

Article

A Comparative Analysis of Declarative Sentences in the Spontaneous Speech of Two Puerto Rican Communities

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Abstract: This paper applies the Autosegmental Metrical (AM) model of intonation phonology and the Spanish Tones and Break Indices (Sp_ToBI) annotation conventions to compare the intonational contours of declarative sentences in two varieties of Puerto Rican Spanish: (1) San Juan Spanish, spoken in the capital city of San Juan, and (2) Loíza Spanish, an Afro-Hispanic vernacular spoken in Loíza. The geographical proximity between these two municipalities entails constant contact within a shared linguistic space. However, speakers from San Juan perceive Loíza as a municipality that has its own peculiar way of speaking. The acoustic and phonological analysis was carried out with PRAAT to verify whether pitch accents coincide in the spontaneous speech of the two analyzed varieties. The data we examined contain an overall predominance of the bitonal pitch accents L*+H and L+<H* in San Juan Spanish, and L+H* in Loíza Spanish. Findings show both similarities and differences within the two speech communities, as well as with intonational patterns in other (Afro-)Hispanic varieties. These results provide new information on spontaneous declarative intonation in (Afro-)Puerto Rican Spanish by offering a new perspective on the origin of a set of the prosodic phenomena found in these two varieties.



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1. Introduction

Navarro-Tomás is considered the pioneer of Hispanic phonology for leading the long history of studies on Spanish intonation (Navarro-Tomás 1918, 1944, 1966), as well as for intertwining intonation with the mastery of a language:

No se penetra enteramente en el dominio de una lengua mientras no se conoce la intimidad de su entonación. ('One does not fully penetrate the domain of a language until one knows the intimacy of its intonation.'). (Navarro-Tomás 1966, p. 8)

His early descriptions of Spanish declarative intonation were accurate enough to be used in more recent studies (Sosa 1999; Face 2002; Alvord 2010) to provide a consistent picture of what neutral declarative intonation looks like in many varieties of Spanish. However, for decades the study of the melodic aspect of language has been limited mainly to differentiating between statements and questions, leaving aside the comparative analysis between languages (Hernández-Rodríguez et al. 2014).

In search of *desarrollar componentes fonético-fonológicos completos* ('developing complete phonetic-phonological components') (Prieto 2003, p. 18), Pierrehumbert (1980) proposed in her research on English intonation a model that was able to make a principled distinction between the phonology of intonation and its phonetic realization (Arvaniti 2022). This methodology, suitable both for recognizing and describing the suprasegmental and prosodic features of the spoken chain and for facilitating the syntagmatic delimitation of

intonational units, was called the *Autosegmental Metrical (AM)* model (Pierrehumbert 1980; Ladd 2008).

In other words, Pierrehumbert was looking to connect the two subsystems of phonology necessary for intonation: (1) an autosegmental level that represents the melodic part of intonation and (2) a metric structure that represents prominence and phrasing. Since its introduction, the model has undergone several improvements until it became the most widely used theoretical framework for intonational studies (see Hualde 2003 for a description of the AM in Spanish). Its labeling scheme is called *Spanish Tones and Break Indices (Sp_ToBI)*, a tool for the prosodic annotation of Spanish speech corpora that contains prosodic, phonetic, and intonational information (Aguilar et al. 2009).

The declarative intonation of Spanish has been widely described, although some varieties have received more attention than others. The analysis of new varieties of Spanish “can provide insights into the phonological system of Spanish in general as well as into our understanding of intonational phonology” (Alvord 2010, p. 3). This comparative study analyzes the intonation patterns of two varieties of Puerto Rican Spanish (PRS) spoken in the *Área Metropolitana de San Juan* (‘San Juan Metropolitan Area’) (AMSJ):¹ (1) *San Juan Spanish (SJS)*, the variety spoken in the capital city of San Juan; and (2) *Loíza Spanish (LS)*, an Afro-Hispanic vernacular spoken in the coastal municipality of Loíza (Visconte and Sessarego 2022a, 2022b) (Scheme 1).



Scheme 1. San Juan and Loíza in the AMSJU (adapted from Feliciano-Astacio et al. 2019).

During the past few decades, a number of linguistic studies have focused on PRS (Navarro-Tomás 1948 et seq.; Álvarez-Nazario 1974, 1982, 1990; López-Morales 1979, 1988; Vaquero 1991; Morales de Walters 2000; Torres-González 2002; Carroll et al. 2015; Guzzardo-Tamargo and Vélez-Avilés 2017; Guzzardo-Tamargo et al. 2018; González-Rivera and Ortiz-López 2018; etc.). Nonetheless, only a few comprehensive works have analyzed the intonational phonology of this Caribbean variety (Sosa 1999; Armstrong 2010, 2017; Hernández-Rodríguez et al. 2014).

Some comparative analyses have included varieties spoken by *boricuas*² and speakers of other languages, such as Papiamentu (Mauleón-Benítez 1974), as well as other varieties of Spanish (Mexican, Colombian, Venezuelan, and Peninsular Spanish) (Quilis 1985, 1989; Sosa 2003; Hernández-Rodríguez et al. 2014). However, we are not aware of an intradialectal comparison that includes a variety of Spanish (such as SJS) and an Afro-Hispanic variety (such as LS).

According to recent census data (US Census Bureau 2022), around 350 thousand Puerto Ricans reside in San Juan, the main center of the AMSJ. Just miles from the capital city sits Loíza, a municipality of less than 24 thousand residents (US Census Bureau 2022) with a dense Afro-Caribbean population. More than 64% of the entire population self-define as “Black” (Mayo-Santana and Negrón-Portillo 2007). This community is well known for its strong Afro-Puerto Rican identity (Moya 2012), which makes this coastal municipality

considered throughout Puerto Rico as an *enclave afropuertorriqueño* ('an Afro-Puerto Rican enclave') (Visconte, forthcoming).

At the linguistic level, Loíza's speech has been stigmatized and belittled by San Juan residents for presenting peculiar cases of phonetic variation (i.e., aspiration of /ɾ/ in implosive position: *ba^hco* (*barco*) 'boat'; conversion of /d/ > [ɾ] and /ɾ/ > [ð] in syllable-initial position: *arema* (*además*) 'in addition', *ayura* (*ayuda*) 'help'; simplification or gemination of consonant groups: *corruto* (*corruptos*) 'corrupted'; loss of syllable-final /ɾ/: *cosé* (*coser*) 'to sew'; etc.), bringing LS closer to other Afro-Hispanic Languages of the Americas (AHLAs) and distancing it from SJS (Mojica-de León 2014; Visconte, forthcoming).

Due to their geographical proximity, San Juan and Loíza share a linguistic space in which social differences play a fundamental factor. Previous studies have focused on intonation as a stigma of discrimination and consequent marginalization of certain Spanish-speaking linguistic communities (Cerrón-Palomino 2003; Tijoux and Retamales 2015; Hernández-Rosete and Maya 2016). Concerning Puerto Rico, in a recent proposal on linguistic attitudes Loíza has been defined as a region where *se habla diferente* ('people speak differently') by speakers from San Juan (Mojica-de León 2014, p. 1274). The municipalities of San Juan and Loíza represent the two extremes of poverty rates in Puerto Rico (US Census Bureau 2022). LS is generally perceived by SJS speakers as a stigmatized vernacular. This is likely due to the historical difficulties that place this Afro-Hispanic region at the top of the ranks of poverty, unemployment, illiteracy, and crime throughout Puerto Rico (Ungerleider-Kepler 2000; Visconte and Sessarego 2022a, 2022b). In this regard, it is clear the existence of *apreciaciones subjetivas* ('subjective appreciations') (Silva-Corvalán 1989, p. 12) leads *sanjuaneros* to consider *loiceños* as speakers of a substandard dialect, while evaluating the variety spoken in the capital city as the standard to follow. In Puerto Rico, the AMSJ enjoys prestige compared with all other areas of Puerto Rico. As stated by Moreno-Fernández (1998, p. 231):

Los hablantes distinguen a la variedad superior con funciones relacionadas con el estatus, tales como la religión, el gobierno o la educación, de la variedad inferior con funciones relacionadas con la solidaridad, el hogar y la intimidad. Estas variedades pueden ser lenguas diferentes, dialectos de la misma lengua o variedades funcionalmente distintas. ('Speakers distinguish the prestige variety with functions related to status, such as religion, government, or education, from the stigmatized variety with functions related to solidarity, home, and privacy. These varieties may be different languages, dialects of the same language, or functionally distinct varieties.')

