

Alfredo Herrero de Haro University of Wollongong
alfredo@uow.edu.au

John Hajek

University of Melbourne
j.hajek@unimelb.edu.au

Eastern Andalusian Spanish (henceforth EAS), is spoken in the east of Andalusia, the southernmost autonomous region of Spain. EAS is most similar to Western Andalusian Spanish (WAS) and to Murcian Spanish, the latter spoken in the autonomous region of Murcia, immediately to the east of Andalusia, and it shares some phonetic traits with EAS, such as vowel lowering. Geographically, Eastern Andalusia includes the provinces of Almería, Granada, Jaén and Málaga, although the precise linguistic delimitation of this area is somewhat more complicated (Figure 1). The main criterion to differentiate EAS from WAS is the lowering or opening of vowels preceding underlying /s/ (Villena Ponsoda 2000). More detailed information on the differences between EAS and WAS can be found in Jiménez Fernández (1999), Villena Ponsoda (2000), Moya Corral (2010) and Valeš (2014). According to Alvar, Llorente & Salvador (1973: map 1696), Cádiz and Huelva in the west are the only Andalusian provinces where vowel lowering before underlying /s/ is not found. As the geographical extent of this phenomenon is widely debated, it is difficult to calculate the precise number of speakers of EAS, but we can assert that this geolect is the native variety of Spanish of approximately 2,800,000 speakers if we take into account the figures from the last census of Andalusia in 2011 (Instituto de Estadística y Cartografía de Andalucía 2011).



Figure 1 Distribution of Eastern and Western Andalusian Spanish. Map taken from de Molina Ortés & Hernández-Campoy (2018: 513).

The description and transcription used in this Illustration are based primarily on spontaneous speech samples from 60 male and female speakers from the towns of El Ejido, Balerma and Adra, in the western part of Almería province. Their ages range from 12 years to 78 years and the recordings were taken during informal conversations covering trivial topics such as

hobbies. No recordings were taken of speakers from the cities of Almería or Granada, the main urban centers of EAS. The materials were collected during informal interviews between the first author (from the Western Almería sub-region) and the participants, usually at their home. The examples (and associated sound files) we cite are taken from the speech of the first author (33 years of age), from four male speakers (aged 16, 17, 27 and 34 years) and from two female speakers (aged 33 and 43 years). The first transcribed passage in the final section of this Illustration is an extract from a conversation with a 43-year-old woman. The second passage is a reading of ‘The North Wind and the Sun’ by the first author. The features found in the recordings match those presented in previous studies on EAS (e.g. Martínez Melgar 1986, Morris 2000 and Peñalver Castillo 2006) and are typical of this variety of Spanish. As EAS is spoken across different cities (e.g. Granada, Almería) and rural areas, the sociolinguistic profile of its speakers is very complex. Wulff (1889), Rodríguez-Castellano (1952), Sanders (1994) and O’Neill (2010) have reported a high degree of variability in the use of certain features in EAS, with some authors finding different realizations of one phoneme even within the same town, depending on the sociolinguistic characteristics of the speakers. Melguizo Moreno (2007), for example, found that, in Granada, the use of [ʃ] for /tʃ/ is more common amongst men than women and Tejada Giráldez (2012) found that there is a relationship between the variable use of [s], [h] or deletion of /s/ and age in Granada city. Alonso, Zamora Vicente & Canellada de Zamora (1950) and Martínez Melgar (1994) go even further and report variability within the same speaker, with evidence, for example, of free variation of /s/ as [s], [h] or \emptyset . EAS has been studied extensively since 1881 (Herrero de Haro 2017b) and the fact that different authors present different and even conflicting descriptions of the same phenomena adds to the complexity of describing this variety of Spanish (see Sanders 1994, Ruch & Peters 2016); the biggest controversy is found with respect to the description of EAS vowels and this is explained further below, in the relevant section. More information on the variability of EAS pronunciation across time and space can be found in Herrero de Haro (2017b).

For convenience, the word often used in the present account for the tendency not to pronounce codas in their underlying form (which remain evident in standard orthography) will be ‘deletion’. However, as noted by a reviewer, in most cases the underlying consonant can be recovered from the phonetic signal thanks to different elements, such as gemination of following consonants. Traditionally, several authors have referred to this phenomenon as ‘aspiration’ (e.g. Gerfen & Hall 2001, Bishop 2007, Ruch & Harrington 2014); however, this term is generally avoided here since relatively few examples of so-called aspiration to [h] have been found in the tokens analyzed for the present Illustration. While aspiration and breathy phonation are common in WAS, they are far less common in EAS.

Consonants

	Bilabial	Labio-dental	Inter-dental	Dental	Alveolar	Post-alveolar	Palatal	Velar
Plosive	p b			t d			ʃ	k g
Affricate						tʃ		
Nasal	m				n		ɲ	
Trill					r			
Flap					r			
Fricative		f	θ		s			x
Lateral fricative					l			

The list below exemplifies each consonant phoneme found in EAS. Allophonic variation, where it occurs, is presented in the discussion that follows. It is worth noting that in any phonetic as opposed to phonemic transcription we use [i e a o u] to represent /i e a o u/, respectively, in all contexts except when these vowels are ostensibly lowered; in those cases, the vowels are transcribed [i̠ e̠ a̠ o̠ u̠]. Further details about this process are given in the ‘Vowels’ section.

/p/	<i>pato</i>	/ ^l pato/	‘duck’
/b/	<i>va</i>	/ ^l ba/	‘he/she goes’
/m/	<i>mano</i>	/ ^l mano/	‘hand’
/f/	<i>fácil</i>	/ ^l faθil/	‘easy’
/θ/	<i>cine</i>	/ ^l θine/	‘cinema’
/t/	<i>té</i>	/ ^l te/	‘tea’
/d/	<i>da</i>	/ ^l da/	‘he/she gives’
/s/	<i>soso</i>	/ ^l soso/	‘bland/dull’
/n/	<i>no</i>	/ ^l no/	‘no’
/ɾ/	<i>pero</i>	/ ^l pero/	‘but’
/r/	<i>perro</i>	/ ^l pero/	‘dog’
/l/	<i>la</i>	/la/	‘the (FEM.SING)’
/tʃ/	<i>chaleco</i>	/tʃa ^l leko/	‘waistcoat’
/j/	<i>yo</i>	/ ^l jo/	‘I’
/ɲ/	<i>ñu</i>	/ ^l ɲu/	‘gnu’
/k/	<i>coche</i>	/ ^l kotʃe/	‘car’
/g/	<i>gota</i>	/ ^l gota/	‘drop’
/x/	<i>jefe</i>	/ ^l xefe/	‘boss’

A few general characteristics of the consonant system of EAS are in order before details of specific consonant phonemes.

Although some differences have been reported between EAS and Castilian Spanish consonants in onset and intervocalic positions, it is in coda position where most differences have been described and analyzed (e.g. Navarro Tomás 1938, 1939; Salvador 1957, 1977; Alarcos Llorach 1958, 1983; López Morales 1984; Gerfen 2002; Henriksen 2017). As in

other varieties of southern Spanish (WAS and Murcian Spanish), EAS consonants tend to be deleted, reduced or fully assimilated in coda, which has a series of implications for adjacent segments which will be discussed further below.

While complete assimilation of codas in medial position is usual, e.g. *hazte* [ˈaːte] ‘to do for/to yourself’ (see also below and in the passages in the final section), full deletion in word-final position is especially common:

igual y [iˈɣwa i] ‘the same and’

terminar [termiˈna] ‘to finish’

In some circumstances, however, codas can be retained, i.e. especially in careful speech, with /n/ and /l/ being most prone to retention. Coda deletion triggers two main effects: (a) the gemination of the following consonant, even across word boundaries; and (b) lowering of a preceding vowel (discussed in detail in the section below related to vowels):

las veía [la βeːˈia] ‘he used to see them (FEM.PL)’

comer carne [koˈmɛˈkɑːne] ‘to eat meat’

There is, however, an exception to this pattern. In lower basilects, the final /r/, unlike other consonants, can be deleted from infinitives without lowering the preceding vowel or geminating initial consonant of the enclitic pronoun:

quitarla [kiˈtala] ‘to take it (FEM.SING) out’

tirarme [tiˈrame] ‘to spend’ (time)

de decirme [de ðeˈθime] ‘of telling me’

In EAS, consonant gemination (triggered by the deletion or assimilation of a previous consonant always still evident in orthography) can, as some sources have argued, have an apparently contrastive role and is the cue to recognizing an underlying word-medial /s/ (*gata* ‘she-cat’ [ˈgata] vs. *gasta* ‘he/she spends’ [ˈgɑːta]) (e.g. Gerfen & Hall 2001, Gerfen 2002, Bishop 2007, O’Neill 2010) (note that we do not provide recordings of examples cited by other authors). Carlson (2012), however, claims that the distinguishing feature between words like *gata* ‘she-cat’ and *gasta* ‘he/she spends’ is vowel lengthening before the underlying /s/.

