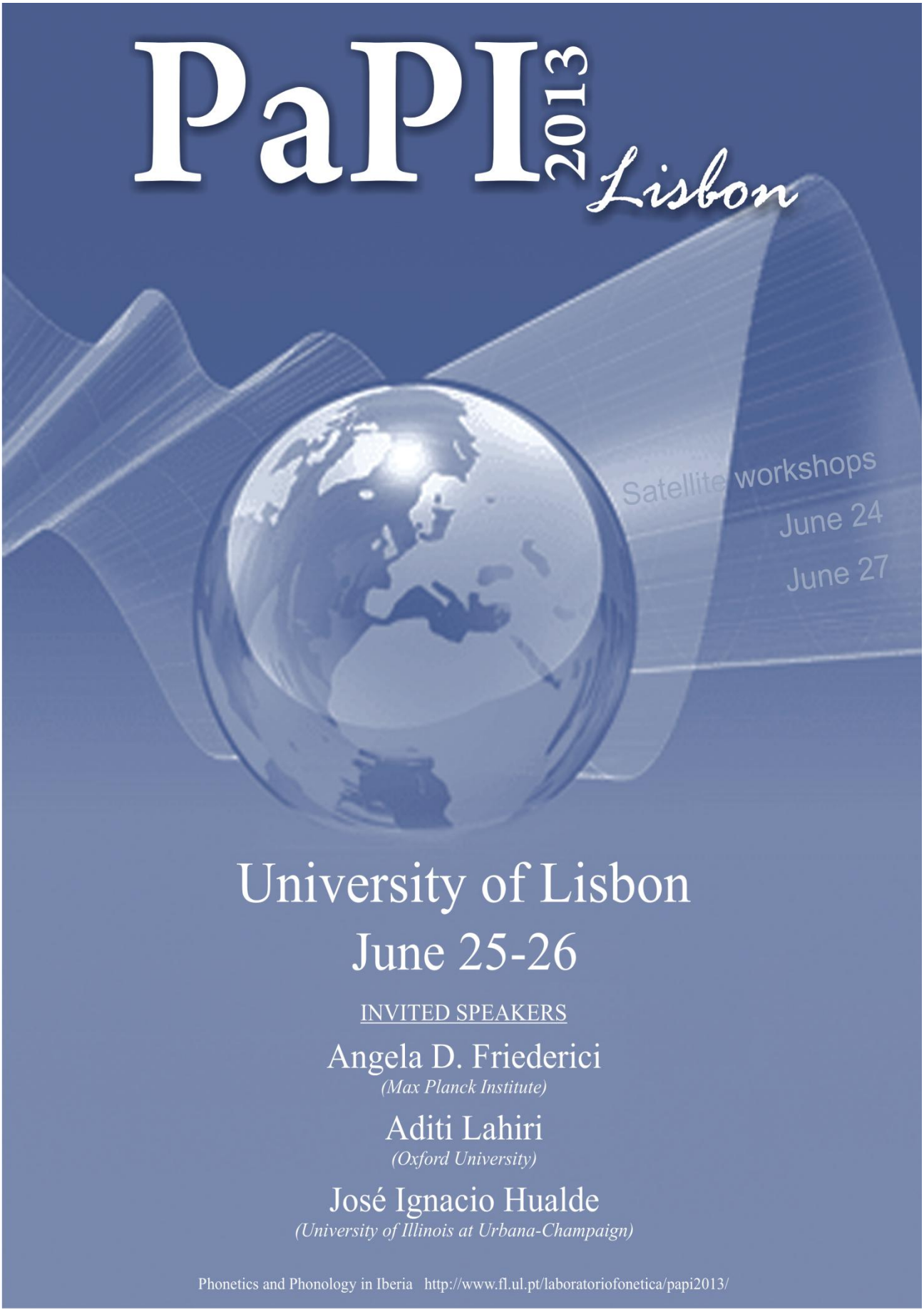

Book of Abstracts

PaPI 2013 – Phonetics and Phonology in Iberia

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PROGRAM

June, 24

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Abstracts

INVITED TALKS

Syntax and prosody in the human brain

Prof. Dr. Angela D. Friederici

Max Planck Institute for Human Cognitive and Brain Sciences, Department of Neuropsychology, Leipzig, Germany

Prosody of is the first aspect language the infant is able to process. Subsequently, in the first months of life other phonological regularities are extracted from the speech input upon which syntactic regularities and rules are built. The neurofunctional and structural prerequisites for these initial developmental steps will be described and so will the adult language network which supports syntactic and prosodic processes. Neuroscientific studies in adults indicate that syntactic information is processed in a left lateralized temporo-frontal network, while prosodic information is processed by a right lateralized temporo-frontal network. Electroencephalographic data from patients with lesions in the posterior third of the corpus callosum indicate that this brain structure guarantees the interaction between the two hemispheres and thereby the interplay of syntax and prosody during speech comprehension.

Phonological awareness and conventionalization in sound change

José Ignacio Hualde
University of Illinois at Urbana-Champaign

In the standard neogrammarian view a distinction is made between regular, biomechanically-induced, sound change and psychologically-based analogy. In a sense, however, all sound change has a psychological aspect, even when its origin is in biomechanics, since at some point phonological recategorization is required for sound change to take place (e.g. /p/ > /b/). In Labovian sociolinguistic research a distinction is also made between change from below and change from above related to speakers' awareness.
In this presentation I will consider the role of phonological awareness in regular sound change drawing from my recent acoustic research on intervocalic consonant lenition in a number of languages (including Spanish, Italian and Basque). I will argue that, at an initial stage, lenition applies as the neogrammarians envisioned: across morphological boundaries and without regard to lexical identity. At this initial stage the process may be below speakers' consciousness, and yet may operate as a conventionalized reductive process in the speech community, beyond biomechanical reduction. A number of factors may cause awareness of the phenomenon and its phonologization. It is at this stage that word- and morpheme-boundaries start to matter as conditioning environments and we also find lexical effects.

This research has also revealed the existence of important individual differences in phenomena such as intervocalic consonant voicing, correlated in part with the sex of the speaker. I will discuss the possible eventual conventionalization of sociolinguistic variation from biomechanic biases in lenition processes perhaps through the social construction of these individual differences in speech.

Aditi Lahiri
University of Oxford
PAPI 2013

Discrete and asymmetry in phonological representations: features and quantity contrasts in the mental lexicon

Lexical phonological contrasts are generally binary and abound in asymmetries. For example, vowels can contrast in nasality (oral vs. nasal), but the presence of contrastive nasal vowels implies the presence of oral vowels, and not vice versa. The occurrence of geminates in a language implies the presence of single consonants and therefore, a contrast in consonantal length. Our claim is that contrastive phonological units (including features, length, and tone) abound in asymmetries, which not only constrain representations of WORDS in the mental lexicon, but also affect language processing and ultimately language change.

Here we address the question of how these asymmetries constrain phonological representations of WORDS in the mental lexicon, and how these constraints affect language processing and change. Various phonological models including FUL (*Fully Underspecified Lexicon*) will be discussed claiming that representations are discrete and asymmetric which in turn lead to asymmetry in processing. Experimental evidence will be presented from behavioural as well as brain imaging studies in Bengali, English, and German.

ORAL SESSIONS

Neurobiological Evidence for the Representation of Allophonic Lexical Tone Variants

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In connected speech, spoken words may vary considerably from their forms in isolation. Much of the variation is regular and can be predicted from the linguistic context. Within generative phonology, such alternations are known as allophonic variation, and often described to derive the variants via context-specific rules. The goal of this study is to investigate whether speakers store such regular variants in their long-term memory and how they process them in on-line speech. Our empirical base is the allophonic variation of lexical tones in Beijing Mandarin.

Lexical tone is defined here as the use of pitch variation to signal word meanings, in addition to consonants and vowels. Most languages of the world are lexical tone languages. Just like segments, a lexical tone can be realized differently in different contexts. In Beijing Mandarin, there are four distinctive lexical tones. In isolation, T1 is produced with a high level pitch contour, T2 a rising pitch contour, T3 a low dipping contour, and T4 a falling pitch contour. When tones are combined, the interesting allophonic variation for T3 is that it is realized with a rising pitch contour (i.e. a T3 sandhi variant; $T3^{SV}$ hereafter) when followed by another T3. This rising contour is comparable to the rising pitch contour of the lexical T2, rendering the two tonal sequences $T3^{SV}$T3 and T2T3 very ambiguous. Behavioral studies with different experimental paradigms (e.g. Zhou & Marslen Wilson 1997 with lexical decision task, Nixon, Chen, & Schiller, submitted, with picture naming task) suggest the activation of the $T3^{SV}$. Chen, Shen, & Schiller (2011), with implicit priming data, argue that $T3^{SV}$ is stored in the mental lexicon and encoded at the level of phonological processing.

In this study, we set to seek further neurophysiological evidence for the representation of T3 and $T3^{SV}$ by utilizing mismatch negativity (MMN) evoked responses to lexical tonal contrasts in Beijing Mandarin. Four oddball conditions were constructed using natural stimuli of three lexical tones produced in isolation (T3/***T1***, T1/***T3***, T3/***T2***, T2/***T3***; with 85% standard stimuli and ***15%*** deviant stimuli) in addition to three control conditions (100% of T1, T2, and T3 stimuli). Twenty native speakers of Beijing Mandarin watched a silent movie while listening to the auditory tonal stimuli passively. We were interested in their MMN responses to lexical tonal contrasts of T1 vs. T3 and T2 vs. T3 when both tones in the contrastive pair serve as either standard or ***deviant***. Within each contrastive pair, their absolute acoustic distance predicts that T3/***T2*** and T2/***T3***, just like T3/***T1*** and T1/***T3***, should elicit comparable MMN effects. However, if a long-term memory representation for $T3^{SV}$ is activated while listening to the standard stimulus T3, we would then predict asymmetrical MMNs in T3/***T2***, compared to T2/***T3***. This is because $T3^{SV}$ is acoustically similar to T2 and the activation of $T3^{SV}$ while hearing the standard T3 would mitigate the saliency of ***T2*** as the deviant.

Our results showed that T1/***T3*** vs. T3/***T1*** indeed showed no MMN difference, as predicted. T3/***T2*** vs. T2/***T3*** exhibited a clear asymmetrical MMN effect (i.e. significantly larger MMN amplitude for T2/***T3*** than T3/***T2***). This asymmetrical MMN effect suggests that T3, as the standard, indeed activated the memory representation of its both variants (i.e. T3 and $T3^{SV}$) despite the lack of tone sandhi context, one of which is similar to Tone2 (the deviant), resulting in reduced MMN responses in T3/***T2*** than that in T2/***T3***. This asymmetry thus provides clear europhysiological evidence for the full specification of the allophonic lexical tone variants in the mental lexicon.

