

Secondary Stress and Stress Clash in Spanish

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1. Introduction

Research on stress in Spanish has generally assumed that secondary stresses cannot occur on adjacent syllables or adjacent to the syllable bearing primary stress (Navarro Tomás 1972[1918], Stockwell et al. 1956, Harris 1983, Roca 1986). Observation of public speech (a type of discourse where the realization of secondary stress is frequent), however, shows that adjacency in secondary stress placement is not necessarily avoided (Hualde 2007a, 2009). In this paper I test the prohibition against stress-clash experimentally. The results show that placing a secondary stress on the syllable immediately preceding the lexically stressed one is not avoided when no other syllable is available. The presence of adjacent stresses or “stress clash”, however, does not result in “pitch-accent clash”, since the acoustic realization of primary and secondary stress is different. In stress-clash situations there is a single pitch-accent, aligned with the secondarily-stressed syllable, whereas the lexically-stressed syllable has durational prominence.

Before considering the details of the experiment, we must start with a review of the different descriptions of secondary stress patterns in Spanish that we find in the literature on this topic.

2. Review of the literature on patterns of secondary stress in Spanish

Although in Spanish only one syllable per word receives contrastive stress (except for certain compounds), several authors have described patterns of secondary stress in prosodic words. The first detailed description of secondary stress patterns in Spanish is found in the work of Navarro Tomás. For Navarro Tomás (1972[1918]: 195-196), Spanish secondary stress is essentially a rhythmic phenomenon operating at the level of prosodic words, which include proclitics such as definite articles, prepositions and conjunctions. He states that, generally, secondary stress falls on alternating syllables from the lexically stressed or *tonic* syllable as in (1), where 3 is the highest level of prominence in the prosodic word. For clarity, I add stress marks on all tonic vowels in Navarro Tomás’s examples:

(1) Navarro Tomás: stress levels, general pattern

2-1-3: *repetír, comparár, contenér, amistád,...*

3-1-2: *rápido, tímido, pánico,...*

1-3-1-2: *retórica, fonética, mismísimo, la música,...*

2-1-3-1: *abadésa, cariñoso, marinero, la mañana, entre todos*

2-1-2-1-3-1: *contraproducente, significativo, experimentado, lo que prometiéron, contra lo tratado,...*

The rhythmic, alternating stress principle has one exception for Navarro Tomás: “En los grupos formados por cuatro o cinco sílabas con acento principal sobre la cuarta, el acento secundario no recae sobre la sílaba segunda, como haría esperar el principio alternativo, sino sobre la primera” [“In groups of four or five syllables with primary stress on the fourth, the secondary stress does not fall on the second syllable as would be expected from the alternation principle, but on the first”] (Navarro Tomás 1972: 196), as in the examples in (2):

(2) Navarro Tomás: non-alternating secondary stress on the initial syllable

2-1-1-3-[1]: *emperador, conversación, reconquistár, explicaciones, entrometido, sobre la frente, por la mañana, en la corriente*

As Bolinger (1962:273) observes, a generalization that would cover both patterns is that Navarro Tomás always assigns secondary stress to the initial syllable “as long as it is at least two syllables removed from the primary”. It is easy to see that this pattern would follow from the interaction of three ordered constraints:

(3) Constraints implicit in Navarro Tomás’s secondary stress patterns

INITIAL STRESS: Assign a secondary stress to the initial syllable.

ALTERNATING STRESS: Assign stress to every other syllable counting from the primary

NO STRESS CLASH: Stresses may not fall on adjacent syllables

The constraint NO STRESS CLASH is ranked highest, and INITIAL STRESS is ranked higher than ALTERNATING STRESS, as the examples in (2) above show:

(4) Constraint ranking needed to produce Navarro Tomás’s patterns

NO STRESS CLASH >> INITIAL STRESS >> ALTERNATING STRESS

Input: emperadór	NO STRESS CLASS	INITIAL STRESS	ALTERNATING STRESS
⇒èmpèradór	OK	OK	*
empèradór	OK	*	
<hr/>			
Input: contraproducénte			
⇒còntrepròducénte	OK	OK	OK
<hr/>			
Input: fonética			
fònéticà	*		
⇒fonéticà	OK	OK	*

In an example like *còntrepròducénte*, all constraints can be satisfied, since alternating stresses leftward from the tonic would place secondary stress on the initial syllable. In *èmpèradór*, initial stress is preferred over alternating stress. Finally, in *fonéticà*, where there is a single pretonic syllable, secondary stress is not assigned to the initial syllable since that would violate the higher-ranked constraint prohibiting stresses on adjacent syllables.