Acoustic analysis of plosive gemination shows lengthening of stop closure followed by a burst. Although vowel lowering will be explained in detail in the next section, it is worth noting from the examples below that EAS vowels lower when they precede an underlying consonant that has been deleted or assimilated:

esto [ˈeːto] ‘this’

carne [ˈkɑːne] ‘meat’

abdicar [aðiˈkɑ] ‘to abdicate’

usted sabe [uˈtɛˈsːaβe] ‘you (SING FORMAL) know’

<i>ignífugo</i>	[iˈn:ɪfuyo]	‘fireproof’
<i>apto</i>	[ˈa:to]	‘capable’
<i>etnia</i>	[ˈe:nja]	‘ethnic group’
<i>acto</i>	[ˈa:to]	‘act’
<i>perfectas</i>	[perˈfet:a]	‘perfect (FEM.PL)’
<i>la vasca</i>	[la ˈβak:a]	‘the Basque woman’
<i>objeto</i>	[oˈx:eto]	‘object’

The voiced plosives /b/, /d/ and /g/ after a deleted /s/ present an interesting case. In a more emphatic or careful pronunciation, these consonants are pronounced as plosives in codas, although they are much more frequently pronounced as voiced approximants. There seems to be free variation when /b/, /d/ and /g/ are geminated, as several examples have been found in our corpus where geminated /b/, /d/ and /g/ are pronounced either [b:], [d:] and [g:] or [β:], [ð:] and [ɣ:], even by the same speaker. Geminated /b/ can also be pronounced [v:] or [f:]

<i>ninguno de los dos</i>	[niŋˈguno ðe lo ˈd:ɔ]	‘none of the two’
<i>las veía</i>	[la β:eˈi:a]	‘he/she used to see them (FEM.PL)’
<i>ellas vean</i>	[ˈe:ja ˈv:ean]	‘they see’
<i>te resbalas</i>	[te rɛˈfi:ɻa]	‘you (SING) slip’

Regarding intervocalic allophones, voiced /b/, /d/ and /g/ usually appear as approximants, although fricative articulations, especially of /d/, may also be heard (Table 1).

Table 1 Word-onset and intervocalic voiced plosives in Eastern Andalusian Spanish.

Position	/b/	/d/	/g/
Word-onset	[b]	[d]	[g]
	<i>bota</i>	<i>diente</i>	<i>garra</i>
	[ˈbota] ‘boot’	[ˈdjente] ‘tooth’	[ˈgara] ‘claw’
Intervocalic	[β]	[ð]	[ɣ]
	<i>la bota</i>	<i>mi diente</i>	<i>la garra</i>
	[la ˈβota] ‘the boot’	[mi ˈðjente] ‘my tooth’	[la ˈɣara] ‘the claw’

Intervocalic /d/ tends to be deleted when it appears in the last syllable of a word:

separado [sepa¹rao] ‘separated’

For ease of transcription, approximant and fricative realizations of /b/, /d/ and /g/ will not be distinguished further here and both will be transcribed as [β], [ð] and [ɣ].

The Andalusian /s/, considered to be stereotypical of Eastern and Western Andalusia, when fully articulated, is reported to be convex in tongue shape (either coronal and flat/convex or pre-dorsal and more convex), as opposed to the concave /s/ in Castilian Spanish (Navarro Tomás, Espinosa & Rodríguez Castellano 1933). In EAS, the most typical /s/ is alveolar, pre-dorsal and convex (Jiménez Fernández 1999: 33) and this consonant can also be pronounced further back in the mouth:

casa casa [ˈkasa ˈkasa] ‘house house’

sí [ˈsi] ‘himself/herself’ and ‘yes’

The Spanish phonemes /s/ and /θ/ merge in some varieties of Andalusian Spanish in two different ways: *seseo*, which is when the phonemes /s/ and /θ/ are pronounced [s] and *ceceo*, which is when /s/ and /θ/ are pronounced [θ]. *Ceceo* used to be the norm in the towns of our participants but Navarro Tomás et al. (1933) identified a change in progress as they noticed that young speakers in that area were starting to differentiate /s/ and /θ/. This demerger of *ceceo* in favor of the distinction of /s/ and /θ/ is currently in progress in some locations of Western Andalusia (Regan 2017), but this process is much more advanced in Eastern Andalusia. All the participants recorded for the current description maintain the contrast /s/ vs. /θ/ regardless of their level of education; however, we note that this is not the norm across all EAS speaking areas. Furthermore, we also acknowledge the issues and limitations which may arise as a result of comparing studies which were published over six decades apart, as different linguistic changes may have taken place in that time. The following studies are useful nevertheless in terms of highlighting variability regarding *seseo* and *ceceo*: Alonso et al. (1950), for example, reported *seseo* in Albaicín, a neighbourhood in Granada, Peñalver Castillo (2006) found *seseo* in Cabra (Córdoba) and García Mouton (1992) reported *ceceo* in the countryside of Jaén, *seseo* in the capital city of the province albeit with contrast between /s/ and /θ/ in the speech of women and older men.

The same consonants /s/ and /θ/ can also be optionally pronounced [h] in onset and [h] or [ɦ] in intervocalic position, a phenomenon called *heheo*:

se puede [he ˈpweðe] ‘one can’

entonces [enˈtõfe] ‘then’

The reduction of /s/ in coda position and more rarely in onset position, has been widely reported to occur in many different varieties of Spanish (e.g. Hammond 1978 in Miami-Cuban Spanish, Figueroa 2000 in Puerto Rican Spanish, Monroy & Hernández-Campoy 2015 in Murcian Spanish, Henriksen & Harper 2016 in south-central Peninsular Spanish). The consonant /s/ can be maintained, debuccalized or deleted to different degrees across EAS and some scholars have also linked different realizations to various sociolinguistic features. Gerfen & Hall (2001) and Bishop (2007), for example, studied so-called aspiration in EAS and concluded that the aspiration that results from the debuccalization of /s/ is longer than the one that results from debuccalizing /p/ or /k/, so words such as *casta* [ˈkahtaː] ‘caste’ and *capta* [ˈkahtaː] ‘he/she captures’ are not fully neutralized in EAS. Even though [h] has been

reported as being a realization of coda /s/ in EAS (e.g. Alvar et al. (1973: map 1696), we have found little evidence of so-called aspiration as a pronunciation of coda /s/ in our corpus.

The realization of plosives after debuccalized /s/ in EAS has also been studied in detail. Torreira (2007) posits that what differentiates minimal pairs like *ata* ['ata] 'he/she ties' and *hasta* ['a:ta] 'until' is post-aspiration of the geminated [t]. He suggests that this also applies to /sk/ and /sp/ and that this is more salient in WAS than in EAS; O'Neill (2010) and Ruch & Harrington (2014) reach similar results. Aspiration of voiceless plosives following debuccalized /s/ is less salient in EAS than in WAS but it has been found in our samples:

resta [ˈretː^ha] 'subtraction'

In EAS, /n/ and /l/ assimilate to the place of articulation of some consonants even across word boundaries, becoming dental before [t] and [d] and interdental before [θ]; the difference between dental and interdental is not marked in the transcription. The consonants /n/ and /l/ become post-alveolar before [tʃ] and in addition to velar assimilation seen previously in *ninguno* [niŋˈɡuno] 'none', /n/ also becomes labiodental before [f]. This pattern is similar to that found in Castilian Spanish:

<i>se esconde</i>	[seˈk:ɔnde]	'one hides'
<i>alto</i>	[ˈaːlto]	'tall'
<i>once</i>	[ˈɔŋθe]	'eleven'
<i>el cine</i>	[elˈθine]	'the cinema'
<i>ancho</i>	[ˈanˈtʃo]	'broad'
<i>el chocolate</i>	[elˈ tʃokoˈlate]	'the chocolate'
<i>anfora</i>	[ˈanfɔra]	'amphora'

It is worth noting that, again for ease of transcription, (inter)dentalized and palatalized allophones of /l/ and /n/ will henceforth be transcribed simply as [l] and [n], respectively.