The role of prosody in information source marking: evidence from Majorcan Catalan

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Evidentiality refers to the marking of the source of information of a proposition (Palmer 2001). Crosslinguistically, evidentiality can be marked through different linguistic strategies. It can be morphologically, as in (1) where the morpheme ***mi*** marks that the speaker has direct evidence that it is raining, or has seen that it is raining in Quechua (Rogers 2010). This can also be done lexically as in (2) by means of a lexical item, such as the verb ***see*** in English. Work investigating prosody's role in marking evidentiality is rare. The only work we know of examining this phenomenon focuses on prosodic encoding of evidentiality in biased questions. Hara & Kawahara's (2012) rating task results showed that deaccenting is used in Japanese questions when there is public evidence for the positive answer. Here we examine the case of biased questions in Majorcan Catalan, a variety that displays several strategies for forming polar questions. For example, speakers may choose from different pitch accents as in (3) or may head questions with particles such as *que* (complementizer 'that') or *o* (conjunction 'or'), see (4).

Do speakers use prosody as a strategy to convey evidential information? How might prosody interact with the lexico-syntactic structure of polar questions for encoding of information source? We test this experimentally using a preliminary corpus elicited through the use of a prompted response questionnaire known as the *Discourse Completion Test* (Billmyer & Varghese 2000). Following Sudo (to appear) as well as Armstrong (submitted), we created a set of situations which contained two evidential conditions (visual evidential and non-visual evidential) plus a non-evidential/non-epistemic situation which triggered a neutral (info-seeking) question.

14 speakers of Majorcan Catalan participated in this experiment. We elicited a total of 26 situations x 14 speakers, yielding a total of 364 utterances. We present data from 8 speakers. The data were coded for use of lexical markers, syntactic markers, and prosodic markers (Cat_ToBI system: Prieto et al. in press). Preliminary results indicate clear tendencies with respect to strategies for polar questions produced when the speaker has direct visual evidence for the propositional content in a question. The rising-falling nuclear configuration L+H* L% (Figure 1) is the most preferred contour used for polar questions produced in direct visual evidence contexts. This contrasts with the upstepped falling nuclear accents found for both unbiased polar questions (questions for which the speaker had no evidence about the truth value of the proposition expressed) and with polar questions indicating direct nonvisual evidence (see Fig. 1). Importantly, it is the case that in these same contexts, the particle *que* is typically used along with L+H* L% (Figure 2). We analyze these questions that mark direct evidence through the particle *que* along with the L+H* L% contour applying a Construction Grammar (CxG) approach, which assumes that phrasal constructions are learned pairings of form and meaning (Goldberg 1995, 2006). Within this framework, phonological factors, including intonational factors, have been shown to license specific constructions (Fried & Östman 2004). Our production results indicate that native speakers of Majorcan Catalan associate a form (*que*- headed questions accompanied by L+H* L%) with a particular meaning (questionhood in addition to information source marking for direct evidence). Thus, our data suggest that the presence of L+H* L% licenses an evidential interpretation for *que* questions. In addition, we will present perceptual evidence that Majorcan Catalan listeners perceive the information source marking conveyed through *que* headed questions bearing the L+H* L% nuclear configuration.

(1) *para-sha-n-**mi***
rain-PROG-3SG-DIR[1]
'It is raining'
(2) *I **see** it's raining*
(3)*Teniu manda**ri**nes?*$_{\text{¡H+L* L\%}}$ 'Do you have tangerines?' vs. *Que hi ha **ga**na?*$_{\text{L+H* L\%}}$ 'Are you hungry?'
(4) *Que encara no ha vengut, s'electricista?* 'The electrician hasn't arrived yet?' vs. *O no estàs bo?* 'Aren't you well?'

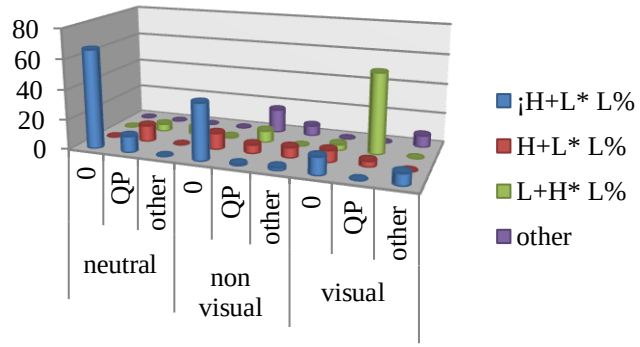

Figure 1. Graph showing the percentage of appearance of different combinations of prosodic markers (¡H+L* L%, H+L* L%, L+H* L% and other) and lexical and syntactic markers (0= no lexical or syntactic marker, QP = presence of question particle, other = other syntactic mechanisms such as tag or split questions) for each evidential condition (neutral, non visual and visual)

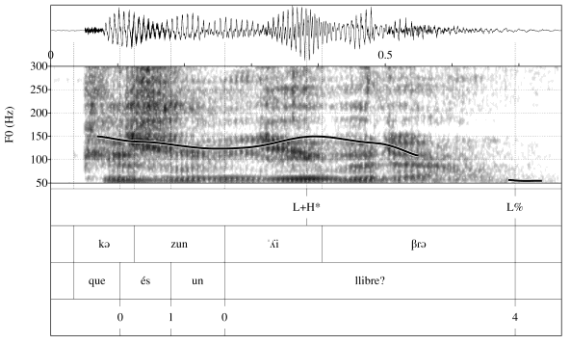

Figure 2. Waveform and fundamental frequency contour of the polar questions *Que és un llibre?* 'Is that a book? ' produced by a male Majorcan Catalan speaker.

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[1] DIR = direct evidence

Understanding phonological acquisition through phonetic perception – non-tone-learning infants' discrimination and word learning of tones

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Infants are born with an initial sensitivity to speech prosody [1]. Around 6-9 months of age, infants undergo a perceptual reorganization (PR) of tones, after which non-tone-learning (NTL) infants' sensitivity for tonal contrasts sharply decreases [2;3]. Nevertheless, NTL adult listeners are sensitive to lexical tones and perceive them in a psycho-acoustic, non-categorical fashion [4]. A gap in our knowledge occurs regarding the transition between NTL infants' loss of sensitivity to tones and adults' restored sensitivity, calling for an inspection of the crucial periods during this perceptual change and its influential factors. This study examines NTL infants' perception and word learning of tones under PR, and extends the discussion to their phonological acquisition.

In the first experiment, 140 Dutch infants of five age groups from 5 to 18 months were tested on their discrimination of an acoustically salient tonal contrast in Mandarin Chinese (high level tone (T1) vs. high falling tone (T4), carried by syllable /ta/) and a manipulated less-salient contrast which shrunk the pitch distance between the two tones. Results showed that Dutch infants displayed initial sensitivity to both contrasts at 5-6 months. For the less-salient contrast, infants' sensitivity decreased at 8-9 months at the tonal PR stage, yet recovered at 17-18 months, forming a U-shaped pattern. For the salient contrast, infants retained their sensitivity throughout infancy. The performance of Dutch infants at 17-18 months is consistent with Dutch adults. Acoustic salience of the contrast influences NTL adults' and infants' discrimination.

In the second experiment, 40 Dutch infants of two age groups (14-15 months, 17-18 months) were tested via an adjusted associative word learning paradigm [5] on their ability to use pitch information linguistically. The sound stimuli were T1 and T4 in Mandarin Chinese, the same salient tonal contrast used in the first experiment. NTL infants were required to associate these novel sounds with novel objects. Results showed that 14-15-month-old NTL infants were able to use pitch linguistically ($p = .026$) whereas such ability was lost at 17-18 months ($p = .219$). The finding was consistent with a previous report on NTL infants' word learning of tones [6].

The U-shaped perceptual pattern in the first experiment is interpreted as caused by 1) the NTL infants' failed attempt at native category formation and/or 2) the influence of native intonation acquisition. Specifically, 1) tonal PR can be viewed as NTL infants' 'surface' manifestation of the effort to build tonal categories, temporarily reducing the discrimination of acoustic details. After category formation has failed in NTL infants, their tone discrimination is no longer suppressed by the categorization effort. 2) NTL infants may benefit from the consistent native intonation input and use intonation categories or prosodic information to facilitate tone perception in a later stage. These interpretations extend to the second experiment, in which a successful word learning involving a non-native contrast may depend on 1) the residual ability to create proto-categories from the input, and 2) the interference level from close native phonemic categories. Linking the two experiments, it has been found that tonal acoustic sensitivity remains in NTL infants at 17-18 months though linguistic function is lost, in line with previous literature [5]. This implies that infants' phonological acquisition pace influences phonetic perception and word learning.

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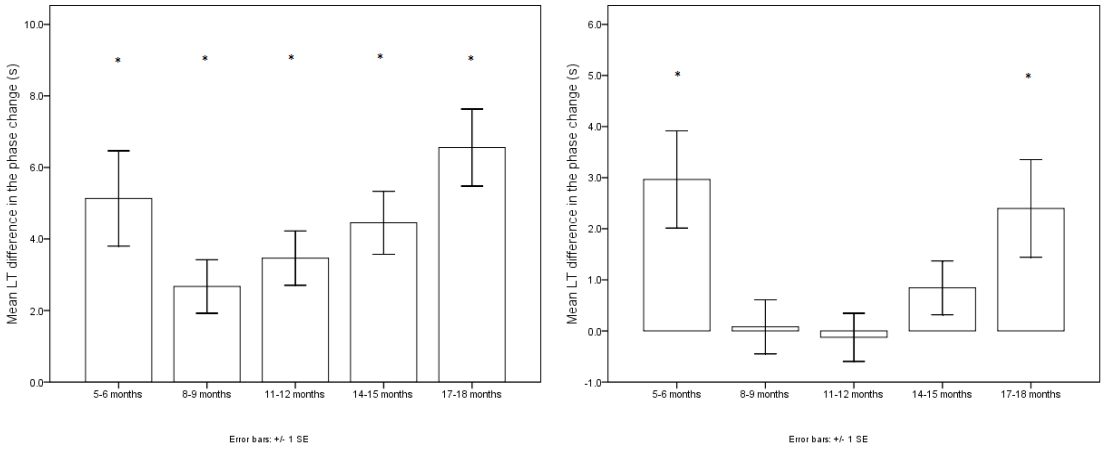
Figures:

(Study 1 - Tonal discrimination)



Figs 1 & 2 Mean looking time differences of T1-T4 (left) and T1-T4 shrunk (right) contrasts in the test phase between habituated trials and changed trials. The height of the bar indicates discrimination to the contrasts at different ages.