We thus see that the most important constraint implicit in Navarro Tomás’s description is the prohibition against adjacent stresses, or NO STRESS CLASH.

Although there are differences of detail, most researchers after Navarro Tomás have also identified either alternating syllables from the tonic or the word-initial syllable as (potential) locations of secondary stress, subject to the non-adjacency condition.

Several other authors have made explicit statements regarding avoidance of clash as an overriding constraint. For Stockwell, Bowen & Silva-Fuenzalida (1956: 657), secondary (“medial”) stress normally falls on the initial syllable of the word (although they admit that other patterns are possible), but also as long as the lexical stress appears no earlier than the third syllable.

Harris (1983: 85-86) describes two patterns of nonprimary stresses, initial and alternating from the lexically stressed syllable, but again “subject to the condition that nonprimaries cannot occur adjacent to each other or to the primary (**gràmàticàlidad, *bàndàda*)” (p. 86).

For Roca (1996) “secondary stress is assigned on alternate syllables leftward of the primary stress” (p. 352). In addition, a rule of stress-shift gives rise to phrase-initial secondary stress: *por Còstantino ~ pòr Constantino*. Since this rule applies after the alternating stress rule, it is clear that adjacent stresses are avoided. His actual secondary stress mechanism, however, requires metrification of posttonic syllables as well, generating secondary stress on the immediately posttonic in some cases. To remove this secondary stress he postulates a clash deletion rule.

It should be noted that that the prohibition against stresses on adjacent syllables that all the authors we have cited assume must be restricted to secondary or postlexical stresses. Lexical stresses can occur on adjacent syllables not only across word boundaries but also in compounds such as *sofà-càma* ‘sofa bed’ and adverbs in *-mente*, which historically derive from compounds, *normálménte* ‘normally’.

The NO STRESS CLASH constraint would thus have to be outranked by a constraint mandating the preservation of lexical stresses. A clarification that perhaps is in order at this point is that I am distinguishish “stress clash”, the occurrence of primary or secondary stress on adjacent syllables, from “pitch-accent clash”, which refers to the occurrence of two pitch accents on adjacent syllables. The fact that in, for instance, *sofá-cáma* or *sé póco* there are two adjacent primary stresses does not imply that they will be uttered with associated pitch accents on the two stressed syllables.

Other references to Spanish secondary stress, such as Wallis (1951), Bolinger (1962) and Quilis (1993) are less explicit regarding the rules determining location of the secondary stresses, or explicitly claim that no rule can be given, but, in any event, they do not mention the possibility of secondary stress on the initial syllable under stress clash.

In recent work (Hualde 2007a, 2009), I have described two patterns of postlexical secondary stress: secondary stress may fall either two syllables before the lexical stress or on the initial syllable. In that work, I made the claim that secondary stress may in fact occur on the initial syllable of the word even if primary stress is on the second. This claim, which goes against the established tradition, was based on the observation of radio, television and other forms of public speech. That is, the observation is that the stress-clash pattern shown in *fónética*, *bàndáda*, which authors such as Navarro Tomás and Harris assume to be excluded, is actually attested. Nevertheless I stated then that this pattern is not frequent and may be suboptimal.

Besides some differences on the secondary stress patterns that are described, the different accounts of secondary stress in Spanish found in the literature disagree in what is perhaps a more fundamental issue. For Navarro Tomás (1972[1918]), Stockwell et al. (1956), Harris (1983) and Roca (1986), secondary stresses appear to characterize all phrases, or perhaps the citation form of words and phrases. On the other hand, following Wallis (1951), Bolinger (1962) and Quilis (1993), I take secondary stress to be an optional phenomenon used for rhetorical purposes that can be very frequent in oratorical style, but is generally not present in less emphatic styles.