/n/ may also be fully reduced in EAS in coda. Alonso et al. (1950) and Zamora Vicente (1960: 324) explain that when this occurs, the nasality is retained on the preceding vowel to maintain the semantic meaning associated with a deleted /n/. According to these authors, *viene* ['bjene] 's/he comes' and *vienen* ['bjenē] 'they come' are distinguished by the nasality found in the final vowel of the latter form. Other examples of /n/ deletion and vowel nasalization include:

tienen [ˈtjenē] 'they have'

This can also happen in word-medial codas, but to a much lesser degree:

entonces [enˈtōfne] 'then'

We can in fact think of /n/ deletion as being involved in a two-step process. The first step is when /n/ is deleted and the previous vowel is left nasalized. The second step would be vowel denasalization, which is also possible in some cases, but is much less frequent:

una multiplicación [una murtiplika^hθjɔ] ‘a multiplication’

When retained, however, word-final coda /n/ is usually pronounced [ŋ] in EAS, as in WAS:

atún [a^htujŋ] ‘tuna’

While the lateral /l/ is also deleted at a higher rate in word-final codas than word-medially, as in Murcian Spanish (Monroy & Hernández-Campoy 2015), coda /l/ is also frequently rhotacized when the following syllable onset is a consonant:

el tuyo [er^htujo] ‘yours’

Alfredo [ar^hfreðo] (PROPER NOUN)

In EAS, as in most other varieties of Spanish, /r/ is found word-initially and in intervocalic position, as well as after /n/, /l/ and /s/, while /r/ is found intervocalically and in the following sequences /pr br tr dr kr gr fr/. The rhotics /r/ and /r/ are only contrasted in intervocalic position in EAS, as /r/ does not appear word-initially and the opposition /r/ vs. /r/ is neutralized in coda position, even when EAS speakers maintain the coda consonant instead of deleting it, which can happen in more formal situational contexts. Following Monroy & Hernández-Campoy (2015), we transcribe coda tap and trill phonemically as /r/. These two rhotics are also merged in syllable-final position in Castilian Spanish, even though this variety of Spanish does not reduce coda consonants in the manner found in EAS. In EAS, as in Castilian Spanish, coda rhotics present a continuum of realizations from tap to trill which depend on stylistic and dialectical variation (e.g. Blecua Falgueras 2005, Bradley 2014). The coda rhotic is the only consonant which shows a different pattern of deletion word-finally and word-internally in EAS. Although it can be maintained in emphatic or in more careful speech, this rhotic is generally deleted word-finally in everyday conversation:

mujer [mu^hxɛ] ‘woman’

carne [ˈka^hɲe] ‘meat’

As is the case when any consonant is deleted, word-final /r/ deletion triggers lowering of the previous vowel (explained in more detail in the vowel section) and gemination of the following consonant due to complete assimilation of /r/; the latter also occurs across word-boundary:

volar [bo^hla] ‘to fly’

reconocer la [rekono^hθɛ la] ‘to recognize the’

In word-medial codas, the rhotic is normally fully assimilated to the following consonant only when it precedes /n/ or /l/ (e.g. *perla* [ˈpe^hla] ‘pearl’, *tierno* [ˈtjɛ^hno] ‘tender’) or in

infinitives preceding an enclitic pronoun starting with /m/, /l/ or /n/, e.g. *comerlo* [ko'mel:ɔ] 'eat it'; if this happens, /m/, /n/ or /l/ are geminated. The rhotic can, however, be maintained in word-medial codas involving /l n/ in careful speech:

horno [ˈorno] 'oven'

The reduction of /tʃ/ to [ʃ], mentioned in the introduction as occurring in Granada EAS, is not found in the EAS variety spoken in Almería and described here.

EAS palatal plosive /ʃ/ can also surface as [j] in intervocalic position. Monroy & Hernández-Campoy (2015) describe a similar process for Murcian Spanish and review various descriptions of this consonant. Some authors, however, have argued for a palatal affricate phoneme or fricative in Castilian Spanish (e.g. Martínez Celdrán, Fernández Planas & Carrera Sabaté 2003).

It is worth noting that due to a reduction process called *yeísmo*, /ʎ/ (spelt *ll* in Spanish) has merged with /ʃ/ (spelt *y*) in most parts of the Hispanic world, even in most phonologically conservative varieties of Spanish. None of the participants in our study differentiated /ʃ/ and /ʎ/, so /ʎ/ will not be included in our analysis. However, in the older literature some authors have reported that the opposition /ʃ/ and /ʎ/ is maintained in some areas where EAS is spoken: Salvador (1957) found the distinction /ʃ/ – /ʎ/ in the speech of women over 70 years of age whom he had interviewed in Cúllar-Baza (Granada), although younger people in this town no longer maintained it; Alvar (1955a) and Llorente (1962) reported the opposition /ʃ/ – /ʎ/ in the northeast of Granada province; Zamora Vicente (1960: 311) found the same in parts of the province of Granada and Jaén; finally, Zamora Vicente (1960: 312) claimed that the distinction /ʃ/ – /ʎ/ was maintained in some areas by women. To our knowledge, no recent study has analyzed the opposition /ʃ/ – /ʎ/ in EAS.

The velar fricative /x/ presents some variability in EAS, both word-initially and word-medially, as well as geographically – something that is evident when comparing earlier discussion on EAS since the late nineteenth century. Some areas present some local variability and it is possible to find variation even within the same speaker. Rodríguez-Castellano & Palacio (1948a, b) found that /x/ was pronounced [h] in a town they studied in Granada. Wulff (1889), Salvador (1957) and Peñalver Castillo (2006) also found that [h] was the preferred pronunciation of /x/ in EAS; however, Peñalver Castillo (2006) reported breathy voiced [ɦ] at times in intervocalic position and after voiced consonants and [x] in speakers of a medium or high education level. The most complete study of this phenomenon can be found in Alvar et al. (1973: map 1716). According to these authors, /x/ is pronounced [h] in the west of the province of Granada, in the south of Jaén province and to the east of Málaga province, while it is pronounced [x] in central and eastern Almería and in central and northern Granada. Interestingly, Alvar et al. (1973: map 1716) present Western Almería, the area where all the participants analyzed for the present study are from, as having /x/ pronounced as either [h] or [ɦ]; the same map presents the area immediately to its east as pronouncing /x/ as [x]. This border must have moved towards the west since Alvar et al. (1973) was published as the most frequent option found in the speakers analyzed in the present study is to pronounce /x/ as [x], alongside [h]. No studies have reported any link between word-initial or word-medial position and a preference for [x] and [h].

déjalo si [ˈdehalo si] 'leave it if'

objeto [ɔˈx:eto] 'object'

Some scholars since the time of Wulff (1889) have also reported variable intervocalic voicing of voiceless consonants in EAS. O'Neill (2010), for instance, found that, in his

sample, Andalusian intervocalic voiceless plosives were voiced in 69% of cases; intervocalic consonant voicing has also been reported in other varieties of Spanish (e.g. Trujillo 1980). The voicing of /p t k/ can create potential mergers with /b d g/, respectively, and O'Neill (2010) reports that this happens in intervocalic position in Andalusian Spanish in 12.5% of cases in his corpus; however, he does not give specific figures for EAS. Further information on the phonological recategorization which might be at play here can be found in studies of non-Andalusian Spanish by Torreira & Ernestus (2011), Hualde, Simonet & Nadeu (2011) and Nadeu & Hualde (2015). Examples of voicing of obstruents in our sample include:

<i>inmediatamente</i>	[im:e'ðja'tamente]	'immediately'
<i>a quitarse</i>	[a xi'tarse]	'to take off'

Vowels

Monophthongs

In EAS, it is important to differentiate between vowels that do not precede an underlying consonant and vowels that do (e.g. Herrero de Haro 2017c, 2018, 2019a).

The EAS vowel system is subject to the already noted and much debated process of 'vowel opening'. Following a reviewer's recommendation, this phenomenon will henceforth be referred to as VOWEL LOWERING, although it is worth bearing in mind that vowel lowering may also be accompanied by an F2 movement. Given the significant level of disagreement among researchers on Eastern Andalusian Spanish regarding its phonological nature, the extent to which different vowels participate in vowel lowering, as well as which underlying consonants are involved, it is necessary to provide an account of this debate before moving on to a phonetic description of vowel lowering in our own data (see Herrero de Haro 2017b for a detailed overview).

Navarro Tomás (1938, 1939) posited that when /s/ was aspirated, i.e. debuccalized, in coda position, a preceding /e/, /a/ or /o/ became lower, with the so-called aspiration being lost in some cases. According to the same author and others, e.g. Salvador (1977), vowel lowering obtains phonemic value when aspiration is lost, as this differentiates pairs of words such as *la* 'the (FEM.SING)' and *las* 'the (FEM.PL)'. It should be noted, however, that some authors believe that /a/ closes before a deleted coda (e.g. Hernández-Campoy & Trudgill 2002). Furthermore, other authors, such as Mondéjar Cumpián (1979) and López Morales (1984), believe that vowel lowering is a phonetic process with no phonological value.

While all sources on vowel lowering in EAS agree that mid and low vowels /e a o/ are affected by this reduction of /s/, opinions significantly vary as to whether high vowels /i u/ also participate. The claim by Navarro Tomás (1938, 1939) and Sanders (1998), for instance, that only /e/, /a/ and /o/ open but not /i u/ before underlying /s/ is supported by a recent experimental study conducted by Henriksen (2017) on speakers from Granada. However, there is also a body of research of more than twenty studies that reports the lowering of /i/ and /u/ before a deleted /s/ (e.g. Rodríguez-Castellano & Palacio 1948a; Alvar 1955a, b; Alvar et al. 1973; Gómez Asensio 1977; Martínez Melgar 1986, 1994; Peñalver Castillo 2006; Herrero de Haro 2019a, b, c). Even some studies that do not fully support opening of /i/ and /u/ report evidence of some lowering; for example, Salvador (1977) finds lowering of /i/ but not of /u/, while Sanders (1994) reports a very slight opening of /i/ and /u/ preceding deleted /s/ and Sanders (1998) finds lowering of pretonic /u/ and a very slight opening of pre-tonic /i/ before deleted /s/. It is worth noting that Zubizarreta (1979), López Morales (1984) and Martínez Melgar (1986) support the opening of /i/ and /u/ but they consider this phonetic, not phonemic.