(Study 2 - Tonal word learning)

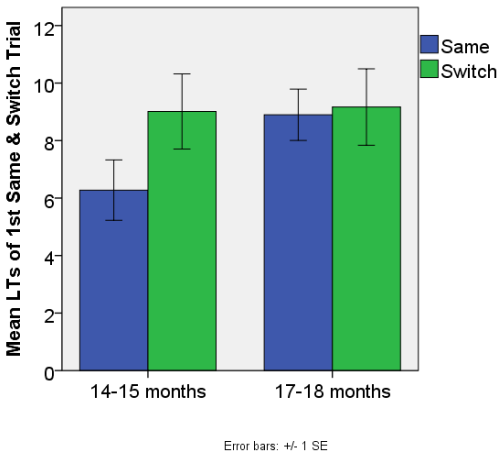


Fig 3 Mean looking time in the test phase between same (habituated association) and switch (assocication break) trials. The increased looking time of switch trial indicates infants awareness when the association between the habituated sound and object is broken.

Quiet is the new loud: Pausing as a cue to focus in child and adult Dutch

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Quiet is the new loud: Pausing as a cue to focus in child and adult Dutch

Introduction: Speakers pause between words in a sentence for various reasons, ranging from speech planning demands and metrical considerations to pragmatic purposes [3,7]. Regarding pragmatic reasons, speakers appear to pause longer to initiate a new topic [6] or highlight certain information [2,4,5]. Considering that young children generally produce more within-sentence pauses than adults and are not adult-like in the use of pitch and duration-related cues to mark focus [1], we ask the question of whether pausing may be a parameter available for young children to use in focus-marking. To this end, we investigated the interface between duration of pauses and focus in Dutch 4- to 5-year-olds, compared to adults.

Study 1

Method: SVO and SVO+adv sentences were obtained from five 4-to-5-year-olds (range: 4;06-5;10, mean:5;3) via a picture matching game adapted from [1] (Fig.1). 30 question-answer mini-dialogues were embedded in the game to elicit these sentences with narrow focus in three positions: (1) NF-i: initial (subject NP), (2) NF-m: medial (verb in SVO; object NP in SVOA); (3) NF-f: final (object NP in SVO; adverbial PP in SVOA), in addition to contrastive focus sentence-medially (CF-m). The sentences were annotated for pauses of a detectable duration in Praat by means of the automatic pause detecting function and manual adjustments.

Results: Overall children produced longer pauses in SVO than in SVOA. Mixed effect modelling was used to assess the effect of focus (focused vs. unfocused) on the duration of pauses both preceding and within a target constituent as well as the effect of contrastivity. Sentence-initially, focus had no effect on the pauses preceding the subject noun. Sentence-medially, the effect of focus approached significance in both SVO ($p=0.086$) and SVOA ($p=0.091$). The pauses preceding the verb in SVO and the object NP in SVOA were observably longer in NF-m and CF-m than in NF-I and NF-f (Fig. 2). Sentence-finally, there was a similar main effect of focus on the pause preceding the adverbial phrase (NF-f and Cf-m vs. NF-i and NF-m) in SVOA sentences ($p=0.006$). Further, models on pauses *within* target constituents revealed a main effect of focus on the pauses preceding the noun of the object NP for SVO ($p=0.03$) and the noun of the adverbial PP for SVOA ($p=0.041$) (Fig. 4) No significant difference was found between CF-m and NF-m. Thus, children not only paused longer before a focused constituent in medial and final position but also before the potential accent-bearing word *within* the focused constituent sentence-finally. The question arising is whether pausing to mark focus is a purely child-specific strategy. In study 2, we explored the use of pausing in adult Dutch.

Study 2

Method: Five adult speakers of Dutch were tested using the method described in Study 1.

Results: Adults generally paused shorter than children (Fig. 3). Mixed effect modelling revealed a main effect of focus on the pauses preceding medial constituents only ($p=0.0001$ for SVO; $p=0.004$ for SVOA). Like children, adults paused longer before the verb in SVO and the object NP in SVOA in the focused condition. No effect of contrastivity was found.

Discussion: our results show for the first time that both children and adults made use of pausing to mark focus in Dutch. Further, adults did this in fewer locations than children. This difference may be explained by different degrees of access to the pitch- and duration-related focus-marking cues between adults and children, including presence and type of accent, and

phonetic realisation. Adults use all of these cues [2] and consequently may have a limited need for cues like pausing, particularly when the insertion of pauses could be disfavoured by syntactic considerations (e.g. pausing between 'the' and 'cake' or between 'in a' and 'basket'). In contrast, children have not yet mastered the use of the pitch and duration-related cues, and thus exploit pausing to a larger degree, giving less weight to syntactic constraints.

Appendix

Experimenter: Look! A dog. And it looks like the dog is throwing something in the hat. What is the dog throwing in the hat?

Child: The dog throws the cake in the hat.

Fig. 1: The picture matching game. Focus conditions were manipulated by asking WH-questions about the subject, verb, object or adverbials. In the contrastive focus condition, the experimenter wrongly guessed the answers, and the child made corrections.

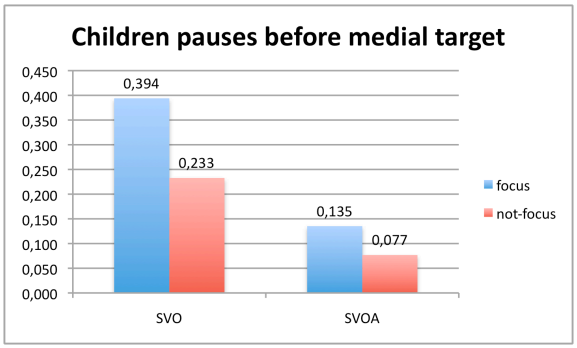

Figure 4: Pauses before verb (SVO) or object NP (SVOA) targets produced by the children

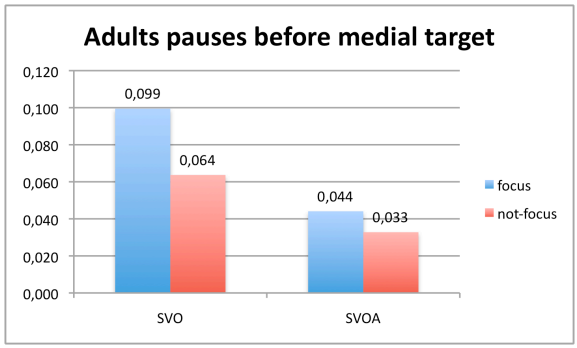

Figure 3: Pauses before verb (SVO) or object NP (SVOA) targets produced by the adults

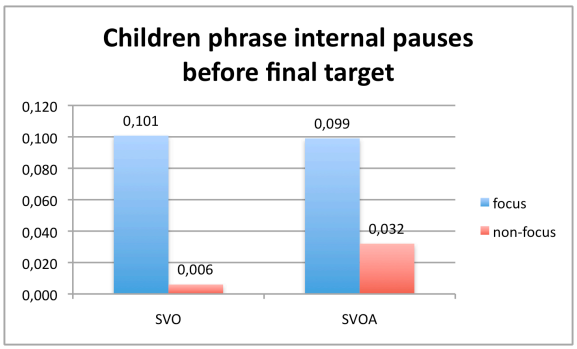

Figure 2: Within-phrase pauses produced before the nouns of final object NP targets (SVO) or the nouns of final adverbial PP targets (SVOA) produced by the children.

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Systemically driven differences in monolingual and bilingual prosodic development

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The few existing cross-linguistic studies that have analysed the development of prosodic features in monolinguals paint a complex picture, e.g. [1]. While some prosodic elements show common developmental paths across languages with different prosodic typologies, others show language-specific patterns which emerge as early as age 2, e.g. [2]; cf. e.g. [3, 4]. As Astruc and colleagues show, pitch height and pitch timing are mastered by 2-year-old monolinguals of typologically different backgrounds. Nevertheless, the mastery of tonal alignment of high targets is crucially dependent on the systemic properties of the target language: Spanish children show more precise alignment at a younger age than English or Catalan children. In contrast, syllable durations are still extensively lengthened by 6-year-olds in comparison to the adult target, e.g. [5]. This leaves open the question to what extent cross-linguistically late development of prosodic features might be attributed to insufficient motor control and un-target-like phonological representations, while language-specific trends could be grounded in inherent systemic differences of the input languages, reflecting early acquisition of the representations at issue. Bilinguals are faced with the additional difficulty that the two languages they are exposed to might be structurally and typologically different. Comparing monolingual and bilingual development enables us to isolate effects that are due to inherent systemic features from the acquisition process more generally.

In this paper we report a semi-structured-elicitation task-based study investigating the rhythm development as well as the marking of prosodic heads and edges in monolingual (ML) Spanish and English 2-, 4-, and 6-year-old children, as well as Spanish-English simultaneous bilinguals (BL) living in Spain (SPBL) and the UK (UKBL). We asked whether BL follow the same developmental paths as ML, or whether target-like acquisition of prosody in one will facilitate the acquisition in the other language, as has been found for segmental features. The question arises whether in bilingual children the systemic properties that contribute to rhythm develop in parallel or independently of each other. We analysed pre-boundary lengthening and accentuation together with a set of rhythm metrics, found to be discriminative for child speech (Varco-V, Varco-C, %V, nPVI-C; cf. Payne et al. 2012).

Vocalic rhythm metric scores show that BL like ML master the less complex rhythm of a syllable-timed language earlier than stress-timed rhythm which is still off-target at the age of 4 (Fig 1). However, even though the development is generally slower in English, BL are still faster in their development than ML and show on-target variability of consonant interval durations (Fig 2). The different degrees of complexity of syllable structures available in the two languages offer one explanation for the differences, but are unlikely to be the only factor influencing the different developmental paths. Our consonantal findings in particular suggest that BL may be benefitting from more advanced motor control due to the production of a greater variety of structures which allows them to coordinate complex articulatory gestures at an earlier age. The difficulties in durational marking of prosodic heads and edges also seem to be rooted in motor control while differences between the two languages, also in bilingual populations, can be attributed to conflicting phonological representations.

These findings suggest that prosodic development is multisystemic; but in bilinguals the systemic properties of the two languages interact, possibly because of a greater variety of structures which monolinguals do not have access to. This suggests that prosodic development is driven by systems that crucially depend on the input. However, because monolinguals in the structurally more complex language also develop more slowly than bilinguals, it seems that it is the greater structural variety in the input which serves to speed up acquisition, rather than structural complexity itself.