Instrumental work, using read materials, has generally failed to find acoustic correlates for secondary stress in Spanish (Prieto & van Santen 1993, Díaz-Campos 2000). I believe this provides evidence against the view that secondary stress is an inherent feature of words or phrases. Arguably, these phonetic studies did not find evidence for secondary stress because the utterances they analyzed did not contain secondary stresses (as I expressed in Hualde 2007b).

On the other hand, Kimura (2006) notices that a relatively frequent phenomenon in Spanish public speech involves the presence of a high tone two syllables before the lexically stressed syllable, providing some examples of pitch contours. Although Kimura does not make the connection with the literature on the topic, his work in fact identifies a correlate of secondary stress. Syllables that are perceived as bearing postlexical or secondary stress may thus anchor a pitch accent.

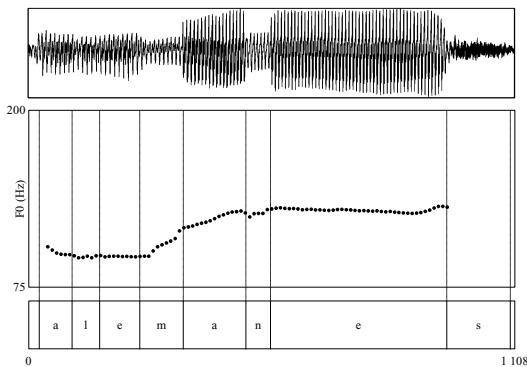
Most previous work on secondary stress has relied either on the intuition of the author or on informal observation, which does not permit the testing of hypotheses in a systematic manner. In order to examine the distribution of secondary stress more systematically, one must be able to elicit speech containing secondary stresses.

In the next section I describe an experiment intended to explore the issue of whether secondary stress on the immediately pretonic syllable, in violation of the NO STRESS CLASH constraint, is avoided in Spanish. The experiment also tested other hypotheses concerning the distribution and acoustic correlates of secondary stress. Only the data relevant to stress clash are presented and discussed here.

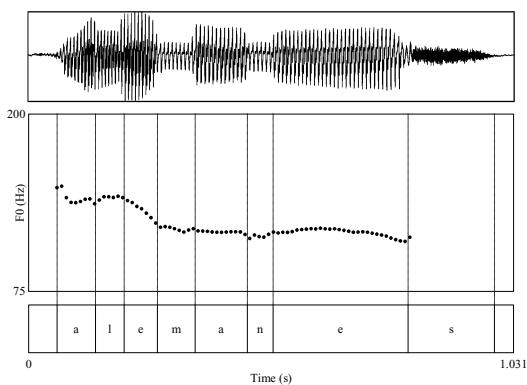
3. Methods

In order to elicit secondary stress and test its possible occurrence in stress clash contexts, I provided a model that would prompt speakers to use secondary stress. Native speakers of Peninsular Spanish were asked to read a list of nationality adjectives as an answer to the question *¿Qué nacionalidades están representadas en tu empresa?* “What nationalities are represented in your company?”. Before each repetition of the list, the participant listened to a recorded stimulus containing the beginning of the list, which contained two nationality adjectives: *Pues, tenemos portugueses, alemanes,...* “Well, we have Portuguese, Germans,...” There were three aural stimuli, which I recorded using three distinct prosodic patterns. I will refer to these patterns as “lexical”, “rhythmic” and “emphatic”. In the lexical pattern intended prominence was placed only on the tonic

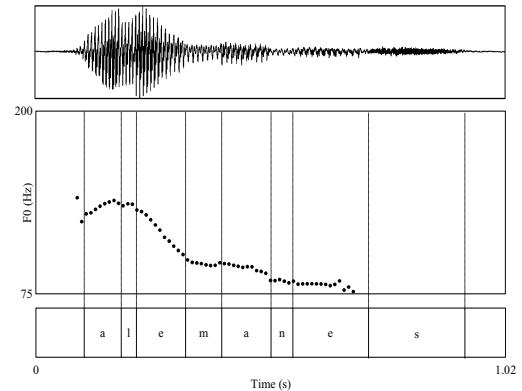
of each word, whereas in the other two patterns the prepretonic was given stress. Waveforms and pitch contours of the three *alemanes* stimuli that were employed are shown in Fig. 1a-c.



a.



b.



c.