The present study contributes to the work on the phonetics and phonology of (Afro-)PRS by considering similarities and differences between the intonational contours of SJS and LS. Puerto Rican intonation (which often includes SJS) has usually been grouped under the label "Caribbean Spanish" along with Dominican, Cuban, and coastal Venezuelan varieties, with which it shares a series of phonological traits (Chela-Flores 1994; Willis 2003, 2010; Alvord 2010; Armstrong 2010). In this extended region, some segmental characteristics (i.e., weakening of /s/ in coda position, different degrees of neutralization of liquid consonants, etc.) are considered quite innovative compared with Peninsular varieties of Spanish (Lipski 2008; Alvord 2010). On the other hand, apart from Lipski's study (2007) of Afro-Cuban *bozal Spanish*³, very little is known about the intonation systems of Afro-Caribbean Spanish (which includes LS).

The goal of this paper is to describe and explain the main word-level intonational patterns of spontaneous declarative sentences in SJS and LS, enlarging the existing literature on (Afro-)Caribbean Spanish intonation, as well as providing a novel approach based on spontaneous rather than controlled speech.

The remainder of this paper proceeds as follows: Section 2 describes the AM theoretical framework of intonational phonology and its transcription system (ToBI). It also provides the data collection methodology and data analysis. Section 3 discusses the results. Section 4 offers the concluding remarks by highlighting the most important findings.

2. Materials and Methods

2.1. The Autosegmental Metrical (AM) Model and Its Annotation System (ToBI)

The AM model indicates a theoretical framework of intonation phonological structure developed over the last three decades on the basis of empirical evidence of speech production and perception (Arvaniti 2022). This theoretical framework proposes the analysis of international pitch contours as sequences made by two types of phonologically distinctive tonal units: *pitch accents* (PAs) and *boundary tones* (BTs) (Prieto and Roseano 2010). PAs indicate “the tonal events anchored to a stressed syllable”, while BTs display “the tonal events anchored to phrase-final edges” (Prieto and Roseano 2010, p. 218). The conjunction of an utterance’s last PA and the following BT is called *nuclear configuration*, which typically contains the most significant information conveyed by intonation (Prieto and Roseano 2010).

In addition to laying the foundation for the AM model, Pierrehumbert (1980) elaborated the representation of intonation through the sequence of two types of basic tones, (*H*)igh and (*L*)ow. Used individually, H and L indicate leveled PAs. When combined, H+L indicates falling PAs, while L+H indicates rising PAs (McGory and Díaz-Campos 2002). H and L may be accompanied by a series of symbols that complete the melodic curve (Table 1) (Hernández-Rodríguez et al. 2014; Butera et al. 2020; Korfhagen et al. 2021; Arvaniti 2022).

Table 1. Summary of annotation conventions (adapted from Korfhagen et al. 2021, p. 159).

Symbols	Description
H	High tones corresponding to F0 peaks.
L	Low tones corresponding to F0 valleys.
*	References the tone most strongly associated with the stressed syllable.
+	Links two contiguous targets; thus, it indicates a multitoneal pitch accent.
<	Denotes posttonic peak alignment.
¡	Marks an <i>upstep</i> within the same ip, that is, a noteworthy rise in the F0 level from one H or L tone to the next.
!	Marks a <i>downstep</i> within the same ip, that is, a noteworthy scaling in the F0 level from one H or L tone to the next.
%	It displays an association with the final edges of utterances (IP boundary).
–	It defines an association with internal phrase boundaries (ip boundary).

The melodic curve has been labeled by Prieto (2003, p. 18) as an *eje vertebrador entre movimientos melódicos* (‘backbone axis between melodic movements’) through which the intonation is phonologically transcribed (Arvaniti 2022). Thus, it is possible to focus on contrasting the elements of the melodic system, as claimed by Hualde (2003, p. 175):

El tipo de transcripción utilizado en el modelo AM se acerca más a una transcripción fonémica que a una transcripción fonética, pues requiere un análisis previo del sistema de contrastes empleado en la lengua. (‘The type of transcription used in the AM model is closer to a phonemic transcription than to a phonetic transcription, since it requires a prior analysis of the contrast system used in the language.’)

This melodic curve structure allows understanding the system of tonally contrastive elements of the language under analysis, recognizing the link between intonation and stress. In Spanish, every word contains a lexically stressed syllable;⁴ thus, almost every word receives a PA (Alvord 2010). *Stress* determines the degree of acoustic prominence in a syllable (Ladd 2008). Concerning Spanish, *accent* marks prominence in the syllables by moving the fundamental frequency (F0) into or near the stressed syllable (Quilis 1993; Face 2003; Hualde 2009). These movements develop different levels of hierarchical organization between the prosodic units (Table 2) (Gussenhoven 2004).

Table 2. Prosodic hierarchy (Gussenhoven 2004).

a.	IP	Intonational phrase
b.	ip	Intermediate phrase
c.	PW	Prosodic Word
d.	F	Foot
e.	σ	Syllable

This study focuses on *Prosodic Words* (PWs) housed within two levels of prosodic phrases (Prieto and Roseano 2010; Rao and Sessarego 2016). IPs are the basic units of information, consisting of at least one PA, and demarcated by longer and easily noticeable pauses at their left and right boundaries. One step further down the prosodic hierarchy are the *ips*, shorter phrases within the IPs that do not always express full thoughts. One or more PWs can be contained in *ips* (Sosa 1999; Nibert 2000; Beckman et al. 2002; Face 2002). As claimed by Alvord (2010, p. 6):

When there is an intermediate phrase present, the end of the last intermediate phrase will always correspond to the end of the intonational phrase, meaning that the intermediate phrase tone and the intonational phrase tone will be adjacent to one another.

Lastly, PWs are units associated with the main stress on content words (e.g., adjectives, nouns, verbs, etc.) rather than function words (e.g., prepositions, clitics, etc.) (Quilis 1993; Hualde 2002). Due to their close relationship with stressed words and syllables, PWs tend to have PAs (Korfhagen et al. 2021). However, *deaccented* words—with no PA—can also be produced, depending on the presence of certain variables, such as word length, word frequency, and repetition in discourse (Rao 2009).

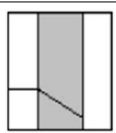
The *Tones and Break Indices* (ToBI) family of systems is the most well-known application of the AM model of intonational phonology. It is based on several standard conventions for defining and describing both PAs and BTs, as well as their associations with syllables within the sentence. This results in a prosodic transcription that captures the phonological contrasts observed in the intonation of the language under study (Beckman et al. 2002). ToBI as a tool has been misinterpreted several times to the point that its creators have had to explain that it is neither a substitute for the International Phonetic Alphabet (IPA) in terms of intonation nor a system that is only applicable to English (Beckman et al. 2002).⁵ The misunderstanding around the model (AM) and its application (ToBI) is reported by Arvaniti (2022, p. 36):

It is not always clear that AM is a phonological model of intonational structure, not a transcription, and that ToBI is a tool. [...] It is also reflected [...] as to whether a level of phonetic transcription is needed in ToBI systems.

