cualquier pregunta que quiera. Si decide abandonar el estudio, no sufrirá ninguna penalización o pérdida de beneficios. No se revelará nada sobre su participación a nadie de IES Abroad o a las empresas socias.

10) **Preguntas sobre el estudio y derechos de los participantes en la investigación**

Si tuviese alguna pregunta sobre el estudio, por favor llame o envíe un correo electrónico a la investigadora jefe, Sally Little, (slittle@brynmawr.edu; 703-509-2048) o a la jefa de departamento que supervisa la investigación, Shizhe Huang (shuang@haverford.edu; 610-896-1262). Si tiene preguntas sobre sus derechos como participante en el estudio, por favor contacte con Leslie Alexander, profesora y presidenta del Bryn Mawr College IRB (lalexand@brynmawr.edu; 610-520-2635).

Tengo 18 años o más: Sí ___ No ___

He leído este formulario de consentimiento o alguien me lo ha leído: Sí___ No ___

Todas mis preguntas sobre el estudio han sido respondidas satisfactoriamente: Sí___ No ___

He recibido una copia de este formulario de consentimiento. Sí___ No ___

Acepto a participar en esta investigación. Sí ___ No ___

Doy permiso para grabar en video mi entrevista. Sí ___ No ___

Solicito que mi nombre real sea usado (si elige “no”, sus respuestas se vincularán con una contraseña o un nombre falso solo). Sí___ No ___

Doy permiso para que mi entrevista (video) sea archivada para que futuros investigadores puedan estudiarlas, (si elige “no”, sus respuestas se destruirán al final del estudio, y no más tarde del 25 diciembre 2016). Sí___ No ___

Entiendo que si permito archivar mi entrevista, existe la posibilidad de que alguien pueda reconocerme. Sí___ No ___

Doy permiso para que mis respuestas (video) sean usado en otros lugares profesionales, como clases de universidad o presentaciones a otros investigadores. Sí___ No ___
Nombre (escriba con letra de molde):

Firma: ___________________ Fecha: ___________________

Nombre de investigador (escriba con letra de molde):

Firma: ___________________ Fecha: ___________________
Appendix D: R code for image creation

# getting data—thesis is the data from the word list alone,
# thesis1 is the raw data from the spontaneous speech,
# and thesis2 is the same as thesis1 but sorted and
# with the 'not reported' value removed
setwd("C:/Users/Sally/My_Documents/LaTeX/")
thesis <- read.csv(file = "thesis.csv", header = TRUE)
thesis1 <- read.csv(file = "adjustedpercentagescode.csv", header = TRUE)
thesis2 <- read.csv(file = "thesis2.csv", header = TRUE)
stimlin <- read.csv(file = "stimlin.csv", header = TRUE)
stimlin$Time <- format(stimlin$Time, format = "Y:H:M:S")
stimlin$Time <- as.POSIXct(stimlin$Time, format = "Y:H:M:S")
library(ggplot2)
library(lattice)
library(reshape2)
labeling<-seq(1,16,by=1)
labs<-c(seq(100,107, by=1),seq(109,116, by=1))
myColors <- grey.colors(n=6)
my.settings <- list(superpose.polygon=list(col=c(myColors[0:4], "white")))
par(family="Charis_SIL")
dev.new()

# making /s/ boxplots from word list (Figure 3)
pdf("SDeletionByAccentBoxplot1.pdf", width=4,height=5)
boxplot(Percentage.of.S.deletion ~ self.reported.accent.Andaluz,
names = c("Castilian","Andalucian"), data = thesis,
main="Percentage of /s/ deletion by self-reported accent")
dev.off()
pdf("SDeletionByBackgroundBoxplot1.pdf", width=4,height=5)
boxplot(Percentage.of.S.deletion ~ From.Andalucia,
names = c("Castilla","Andalucia"), data = thesis,
main="Percentage of /s/ deletion by background")
dev.off()