Fig. 1. Pitch contours of the three tokens of *alemanes* given as aural stimuli: a. lexical pattern, b. rhythmic pattern, c. emphatic pattern.

Participants were asked to read the complete list using the same pattern as in the examples. Whereas the two examples that were presented as stimuli have two syllables before the tonic, *portuguéses*, *alemánes*, the list that participants read contained examples with zero to three syllables before the tonic, randomly distributed. The complete list is given in the appendix. The focus of this paper are the examples with a single pretonic syllable, *rumános*, *chilénos*, *polácós*, *francésés*, *inglésés*. If there is a prohibition against stress clash, as has been widely assumed in the literature, we would expect that speakers who successfully produced, for instance, *mèxicános* in the “rhythmic” pattern would nevertheless produce *rumános*, without secondary stress, instead of *rùmános*.

Subjects were recorded reading the list 6 times; twice, with each of the three intended patterns.

For the acoustic analysis, all vowels in the target words were segmented and their duration, pitch and intensity were measured automatically in Praat (Boersma & Weenink 2009) with a script written for this purpose. Data for 4 speakers have been analyzed. Spkr 1 is male and the other three speakers are female. A few tokens, mostly produced by Spkr 1, were discarded because of devoicing of the last syllable, which created problems for the script.¹ As mentioned, only speakers of Peninsular Spanish participated in the experiment. This is because very little is known yet regarding dialectal variation in this respect.

¹ Two additional speakers were recorded, but their data were not analyzed because they did not use a consistent prosodic pattern throughout each of the repetitions of the list. Typically, after pronouncing the first few words with secondary stress, they would revert to a pattern with stress only on the tonic.

4. Results: Trisyllabic paroxytones

Results of all measurements taken are presented by means of interaction line plots, separately for each of the four speakers. In the figures, vowels are identified as pretonic (PT), tonic (T) and word final (WF). Each figure compares the values obtained under each of the three conditions; that is, the tokens that the speaker produced right after hearing each of the three different stimuli, “emphatic,” “lexical,” and “rhythmic”. I present the results for average pitch, average intensity and duration in separate subsections.

4.1. Pitch

In the interaction line plots in Fig. 2, the average pitch in Hz of the vowels in the pretonic (PT), tonic (T) and word final (WF) syllables is shown for the tokens of trisyllabic paroxytones that the speakers produced after hearing each of the stimuli. Results for each speaker are presented in a different panel.