Despite this, the ToBI method seems to have gained appeal, especially given that it has been used in several languages over the past few years (for Asian languages see Jun 2005; Venditti 2005; and Wong et al. 2005; for Romance languages see Frota and Prieto 2015; etc.). ToBI acronyms are usually prefixed with a code, which identifies the language they apply to (i.e., *Sp_ToBI* for Spanish). Since its development in the early 1990s, there have been various upgrades. As for Spanish, *Sp_ToBI* has already gone through some reformulations in recent years (Estebas-Vilaplana and Prieto 2008; Prieto and Roseano 2010; Hualde and Prieto 2015).

A number of proposals (Face and Prieto 2007; Estebas-Vilaplana and Prieto 2008; Aguilar et al. 2009; Prieto and Roseano 2010; Santos 2021; etc.) have reported the inventory of the most common PA accents of Spanish. Table 3 accounts for the main Spanish PAs. In the schematic representation, the middle third indicates the tonic syllable.

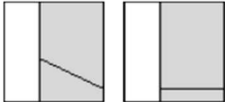
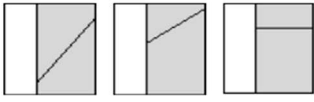
Table 3. Spanish PAs and their Sp_ToBI labels (adapted from [Armstrong 2010](#); [Prieto and Roseano 2010](#); [Hualde and Prieto 2015](#)).

Monotonal Pitch Accents		
	L*	This accent is phonetically realized as a low plateau at the bottom of the speaker's pitch range.
	H*	This accent is phonetically realized as a high plateau with no preceding F0 valley.
	¡H*	This accent is phonetically realized as a rise from a high plateau to an extra-high level.
Bitonal Pitch Accents		
	L+H*	This accent is phonetically realized as a rising pitch movement during the stressed syllable with the F0 peak located at/near the end of this syllable.
	L+¡H*	This accent is phonetically realized as rise to a very high F0 peak located in the accented syllable. It contrasts with L+H* in F0 scaling.
	L+<H*	This accent is phonetically realized as a rising pitch movement in the stressed syllable with the F0 peak located in the post-accentual syllables.
	L*+H	This accent is phonetically realized as an F0 on the accented syllable with a subsequent rise on a post-accented syllable.
	H+L*	This accent is phonetically realized as an F0 fall from a high level within the accented syllable.
	¡H+L*	This accent is phonetically realized as a fall from a relatively high tone produced which is produced in a low (compressed) pitch range to a low target.
Tritonal Pitch Accents		
	L+H*+L	This accent displays a rising–falling pattern within the stressed syllable. ¹

¹ This tritonal PA is also known as “circumflex tonal configuration” ([Rao and Sessarego 2016](#), p. 49).

Spanish displays different degrees of complexity in the composition of its BTs (Aguilar et al. 2009; Prieto and Roseano 2010; Hualde and Prieto 2015). In Table 4, the schematic representations of the main monotonal Spanish BTs associated with the right edge of an IP in declaratives are reported, with a simple change from % to—needed to denote ip boundaries. The white rectangles represent stressed syllables and gray rectangles represent final unstressed syllables.

Table 4. Spanish BTs and their Sp_ToBI labels (based on Hualde and Prieto 2015).

Monotonal Boundary Tone		
	L%	This boundary tone is phonetically realized as a low or falling tone at the baseline of the speaker.
	!H%	This boundary tone is phonetically realized as a rising or falling movement to a target mid-point.
	H%	This boundary tone is phonetically realized as a rising pitch movement coming from a low or rising pitch accent.

2.2. Pitch Accents and Boundary Tones across the Varieties of Spanish

Thanks to the AM model and its ToBI transcription, as well as the use of software like PRAAT 6.4.06 (Boersma and Weenink 2013) for the extraction of F0 contours from recorded speech, in recent decades there has been an enormous increase in intonation studies. As regards Spanish, the most studied intonational aspect is that of declarative sentences, understood as utterances where no one part is highlighted more than another part (Ladd 1980). The main characteristics of declaratives can be found in McGory and Díaz-Campos (2002, p. 73):

In a prototypical declarative produced without any particular lexical emphasis, there is a pitch accent on each content word, and every accent after the first is downstepped relative to the preceding accent peak. Also, there is a fall to a low pitch at the sentence boundary, after the last pitch accent. This gives an overall impression of a gradually declining backdrop pitch range, a series of smaller and smaller peaks ending with a final fall in pitch at the end of the utterance.

Navarro-Tomás (1918, 1944) was the first to describe declarative intonation in his *Manual de Entonación Española* ('Manual of Spanish Intonation') by dividing its F0 contour into (1) *inflexión inicial* ('initial inflexion'), (2) *cuerpo de la unidad enunciativa* ('body of the F0 contour'), and (3) *fin de la unidad* ('end of the utterance'). In his analysis, he observed that the F0 frequency begins its rise near the beginning of the stressed syllable and increases throughout, peaking in the next unstressed syllable.

In the literature, the placement of both PAs and BTs is of fundamental importance when establishing an intonational contour, since they can appear in either nuclear (i.e., final) or prenuclear (non-final) position (Rao and Sessarego 2016). Regarding the former, prior studies on declarative sentences in most Spanish dialects support the above-mentioned results obtained by Navarro-Tomás, showing a pitch pattern that is characterized by a rise in F0 in the stressed syllable (Prieto et al. 1995, 1996; Alvord 2010).⁶ Such sentences present an *L+<H** prosodic annotation, with the peak shifted to the following unstressed syllable (*peak displacement*), and often a gradually dropping pitch (i.e., *downstepping*) throughout the utterance (Prieto 1998). In addition, it has been displayed that both speech rate and syllable structure, specifically open versus closed syllables, can affect prenuclear peak alignment (Prieto and Torreira 2007). On the other hand, regarding the nuclear position, Rao (2009) indicates that Romance languages typically follow the *Nuclear Stress Rule* (Chomsky and

Halle 1968) to indicate the prosodic hierarchy (Table 2), according to which “the rightmost element of a prosodic domain is the most prominent” (Rao and Sessarego 2016, p. 48). However, there are cases in which “word salience is often achieved through final lengthening, with F0 being reduced to a relative low (i.e., *final lowering*)” (Rao and Sessarego 2016, p. 48). In such circumstances, a significant decrease in F0 (L) followed by a limiting tone (L%) will be indicated by the L*L% contour.

When the nuclear position exhibits F0 peaks, they tend to shift leftward within the stressed syllable and are phonetically marked as L+H*. This bitonal accent, besides being identified in words featuring oxytonic stress (Llisterri et al. 1995; Hualde 2002), has been a subject of discussion in various studies related to Afro- and other Spanish contact varieties (Elordieta 2003; Colantoni and Gurlekian 2004; O’Rourke 2004, 2005; Lipski 2007, 2010; Hualde and Schwegler 2008; Colantoni 2011; Michnowicz and Barnes 2013; Rao and Sessarego 2016, 2018; Sessarego and Rao 2016; Knaff et al. 2018; Butera et al. 2020; Korfhagen et al. 2021).

In other words, the alternation of PAs and BTs in Spanish seems to be diatopically distributed as has been observed in several varieties (for an overview on Caribbean Spanish see García-Riverón 1996; Sosa 1999; Willis 2003; Beckman et al. 2002; Armstrong 2010). Nonetheless, it does not seem to be a universal pattern due to the presence of some exceptions, such as the Argentine variety (Sosa 1999; Toledo 2000, 2008; Colantoni and Gurlekian 2004), whose declarative utterances “tend to show peak alignment with the stressed syllable” (Alvord 2010, p. 34).