# making /s/ boxplots from spontaneous speech (Figure 7)
pdf("SDeletionByAccentBoxplot2.pdf", width=4, height=5)
boxplot(s.deletion.percent ~ not.markedandaluz,
names=c("Castilian","Andalucian"), data = thesis2,
main="Percentage of /s/ deletion by self-reported accent")
dev.off()
#making /s/ barplots from word list (Figure 4)
dev.new(width=10, height=4)
barplot(thesis$Percentage.of.S.deletion, names.arg = thesis$Identifier,
col = factor(thesis$self.reported.accent.Andaluz),
las=2, main = "Percentage of /s/ deletion by self-reported accent",
xlab = "Participants", ylab = "Percentage deleted",
legend.text = c("Andalucian accent", "Castilian accent"),
args.legend = list(x ='topright', fill=c("red","black"), bty="n"))
dev.off()

dev.new(width=7, height=4)
barplot(thesis$Percentage.of.S.deletion, names.arg = thesis$Identifier,
col = factor(thesis$From.Andalucia), las=2, border=NA,
main = "Percentage of /s/ deletion by background",
xlab = "Participants", ylab = "Percentage deleted",
legend.text = c("From Andalucia", "From Castilla"),
args.legend = list(x = 'topright', fill=c("red","black")))
dev.off()

#making /s/ barplots from spontaneous speech (Figure 8)
dev.new(width=7, height=4)
barplot(thesis2$s.deletion.percent, names.arg = thesis2$identifier,
col = factor(thesis2$not.marked.andaluz),
las=2, main = "Percentage of /s/ deletion by self-reported accent",
xlab = "Participants", ylab = "Percentage deleted",
legend.text = c("Andalucian accent", "Castilian accent"),
args.legend = list(x = 'topright', fill=c("red","black"), cex=0.75, bty="n", inset=c(-0.051,0.5)))
dev.off()

dev.new(width=7, height=4)
boxplot(d.deletion.percent ~ not.marked.andaluz,
names = c("Castilian", "Andalucian"), data = thesis2,
main="Percentage of /s/ deletion by self-reported accent")
dev.off()

boxplot(d.deletion.percent ~ is.not.from.andalucia,
names = c("Castilla", "Andalucia"), data = thesis1,
main="Percentage of /s/ deletion by background")
dev.off()

#making /d/ /s/ comparison barchart (Figure 5)
sdcomp <- subset(thesis1, select = c("identifier", "s.deletion.percent"),
"d. deletion percent")

head(sdcomp)
melted <- melt(sdcomp, id="identifier")

pdf("sdcomparison.pdf", width=7, height=4)
barchart(value~identifier, data=melted, groups=variable,
main="Comparison of \(s\) and \(d\) deletion",
ylab="Deletion percentage", horizontal=FALSE, cex.names=2,
auto.key=list(text=c("Percent of \(s\) deletion", "Percent of \(d\) deletion"),
border=FALSE, space="bottom",
padding.text=(3), columns=2),
par.settings = my.settings,
scales=list(x=list(labels=labs)))

dev.off()

# making stacked barplot (Figure 11)
comp <- read.csv(file = "piecharts.csv")
comp

pdf("ComparisonAcrossTokens.pdf", width=7, height=4.5)
barplot(as.matrix(comp[ , 2:7]), las=2,
main="Relative behavior of each token", xlab="Token", col=grey.colors(n=3),
legend.text = c("Deletion", "Weakening", "Retention"),
args.legend = list(x = 'topright', bty="n", inset=c(0,-0.27)))

dev.off()

# making n plot based on word list (Figure 6)
ncountaccent <- read.csv("ncountaccent.csv")
ncountaccent
ncountbkgd <- read.csv("ncountbkgd.csv")
ncountbkgd

dev.new(width=7, height=4)
barchart(informants~accent, data=ncountaccent, groups=realization,
main="Realization of \(n\) by accent", labels=c("Castilian accent", "Andalucian accent"),
legend.text = c("/m/", "/n/", "/n/")

xlab="Self-reported accent", ylab="Number of Informants",
scales=list(x=list(labels=c("Castilian", "Andalucian")), tick.number=4),
auto.key=list(text=c("\u001B[m", "\u001B[n"]

border=FALSE, space="left",
padding.text=(3), columns=1)
par.settings = my.settings)

dev.off()

dev.new(width=7, height=4)
barchart(form=background, data=n_count_bkgd, groups=realization, 
main="Realization of /n/ by background", 
labels=c("From Northern-Central Spain", "From Andalucia"), 
legend.text=c("[n]", "[m]", "[u014B]"), xlab="Background", 
ylab="Number of Informants", 
scales=list(x=list(labels=c("From Castilla", "From Andaluca")), tick.number=4), 
auto.key=list(text=c("[u014B]", "[m]", "[n]"), 
border=FALSE, space="left", 
padding.text=(3), columns=1), 
par.settings = my.settings) 
dev.off()