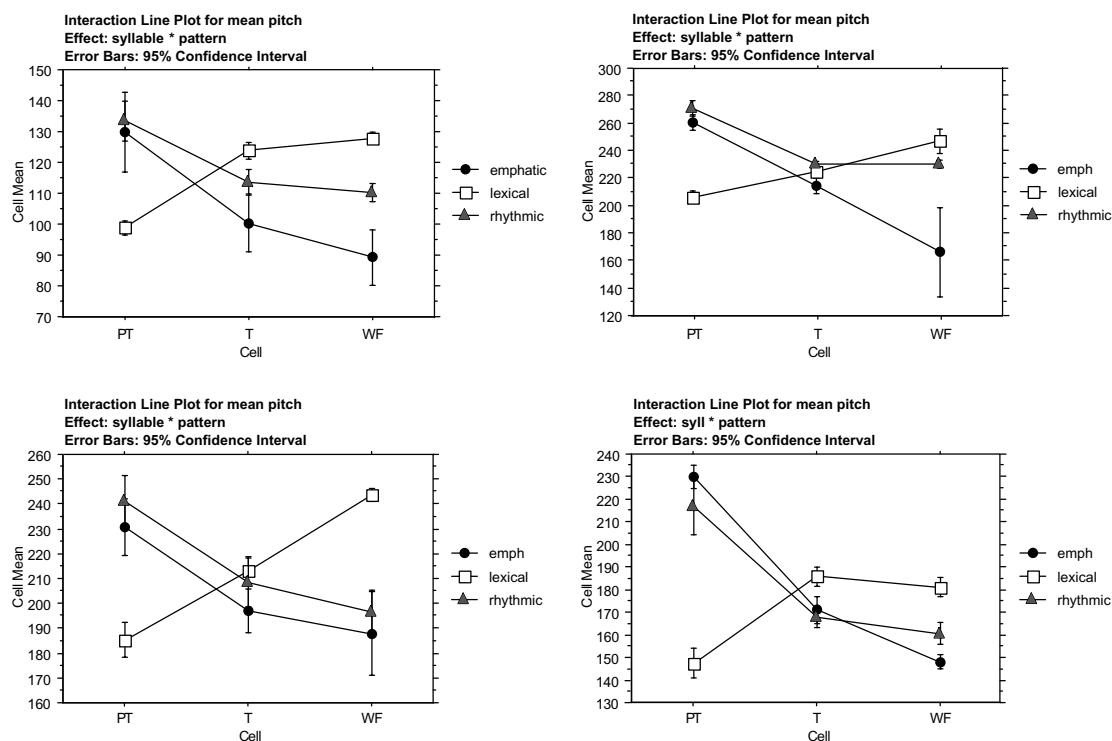


Fig. 2. Average pitch of all vowels in three-syllable paroxytones (4 speakers)

As can be seen in Fig. 2, the pitch on the word-initial pretonic vowel is much higher in the rhythmic and emphatic patterns than in the lexical pattern for all speakers. In the lexical pattern, the pitch rises from the pretonic to the tonic for all speakers and either continues rising or remains at more or less the same level from the tonic to the final. I interpret these facts as being due to the presence of a rising accent on the tonic and a choice of tonal boundaries at the end of the word, which is not unexpected in the list context where the words were inserted. An example from Spkr 1 is given in the first panel of Fig. 3.

In both the rhythmic and emphatic patterns, on the other hand, there is high pitch on the initial pretonic syllable and a fall from the pretonic to the tonic, which shows that in both of these contours the pitch accent has been placed on the immediately pretonic initial syllable. Examples, also produced by Spkr 1, are given in the second and third panels of Fig. 3.