The AHLAs have also been reported to display a set of peculiar prosodic features (Rao and Sessarego 2016, 2018; Sessarego and Rao 2016; Knaff et al. 2018; Butera et al. 2020; Korfhagen et al. 2021). These contact vernaculars, although generally understandable by speakers of other varieties of Spanish, have a series of segmental and suprasegmental characteristics that distinguish them from non-Afro-Hispanic dialects (i.e., multiple high intonation peaks, stressed syllables at the end of the phrase with lengthened vowels, etc.) (Lipski 2008). Regarding intonational contours, Afro-Hispanic vernaculars are distinguished from other non-Afro varieties by the use of L+H* as the most common word-level target in both prenuclear and nuclear position (Rao and Sessarego 2016).

Unlike PAs, BTs appear to discern across the varieties of Spanish far less clearly. Indeed, in many proposals the monotone L% is frequently the most attested, signaling the end of broad-focus statements and an F0 suppression (Rao 2010; de-la-Mota et al. 2010). In terms of pragmatics, this tone is significant since it denotes the finalization of a thought and suggests a potential turn-taking strategy (Butera et al. 2020, p. 232):

Speakers of the majority of varieties tend to use the boundary tones of each phrasal level to create a pragmatic distinction that helps facilitate communication of complete or incomplete thoughts, and thus, turn-taking strategies. In declaratives, especially those that are neutral, the most widespread strategy is the implementation of H- at the ip level to indicate “my thought has not been fully articulated yet and I have more to say,” and the use of L% at the IP level to convey “my thought is now complete and I am done talking for the moment.”

In the existing literature on intonation in Spanish, there is no research in the Puerto Rican context that adopts an intradialectal comparative analysis, understood as two or more varieties within a single dialect (in this case, PRS). This work adds to existing research in the fields of Caribbean Spanish and Afro-Hispanic vernaculars by providing an analysis of word-level declarative intonation of SJS and LS.

2.3. Methodology and Data Collection

Due to the comparative nature of this study, the research required a similar number of older adult speakers born and residing in San Juan and Loíza. In this way, through the researchers’ informal social networks, two participants were recruited for each variety analyzed, for a total of four (Afro-)Puerto Rican men. At the time of the interviews, which are part of a bigger not-yet-published corpus that includes both varieties (LS and SJS), the informants were between 69 and 78 years old, all with a low educational level

(primary school) and had never lived outside their native municipality. The selection criteria for the participants were aligned with existing assumptions in the field of variationist sociolinguistics (Chambers and Trudgill 1998), according to which older people who have never lived outside their place of origin are likely to preserve speech patterns that are more representative of their community. Furthermore, it is traditionally assumed that women's speech tends to show a higher level of self-awareness and status compared with men's speech. For these reasons, the selection of two old, nonmobile, men with a low level of education for each variety was meant to better analyze what might be understood as the local vernacular variety for these two Puerto Rican communities.

This study represents a novel approach to intonation analysis, as most existing studies are based on data collected in (semi-)controlled environments (i.e., laboratory settings) that typically involve reading from a script. By analyzing spontaneous speech in naturalistic environments, this proposal faces pragmatic complexities, such as emotion, the relationship between interlocutors, the communicative context, and turn-taking strategies (Face 2003). Despite these challenges, this choice reflects the everyday situation in which a wide range of intonation contours occur naturally. For this reason, the corpus of oral speech was compiled through semidirected sociolinguistic interviews carried out during the summers of 2021 and 2022 in environments in which the informants expressed feeling comfortable (their own homes, parks, and bars near their homes, etc.) to facilitate their spontaneity.

Topics related to both personal and family interests as well as the socioeconomic situation in Puerto Rico were discussed, following up on questions with the purpose of applying the concept of *Tangential Shift* (Labov 1984, p. 37). This allowed us to compile an extensive oral corpus that later was used to identify a considerable number of declarative sentences. The spontaneous speech minimized the *Observer Paradox* (Labov 1972) and 200 chunks of neutral declarative speech that perceptually sounded neutral or nonemphatic were selected to then analyze through PRAAT (Boersma and Weenink 2013). The number of declarative extracts is based on previous similar studies on other AHLAs' intonation patterns (Butera et al. 2020; Korfhagen et al. 2021). Some of these chunks contain multiple IPs (corresponding with sentences), resulting in the total number of sentences subjected to analysis being 359.

In order to identify and then select neutral statements, we extracted from our corpus IPs delimited by longer and easily noticeable pauses at their left and right boundaries, in which acoustic measures (i.e., F0, intensity, duration) were clearly higher than what is estimated as a relative norm for each speaker (Rao and Sessarego 2016). Likewise, ips were detected by tone reset, short pauses, and lengthening of the final syllable, as in Rao (2010). We then proceeded with the assignment of the respective BTs on the right edge of each natural declarative.

The nuclear configurations were analyzed according to their positions (non-IP-final versus IP-final) in order to determine "whether or not our participants phonetically and phonologically distinguished terminal and non-terminal junctures in speech" (Rao and Sessarego 2016, p. 51). Next, peaks and valleys in fundamental frequency (F0) were analyzed with respect to the stressed syllables. In doing so, it was possible to accurately transcribe the PAs of each stressed word following the AM and Sp_ToBI conventions (Prieto and Roseano 2010).

The data extracted from the four interviews with *boricua* speakers consist of a total of 1003 stressed words from IPs and ips. PRAAT software (Boersma and Weenink 2013) was used to individuate and select the declarative sentences to analyze. Subsequently, BTs were marked and the syllabic division of the utterances was completed. Each file includes two tiers, one containing the syllabic division and another comprising the labeling operations according to the Sp_ToBI conventions (Prieto and Roseano 2010). Additionally, each target speech string was reported in Excel sheets to identify a set of information contained therein: stressed words; position (initial (I), middle (M), final (F)); stress pattern (oxytone (O); paroxytone (P); proparoxytone (PP)); stressed syllable structure (opened (O); closed (C)); PAs; and BTs. The entirety of the information is reported in Table 5.

Table 5. Excel spreadsheet reporting the prosodic information related to the structure of *María se llevó el techo* ('[Hurricane] Maria took away the roof').

# of Target Item	Speaker's Initials	Stressed Words	Position	Stress Pattern	Stressed Syllable Structure	Pitch Accents	Boundary Tones
31	#F4	María	I	O	O	L+<H*	L%
		llevó	M	O	O	L+H*	
		techo	F	P	P	L+(j)H*	

Out of the total count of 1003 stressed content words, only 27% exhibit the oxytone stress pattern (271/1003), whereas 71% (712/1003) and 2% (20/1003) are identified as paroxytone and proparoxytone, respectively. As suggested in prior proposals (Hualde 2002), the elevated number of non-oxytone content words implies that a high occurrence of peak alignment within the stressed syllable (i.e., L+H* PA) should not be merely attributed to stress pattern artifacts or a preference for early alignment in oxytones.

3. Results and Discussion

This section reports the main results of the analysis of declarative sentences in SJS and LS, showing the existence of some similarities and some differences with the intonation patterns across these two varieties (Table 6).

Table 6. The most common PAs in both SJS and LS ($n = 1003$).

Most Common Pitch Accents	San Juan Spanish (SJS) Participants ($n = 504$)		Loíza Spanish (LS) Participants ($n = 499$)	
	M1 ($n = 257$)	M2 ($n = 247$)	M3 ($n = 258$)	M4 ($n = 241$)
L+H*	21% (54/257)	21% (52/247)	53% (137/258)	51% (123/241)
L+<H*	31% (80/257)	34% (84/247)	15% (39/258)	17% (41/241)
L*+H	30% (77/257)	26% (64/247)	8% (20/258)	10% (24/241)
H+L*	10% (26/257)	8% (20/247)	17% (44/258)	16% (39/241)
Others (L*, H*)	8% (20/257)	11% (27/247)	7% (18/258)	6% (14/241)
Total	100% (257)	100% (247)	100% (258)	100% (241)

Our findings suggest that in SJS the most common intonational contours are L*+H and L+<H* (Table 6, rows 2 and 3), as reported in previous studies on declaratives in Caribbean Spanish (Willis 2010; Armstrong 2010). On the other hand, in LS the use of the L+H* contour exceeds 50% (Table 6, row 1), in line with other studies on the AHLAs (Rao and Sessarego 2016, 2018; Sessarego and Rao 2016; Knaff et al. 2018; Butera et al. 2020; Korfhagen et al. 2021).