The question of which deleted consonants trigger vowel lowering is also the subject of ongoing debate and research. Eighteen studies have found different degrees of vowel lowering depending on what the following underlying consonant is (e.g. Wulff 1889; Navarro Tomás 1938, 1939; Alonso 1956; Gómez Asensio 1977; García Marcos 1987; García Mouton 1992; Herrero de Haro 2016, 2017a, c, 2019a, b, c). Rodríguez-Castellano & Palacio (1948a), for instance, claim that /a/ opens to different degrees depending on whether the following deleted consonant is /s/, /θ/ or /d/ and, for Alonso et al. (1950), /a/ has a different quality before deleted /s/, /r/ and /l/. Alonso (1956) found that final /as/, /al/ and /ar/ were pronounced [e] in some towns in the west of Eastern Andalusia but this phenomenon does not appear in our samples. Finally, according to Mondéjar Cumpián (1979), all vowels open before deleted /s x θ r l/.

Studies such as Herrero de Haro (2016, 2017a, c) have examined whether that expanded type of vowel lowering has phonemic value, although we make no definitive claims about this here noting only that further investigation, including in terms of phonological patterning, is required.

Perception tests carried out in Herrero de Haro (2016, 2017a) seem to indicate that, at least in the cases of /e/ and /o/, the lowering that these vowels undergo preceding deletion of final /s r θ/ may be what provides the cue to these listeners that a consonant segment is missing, thus helping them infer the meaning of the word heard. It could be argued that final-consonant deletion may be incomplete, so that, in the articulation, some kind of reduced consonantal gesture remains; however, no indication or remnant of consonantal gestures has been found in the samples used for the acoustic analysis. That said, investigation is still needed to ascertain that the identification is not based on undetected suprasegmental features (e.g. duration, pitch, intensity); a possible relation between identification and any formant slope (transition), and not only formant values, as studied in Kewley-Port & Goodman (2005), should also be investigated but this falls outside the remit of the present description.

The divergence of viewpoints and results between the studies with respect to vowel lowering in EAS may be accounted by the differing effect of a range of factors. For example, many researchers point out to a great deal of sociolinguistic variation in EAS pronunciation (e.g. Wulff 1889, Navarro Tomás 1939, Peñalver Castillo 2006, Tejada Giráldez 2012) and some researchers have analyzed read speech while others have examined spontaneous speech. Likewise, most articles focus on Granada (136 km from Western Almería), some on Jaén (225 km from Western Almería) and some on Córdoba (332 km from Western Almería) and this geographical differentiation could also explain differences between previous research and ours; as with any other language variety, EAS varies through space and, therefore, it is normal to find some variation between towns located over 200 or 300 km from each other. Finally, different researchers work with different sample sizes and this could have influenced results. For example Sanders (1994) analyzed the speech of three male speakers from villages near Granada city while the present corpus has been taken from the speech of 60 speakers from Western Almería. The fact that so many researchers have reported /i/ and /u/ lowering in EAS makes the issue of statistical power less likely; however, it should be clear from these paragraphs that there is no consensus regarding EAS vowels at this point and that further research is required since this issue is still not settled.

The vowel data presented in the current description come from a corpus of 1913 stressed and unstressed vowels taken from a corpus collected by the first author and already partly analyzed (e.g. Herrero de Haro 2016, 2017a). The analysis of our data shows not only that the five basic Spanish vowels (/i e a o u/) open when they precede an underlying /s/, but it suggests also that the deletion of /r/ and of /θ/ changes the quality of the vowels to a different degree than with /s/ deletion. As Figure 2 shows below, lowering is more evident in non-high vowels, especially /e o/, which could explain in part why /i/ and /u/ lowering is reported less frequently in the literature; a detailed breakdown of the statistical significance

for each of these realizations can be found in Herrero de Haro (2019c). The greatest degree of lowering seen in Figure 2 appears to be associated mostly with a following coda /r/, with post-sibilant lowering more moderate in degree. Lowering before /θ/ appears also to involve more fronting of high vowels and backing of non-high vowels. It should be noted that Herrero de Haro (2016, 2017a, c, 2019a, b, c) are the only studies that have analyzed vowel lowering specifically before /r/ or /θ/ (rather than just /s/) acoustically, perceptually and/or statistically (for a detailed account of EAS vowel descriptions in studies published between 1881 and 2016, see Herrero de Haro 2017b).

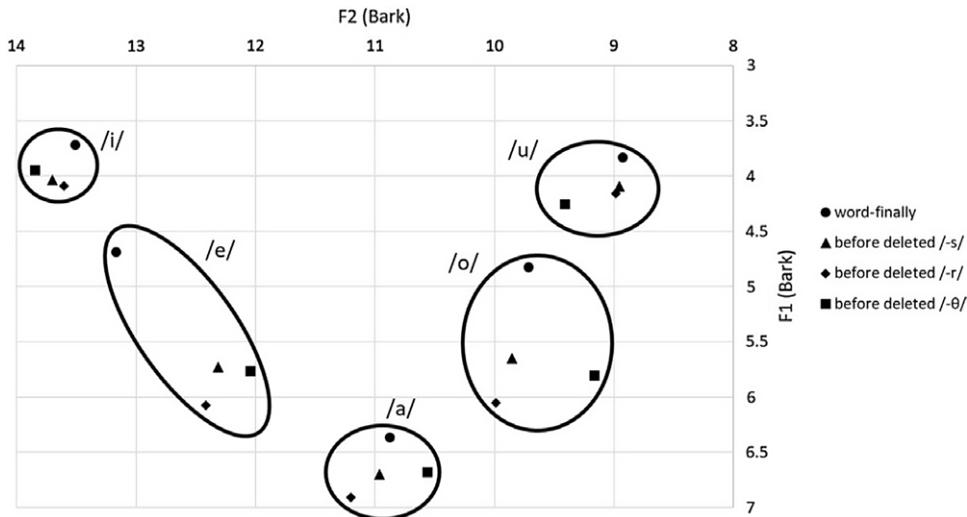


Figure 2 Distribution of Eastern Andalusian Spanish vowels (average values based on 1913 stressed and unstressed tokens, 60 subjects).

The type of vowel lowering shown in Figure 2 is also included in our description and transcription but no distinction is made in the transcriptions regarding whether a lowered vowel precedes an underlying /s/ or an underlying /r/ or /θ/. The list of words included in the account of gemination in the Consonants section contains various examples of EAS vowels laxing before different underlying consonants (e.g. /s r p k/); however, these items are not repeated here in the interest of brevity. As noted briefly above, we propose the phonetic symbols in Table 2 to transcribe EAS vowels and EAS vowels preceding underlying consonants. It is important to note that we do not propose different symbols to differentiate between different degrees of vowel lowering depending on what consonant has been deleted (e.g. /e/ before underlying /s/ vs. /e/ before underlying /r/) given the acoustic differences are typically small, as Figure 2 shows.

Table 2 Proposed symbols to transcribe Eastern Andalusian Spanish vowels.

Phoneme	Symbol								
/i/	[i]	/e/	[e]	/a/	[a]	/o/	[o]	/u/	[u]
/i/ before underlying consonant	[i̠]	/e/ before underlying consonant	[e̠]	/a/ before underlying consonant	[a̠]	/o/ before underlying consonant	[o̠]	/u/ before underlying consonant	[u̠]

We believe that the lowering of /i e a o u/ when they precede underlying consonants justify using the symbols [ĩ ɛ ɔ ɔ̃ ʊ], respectively. Some authors consider /e/ and /o/ higher in EAS than in Castilian Spanish (e.g. Hualde & Sanders 1995) but /e/ and /o/ before underlying consonants have already been transcribed as [ɛ] and [ɔ] by other researchers (e.g. Henriksen 2017). The EAS /a/ is a central vowel. It is more open when it precedes an underlying consonant and that justifies our decision to transcribe lax EAS /a/ as [a̠] when required.