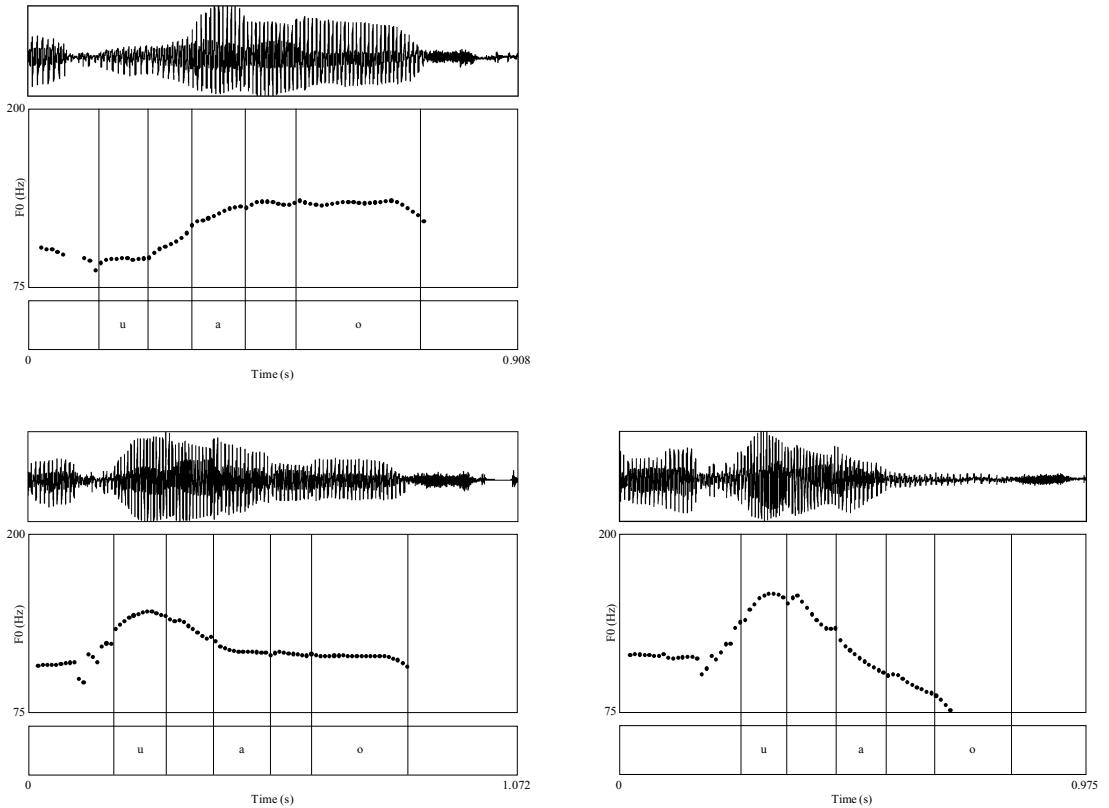


Fig. 3. Example of three-syllable paroxytone, *rumanos*. (a) “lexical”, (b) “rhythmic”, (c) “emphatic” (Spkr 1)

4.2. Intensity

Average intensity data for all vowels in trisyllabic paroxytonic words under the three prosodic patterns are shown in line plots in Fig. 4.

Just like for pitch, the initial syllable has higher intensity than the tonic in the rhythmic and emphatic, but not in the lexical pattern. That is, in the line plots, we see a decrease in intensity from the first to the second syllable in the rhythmic and emphatic pattern and an increase in intensity in the lexical pattern. This is true for all speakers.

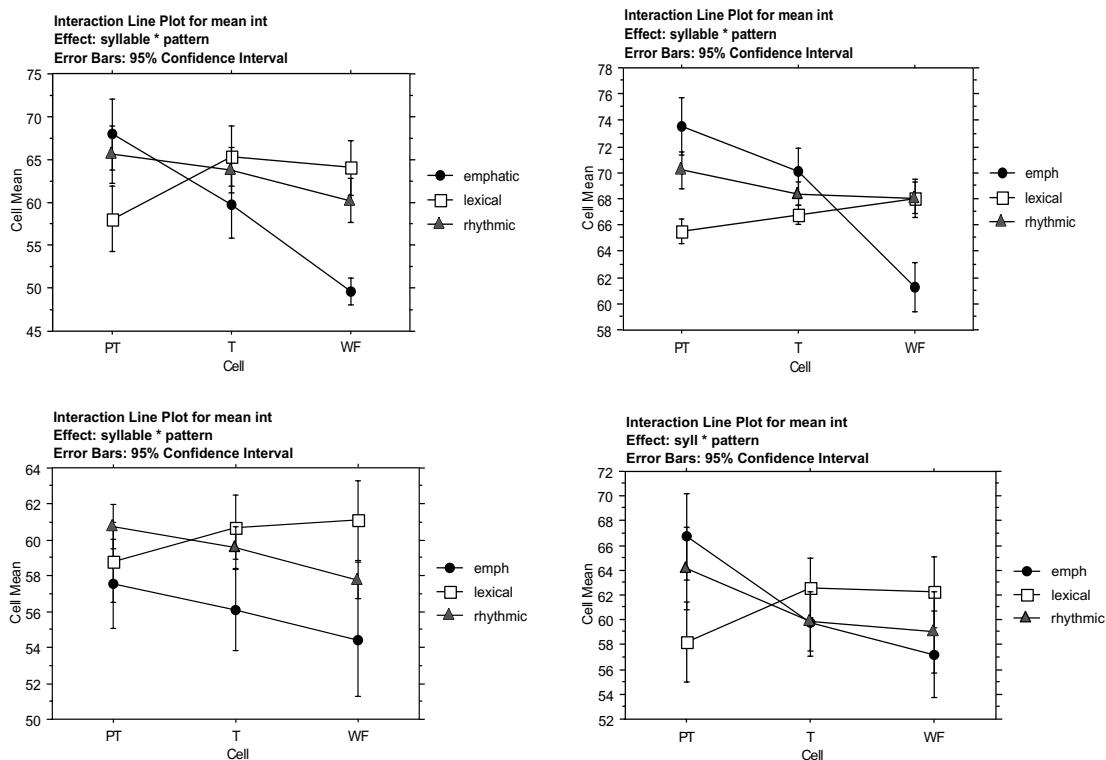


Fig. 4. Average intensity of all vowels in three-syllable paroxytones (4 speakers)

4.3. Duration

The results for duration are quite different from those for average pitch and average intensity, see Fig. 5.