The analysis below focuses on the distinction between prenuclear and nuclear positions, given that they often demonstrate variation in pitch accent distribution. Simultaneously, upcoming sections emphasize how the nuclear position involves a discussion of both pitch accents and boundary tones (Table 7).

Table 7. Pitch accents in prenuclear position ($n = 598$).

Pitch Accent	Frequency	
	San Juan Spanish (SJS) (M1 + M2)	Loíza Spanish (LS) (M3 + M4)
L+H*	19% (56/296)	53% (159/302)
L+<H*	29% (87/296)	12% (36/302)
L*+H	41% (120/296)	9% (28/302)
H+L*	4% (12/296)	17% (51/302)
Others (L*, H*)	4% (12/296)	6% (17/302)
Deaccented	3% (9/296)	3% (11/302)

3.1. Prenuclear Configurations

In prenuclear (i.e., non-final) position, the data presented here follow [Armstrong \(2010, p. 156\)](#), according to whom “Puerto Rican Spanish strongly favors the prenuclear tonal accent L*+H”. This author also stated that L*+H is “one of a series of intonational features that these dialects [Puerto Rican, Dominican, and Canarian Spanish] share” ([Armstrong 2010, p. 156](#)). Especially with respect to Dominican Spanish, Armstrong claimed as follows:

Like Dominican Spanish, Puerto Rican Spanish also has a prenuclear rising pitch accent characterized by a flat low tone throughout the accented syllable followed by a rise in a posttonic syllable. This rise is heavily favoured in Puerto Rican Spanish for broad focus statements. [...] a typical broad focus statement in Puerto Rican Spanish, L*+H is characterized by a level low tone throughout the stressed prenuclear syllable followed by a rising trajectory that occurs in the posttonic syllable(s). In Puerto Rican Spanish, the flat low tone tends to continue throughout the entire accented syllable. ([Willis 2010, pp. 160–61](#))

In the prenuclear position, while Puerto Rican Spanish heavily favors L*+H, it is similar to Dominican Spanish in that for the same sentence type, prenuclear pitch accents may be focus-dependent (broad vs. narrow). Puerto Rican Spanish may distinguish between L*+H in the prenuclear position for broad focus and L+<H* in the same position for narrow focus, as previously shown by [Willis \(2010, p. 185\)](#) for Dominican Spanish.

In the present study, it is interesting to see how the two *sanjuaneros* speakers favor the PA L*+H (41%) (Table 7, row 3). On the contrary, in *afroloiceño* speech, the most common PA is L+H* (53%) (Table 7, row 1).

The alternation found in SJS between L*+H (41%) and L+<H* (29%) (Figures 1 and 2) has been the object of recent studies in other varieties of Spanish by a number of scholars ([Beckman et al. 2002](#); [Willis 2003](#); [Face and Prieto 2007](#); [Armstrong 2010](#)).

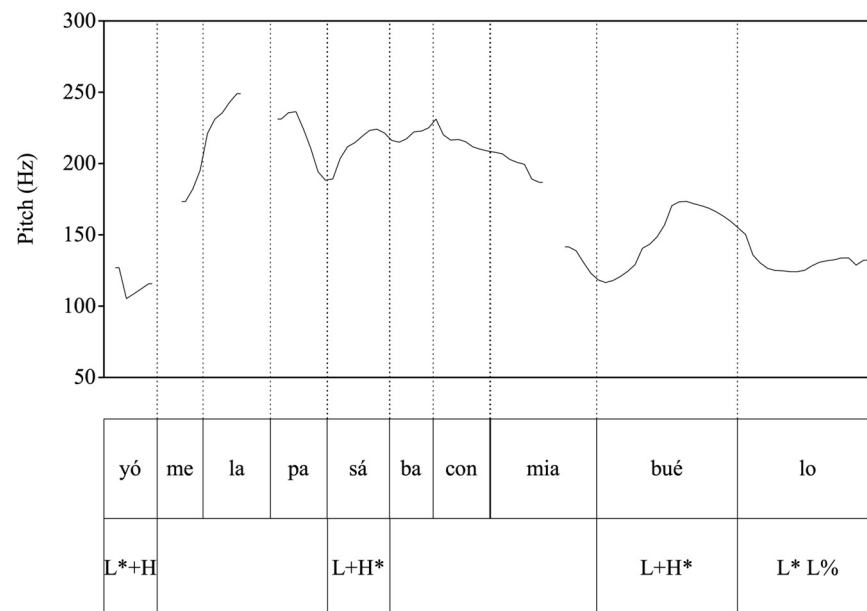


Figure 1. Broad-focus statement *Yo me la pasaba con mi abuelo* (‘I used to spend time with my grandfather’) in San Juan Spanish, showing L*+H prenuclear accent (data collected by the authors).

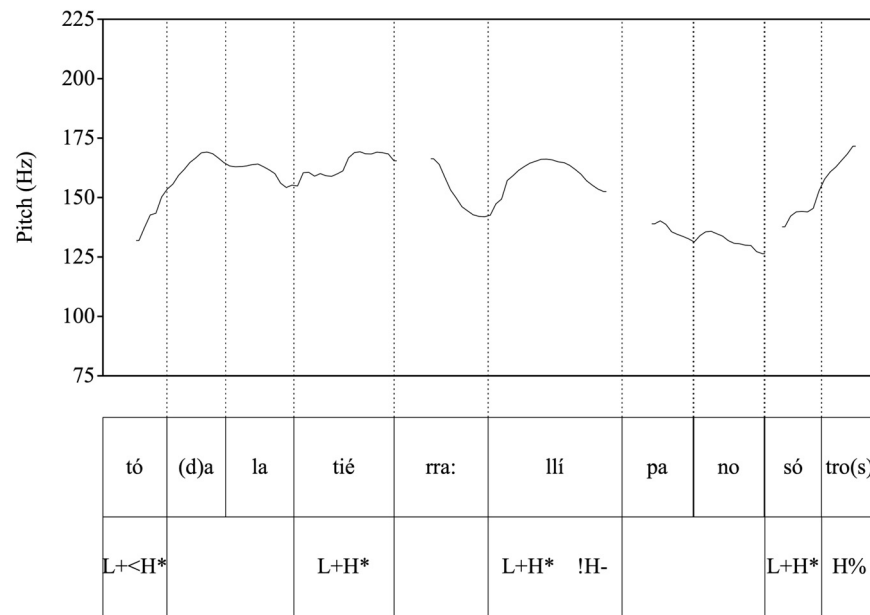


Figure 2. Broad-focus statement *Toda la tierra allí para nosotros* ('All the land there for us') in San Juan Spanish, showing L+<H prenuclear accent (data collected by the authors).⁷

Regarding Caribbean Spanish, high rates of the low rising tone L*+H have been reported in San Juan speech, with an initial flat F0 valley along the accented syllable and a subsequent F0 rise in the posttonic syllable (Armstrong 2010, p. 162). Likewise, Dominican speech has disclosed a majority use of L+<H*, showing a rising pitch movement throughout the accented syllable, with the F0 peak located in the posttonic syllable (*peak displacement*) (Willis 2010, p. 128).

In the Puerto Rican intradialectal context analyzed in this study, it can be summarized that in the prenuclear position a relevant alternation of post-peak alignment is reflected in the SJS speakers, either at the beginning or in the middle of the posttonic syllable (L*+H), or throughout the latter (L+<H*) (Tables 1 and 2). This last contour, which constitutes a norm in many varieties of Spanish, is reported with very low percentages in LS, a variety that instead favors the PA L+H* (Figure 3).