Due to vowel harmony, vowel lowering is not restricted to word-final position or to vowels preceding assimilated underlying consonants. The lowering of vowels which precede an underlying word-final consonant spreads leftwards as far as the stressed vowel, as was first identified by Navarro Tomás (1938):

<i>papa</i>	[ˈpapa]	‘pope’
<i>papas</i>	[ˈpap̠a]	‘popes’
<i>papá</i>	[paˈpa]	‘dad’
<i>papás</i>	[paˈp̠a]	‘dads’

Several other authors have also studied this phenomenon and there are different opinions regarding how it works. For Alonso et al. (1950), features of a vowel only spread across a word to its vowel counterparts (e.g. the first /o/ would open in *todos* ‘all masculine’ but not in *todas* ‘all feminine’). Other authors believe that /a/ participates in vowel harmony processes (e.g. Navarro Tomás 1938), while others believe /a/ does not (e.g. Zubizarreta 1979). Furthermore, Zubizarreta (1979) believes that /a/ does not let harmony extend beyond it. Optimality Theory has proved useful to analyzing EAS vowel harmony (Jimenez & Lloret 2007 and Lloret & Jimenez 2009) and from a perceptual point of view, the motivation for vowel harmony seems to be to increase the perception of a feature (vowel lowering) by extending it across syllables as much as possible (Kaplan 2012). Jiménez & Lloret (2007) and Lloret & Jiménez (2009) suggest that vowel harmony results from languages attempting to minimize resetting of articulators; for Henriksen (2017), however, vowel harmony is due to phonological harmony, not to coarticulation, as first posited for EAS by Alarcos Llorach (1958). Likewise, although most authors believe that vowel harmony cannot travel past stressed vowels, Jiménez & Lloret (2007) believe this can happen. The reasons given above to explain the different results in the study of vowels also apply to vowel harmony, demonstrating that there is no definite description of how vowel harmony works in Eastern Andalusian Spanish.

Further explanations of the role of stress in EAS vowel harmony can be found in Zubizarreta (1979), Jiménez & Lloret (2007) and in Henriksen (2017). A more thorough summary of past studies on EAS vowel harmony can be found in Herrero de Haro (2017b).

Some authors (e.g. Rodríguez-Castellano & Palacio 1948a, Alonso et al. 1950, Alarcos Llorach 1958) claim that EAS vowels are longer when they precede a deleted consonant. However, for Salvador (1977), lengthening is not a regular feature of these vowels. On the other hand, Martínez Melgar (1994) posits that all vowels are shorter when they precede an underlying /s/, although for Sanders (1998), only high vowels are shorter before underlying /s/ than syllable-finally. Carlson (2012) found that the duration of Andalusian vowels increased by 24.2% when they precede an underlying /s/, which she believed was the distinguishing feature in words with word-medial /s/ deletion (e.g. *coto* [ˈkoto] ‘nature reserve’ vs. *costo* [ˈkɔːto] ‘cost’). Although further investigation is required, our analysis of /e/ in the contexts /ˈeta/, /ˈesta/, and /ˈekta/ shows instead that /e/ tends to be 9.72 ms shorter when it precedes a deleted /s/ or /k/ ($F(1, 270) = 32.56, p < .05, \eta_p^2 = .108$). The effect of coda deletion

in EAS on preceding vowel duration remains an open question and more investigation is needed.

EAS speakers can lengthen and intensify stressed vowels in order to intensify meanings. This lengthening is considerably longer than that found in other varieties of Spanish in similar contexts:

<i>ese</i>	[¹ e:se]	‘that one’
<i>no conozco a nadie</i>	[no ko ¹ nok:o a ¹ na:ðje]	‘I don’t know anyone’

Diphthongs

In Spanish, diphthongs can be formed by two high vowels (/i/ and /u/, irrespectively of the order), by a high vowel (/i u/) and a mid or low vowel (/e a o/) or by a mid or low vowel and a high vowel. A combination of either high vowel and mid/low vowel or mid/low vowel and high vowel is only considered a diphthong if the high vowel is not the stressed element.

Diphthongs preceding underlying consonants in EAS are subject to two types of modifications. Firstly, the final element of the diphthong undergoes vowel lowering in a manner similar to monophthongs. Secondly, if the first element of a diphthong is stressed, this also undergoes lowering due to vowel harmony:

/ai/	<i>pasáis</i>	[pa ¹ saj]	‘you (PL) pass’
/ei/	<i>coméis</i>	[ko ¹ mei]	‘you (PL) eat’
/oi/	<i>sois</i>	[soi]	‘you (PL) are’
/au/	<i>austeridad</i>	[aʊteri ¹ ða]	‘austerity’
/eu/	<i>Eustaquio</i>	[eʊ ¹ t:akjo]	(PROPER NOUN)

Triphthongs

EAS triphthongs, which all have the stress on the middle element, behave like EAS diphthongs with the same last two elements (e.g. the last two vowels of the triphthong in *copiáis* [ko¹pjaj] ‘you(PL) copy’ are the same as in the diphthong in *llamáis* [ja¹maj] ‘you(PL) call’). It is worth noting that the last element of the diphthong and triphthong above is transcribed [j] as it precedes a deleted /s/; the same applies to the examples below. To our knowledge, these are the only four triphthongs of this type (with pre-nuclear glides derived from /i/ and /u/ represented by [j] and [w], respectively):

/iai/	<i>copiáis</i>	[ko ¹ pjaj]	‘you (PL) copy’
/iei/	<i>copiéis</i>	[ko ¹ pjei]	‘you (PL) copy (SUBJUNCTIVE)’
/uai/	<i>continuáis</i>	[konti ¹ nʷaj]	‘you (PL) continue’
/uei/	<i>continuéis</i>	[konti ¹ nwei]	‘you (PL) continue (SUBJUNCTIVE)’

Prosodic features

Lexical stress

EAS stress has phonemic value, that is, it differentiates between meanings (e.g. *hábito* [ˈaβito] ‘habit’, *habito* [aˈβito] ‘I inhabit’ and *habitó* [aβiˈto] ‘he/she inhabited’). In EAS, stress is transferred from the final to the penultima syllable in some proper nouns in familiar forms:

Miguel [ˈmiɣɛ] (PROPER NOUN)

José [ˈxose] (PROPER NOUN)

Vowel harmony

As previously noted, in EAS, stress has a key role in determining which vowels lower as a result of vowel harmony. Given its prosodic nature, we briefly represent the phenomenon here. The vowel preceding a word-final underlying consonant opens and all vowels further to the left open up as far as the stressed syllable.

casas [ˈkaʃa] ‘houses’

dientes [ˈdjente] ‘teeth’

coches [ˈkotʃɛ] ‘cars’

papás [paˈpa] ‘dads’

papas [ˈpaɸa] ‘popes’

Intonation

The general nuclear intonation pattern of EAS is low fall for *wh*-questions, high rise for yes/no questions, and progressively descending for declarative sentences; this is the same for Castilian Spanish (Martínez Celdrán et al. 2003). However, EAS can display a very narrow range of tones in statements and in questions (Figures 3 and 4), as in Murcian Spanish (Monroy & Hernández-Campoy 2015), that differs from Castilian Spanish:

Rising intonation as well as vowel lengthening can be used to intensify meanings, as exemplified in the fragment in Figure 5.

Transcriptions

The first of the two passages is a story as told by a 43-year-old female speaker from El Ejido while the second is a transcription of ‘The North Wind and the Sun’ read by the first author

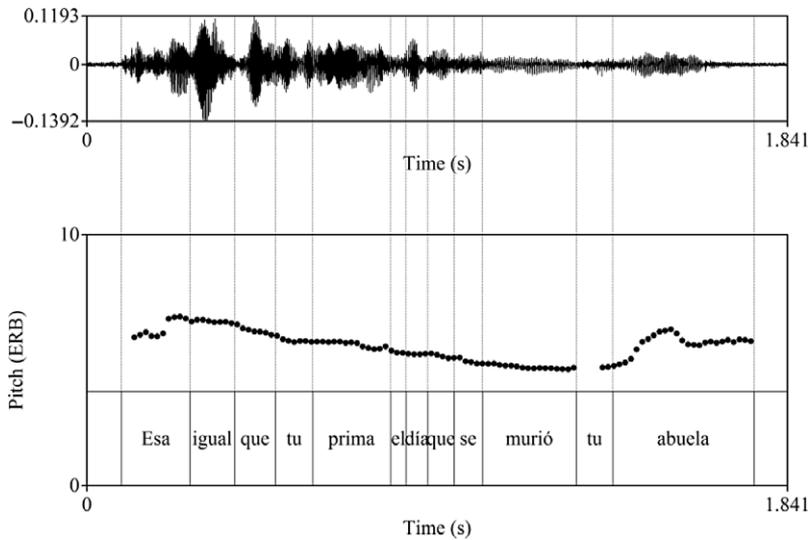


Figure 3 F0 tracing of *Esa igual que tu prima el día que se murió tu abuela* ['esa i'ɣwal ke tu 'prima el 'ðia ke se mu'rjo tu a'βwela] 'that one, like your cousin the day that your grandmother died'.