As shown in Fig. 5, the tonic is generally longer than the pretonic in all three stress patterns. The vowel of the final syllable is even longer, as expected from a listing pattern. That is, whereas pitch and intensity prominence are concentrated on the first, pretonic syllable, in the secondary stress patterns, the tonic retains durational marking of its lexical stress, just like in the lexical pattern, where it bears a pitch accent.

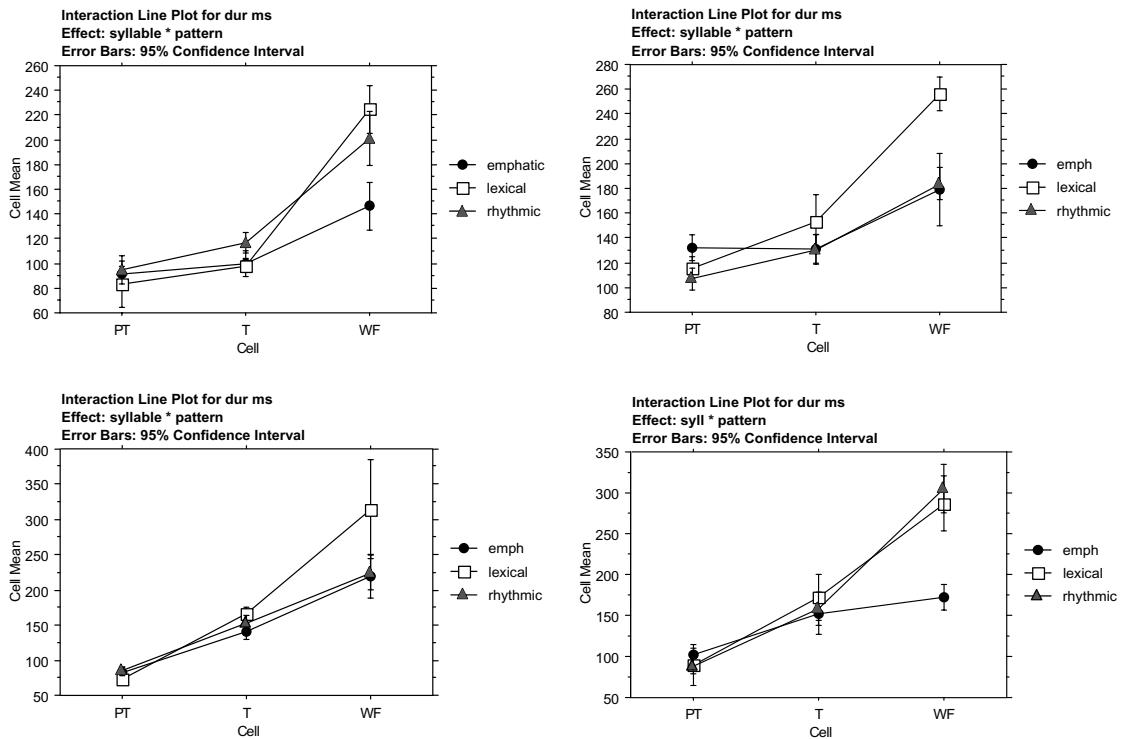


Fig. 5. Duration of all vowels in three-syllable paroxytones (4 speakers)

5. Conclusion and discussion

The results show that participants did not avoid stress clash, systematically placing secondary stress on the initial syllable of words with lexical stress on the second under both the rhythmic and the emphatic contours.

We can conclude that stress clash is not avoided in Spanish, if by stress class we mean presence of prominence on two adjacent syllables. When using a pattern that would produce prominence two syllables before the tonic, *àlemánes*, all speakers consistently placed accentual prominence on the immediately pretonic syllable in trisyllabic words, *rùmános*. This is in agreement with the observations in Hualde (2007a, 2009) and against the claims of previous authors such as Navarro Tomás (1977), Harris (1983) and Roca (1986). It is important to notice, however, that stress is realized in different ways on the secondarily stressed and the lexically stressed syllables. The secondarily stressed syllable anchors a pitch accent, whereas the lexically stressed syllable has durational stress. As in English (Shattuck-Hufnagel et al. 1994) and Catalan (Prieto et al. 2001) pitch-accent on adjacent syllables are indeed avoided.