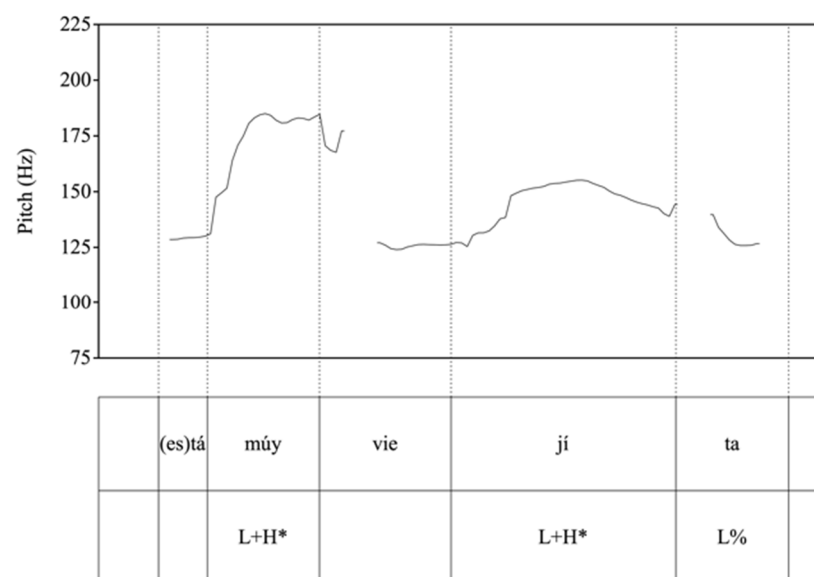


Figure 3. F0 contour in LS declarative *(es)tá muy viejita* ('(she) is quite old') (data collected by the authors).⁸

3.2. Nuclear Configurations

As far as the nuclear configurations (i.e., final) are concerned, PA frequencies were examined separately based on whether they appeared in non-terminal ips ($n = 239$) or in the IP-nuclear position ($n = 359$). The purpose of this distinction is to compare how speakers used different tonal configurations to signal discourse junctures indicating the continuation or completion of a thought at both the IP level and the non-IP-final level. By analyzing PA frequencies in this way, it can be better understood how speakers use tonal patterns to convey different pragmatic meanings in their speech.

3.2.1. Non-Terminal Ips

The analysis of 239 non-terminal PA and ip BT configurations shows divergences in the two Puerto Rican communities. Concerning PAs, L+H* is overwhelmingly the most common PA in LS speech (Table 7, row 1), occurring in 64% (84/131) of tokens. On the other hand, the nuclear accent H+L* slightly dominates the SJS data (48%) (52/108) (Table 8, row 2), with cases of progressive maximum decay (i.e., *downstepping*). In addition, SJS presents high rates of L+H*, following [Armstrong's \(2010\)](#) analysis.

Table 8. Pitch accent frequencies in ip-nuclear position when ips are at non-terminal junctures ($n = 239$).

Pitch Accent	Frequency	
	San Juan Spanish (SJS) (M1 + M2)	Loíza Spanish (LS) (M3 + M4)
L+(j)H*	37% (40/108)	64% (84/131)
H+L*	48% (52/108)	21% (27/131)
H*	9% (10/108)	10% (13/131)
L*	6% (6/108)	5% (7/131)

As far as BTs are concerned, L- is the most common configuration in LS (79%) (Table 9, row 1). Conversely, SJS data indicate a higher use of H-tone (62%) (Table 9, row 2), resembling more common varieties of Spanish and indicating that the speaker is not yet finished speaking.

Table 9. Boundary tone frequencies in ip-nuclear position when ips are at non-terminal junctures ($n = 239$).

Boundary Tones	Frequency	
	San Juan Spanish (SJS) (M1 + M2)	Loíza Spanish (LS) (M3 + M4)
L-	38% (41/108)	79% (103/131)
(!)H-	62% (67/108)	21% (28/131)

3.2.2. IP-Nuclear Configurations

Regarding the PA and BT configurations of 359 stressed content words at terminal discourse junctures, our findings are reported, respectively, in Tables 10 and 11.

In LS data, L+H* turns out to be the dominant PA (70%) (Table 10, row 2), while H+L* prevails in SJS speech (59%) (Table 10, row 2). Regarding the latter, many varieties of Spanish, including Puerto Rican and Dominican Spanish, implement high tones in the nuclear position (H* or (!)H+L*). As claimed by [Armstrong \(2010, p. 161\)](#):

The final pitch movement for broad focus statements within Sp_ToBI is characterized by a fall throughout the accented syllable of the final word. This fall is produced within a compressed pitch range and as a result, the high tone produced within this compressed range is lower in the speaker's range than we would typically expect for a high tone. To reflect this, the fall within the nuclear tonic

syllable is labelled !H+L*, followed by a low boundary tone L%. Note that the leading tone of this bitonal pitch accent is labelled as downstepped. In this case, the diacritic (!) indicates the scaling of the high tone (the high is “lower” than a typical high—in relationship to a preceding tone of the same category–). [. . .] Similar phrase final falls are found for broad focus in Canarian Spanish.

Regarding BT, both Puerto Rican varieties show elevated percentages (more than 70%) of the low sustained tone L% (Table 11, row 1). Concerning H%, our findings report an unexpectedly high use of this high BT (Table 11, row 2). This configuration could be due to the spontaneous nature of the participants’ speech; in fact, a previous study on an AHLA generated a similar result (Butera et al. 2020).

Table 10. Pitch accent frequencies in IP-nuclear position ($n = 359$).

Pitch Accent	Frequency	
	San Juan Spanish (SJS) (M1 + M2)	Loíza Spanish (LS) (M3 + M4)
L+H*	32% (54/168)	70% (134/191)
H+L*	59% (99/168)	16% (31/191)
H*	6% (10/168)	8% (15/191)
L*	3% (5/168)	6% (11/191)

Table 11. IP boundary configuration frequencies in IP-nuclear position ($n = 359$).

Boundary Tones	Frequency	
	San Juan Spanish (SJS) (M1 + M2)	Loíza Spanish (LS) (M3 + M4)
L%	72% (121/168)	79% (151/191)
H%	28% (47/168)	21% (40/191)

In sum, LS data show high frequency of L- BT in both the ip-nuclear position—when ips are at non-terminal junctures—and the IP-nuclear position. This Afro-Hispanic variety commonly shows tonal contours like L+H*L- or L+H*L% (Figure 4). These combinations differentiate LS from other varieties of Spanish, including SJS (Figure 5), in which “an H-boundary tone would be expected, signaling that the speaker is not yet finished speaking and has more to say” (Butera et al. 2020, p. 239).

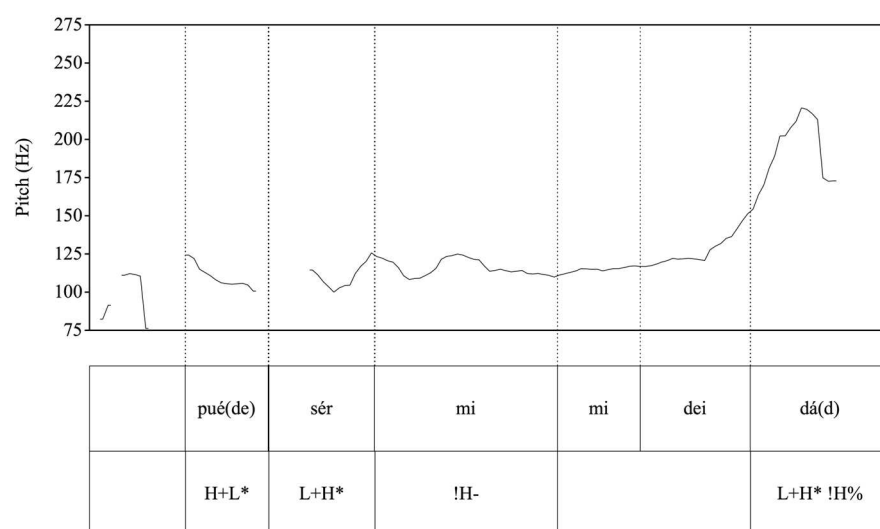


Figure 4. Broad-focus statement *Puede ser mi deidad* (‘She can be my deity’) in Loíza Spanish, showing L+H*!H% final contour (data collected by the authors).