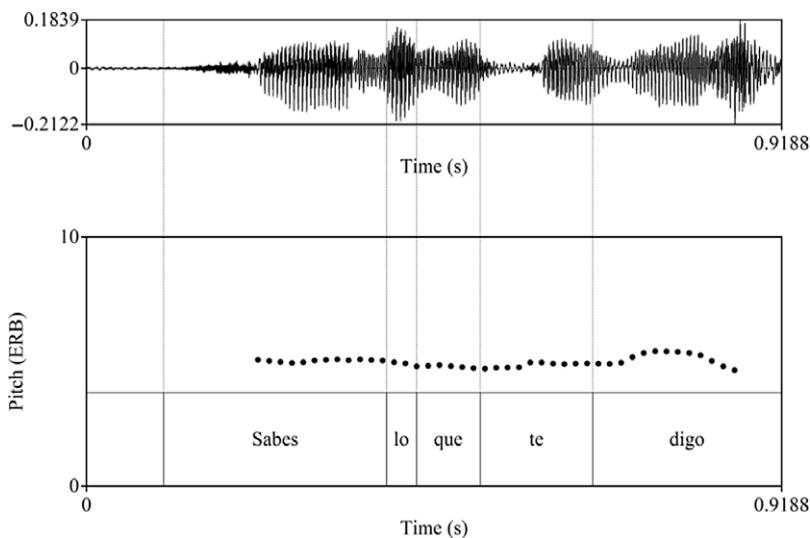


Figure 4 F0 tracing of *¿Sabes lo que te digo?* ['saβe lo ke te 'ðiɣo] 'Do you know what I'm saying?'.

(from the Western Almería sub-region, as the other 60 speakers analysed for this paper). The style of transcription is in general alignment with previous illustrations of varieties of Spanish, e.g. Martínez Celdrán et al. (2003) and Monroy & Hernández-Campoy (2015). We have included a phonemic transcription and a phonetic one, following Coloma (2018).

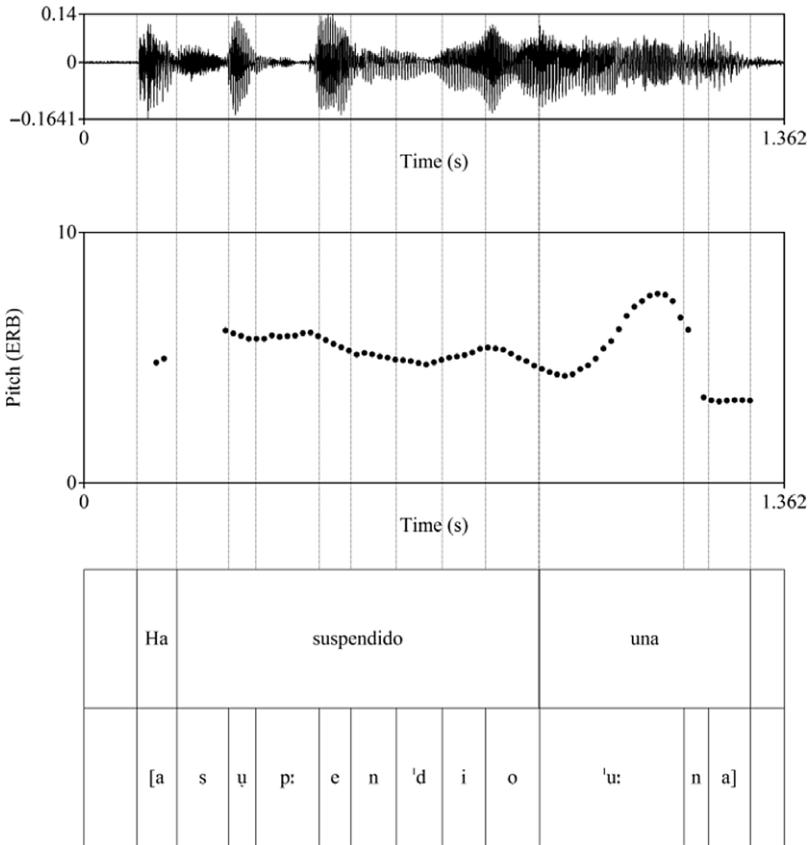


Figure 5 FO tracing of *ha suspendido una* [a sʊp:en'dio 'u:na] 'She has failed one' with lengthening of /u/.

'Mi hija y las matemáticas' [My daughter and mathematics]: Broad (phonemic) transcription

||si | 'kuando se 'jeba | 'mira | termi'no | 'iθo una multiplika'θion i la pri'mera 'tanga me la 'puso 'bien | la se'gunda me 'puso | empe'θo por po'nerme un 'numero de'baxo de 'otro i no 'era de'baxo | 'era en el si'giente 'porke 'era el se'gundo | i 'luego se je'baba 'una | i en 'beθ de 'eran 'dieθ lo ke le 'daba i se je'baba 'una i en 'beθ de po'ner ke se je'baba 'una 'puso el 'dieθ di'rekta'mente i le 'digo | i 'digo ke es lo ke as 'etʃo | 'otra 'beθ | 'pero 'jo 'kreo ke no 'boi a suspen'der | 'ombre 'jo 'kreo ke 'no | de'pende tan'bien de la ma'estra a'ora 'pero | al'fredo | 'jeba 'kuatro beinti'θinko | 'kuatro se'tenta i 'θinko | un 'tres | ke 'son en 'pruebas||

'Mi hija y las matemáticas' [My daughter and mathematics]: Semi-narrow (phonetic) transcription

||si: | 'kwando se 'jeβa | 'mira | termi'no | 'iθo una murtiplika'θjɔ i la pri'mera 'taŋga me la 'puso βjẽ | la se'γunda me 'puso | empe'θo por po'nemeɯŋ 'numero ðe'βaxo ðe 'otro i no 'era ðe'βaxo | 'eraɣŋ er si'γjente 'porke 'eraɣr se'γundo | i 'lweγo se je'βaβa 'u:na | jem'be ðe 'eraŋ ðje l:o ke le 'ðaβaj se je'βaβa 'una jem 'be ðe po'ne k:e se je'βaβa 'una 'pusoɣl 'dje ði'reta'mentej le 'ðiγo | i 'ðiγo ke ε l:o ke ɤ 'etʃo | 'otra 'βε | 'pero 'jo 'kreo ke no 'βoj a sup'en'de | 'ombre 'jo 'kreo ke 'no | de'pende tam'bjẽ ðe la ma'etra 'ora 'pero | ar'freðo | 'jeβa 'kwatro βeinti'θiŋko | 'kwatro se'tenta _i 'θiŋko | uŋ 'trε | ke 'soŋ em 'prweβah||

'Mi hija y las matemáticas' [My daughter and mathematics]: Orthographic version

Sí, cuando se lleva, mira, terminó... hizo una multiplicación, y la primera tanga [sic] me la puso bien, la segunda me puso... Empezó por ponerme un número debajo de otro, y no era debajo, era en el siguiente, porque era el segundo. Y luego, se llevaba una y en vez de poner (eran diez lo que le daba y se llevaba una) y en vez de poner que se llevaba una puso el diez directamente, y le digo... y digo: ¿Qué es lo que has hecho? ¡Otra vez! Pero yo creo que no voy a suspender. Hombre, yo creo que no, depende también de la maestra, ahora. Pero, Alfredo, lleva cuatro veinticinco, cuatro setenta y cinco, un tres..., que son en pruebas...

'Mi hija y las matemáticas' [My daughter and mathematics]: English translation

Yes, when she carries, look, she finished... she did a multiplication, and she did the first one correctly, with the second one she wrote down... She started by putting one number underneath another, and it didn't go under, it had to go next to it, because it was the second one. And then, she had to carry one and instead of writing (it was ten what she got and she had to carry one) and instead of writing down that she had to carry one, she wrote ten straightaway, and I said... and I said: What have you done? Again! But I don't think I'm going to fail. Man, I don't think so, it's up to the teacher too, now. But, Alfredo, she got four twenty-five, four seventy-five, a three... which are in tests...