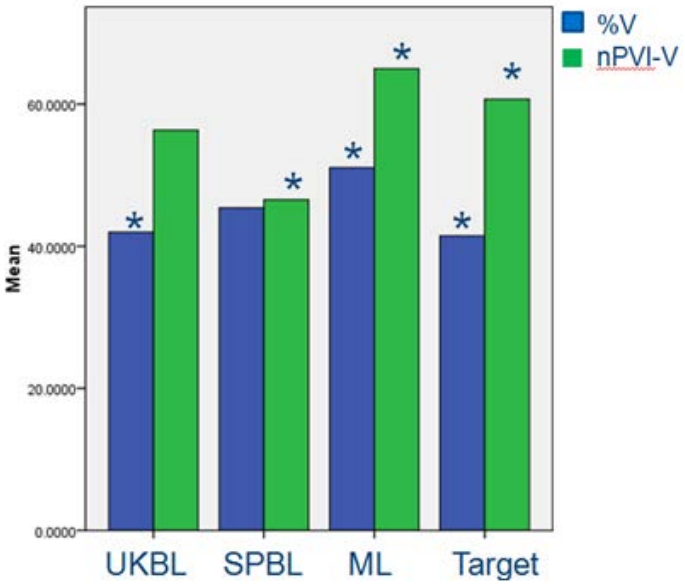

Fig 1: %V and nPVI-V scores of 4-year-old children and the adult target in English

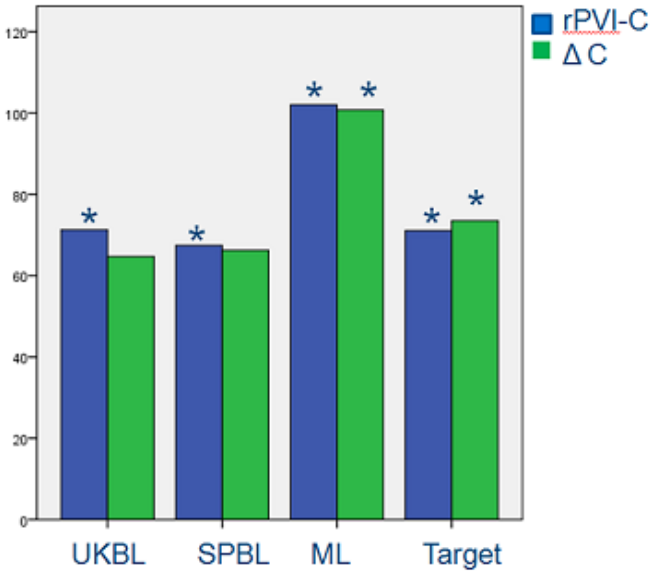

Fig 2: rPVI-C and ΔC scores of 4-year-old children and the adult target in English

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English-dominant early Spanish-English bilinguals production and perception of English tense-lax vowel contrasts

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This study investigates how Spanish-English bilinguals produce, perceive and process (lexically) two English vowel contrasts: /æ/-/ɑ/, /i/-/ɪ/. In addition to a control group of native speakers of English, two bilingual groups are examined: early-onset fluent Spanish-English bilinguals raised by Spanish-speaking families but who became dominant in English during childhood, and Spanish-speaking late-onset fluent second language learners of English who continue to be dominant in Spanish. The particpants provided data for four different tasks. First, the participants produced a series of English vowels (/ɑ/, /æ/, /ɪ/, /ɛ/, /i/) embedded in real English words. Second, they carried out a forced-choice perceptual identification experiment in which they classify items on re-synthesized acoustic continua (Pallier et al., 1997b). Third, they participated in a discrimination experiment with minimal pairs in which they identify which of three words is not a member of the set (Flege and MacKay, 2004). Finally, they detected pronunciation errors in English words whose vowels have been mispronounced on purpose (Sebastián-Gallés et al., 2005a). The phonetic behavior of the early-onset fluent Spanish-English bilinguals can shed light on our understanding of the relative effects of age (at onset of language exposure) and language dominance (at time of testing), while the other two groups provide a point of comparison for the first group.

Research on bilinguals has consistently shown that the best predictor for native-like production and perception in a second language appears to be the age at which the L2 is acquired Flege (1999, 2003). However, other studies have also shown that early L2 exposure does not guarantee native-like capabilities Pallier et al. (1997a); Sebastián-Gallés and Soto-Faraco (1999a); Sebastián-Gallés et al. (2005b). A well-known example of this finding is the apparent difficulty that Spanish-dominant Spanish-Catalan early bilinguals have with the mid-vowel contrast /e/-/ɛ/ of Catalan. This study addresses the nature of the difference between native English speakers and English-dominant bilinguals who learned Spanish as their first language and complements much previous work on bilingual constraints or limitations in second language speech production and perception (Dupoux et al., 2010; Flege et al., 1995, 1999; Oyama, 1976; Pallier et al., 1997b; Sebastián-Gallés and Soto-Faraco, 1999b; Yeni-Komshian et al., 2000) by examining a population that has seldom received attention: early sequential bilinguals who became dominant in their second language during childhood (Antoniou et al., 2010, 2011, 2012; Mack, 1989). Importantly, it analyzes the influence of initial phonetic exposure on language learning occurring later in life. Moreover, this study explores whether processing is hierarchical, i.e. whether inaccuracies in perception tasks predict even greater inaccuracies in lexical processing tasks, especially in bilinguals and second language learners.

Together, the results of the 4 tasks show that both early and late bilinguals differ from native controls in their production, perception and lexical processing of the /æ/-/ɑ/ contrasts. Production, perception and lexical processing of the /i/-/ɪ/ contrast differs between native controls and late bilinguals, but early bilinguals do not differ from controls. It is found that processing difficulties are not strictly cumulative. This study sheds light on our understanding of the relative effects of age (at onset of exposure) and language dominance (at time of testing)sequential bilingualism impacts phonetic behavior even when speakers have become dominant in the target language, as well as on the relation between perceptual tasks and spoken word recognition.

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Early and late Spanish bilinguals' production of ustressed English vowels

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English and Spanish differ prosodically, whereas English is a stress-timed language with both full and reduced vowels that vary in duration and prominence, Spanish is a syllable-timed language with full vowels only. Both languages also vary in the relative weight of the three acoustic correlates that are known to signal stress, F0, intensity and duration. For instance, Fry (1955) reported that duration and intensity ratios were both cues for judgments of stress in English. More recently, Beckman & Edwards (1994) found that stress duration was found to be a consistent correlate of stress at the word level, whereas pitch accents are stress correlates at the sentence level. In Spanish, Ortega-Llebaria & Prieto (2010) reported that duration was a consistent stress correlate in all Spanish vowels, whereas, intensity played a secondary role. English word-stress also involves changes in vowel quality, unstressed vowels are known to be reduced and/or centralized. However, in Spanish unstressed vowels are not reduced, thus the difference in vowel quality between stressed and unstressed vowels is very small (Quilis and Esgueva, 1983, Hualde 2005).

The Feature Hypothesis in L2 learning (McAllister, Flege and Piske, 2002) states that L2 phonetic features not used to signal phonological contrast in the L1 are more difficult to acquire. Therefore, native speakers of Spanish are predicted to produce English reduced vowels unnaccurately because these are based on phonetic features not exploited in the phonological system of their L1. This paper investigates the production of English unstressed vowels by two groups of early and late Spanish bilinguals and a group of native English monolinguals (NE). Participants produced a sample of 19 bisyllabic and trisyllabic words, in which stress fell on different syllabic positions. The target words were embedded within the carrier phrase " I say __ this time". Three acoustic measurements were obtained, namely, unstressed-to-stressed duration and intensity ratios and vowel quality (F1 and F2). The formant frequencies were normalized to one randomly selected NE speaker to neutralize sex-linked differences (Guion, 2003; Yang, 1996). Both groups of bilinguals showed significantly less difference in duration between stressed and unstressed vowels than the native English speakers ($F(2,639) = 26.56$ $p<0.001$). The late bilinguals also showed significantly less intensity differences than either the early bilinguals or the NE ($F(2,644) = 3.61$ $p<0.05$) . As for vowel quality, the early bilinguals (middle chart) reduced the unstressed vowels, which clustered around the mid-center area of the vowel space, in the same fashion as the NE monolinguals (top chart). However, the late bilinguals (bottom chart) showed a more Spanish-like pattern with vowels that were more peripheral in the vowel space. Overall, results support the feature hypothesis in that phonological relevance of an L1 phonetic feature influences L2 production.

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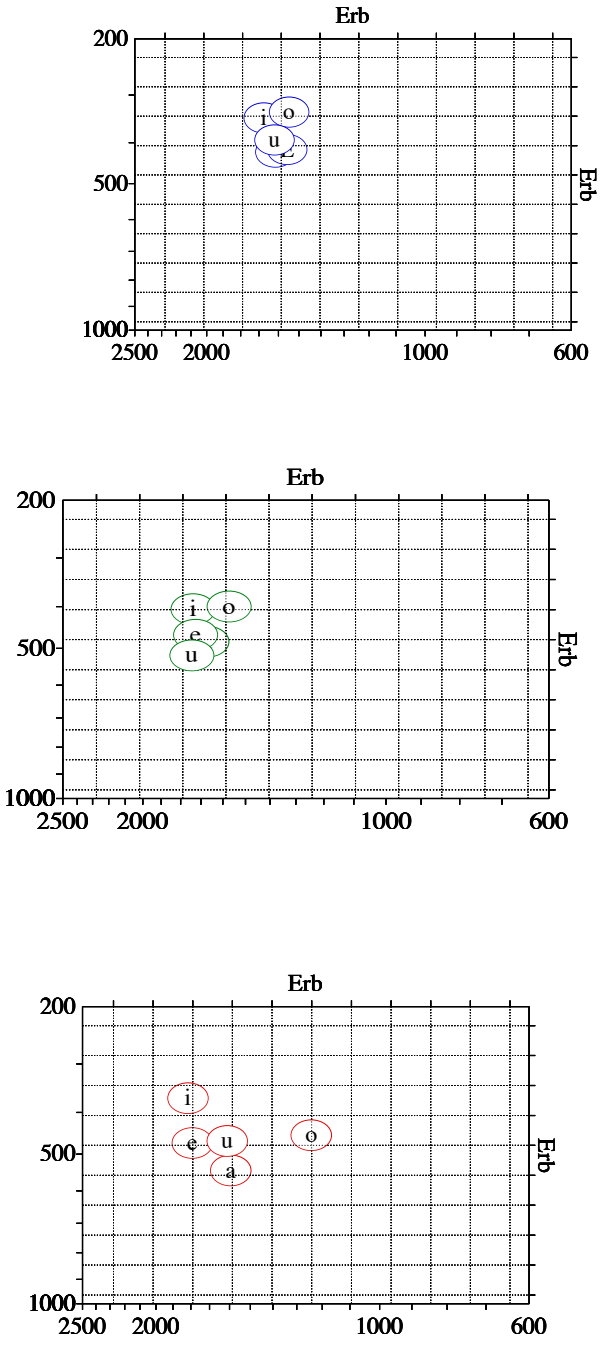

Fig 1. Unstressed English vowels produced by native English speakers (top), early Spanish bilinguals (middle) and late Spanish bilinguals (bottom), averaged across words in ERB.