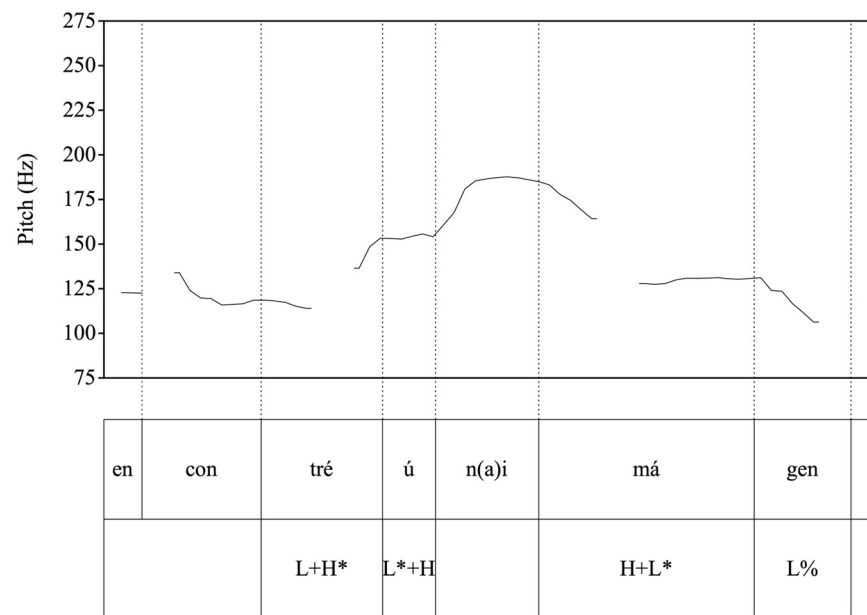


Figure 5. Broad-focus statement *Encontré una imagen* ('I found an image') in San Juan Spanish, showing H+L*L% final contour (data collected by the authors).⁹.

Likewise, when F0 peaks are present, in SJS they are in the posttonic syllable (L*+H or L+<H*), while in LS they are typically pushed leftward into the stressed syllable (L+H*) due to an upcoming phrase boundary (Colantoni and Gurlekian 2004; Lipski 2007, 2010; Hualde and Schwegler 2008; Michnowicz and Barnes 2013; Rao and Sessarego 2016, 2018; Sessarego and Rao 2016; Knaff et al. 2018; Butera et al. 2020; Korfhagen et al. 2021). In the ip boundaries (i.e., non-terminal juncture), H- BT are common in SJS (62%, Table 9), in line with most Spanish varieties, while the LS data contain both L- and H-boundaries.

As for the IP boundaries (i.e., terminal juncture), the falling contour L% is by far the most common in both LS and SJS, coinciding with F0 deletion. Furthermore, L% yields the circumflex nuclear configuration L+H*L% (i.e., rise–fall), described by Sosa (1999) as the *tonema ascendente-descendente puertorriqueño* ('Puerto Rican rising-falling tone'), a typical pattern "in declaratives with various emphatic pragmatic functions in some varieties of Spanish" (Korfhagen et al. 2021, p. 161). This contour with the nuclear peak within the stressed nuclear syllable, commonly found in San Juan (Sosa 1999), has been reported in this study to also be quite frequent in LS.

The comparative analysis of PAs in the two Puerto Rican varieties shows similarities and differences between their patterns, as well as in relation to other native varieties of Spanish (Elordieta 2003; Colantoni and Gurlekian 2004; O'Rourke 2004, 2005; Colantoni 2011; Michnowicz and Barnes 2013), including some Afro-Hispanic varieties (Rao and Sessarego 2016, 2018; Sessarego and Rao 2016; Knaff et al. 2018; Butera et al. 2020; Korfhagen et al. 2021).

One noteworthy observation in LS and other contact Spanish varieties concerning nuclear PWs is the prevalent use of the L+H* pattern and the near absence of the L+<H* PA. This stands in contrast to most native (non-contact) varieties of Spanish, including SJS, where L+<H* is the favored configuration (Rao and Sessarego 2016). While previous studies have suggested that natural data exhibit more pitch alignment variations than laboratory speech (Face 2003), the consistent occurrence of L+H* in prenuclear positions across many Spanish contact varieties cannot be attributed solely to methodological issues.

It is well established that Spanish speakers often utilize peak alignment movement to convey a pragmatic distinction between broad and narrow focus (Face 2002; among many others). This involves phonologically displacing the peak along the horizontal axis. In standard Spanish and SJS, a posttonic peak typically indicates broad focus, while a tonic peak signals narrow focus or emphatic speech. In contrast, in LS and other contact

dialects, peaks consistently align with stressed syllables, rendering the aforementioned peak alignment strategy ineffective for expressing emphasis. As a result of this phenomenon, speakers of other varieties might perceive it as an overgeneralization of narrow focus or emphatic speech, potentially explaining why people from San Juan anecdotally claim that in Loíza *se habla diferente* ('people speak differently') (Mojica-de León 2014, p. 1274).

Intriguingly, L+H* is a configuration typically associated with nuclear positions in many Spanish dialects, indicating prosodic heads and relative prominence in broad-focus declaratives (Korfhagen et al. 2021). This same configuration is also employed in many varieties of Spanish to convey emphasis in narrow-focus constructions (Hoot 2016; Beckman et al. 2002). The relatively high frequency of L+H* across the board in LS begs the question of why we find this PA in LS and not those that are more common in SJS, such as L*+H and H+L*, which are conditioned by their positions (prenuclear and nuclear, respectively). Interestingly, the same configuration has been detected for a number of other Spanish contact varieties: other Afro-Hispanic vernaculars (Korfhagen et al. 2021), Spanish in contact with Maya (Michnowicz and Barnes), with Veneto (Barnes and Michnowicz 2013), with Quechua (O'Rourke 2004, 2005), etc. Given the heterogeneous range of languages involved in these contact scenarios, it is difficult to claim the existence of a specific substrate effect to account for the common L+H* configuration. For this reason, in recent studies, it has been suggested that, given the emphasis usually associated with this PA, it may be perceived as more salient and thus easier to acquire in language contact contexts (Rao and Sessarego 2016). In this regard, Michnowicz and Barnes (2013) as well as Barnes and Michnowicz (2013) have proposed a Second Language Acquisition (SLA) process to account for the prenuclear use of L+H* PA in Spanish varieties in contact with Veneto and Maya. Our LS data could be taken to further support such a contact-based explanation, providing a logical rationale for why various Spanish contact varieties with diverse substrates tend to converge on similar prosodic patterns (see also Elordieta 2003 for Basque; Colantoni 2011; Colantoni and Gurlekian 2004 for Italian).¹⁰

When examining configurations at the PW level within nuclear positions in LS and SJS, it becomes evident that the L+H* PA is the most prevalent at both the ip- and IP-edges. Typically, at the ip-edge, the L+H* configuration is favored in many Spanish dialects due to the inhibitory effect of the BT on peak displacement. At the IP-edge, various Spanish dialects resort to suppressing to L*, while others opt for circumflex contours with an L+H* configuration (Rao and Sessarego 2016). In the case of LS and SJS, these varieties seem to align more closely with dialects that favor L+H*. Furthermore, they lean towards the L% IP BT to signify pragmatically that the speaker has concluded their speech, aligning with normative Spanish practices.