'El sol y el viento' [The North Wind and the Sun]: Broad (phonemic) transcription

||el 'biento 'norte i el 'sol | por'fiaban 'sobre 'kual de 'eγos 'era el 'mas 'fuerte | kuando aθer'to a pa'sar 'un bia'xero en'buelto en 'antʃa 'kapa || kombi'nieron en ke 'kien 'antes lo'grara obli'gar al bia'xero a ki'tarse la 'kapa | se'ria konside'rado el 'mas pode'roso || el 'biento 'norte so'plo kon 'gran 'furia | 'pero 'kuanto 'mas so'plaba | 'mas se arebu'xaba en su 'kapa el bia'xero || por 'fin el 'biento 'norte abando'no la em'presa || en'tonθes | bri'jo el 'sol kon ar'ðor | e inme'diata'mente se despo'xo de su 'kapa el bia'xero || por lo ke el 'biento 'norte 'ubo de rekono'θer la superjori'dad del 'sol||

'El sol y el viento' [The North Wind and the Sun]: Semi-narrow (phonetic) transcription

||el 'βjento 'norte jel 'sol | por'fjaβaŋ 'soβre 'kwal ðe'ejo 'eraɐl 'ma 'f:werɛ | kwando aθer'toa pa'sa 'um bja'xeroɐm'bweltoɐn 'antʃa 'kapa || kombi'njeron eŋ ke 'kjen 'ante l:o'ɣraraobli'ɣa al βja'xeroa ki'tarse la 'kapa | se'ria konsiðe'rao el 'ma p:oðe'roso || el 'βjento 'norte so'plo koŋ 'graŋ 'furja | 'pero 'kwanto 'ma s:o'plaβa | 'ma sɔareβu'xaβaɐn su 'kapaɐl βja'xero || por 'fin el 'βjento 'norte aβando'no laɐm'presa || en'tɔnθe | βri'joɐl 'sol kon ar'ðo | e jm:e'ðjata'mente se ðep:o'xo ðe su 'kapaɐl βja'xero || pɔ l:o ke el 'βjento 'norte 'uβo ðe rekono'θe la superjori'ðə ð:el 'sol||

'El viento norte y el sol' [The North Wind and the Sun]: Orthographic version

El viento norte y el sol porfiaban sobre cuál de ellos era el más fuerte, cuando acertó a pasar un viajero envuelto en ancha capa. Convinieron en que quien antes lograra obligar al viajero a quitarse la capa sería considerado más poderoso. El viento norte sopló con gran furia, pero cuanto más soplaba, más se arrebujaba en su capa el viajero; por fin el viento norte abandonó la empresa. Entonces brilló el sol con ardor, e inmediatamente se despojó de su capa el viajero, por lo que el viento norte hubo de reconocer la superioridad del sol.

Acknowledgements

We would like to thank the editor of *JIPA* Amalia Arvaniti and the anonymous reviewers for their comments and suggestions on earlier drafts of this manuscript. The collection of data samples analyzed in this paper was funded by the Faculty of Law, Humanities and the Arts of the University of Wollongong (Australia) and by a Hispanex grant from the Spanish Ministry of Education, Culture and Sport. We would like to thank staff and students at the following schools for helping us gather the necessary materials for this paper: I.E.S. Fuente Nueva (El Ejido); I.E.S. Santo Domingo (El Ejido); C.E.I.P. Laimún (El Ejido); I.E.S. Mar Azul (Balerma); I.E.S. Virgen del Mar (Adra); and I.E.S. Abdera (Adra).

Supplementary material

To view supplementary material for this article, please visit <https://doi.org/10.1017/S0025100320000146>.

References

- Alarcos Llorach, Emilio. 1958. Fonología y fonética (a propósito de las vocales andaluzas). *Archivum: Revista de la Facultad de Filología* 8, 193–205.
- Alarcos Llorach, Emilio. 1983. Más sobre vocales andaluzas. *Philologica hispaniensi: in honorem Manuel Alvar*, 49–56. Madrid: Editorial Gredos.
- Alonso, Dámaso. 1956. *En la Andalucía de la e: dialectología pintoresca*. Madrid: Gredos.
- Alonso, Dámaso, Alonso Zamora Vicente & María Josefa Canellada de Zamora. 1950. Vocales andaluzas. Contribución al estudio de la fonología peninsular. *Nueva Revista de Filología Hispánica* 4(3), 209–230.

- Alvar, Manuel. 1955a. Las encuestas del “Atlas lingüístico de Andalucía”. *Revista de Dialectología y Tradiciones Populares* XI, 231–274.
- Alvar, Manuel. 1955b. Las hablas meridionales de España y su interés para la lingüística comparada. *Revista de Filología Española* 39, 284–313.
- Alvar, Manuel, Antonio Llorente & Gregorio Salvador. 1973. *Atlas lingüístico y etnográfico de Andalucía*, vol. 6. Granada: Universidad de Granada/Consejo superior de investigaciones científicas.
- Bishop, Jason B. 2007. Incomplete neutralization in Eastern Andalusian Spanish: Perceptual consequences of durational differences involved in s-aspiration. In Jürgen Trouvain & William J. Barry (eds.), *Proceedings of the 16th International Congress of Phonetic Sciences (ICPhS XVI)*, 1765–1768. Dudweiler: Pirrot.
- Blecuá Falgueras, Beatriz. 2005. Variación acústica de la vibrante en posición implosiva. In María José Albalá, Margarita Cantarero, Celia Casado Fresnillo, María Victoria Escandell, Manuel Esgueva, José Manuel Fradejas, Pilar García Mouton, Lourdes García-Macho, César Hernández Alonso & Victoria Marrero Aguiar (eds.), *Filología y lingüística: estudios ofrecidos a Antonio Quilis*, vol. 1, 97–111. Madrid: CSIC/UNED/Universidad de Valladolid.
- Bradley, Travis G. 2014. Optimality Theory and Spanish phonology. *Language and Linguistics Compass* 8(2), 65–88.
- Carlson, Kristin M. 2012. An acoustic and perceptual analysis of compensatory processes in vowels preceding deleted post-nuclear /s/ in Andalusian Spanish. *Concentric: Literary & Cultural Studies* 38, 39–67.
- Coloma, Germán. 2018. Illustrations of the IPA: Argentine Spanish. *Journal of the International Phonetic Association* 48(2), 243–250.
- de Molina Ortés, Elena & Juan M. Hernández-Campoy. 2018. Geographic varieties of Spanish. In Kimberly L. Geeslin (ed.), *The Cambridge handbook of Spanish linguistics*, 496–528. Cambridge: Cambridge University Press.
- Figueroa, Neysa. 2000. An acoustic and perceptual study of vowels preceding deleted post-nuclear /s/ in Puerto Rican Spanish. In Alonso Morales-Font, Héctor Campos, Elena Herburger & Thomas J. Waslsh (eds.), *Hispanic linguistics at the turn of the millennium: Papers from the 3rd Hispanic Linguistics Symposium*, 66–79. Somerville, MA: Cascadilla Press.
- García Marcos, Joaquín Francisco. 1987. El segmento fónico vocal + S en ocho poblaciones de la costa granadina (aportación informática, estadística y sociolingüística al reexamen de la cuestión). *Epos: Revista de Filología* 3, 155–180.
- García Mouton, Pilar. 1992. El atlas lingüístico y etnográfico de Andalucía. Hombres y mujeres. *IKER*, 667–685.
- Gerfen, Chip. 2002. Andalusian codas. *Probus* 14(2), 247–277.
- Gerfen, Chip & Kathleen Hall. 2001. Coda aspiration and incomplete neutralization in Eastern Andalusian Spanish. Ms., University of North Carolina at Chapel Hill. [www.unc.edu/~gerfen/papers/GerfenandHall.pdf, downloaded 10 July 2013]
- Gómez Asensio, José J. 1977. Vocales andaluzas y fonología generativa. *Studia Philologica Salamanticensia* 1, 116–130.
- Hammond, Robert. 1978. An experimental verification of the phonemic status of open and closed vowels in Caribbean Spanish. In Humberto López Morales (ed.), *Corrientes actuales en la dialectología del Caribe hispánico*, 33–125. Rio Piedras: Universidad de Puerto Rico.
- Henriksen, Nicholas. 2017. Patterns of vowel laxing and harmony in Iberian Spanish: Data from production and perception. *Journal of Phonetics* 63, 106–126.
- Henriksen, Nicholas & Sarah K. Harper. 2016. Investigating lenition patterns in south-central Peninsular Spanish /sp st sk/ clusters. *Journal of the International Phonetic Association* 46(3), 1–24.
- Hernández-Campoy, Juan M. & Peter Trudgill. 2002. Functional compensation and Southern Peninsular Spanish /s/ loss. *Folia Linguistica Historica* 23(1–2), 141–166.
- Herrero de Haro, Alfredo. 2016. Four mid front vowels in Western Almería: The effect of /s/, /r/, and /θ/ deletion in Eastern Andalusian Spanish. *Zeitschrift für Romanische Philologie* 132(1), 118–148.