Allophony of /ʝ/ in Peninsular Spanish

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The phoneme /ʝ/ in Spanish is nown o ve ide nge of phonetic realizations, including palatal and prepalatal approximants, strident fricatives and (affricated) stops. Even within a single dialect, the range of variation is sometimes considerable. For Standard Peninsular Spanish, Navarro Tomás (1918) describes two allophones in complementary distribution: voiced palatal affricate after pause, /n/ or /l/ and voiced latal fricative sewhere. This distribution, which is repeated in other standard sources (e.g. Quilis 1993: 275) is, of course, highly reminiscent of that of the allophones of d g/ in the same standard description. Whereas the influence of different contextual factors in conditioning the allophony f /bdg/ has been the object of much recent acoustic investigation (Cole et al. 1999, Soler Romero 1999, Ortega Llebaria 2004, Eddington 011, arrasco et al. 2012, among others), somewhat surprisingly there are no comparable studies of the voiced palatal obstruent. We eport on an acoustic investigation of this phenomenon in Peninsular Spanish. Our data are from *Glissando*, recently developed corpus Peninsular Spanish and Catalan speech (Garrido t al. 2013). We have restricted our analysis to data from 8 speakers in two ews' ubcorpora. n the TextGrids, we searched for all instances of jj (=orthographic <y>) and L (= orthographic <ll>) on the phoneme tier. After discarding spurious data (such as foreign proper names), we obtained a total of 92 tokens for the analysis. As an acoustic correlate of degree of constriction we have chosen the difference between the minimum intensity during the production of the consonant and the following maximum intensity within the CV portion (IntDiff), as n ecent rk on he llophony of Spanish dg/ e.g. Carrasco et al 2012). A t-test howed that kens orresponding rthographic y> and ll> o t ave different distributions. That is, our speakers appear to present e general *yeísta* pronunciation with merger of the two historical phonemes (see ñederra 2012). Fig. 1 shows the distribution of the IntDiff data by preceding environment. Visual inspection shows hat post-pausal tokens are more constricted than the rest. On e other nd, preceding n/l does not rigger a more constricted realization of /ʝ/ than other preceding consonants. We have tested the ffects f tress stressed s unstressed, with greater IntDiff edicted in stressed yllables) and word position (initial vs medial) with the package lme4 in R. For the statistical analysis we have excluded all 58 post pausal tokens, to avoid a colinearity (all prepausal okens re word nitial), for a total of 1034 tokens included in the nalysis. Word' and speaker' were entered as andom factors. Fig. 2 3 show a trend in the expected direction for both tress and rd sition. owever, of hese wo, only ress turns ut a statistically significant factor. Our results only partially confirm the aditional iew that the preceding context determines degree of constriction for Spanish /ʝ/ (only utterance-initial tokens are clearly more constricted). Like in other recent studies on he llophony of /b d g/, stress appears to also be a relevant factor, whereas the presence a word boundary in the absence pause oes not consistently affect

degree of constriction, seemingly against e edictions f rtain ews f xical encoding (e.g. ybee .

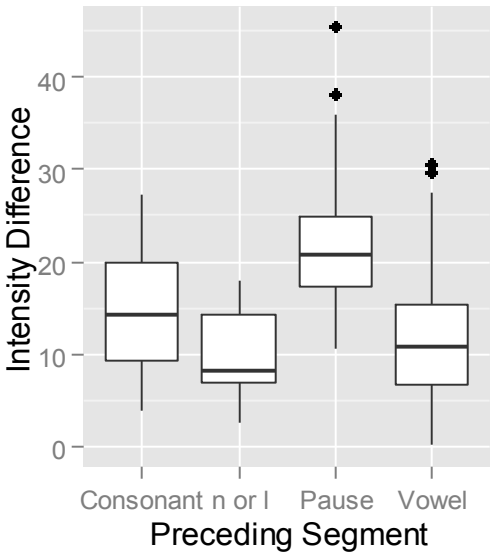

Fig. 1. Effect of preceding context

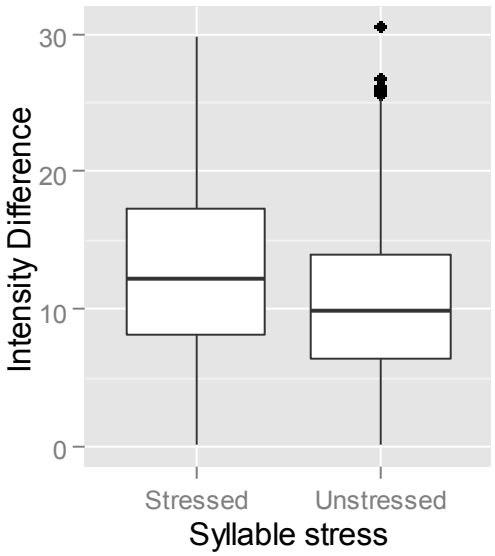

Fig. 2 stress effect

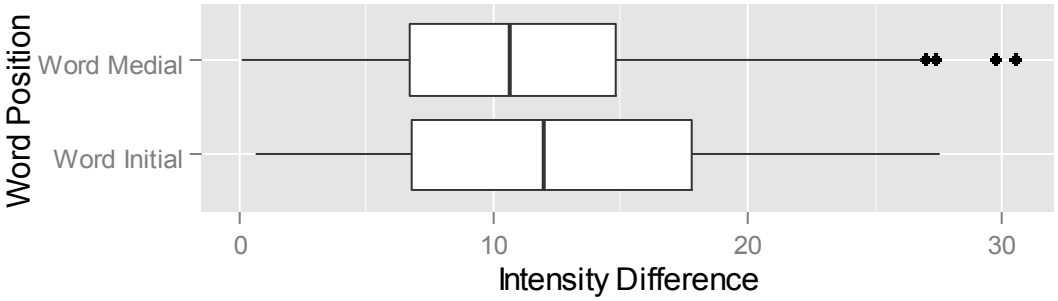

Fig. 3. Effect of word position

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Variation in French and Spanish Interrogative Intonation and L2 Perception

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The purpose of our study is to determine how Mexican Learners of French evaluate the appropriateness of three different final boundary tones (L%, H% and HH%) inserted at the end of two neutral interrogative sentence types in L2 French: yes-no questions and wh-questions. The issue that we address is whether the extra-rising contours observed in learners' productions (see [1]) are also perceived as unmarked forms in the L2 acquisition process. In descriptions of French and Spanish intonation, yes-no questions are usually characterized by final rising contours (H%), whereas wh-questions are associated to final falling contours (L%) (see [2] and [3]). Nevertheless, different tonal configurations can be observed in both interrogative sentence types: falling contours could appear in French yes-no questions when the lexical content or the morpho-syntactic structure already clarify the modality, whereas rising patterns can appear in both Spanish and French wh-questions (see [4], [5]). In French productions by Mexican Learners, an extra-rising contour (HH%) can be observed at the end of both yes-no and wh-questions. Santiago & Delais [1] have proposed that this could be related to an L1 transfer in the case of yes-no questions (HH% being a common pattern in this Spanish variety as shown in [6] and [7]), but not in the case of wh-questions (HH% not being a frequent pattern in Mexican Spanish wh-questions). The authors argued that this extra-rising form may be related to the L2 acquisition process itself.

We set up a perceptive test for three categories of listeners: French native speakers being tested on French (FL1), Mexican learners of French (positioned at level B2 in accorder to the CECR) being tested on French stimuli (FL2) and Spanish native speakers from Mexico being tested on Spanish stimuli (SL1). The test has been completed by 37 participants (13, 9 and 15 listeners for each category respectively); however, the work is ongoing and we plan to raise the number of participants, also including learners at different levels in order to check for the existence of a progression in L2 perception. The stimuli consisted of 66 questions in French and 30 neutral questions in Spanish classified in four sets: (1) yes-no questions without any interrogative marker in declarative form, (2) yes-no questions with a syntactic marker indicating the modality of the utterance (French only), (3) wh-questions and (4) wh-in situ questions (French only).

Two native phoneticians in both languages recorded stimuli at the Laboratory of Linguistics from the University Paris 7. The form and direction of the melodic movement occurring on the last syllable in all stimuli were manipulated in *Praat* in order to obtain perfectly coherent realizations of the three different final boundary tones tested in this study: falling contours (L%), rising contours (H%) and extra-rising contours (HH%) (fig. 1). Participants were asked to read different discursive contexts presenting a scenario for each question. They were instructed to listen to the resynthesized questions inserted in each scenario (without their transcription), and evaluate their melody within a 1 to 5 scale (1= melody is inappropriate, 5= melody is appropriate).

Preliminary results show that rising contours (H% and HH%) are evaluated as more appropriate for all question types. In a global perspective, the interaction between groups and contour evaluations is not statistically significant: the L1 does not seem to play a relevant role on the preference for rising vs. falling contours. However, a significant interaction can be observed in set 2 (fig. 2): the FL2 group shows a preference for H% and HH% over L%, whereas the FL1 group does not show any clear preference. We therefore suggest that learners prefer rising over falling contours in those cases in which the L1 syntactic structure differs from the corresponding one in L2. The ongoing validation of this hypothesis should include results of more L2 participants. These results may confirm that the use of HH% in learners' productions is not associated to an L1 transfer, but rather to the L2 acquisition process.