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Appendix

Written materials

Lea las siguientes frases imitando la entonación del ejemplo:

El contexto sería la pregunta: *¿Qué nacionalidades están representadas en tu empresa?*

1. Pues, tenemos portugueses, alemanes, italianos,...
2. Tenemos hondureños, franceses, españoles,...
3. Tenemos mexicanos, venezolanos, colombianos,...
4. Tenemos japoneses, polacos, rusos,...
5. Tenemos americanos, búlgaros, canadienses,...
6. Tenemos senegaleses, ingleses, galeses,...
7. Tenemos dominicanos, panameños, puertorriqueños,...
8. Tenemos rumanos, árabes, ecuatorianos,...
9. Tenemos argentinos, chilenos, tailandeses,...
10. Tenemos húngaros, salvadoreños, islandeses,...

References

- Boersma, Paul & David Weenink. 2009. Praat: doing phonetics by computer (Version 5.1.17). www.praat.org.
- Bolinger, Dwight. 1962. 'Secondary stress' in Spanish. *Romance Philology* 15.3: 273-279.
- Díaz-Campos, Manuel. 2000. The phonetic manifestation of secondary stress in Spanish. In *Papers from the 3rd Hispanic Linguistic Symposium* (Héctor Campos, Elena Herburger, Alfonso Morales-Front & Thomas J. Walsh, editors), pp. 49-65. Somerville: Cascadilla.
- Harris, James. 1983. *Syllable structure and stress in Spanish*. Cambridge, Mass.: MIT Press.
- Hualde, José I. 2007a. Stress removal and stress addition in Spanish. *Journal of Portuguese Linguistics* 5 (2)/6 (1): 59-89.
- Hualde, José I. 2007b. Review of Eddington, David, *Spanish phonology and morphology*. *Language* 83.2: 435-438.
- Hualde, José I. 2009. Unstressed words in Spanish. *Language Sciences* 31. 2-3: 199-212.
- Kimura, Takuya. 2006. Mismatch of stress and accent in spoken Spanish. In *Prosody and syntax: Cross-linguistic perspectives* (Yuji Kawaguchi, Ivan Fonagy & Tsunekazu Moriguchi, editors), pp. 141-155. Amsterdam: Benjamins.
- Navarro Tomás, Tomás. 1977. *Manual de pronunciación española*, 19th ed. Madrid: Consejo Superior de Investigaciones Científicas (Publicaciones de la Revista de Filología Española) [1st ed., 1918].
- Prieto, Pilar & Jan van Santen. 1996. Secondary stress in Spanish: Some experimental evidence. In *Aspects of Romance linguistics* (Claudia Parodi, Carlos Quicoli, Mario Saltarelli & María Luisa Zubizarreta, editors), pp. 337-356. Washington, DC: Georgetown Univ. Press.
- Prieto, Pilar, Salvador Oliva, Blanca Palmada, Pep Serra, Beatriu Blecua, Sílvia Llach & Victòria Oliva. 2001. Manifestació acústica de la resolució de xocs accentuals en català. *Estudios de Fonética Experimental* 11: 11-38.
- Quilis, Antonio. 1993. *Tratado de fonología y fonética españolas*. Madrid: Gredos.
- Roca, Iggy. 1986. Secondary stress and metrical rhythm. *Phonology Yearbook* 3: 341-370.
- Shattuck-Hufnagel, Stephanie, Mari Ostendorf & K. Ross. 1994. Stress shift and early pitch accent placement in lexical items in American English. *Journal of Phonetics* 22: 357-388.
- Stockwell, Robert, J. Donald Bowen & I. Silva-Fuenzalida. 1956. Spanish juncture and intonation. *Language*, 32: 641-645.
- Wallis, Ethel. 1951. Intonational stress patterns in contemporary Spanish. *Hispania* 34: 143-147.

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