- Herrero de Haro, Alfredo. 2017a. Four mid back vowels in Eastern Andalusian Spanish: The effect of /s/, /r/, and /θ/ deletion on preceding /o/ in the town of El Ejido. *Zeitschrift für romanische Philologie* 133(1), 82–114.
- Herrero de Haro, Alfredo. 2017b. The phonetics and phonology of Eastern Andalusian Spanish: A review of literature from 1881 to 2016. *Íkala, Revista de Lenguaje y Cultura* 22(2), 313–357.
- Herrero de Haro, Alfredo. 2017c. Four low central vowels in Eastern Andalusian Spanish: /a/ before underlying /-s/, /-r/, and /-θ/ in El Ejido. *Dialectologia et Geolinguística* 25, 23–50.
- Herrero de Haro, Alfredo. 2018. Context and vowel harmony: Are they essential to identify underlying word-final /s/ in Eastern Andalusian Spanish? *Dialectologia* 20, 107–145.
- Herrero de Haro, Alfredo. 2019a. Consonant deletion and Eastern Andalusian Spanish vowels: The effect of word-final /s/, /r/, and /θ/ deletion on /i/. *Australian Journal of Linguistics* 39(1), 107–131.
- Herrero de Haro, Alfredo. 2019b. The vowel /u/ before deleted word-final /s/, /r/, and /θ/ in Eastern Andalusian Spanish. *Lengua y Habla* 23, 56–75.
- Herrero de Haro, Alfredo. 2019c. Catorce vocales del andaluz oriental: Producción y percepción de /i/, /e/, /a/, /o/ y /u/ en posición final y ante /-s/, /-r/ y /-θ/ subyacentes en Almería. *Nueva Revista de Filología Hispánica* 67(2), 411–446.
- Hualde, José Ignacio & Benjamin P. Sanders. 1995. A new hypothesis on the origin of the Eastern Andalusian vowel system. *Berkeley Linguistics Society* 21 (BSL 21), 426–437.
- Hualde, José Ignacio, Miquel Simonet & Marianna Nadeu. 2011. Consonant lenition and phonological recategorization. *Laboratory Phonology* 2(2), 301–329.
- Instituto de Estadística y Cartografía de Andalucía. 2011. Población por sexo y relación entre el lugar de nacimiento y residencia. *Censos de Población y Viviendas*. Junta de Andalucía. (<http://www.juntadeandalucia.es/institutodeestadisticaycartografia/ica/resultadosConsulta.jsp?CodOper=768&codConsulta=61255>, accessed 21 August 2020.)
- Jiménez Fernández, Rafael. 1999. *El andaluz*. Madrid: Arco/Libros.
- Jiménez, Jesús & María-Rosa Lloret. 2007. Andalusian vowel harmony: Weak triggers and perceptibility. Presented at the 4th Old World Conference in Phonology, Workshop on Harmony in the Languages of the Mediterranean, Rhodes, Greece.
- Kaplan, A. 2012. Eastern Andalusian vowel harmony and theories of variation. Presented at the Phonetics and Phonology Reading Group, University of California, Santa Cruz.
- Kewley-Port, Diane & Shawn S. Goodman. 2005. Thresholds for second formant transitions in front vowels. *The Journal of the Acoustical Society of America* 118(5), 3252–3260.
- Llorente, Antonio. 1962. Fonética y fonología andaluzas. *Revista de Filología Española* 45(1), 227–240.
- Lloret, María-Rosa & Jesús Jiménez. 2009. Un análisis “óptimo” de la armonía vocálica del andaluz. *Verba: Anuario Galego de Filoloxía* 36, 293–325.
- López Morales, Humberto. 1984. Desdoblamiento fonológico de las vocales en el andaluz oriental: reexamen de la cuestión. *Revista Española de Lingüística* 14(1), 85–97.
- Martínez Melgar, Antonia. 1986. Estudio experimental sobre un muestreo de vocalismo andaluz. *Estudios de Fonética Experimental* 2, 198–248.
- Martínez Melgar, Antonia. 1994. El vocalismo del andaluz oriental. *Estudios de Fonética Experimental* 6, 11–64.
- Martínez Celdrán, Eugenio, Ana María Fernández Planas & Josefina Carrera Sabaté. 2003. Castilian Spanish. *Journal of the International Phonetic Association* 33(2), 255–259.
- Melgizo Moreno, Elisabeth. 2007. La fricativización de /ç/ en una comunidad de hablantes granadina. *Interlingüística* 17, 748–757.
- Mondéjar Cumpián, José. 1979. Diacronía y sincronía en las hablas andaluzas. *Lingüística Española Actual* 1(2), 375–402.
- Monroy, Rafael & Juan M. Hernández-Campoy. 2015. Illustrations of the IPA: Murcian Spanish. *Journal of the International Phonetic Association* 45(2), 229–240.
- Morris, Richard. 2000. Constraint interaction in Spanish /s/-aspiration: Three peninsular varieties. In Alfonso Morales-Font, Héctor Campos, Elena Herburger & Thomas J. Walsh (eds.), *Hispanic linguistics at the turn of the millennium: Papers from the 3rd Hispanic Linguistics Symposium*, 14–30. Somerville, MA: Cascadilla Press.

- Moya Corral, Juan A. 2010. El oriente andaluz y el español común. In Juan A. Moya Corral & Marcin Sosinski (eds.), *Proceedings of the XVI Jornadas sobre la lengua española y su enseñanza*, 101–115. Granada: Universidad de Granada.
- Nadeu, Marianna & José Ignacio Hualde. 2015. Biomechanically conditioned variation at the origin of diachronic intervocalic voicing. *Language and Speech* 58(3), 351–370.
- Navarro Tomás, Tomás. 1938. Dédoublément de phonèmes dans le dialecte andalou. *Travaux de Cercle Linguistique de Prague* 8, 184–186.
- Navarro Tomás, Tomás. 1939. Desdoblamiento de fonemas vocálicos. *Revista de Filología Hispánica* 1, 165–167.
- Navarro Tomás, Tomás, Aurelio Espinosa & Lorenzo Rodríguez Castellano. 1933. La frontera del andaluz. *Revista de Filología Española* 20, 225–277.
- O'Neill, Paul. 2010. Variación y cambio en las consonantes oclusivas del español de Andalucía. *Estudios de Fonética Experimental* 19, 11–41.
- Peñalver Castillo, Manuel. 2006. El habla de Cabra: situación actual. *Anuario de Estudios Filológicos* 29, 247–253.
- Regan, Brendan. 2017. A study of ceceo variation in Western Andalusia (Huelva). *Studies in Hispanic and Lusophone Linguistics* 10(1), 119–160.
- Rodríguez-Castellano, Lorenzo 1952. El habla de Cabra (Notas de morfología). *Archivum* 2(2), 384–407.
- Rodríguez-Castellano, Lorenzo & Adela Palacio. 1948a. Contribución al estudio del dialecto andaluz: El habla de Cabra. *Revista de Dialectología y Tradiciones Populares* 4(3), 387–418.
- Rodríguez-Castellano, Lorenzo & Adela Palacio. 1948b. Contribución al estudio del dialecto andaluz: El habla de Cabra. *Revista de Dialectología y Tradiciones Populares* 4(4), 570–599.
- Ruch, Hanna & Jonathan Harrington. 2014. Synchronic and diachronic factors in the change from pre-aspiration to post-aspiration in Andalusian Spanish. *Journal of Phonetics* 45, 12–25.
- Ruch, Hanna & Sandra Peters. 2016. On the origin of post-aspirated stops: Production and perception of /s/ + voiceless stop sequences in Andalusian Spanish. *Laboratory Phonology: Journal of the Association for Laboratory Phonology* 7(1), 1–36.
- Salvador, Gregorio. 1957. El habla de Cúllar-Baza. Contribución al estudio de la frontera del andaluz. *Revista de Filología Española* 41, 161–252.
- Salvador, Gregorio. 1977. Unidades fonológicas vocálicas en andaluz oriental. *Nueva Revista de Filología Hispánica* 7, 1–23.
- Sanders, Benjamin P. 1994. *Andalusian vocalism and related processes*. Ph.D. dissertation, University of Illinois at Urbana–Champaign.
- Sanders, Benjamin P. 1998. The eastern Andalusian vowel system: Form and structure. *Rivista di Lingüística* 10(1), 109–136.
- 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.
- Torreira, Francisco. 2007. Pre- and postaspirated stops in Andalusian Spanish. In Pilar Prieto, Joan Mascaró & María Josep Solé (eds.), *Segmental and prosodic issues in Romance phonology*, 67–82. Amsterdam: John Benjamins.
- Torreira, Francisco & Mirjam Ernestus. 2011. Realization of voiceless stops and vowels in conversational French and Spanish. *Laboratory Phonology* 2(2), 331–353.
- Trujillo, Ramón. 1980. Sonorización de sordas en Canarias. *Anuario de Letras* 18, 247–266.
- Valeš, Miroslav. 2014. Panorama de la sociolingüística andaluza. *Linguistica Pragensia* 24(1), 45–54.
- Villena Ponsoda, Juan Andrés. 2000. Identidad y variación lingüística: Prestigio nacional y lealtad vernacular en el español hablado en Andalucía. In Georg Bossong & Francisco Báez de Aguilar González (eds.), *Identidades lingüísticas en la España autonómica*, 107–150. Madrid: Iberoamericana Vervuert.
- Wulff, Fredrik. 1889. Un chapitre de phonétique andalouse. *Recueil de mémoires philologiques présenté à Monsieur Gaston Paris*, 211–260. Stockholm: L'imprimerie centrale.
- Zamora Vicente, Alonso. 1960. *Dialectología española*. Madrid: Gredos.
- Zubizarreta, Maria Luisa. 1979. Vowel Harmony in Andalusian Spanish. *Papers on syllable structure, metrical structure and harmony processes* (MIT Working Papers in Linguistics 1), 1–11.