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Figure 1

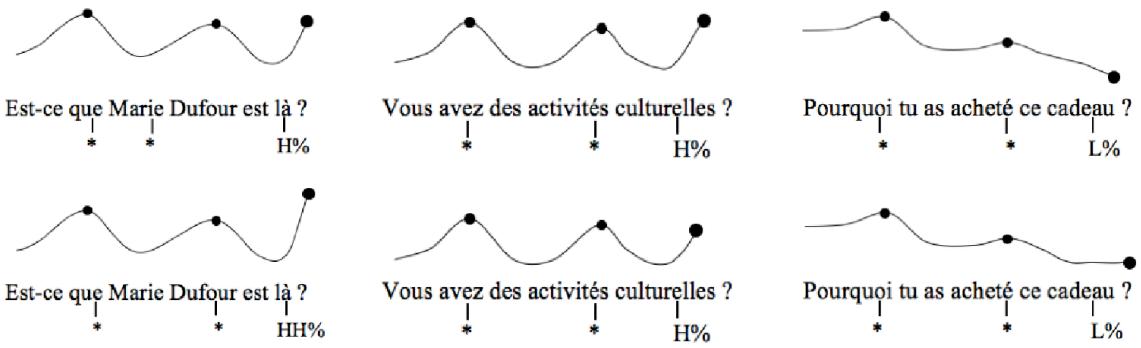

Figure 1: Illustration of how recordings were treated in order to produce coherent stimuli with the three target contours HH%, H% and L%. Firstly, we obtained a stylization of the entire prosodic contour of the recording (above). Then, the final contour was manipulated so that (a) HH% corresponded to a 12-semitones rise between the end of the pre-nuclear syllable and the final contour, (b) H% corresponded to a 7-semitones rise and (c) L% corresponded to a 0-semitones plateau. Finally, stimuli were resynthesized with the new final boundary tones.

Figure 2

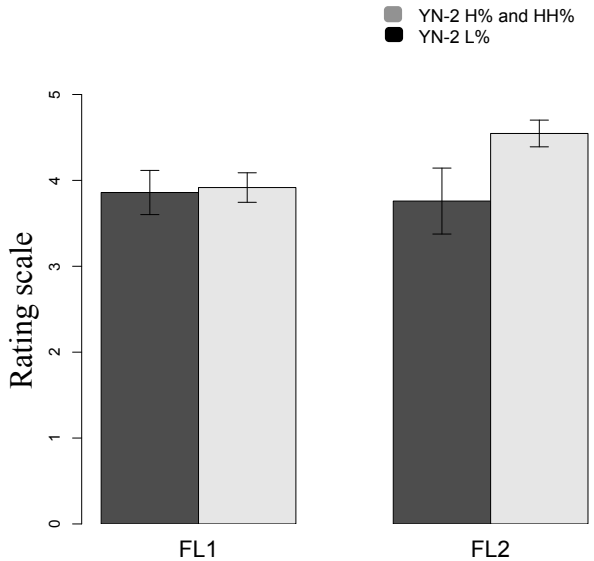

Figure 2: Evaluations of H% and HH% (grouped together) in yes-no questions of set 2 and L% by French natives (FL1) and Mexican Learners (FL2). All differences between groups and conditions are significant at $p<.05$.

Intonational Meaning involves attribution of intentions: the case of French

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Intonational meaning has long been shown to convey participant's commitment, i.e. engagement towards the truth of some information. According to Gussenhoven (1983), a rise signals that the speaker S is not engaged towards the truth of his utterance's content. Gunlogson (2003) proposes that in American English, falling contours, typically used in assertion, signal S's commitment to the truth of the proposition p, while rising contours, typically used in confirmation questions, signal the addressee A's commitment to it, since A is asked to say whether p is true or not. For Steedman (2007), rising contours rather signal the attribution of that commitment to A on behalf of S; and Grice & Savino (1997) show that the choice of a specific pitch accent in Bari Italian reflects how much S believes A to share particular information with him.

The present study tests the claim by Beyssade & Marandin (2007) that intonation meaning involves belief attribution to A by S: "the pragmatic choice of an intonational contour signals how S anticipates A's reception of the utterance which could consist in an acceptance or a revision of the commitment proposed by S. We propose an original interpretation task where participants have to choose among different possible reactions to sentences carrying 4 French intonational contours: a simple fall L*L%, a simple rise H*H%, a rise-fall H*L% or a rise-fall-rise H+!H*H% (see Figure 1).

We assume that participants' choice reflects how they interpret the contours and how they react to the speaker's attribution of intention to them (see Example (1)): the choice of L*L% presents the content as assumed by S and uncontroversial for A. An appropriate reaction is *J'en prends note* 'I've got it' signaling that the content can be added to the common ground. The H*H% presents A as potentially committed to the content. The reaction J'en sais rien 'I don't know', which contradicts S's belief on A's commitment, is appropriate here. The two remaining contours are more complex and they are the specific target of the present study. Specifically, we hypothesized that H*L% presents the content as potentially controversial but strongly assumed by S: an appropriate reaction would be *tu dois avoir raison* 'You may be right' conveying both the acknowledgment of S's commitment and the remaining doubt of A. Additionally we hypothesized that H+!H*H% presents the content as doubtful for S but supported by A: the reaction *Si, si, je t'assure!* 'Yes, it's no joke!' would comment both on S's doubt and on the commitment of A.

In line with our hypothesis, all contours were consistently associated with the hypothesized reactions as shown in Figure 2. Using a novel method of sentence-reaction matching, the present study provides quantitative support for the view that four contours of French intonation convey dialogical meaning including attribution of intention to the addressee. These results give experimental support in favor of a dialogical model of intonation meaning such as the one proposed by Beyssade & Marandin (2007) for French. They also validate a new interpretation task which simplicity and ease of use should allow to adapt it to people with deficiency in attributing intentions to others such as schizophrenic patients in order to investigate their use of intonation.

Figures and example

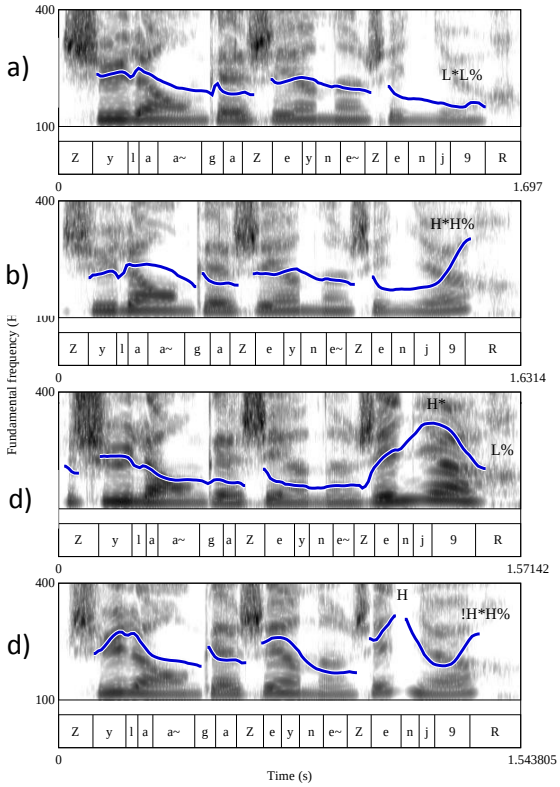

Figure 1. Four renderings of the utterance Jules a engagé un ingénieur 'Jules committed an engineer' with: a) (H)L*L%; b) (L)H*H%, c) (L)H*L% and d) (L)H+!H*H%) on the final Accentual Phrase within the Intonation Phrase.

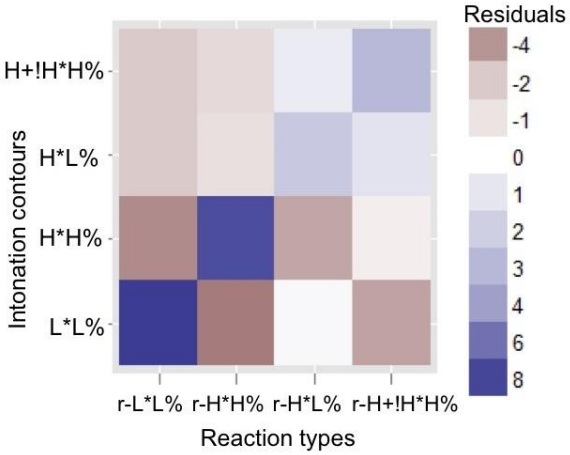

Figure 2. Adjusted Pearson residuals of the Chi-test depending on the intonation contours heard by participants and the type of reaction they chose. The bluer the square the more significant the matching between contour and reaction.

(1)
A: Ils ont recruté un ingénieur
They recruted an engineer
B:
L*L% a. J'en prends note.
I've got it.
H*H% b. J'en sais rien.
I don't know
H*L% d. Tu dois avoir raison.
You may be right.
H*LH% c. Si, si, je t'assure !
Yes, it's no joke !

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Talk/poster

Social and contextual factors constrain pitch contour selection in vocatives

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Vocatives are used in a variety of speech acts, such as greetings, calls, commands or requests, and they have been claimed to fulfill three main functions: getting someone's attention, identifying someone as addressee, and maintaining and reinforcing social relationships (Zwicky 1974, Leech 1999, Poynton 1990). Because of their explicit social implications, they characterize the speaker in relation to the addressee and provide marks of power and solidarity (cf. the use of honorifics or the distinction *tu*/*vous* 'you' in French) (Brown & Levinson 1987, Ahmed 2007). Languages may use a variety of strategies to mark vocatives, such as morphological vocative case, vocative particles (e.g., the use of *o* in Balearic Catalan; Prieto et al. 2013), as well as prosodic mechanisms such as specific intonation forms, stress shift or truncation (e.g. in Southern Italian dialects; Vanrell & Cabré 2011) (see Daniel & Spencer 2009 for a review). As for vocative intonation, a number of studies have identified the use of several pitch contours within a language (e.g. Ladd 1996 for English, Frota & Prieto 2013 for Romance languages). Some authors have claimed that age and social status constrain the use of the so-called *vocative chant* (labeled H* !H% after Ladd 1996) across languages: for instance, it is found to be characteristic of children's speech (Abe 1998 for Japanese) or not used to call somebody of a higher social rank (Sadat-Tehrani 2008 for Persian). In Romance languages, factors such as insistence and physical distance have been highlighted as playing a role in the selection of vocative intonation (see Prieto et al. 2013 for Catalan, and Frota et al. 2013 for European Portuguese). Yet little is known about the potential interaction between the role of social politeness and other pragmatic factors in pitch contour selection.