It is noteworthy, however, to discover a significant presence of L- at non-terminal junctures in LS, in line with many other AHLAs (Korfhagen et al. 2021). This implies that the pragmatic strategy commonly employed in most Spanish varieties (including SJS) to indicate that the speaker is not finished speaking (i.e., H- at the ip boundary) is not as commonly present in this Afro-Hispanic dialect. Indeed, the frequent use of L- may stem from a generalization of the preferred IP-level configuration to the lower level. This, in essence, could be characterized as an instance of a copy-and-paste strategy (Rao and Sessarego 2016, 2018), where a prominent category (i.e., the terminal L tone) has been extended to all other positions, specifically the non-terminal ip junctures.

Some scholars have posited that a set of specific prosodic patterns observed in Palenquero may be linked to a potential substrate effect, possibly originating from some Bantu languages (Hualde and Schwegler 2008). Conversely, in alignment with recent proposals on the nature of PA configurations in other AHLAs (Rao and Sessarego 2016; Sessarego and Rao 2016), we would like to suggest that the prosodic patterns identified in LS could be better explained as the result of more general contact-driven strategies, which may not necessarily be tied to any particular substrate language (Korfhagen et al. 2021).

The replication and restructuring of phonological targets may be linked to the historical evolution of the Afro-Hispanic speech communities in Latin America, whose members

often acquired Spanish as a second language in a non-tutored plantation context. In such a distinctive setting, it is conceivable that the first generation of enslaved people acquiring Spanish may have encountered communicative challenges. Despite closely converging with Spanish in their L2 speech, certain aspects of this contact variety inevitably deviated from the target language. This contact-driven restructuring process may have led more emphatic/salient phonological targets to override other configurations carrying nuanced pragmatic meanings. Overall, these findings indicate the presence of a set of restructured phonological targets across PW, ip, and IP levels in LS. Thus, the observed overgeneralization of L+H* and L-configurations in this dialect might be analyzed as the result of contact-driven processes also common to many other AHLAs (Korfhagen et al. 2021).

4. Conclusions

In this paper, we have shown the most common word-level phonological targets used in declarative constructions in two varieties of Puerto Rican Spanish: SJS, spoken in Puerto Rico's capital city, San Juan; and LS, spoken in the Afro-Hispanic community of Loíza. The two municipalities share a geographic space known as *el área metro(politana)* ('the metro[politan] area [of San Juan]'), which makes their contact frequent.

We examined PAs in both prenuclear and nuclear positions (non-IP-final versus IP-final) through an analysis of F0 peaks and valleys associated with stressed syllables. In doing so, it was possible to accurately transcribe the PAs of each stressed word following the AM model and the Sp_ToBI conventions (Prieto and Roseano 2010).

At the level of F0 rising and falling, Loíza speech shows high levels of L+H* configurations in both prenuclear and nuclear positions, in line with other contact varieties of Spanish (Elordieta 2003; Colantoni and Gurlekian 2004; O'Rourke 2004, 2005; Colantoni 2011; Michnowicz and Barnes 2013). Conversely, SJS largely favors L*+H in the nuclear position, and L+<H* in the prenuclear position, in line with recent studies on this Puerto Rican variety (Armstrong 2010), and in other non-contact varieties of Spanish (Face 2002; Hualde 2002; Prieto and Roseano 2010). Moreover, LS and SJS show disparities in falling contours, with rare cases of progressive maximum decay (i.e., *downstepping*) in LS that are instead more common in SJS (i.e., (!)H+L*).

At the IP level, both Puerto Rican communities preferred L%, which not only signals the end of broad-focus statements and an F0 suppression (Rao 2010; de-la-Mota et al. 2010), but also carries pragmatic value, since it denotes the finalization of a thought and suggests a potential turn-taking strategy (Butera et al. 2020). On the other hand, for LS, we noted an elevated frequency of L- at ip junctures, a pattern that aligns with other AHLAs and diverges from many non-contact varieties of Spanish, where H- is more common to signal the continuation of a thought.

Given the close similarities among LS, other AHLAs, and several other contact varieties of Spanish across their PW, ip, and IP levels (in contrast with the results proceeding from the analysis of SJS intonation), we suggested a contact-driven explanation, which supports previous claims on the nature and origin of similar phenomena in other Spanish contact dialects (Michnowicz and Barnes 2013; Barnes and Michnowicz 2013; Sessarego and Rao 2016).

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of The University of Texas at Austin (IRB #2019-09-0010).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The San Juan Spanish Corpus and the Loíza Spanish Corpus have not been published yet. Please contact the authors for additional information.

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Notes

- ¹ The concept of a Metropolitan Area includes a large population center (in the case of Puerto Rico, its capital San Juan), along with adjacent communities (the municipalities of Guaynabo, Bayamón, Toa Baja, Cataño, Carolina, and Trujillo Alto) that have a high degree of economic and social integration with their core (Puerto Rico Census Geography 2006).
- ² The term *boricuas* refers to Puerto Ricans who were born and raised in the Puerto Rican archipelago (Real Academia Española 2022).
- ³ The Spanish spoken in Cuba by the African-born enslaved people, who spoke Spanish as a second language.
- ⁴ Except for prepositions, definite articles, and other function words.
- ⁵ Since one of its first uses was for the transcription of Mainstream American English (MAE) intonation (Beckman and Hirschberg 1994).
- ⁶ Many Peninsular and Latin American Spanish varieties follow L+<H* (García-Riverón 1996, 1998 on Cuban Spanish; Sosa 1999 on Peninsular Spanish; Willis 2003 on Dominican Spanish). On the other hand, Argentinian Spanish can be considered an exception since “broad focus declarative utterances in this variety tend to show peak alignment with the stressed syllable” (Alvord 2010, p. 34).
- ⁷ We acknowledge that it is plausible to transcribe the ip boundary following *allí* as L-. Our selection is based on the fact that a relative F0 mid-point rather than low point corresponds with this non-terminal juncture, likely due to the final stress on *allí*, which does not allow for as much time for a full fall in F0. Additionally, we perceived that this fall is distinct from and less salient than cases that we viewed as L- across the data set.
- ⁸ Given that *está* and *muy* are both stressed words in Spanish, and thus potential anchoring sites for pitch accents, one could suggest an alternative labeling scheme in which the former bears a pitch accent and the latter is deaccented. We have opted for the opposite for two reasons: (i) in Rao’s (2009) hierarchy of deaccenting by grammatical category, verbs, especially those that are high-frequency (e.g., *estar*), exhibit higher odds of being deaccented than adverbs; (ii) our perception of relative salience when comparing the realization of the two items in this particular utterance.
- ⁹ We realize that our interpretation of the pitch accent sequence in *encontré una* could be debated, since determiners like *una* have often been classified as not carrying pitch accents. Our transcription is grounded in the following: (i) Oxytones have been described as showing a tendency to display an early aligned (i.e., L+H*) pitch accent (Hualde 2002). (ii) Indefinite articles indeed have been categorized as stressed items in previous literature (Quilis 1993), and in turn, can be seen as anchoring sites for pitch accents. (iii) Our perceived relative salience of *una* in this instance is evidence in favor of it meriting a pitch accent.
- ¹⁰ Delving deeper into reasons for early aligned peaks in contact situations is outside the scope of the current paper but clearly merits further investigation. This would require consulting bodies of literature on issues such markedness, for example, to support a claim that early alignment of peaks is less marked than displacement, as well as studies in which data from substrate languages are also included as a direct point of comparison. We encourage pursuing such avenues in order develop a more detailed understanding of the trends cited here.

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