# making a plot based on spontaneous speech (Figure 14) 
nrealcount <- subset(thesis2, select=c(n.as.n:n.as.g)) 
nrealcount <- t(nrealcount) 
head(nrealcount) 
dev.new(width=7, height=4) 
barplot(as.matrix(nrealcount), las=2, main="Realization of /n/", 
ylab="Uses of word-final /n/", xlab="Participants", 
names.arg=thesis2$identifier, legend.text = c("[n]", "[m]", "[u014B]"), 
args.legend = list(x = 'topright', inset=c(0, -0.25))) 
dev.off()

# /s/ timeline plots (Figure 10) 
sub102 <- stimlin[stimlin$Informant == 102, ] 
head(sub102) 
pdf("timeplot102.pdf", width=15, height=4) 
ggplot(sub102, aes(Time, State)) + geom_point() + 
theme(text = element_text(size = 15)) 
dev.off() 
sub110 <- stimlin[stimlin$Informant == 110, ] 
head(sub110) 
pdf("timeplot110.pdf", width=15, height=4) 
ggplot(sub110, aes(Time, State)) + geom_point() + 
theme(text = element_text(size = 15)) 
dev.off() 
sub113 <- stimlin[stimlin$Informant == 113, ] 
head(sub113) 
pdf("timeplot113.pdf", width=15, height=4) 
ggplot(sub113, aes(Time, State)) + geom_point() + 
theme(text = element_text(size = 15)) 
dev.off() 
sub107 <- stimlin[stimlin$Informant == 107, ]
# making orthography comparison barchart (Figure 12)

ortho <- read.csv(file = "orthography.csv", header = TRUE)
head(ortho)

A <- cbind(subset(as.data.frame(table(ortho$X.s)), Var1!=""), rep("/s/"))
colnames(A)[3] <- "variable"

B <- cbind(subset(as.data.frame(table(ortho$deletion)), Var1!=""), rep("/\u00F8/"))
colnames(B)[3] <- "variable"

C <- cbind(subset(as.data.frame(table(ortho$X...)), Var1!=""), rep("/θ/"))
colnames(C)[3] <- "variable"

D <- cbind(subset(as.data.frame(table(ortho$X..)), Var1!=""), rep("/\u00F0/"))
colnames(D)[3] <- "variable"

E <- cbind(subset(as.data.frame(table(ortho$X.z)), Var1!=""), rep("/z/"))
colnames(E)[3] <- "variable"

tab <- rbind(A, B, C, D, E)
dev.new(width=7, height=5)
barchart(Freq~Var1, data=tab, groups=variable, main="Comparison of realization by orthography")
#comparing s word list to s spontaneous (Figure 9)
f <- subset(thesis, Identifier != 103, select=c(Identifier, Percentage.of.S.deletion))
register <- cbind(f, thesis2[,5])
register[7,2] <- 0
register[9,2] <- 0
register[14,2] <- 0
register[15,2] <- 0
colnames(register)[2] <- "wordlistSdeletion"
colnames(register)[3] <- "sponspeechSdeletion"
h <- c(103, 100, 86.36363636)
register <- rbind(register, h)
melter <- melt(register, id="Identifier")
pdf("stoscomp.pdf", width=7,height=4)
barchart(value~Identifier, data=melter, groups=variable,
main="Comparison of /s/ deletion by word list and spontaneous speech",
xlab="Participant",
ylab="Percentage of /s/ deletion", horizontal=FALSE, cex.names=2,
auto.key=list(text=c("Word list ", "Spontaneous speech"),
border=FALSE, space="bottom",
padding.text=(3), columns=2),
par.settings = my.settings,
scales=list(x=list(labels=labs)))
dev.off()

#finding outliers
was <- register$wordlistSdeletion
now <- was-register$sponspeechSdeletion
register$changed.by.percent <- (now/was)*100
register


Mexicano, El. 2009. Esquema del realajuste de las sibilantes del español medieval. Wikipedia. Licensed under the Creative Commons Attribution-Share Alike 4.0 International, 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic license.