The present study investigates the influence of social factors, physical distance and insistence in the production of vocative intonation in Catalan. In Central Catalan, vocatives are mainly identified through the lack of personal article (*Maria, vine!* 'Mary, come here!' vs. *La Maria va venir ahir* 'Mary came yesterday'). Following Brown & Levinson's (1987) politeness theory, two sociopragmatic features were selected, namely social distance (two levels: work situation vs. home situation) and power balance (two levels for each social distance value: at work, calling a supervisor vs. a subordinate; at home, calling the aunty vs. the little sister). The other two factors were physical distance (same room, next-to-speaker's room) and degree of insistence (first call, second call). Twenty speakers of Central Catalan participated in a Discourse Completion Task (Billmyer & Varghese 2000) containing 16 different discourse contexts which were controlled for the abovementioned features (2 SOCIALDIST × 2 POWER × 2 PHYSICALDIST × 2 INSISTENCE). The target vocative utterances obtained were prosodically labeled using the Cat_ToBI system (Prieto et al. 2013).

Pilot results from 160 utterances (16 contexts × 10 speakers) show that Catalan speakers used predominantly three intonation contours for vocation (Fig. 1). Descriptive statistics reveal that L+H* HL% is mainly found in non-insistent first calls, while the vocative chant (L+H* !H%) is predominantly used in insistent calls. In the case of non-insistent calls, factors such as social power and physical distance are important for pitch contour selection. For example, the proportion of L+H* !H% increases when calling a subordinate, and most L* HL% are found when the interlocutor is physically closer. All in all, our results suggest that pitch contour selection in vocatives is governed by a complex interaction between social and other pragmatic factors, similar to those used for selecting an adequate address.

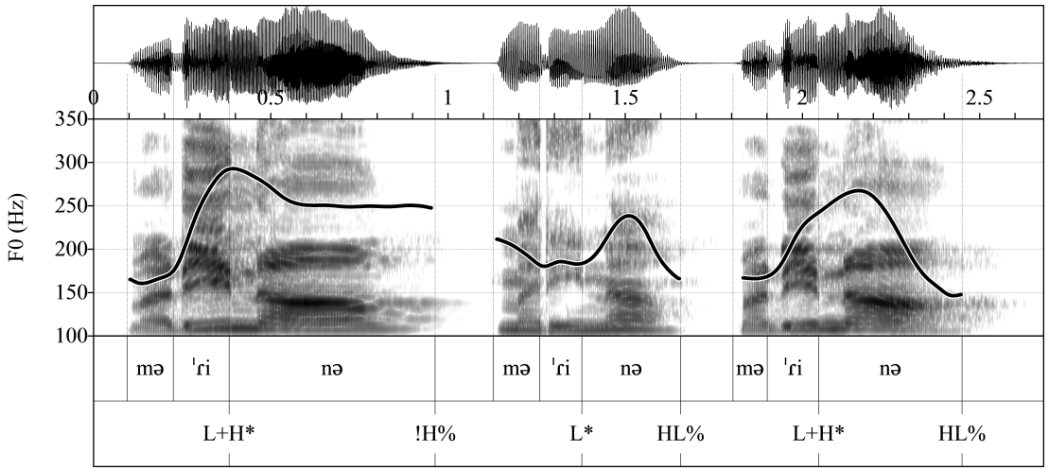

Figure 1. Three characteristic intonational contours found in Catalan vocatives: L+H* !H% (left), L* HL% (center), and L+H* HL% (right).

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Variable phonological rules and 'quantal' perception as a source of probabilistic sound change: The case of intervocalic voicing in Old Tuscan

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Introduction. The origin and nature of 'irregular', 'sporadic' sound changes has been debated by different theories of phonological change since at least the Neogrammarians. They are often ascribed to non-phonological reasons, as analogy or borrowing, or to the non-(purely)-phonological mechanism of lexical diffusion. My goal is to show that a 'sporadic' sound change in the historical phonology of Tuscan – namely the voicing of some intervocalic voiceless stops – was not due to borrowing (as often argued), but to a variable and allophonic voicing rule, whose output was subject to partial phonological re-categorization.

Facts and previous proposals. While most instances of Latin intervocalic [k, t, p] remain voiceless in Tuscan, several Tuscan words display the outcomes [g, d, b/v] (Ex. 1). Two classical alternative explanations exist. According to the former, intervocalic voicing was a regular sound change in Tuscan, but the cultural prestige of Latin caused massive learned restoration of voiceless segments (Merlo 1941). According to the latter, Tuscan preserved voicelessness, while words with voiced outcomes were borrowed from languages (northern Italian vernaculars, Provençal and Old French) belonging to the so-called 'Western' branch of Romance, in which intervocalic stop voicing had been systematic (e.g. Rohlfs 1966).

Hypothesis. Both hypotheses have several weaknesses (see Izzo 1980, Giannelli & Cravens 1997). I want to argue that 1) (most) voiced outcomes are due to sound change, not borrowing: they show phonological conditioning, with properties unattested in Western Romance; 2) the fine-grained phonological variability of this phonological conditioning suggests that voicing in Old Tuscan was not a categorical and obligatory process, but rather a variable and gradient phenomenon (as already proposed by e. g. Giannelli & Savoia 1979-80, Maiden 1995, Cravens 2002; still today some peripheral areas of Tuscany have an allophonic process that creates breathy, slack voiced and even occasional fully voiced intervocalic stops).

Survey. To test these hypotheses, a list of Tuscan words, containing at least one intervocalic voiceless stop in their Latin etymon, was extracted from the *OVI* online corpus of medieval Italian texts. Learned words and clear borrowings from other Romance languages were excluded; then the intervocalic stops in the remaining words were classified with respect to several phonological parameters. It was found that Latin voiceless stops were more likely (at a statistically significant level, applying a generalized linear model) to become voiced in Tuscan *i)* the more the preceding vowel was open, *ii)* the more the following vowel was open, *iii)* if one of the adjacent vowels was stressed. Finally, *iv*) velars underwent voicing much more frequently than coronals, which in turn were voiced more frequently than labials (*ii* and *iv* in Fig. 1). Interestingly, the likelihood of a voiced outcome does not increase in a linear manner. An overall index of 'strength of voicing environment' was created combining the four factors that conditioned voicing; it emerges that for a fairly large range of values the probability of a voiced outcome remains quite low, then it rises rather abruptly (Fig. 2).

Conclusions. Whereas there is no obvious way to explain the phonological asymmetries discovered if lexical borrowing is assumed (in the supposed donor languages all intervocalic stops were regularly voiced), they are consistent with an allophonic voicing process, gradiently influenced by several phonological factors. Also, Fig. 2 shows that there was a non-linear relation between articulatory variation in voicing and its categorization as either [–voice] or [+voice], as predicted by the Quantal Theory of Speech (Stevens 1972). This may explain why, although the phonetic overlap with phonologically voiced stops plausibly was not complete, reanalysis occurred: voicing was allophonic but presumably strong enough to cause perceptual uncertainty, especially in environments that favoured voicing most.

fuoco 'fire' < FOCU(M) *prato* 'meadow' < PRATU(M) *siepe* 'hedge'< SAEPE(M)
lago 'lake' < LACU(M) *strada* 'road' < STRATA(M) *riva* 'river bank' < RIPA(M)

Example 1

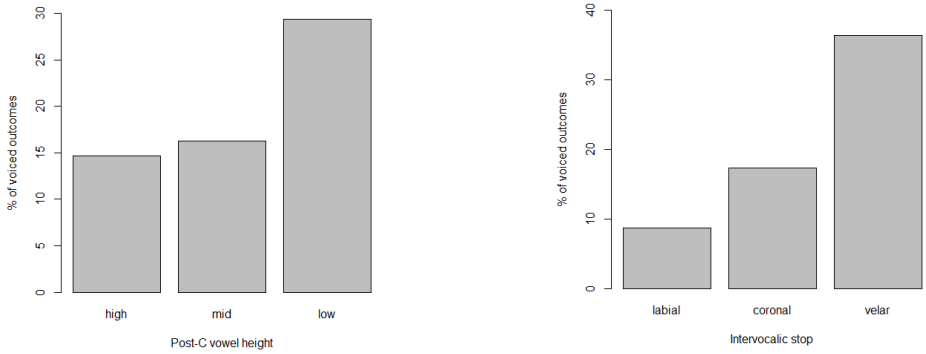

Figure 1

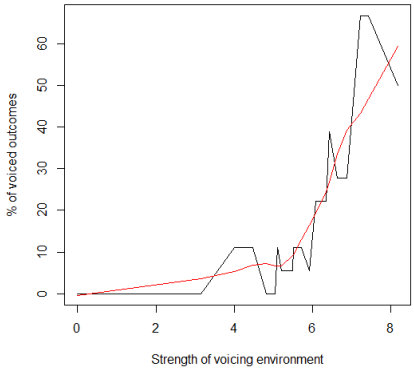

Figure 2 – Smoothing function *lowess* superimposed in red

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From devoicing to apocope: an acoustic study of poststressed high vowel lenition in Brazilian Portuguese

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This paper examines lenition of final poststressed high vowels in voiceless consonant environments in Brazilian Portuguese (henceforth BP). We present evidence that such vowels do not undergo apocope (i.e., deletion), but, rather, gestural overlap and devoicing as a result of a lenition process, probably imputable to stresslessness. However, apocope appears to be the final step of this change. This kind of lenition can be explained by changes in gestural magnitude and timing, as well as reorganization of adjacent consonantal gestures.

A significant number of languages have been reported to exhibit high vowel devoicing in different contexts (e.g., Tsuchida, 1997; Torreira & Ernestus, 2010). Unstressed high vowel deletion or devoicing has also been investigated by researchers working within Articulatory Phonology (Browman & Goldstein, 1989), who claim that many surface characteristics of casual speech production can be accounted for by changes in gestural magnitude or overlap instead of traditional symbolic processes (e.g., Chitoran & Iskarous, 2008). Descriptions of BP report apocope rather than high vowel devoicing (Rolo & Mota, 2012), but acoustic observations reveal that a gradient process exists whereby over 50% of such vowels are lenited and devoiced between voiceless consonants.

The goal of our study is to investigate, on the basis of acoustic data, the relationship between vowel reduction, devoicing and apocope in final poststressed position in BP. We argue that there is an ongoing lenition change that takes place in three steps: vowel reduction, partial or total overlap with the preceding consonant, and, eventually, apocope. All three steps coexist in synchronic variation.

In order to explore the nature of such a process, dissyllabic words of the form ˈ(C)VCV were investigated in which the second C was always [s].They were read in a carrier sentence by six female speakers of a northeastern BP dialect. The following measurements were made: formant centralization ratio (FCR) and vowel space area (VSA) of voiced vowels in devoicing contexts, centroid of [s] noise, and duration of the target syllable and its noise (fricative + vowel) in the devoiced case.

The results indicate a lot of interspeaker and intraspeaker variability, manifested in three lenition effects, namely: (i) when the vowel is voiced and acoustically visible there is a clear vowel space reduction, i.e., voiced vowels in devoicing contexts are shorter and more centralized than elsewhere. The high negative correlation between the FCR and VSA (see Fig. 1) points to this first step, i.e., vowels that are not completely devoiced lose gestural magnitude under devoicing conditions ($r(11) = -0.77$, $p = 0.002$); (ii) when the vowel is apparently absent, a lower average centroid (See Fig. 2) differentiates the presence or absence of the vowel within the [s] noise (e.g., for [i̥], $t(2) = -6.64$, $p < 0.02$); (iii) there is a kind of "compensatory" lengthening of [s] (see Fig. 3) when the vowel is fully devoiced. Post hoc comparisons using Tukey HSD test indicate that the mean length for the [s] noise of devoiced cases is significantly different from that of partially devoiced or voiced cases.

Lenition thus seems to first reduce gestural magnitude to then increase gestural overlap. Completely overlapped and thus devoiced vowels may eventually trigger a listener-based process of vowel apocope along the lines advocated by Ohala (1981). This last step is still under investigation through an auditory identification experiment built on the basis of the [s] token subset where no difference was found in the [s] centroid (e.g., 'aço' vs. 'ás').

Figures:

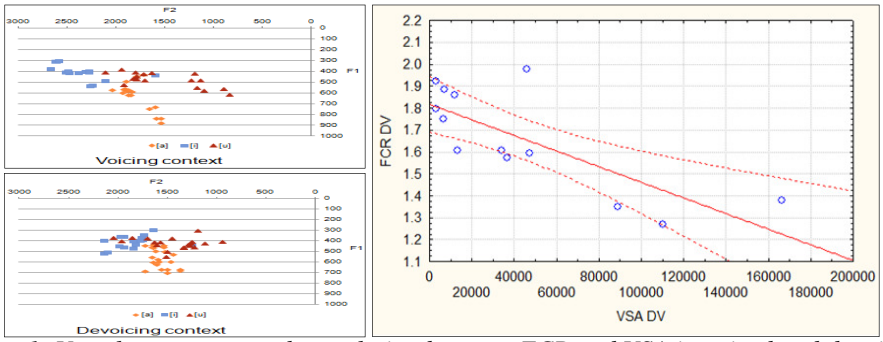

Figure 1: Vowel space area and correlation between FCR and VSA in voiced and devoiced cases.

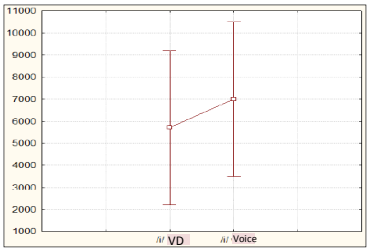

Figure 2: Centroid of fricative noise above 4 kHz in syllables "without" vowel (/i/ VD) and with vowel (/i/ voice).

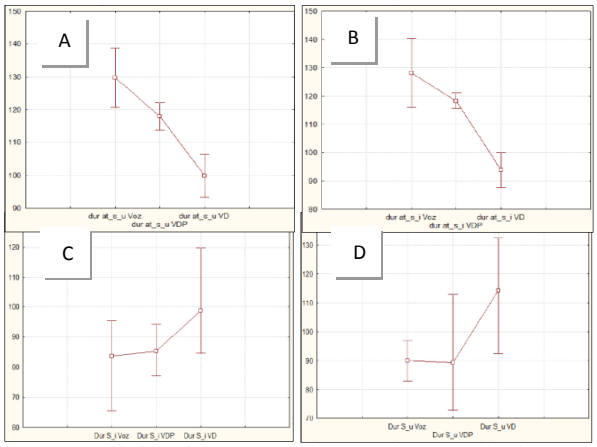

Figure 3: Syllable duration with voiced, partially devoiced, and devoiced vowel (A-B) vs. duration of [s] noise with voiced, partially devoiced, and totally devoiced vowel (C-D).

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Prosodic change in Pescara: sociolinguistic and linguistic factors

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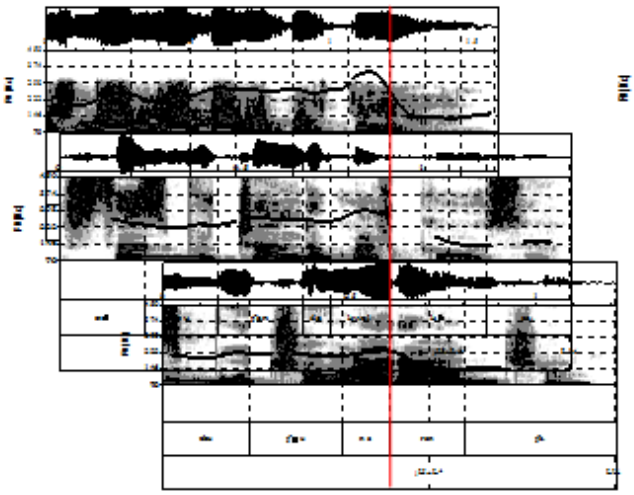
Research on the role of prosody in language contact situations has attested many cases of transfer of one group of speakers' native prosodic features to a second language (Gut, 2000; Simonet, 2008, among others). This phenomenon, combined with transfer between varieties of the same language (Rogers, 1981), can give rise to feature transfer between two languages (Elordieta & Romera, 2013; Colantoni & Gurlekian, 2004; O'Rourke, 2005). It has been suggested that semantically marked sentence types such as questions are more subject to change than statements (Elordieta & Romera, 2013), but semantic shift can prepare prosodic change of statements too (Colantoni & Gurlekian, 2004). In all cases outcomes of intonational change are those which best suit the sociological need for a local identity. However, a work on dialect levelling (Heffernan, 2006) described the slow replacement of a regional system, with a reduced intonational inventory, under the presence of a standardizing national language, with the creation of two distinct groups with well polarized behaviours, standard speakers and levellers, the first gradually replacing the second.

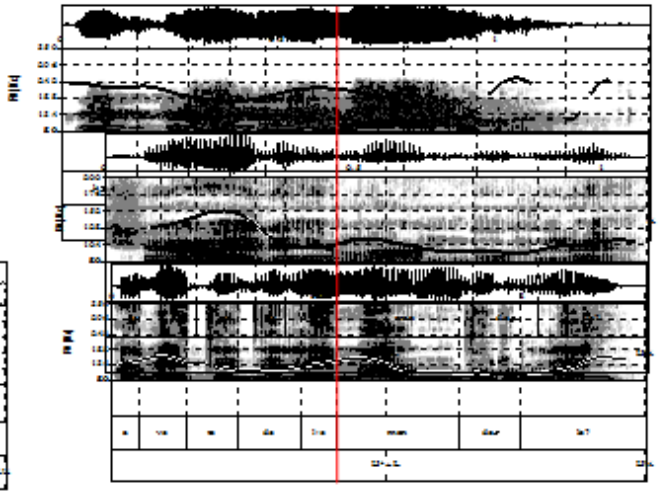
The purpose of this study is to understand how linguistic and sociolinguistic factors competed in triggering prosodic change in Pescara, Eastern Italy. Pescara grew as a city after World War II and its original local Romance language, Pescarese, almost disappeared, gradually replaced by standard Italian, the theoretical segmental model of Italian, which lacks a standard prosody. We study the evolution of Pescara Italian intonation, initially shaped on Pescarese, under the influence of other varieties, such as those spoken by professional speakers in media, and with specific attention to central varieties, such as Rome Italian.

Eight young and six old speakers of Pescara Italian, as well as six old speakers of Pescarese participated in a Discourse Completion Task (Kasper & Dahl, 1991; Prieto, 2001). The task was aimed at eliciting 35 pragmatic sentence types in a semi-spontaneous way. A total of 700 utterances (35 discourse settings x 20 speakers = 700 tokens) were labelled with the It_ToBI system (Grice et al., 2005; Gili Fivela et al., in press) using Praat (Boersma & Weeninck, 2010).

The results show that Pescarese speakers have a reduced range of intonational resources, overusing a salient contour, that consists of a typical falling movement from a pre-tonic high peak, which we labelled as ¡H+L* L%, marking local identity. Our interpretation is that Pescarese features were initially superimposed to segmental Italian, and are still reflected in the performance of our old male Italian speakers. Later Pescara Italian has undergone change: younger speakers' intonation has split up into a double system, in such a way that the use of the old intonation is restricted to certain sentence types. The typical ¡H+L* L% contour was maintained in unfocused and non-contrastive focus statements (see left panels in the next page), but it was mainly replaced by Rome contour H*+L H% in contrastive focus statements and polar questions (right middle panel in the next page). In these contexts, when the old ¡H+L* L% contour is produced, it is now perceived with an additional socio-phonetic mark of emphasis or negative bias. The Pescarese intonation has been replaced in wh-questions too. This shows that questions and semantically marked sentence types are more subject to change than unfocused statements, that salient and socio-linguistically marked features tend to survive on unmarked sentence types, marking local identity and that semantic shift plays an important role in this process. Moreover, unlike in (Heffernan, 2006), prosodic substitution, in our case, does not regard all sentence types and thus it is not leading to disappearing of the old intonation.



Statements. ¡H+L* L% is transferred from Pescarese ("Sta ccapà nu purtialle", top panel) to old people Pescara Italian ("Sbuccia un'arancia", middle panel) and maintained by young people (bottom panel).



Y/N questions. Pescarese ¡H+L* L% ("Chi tenete li manderle?", top panel) is tending towards H*+L H% ("Avete le mandorle?", bottom panel), influenced by Roma Italian (middle panel).

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A stress "deafness" effect in European Portuguese

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Research on the perception of word stress suggests that speakers of languages with non-predictable or variable stress (e.g., English and Spanish) are more proficient than speakers of languages with fixed stress (e.g., French and Polish) at distinguishing nonsense words contrasting in stress location (Dupoux et al. 1997, Dupoux et al. 2001, Peperkamp et al. 2002, Peperkamp et al. 2010). Segmental and suprasegmental cues for word stress may also predict the ability of speakers to perceive stress in a given language. For instance, in Spanish, a language with variable stress that doesn't have vowel reduction, duration and intensity cue stress (Ortega-Llebaria et al. 2008), whereas English and Catalan, both with vowel reduction, use a more diverse set of cues (vowel quality, duration and intensity - Fry 1958, Cooper et al. 2002, Ortega-Llebaria et al. 2010). The co-variation between stress and pitch accent also patterns differently across languages (Hellmuth 2007). English, Spanish and Catalan have dense co-variation between stress and pitch accent. European Portuguese (EP) is a language with variable stress and vowel reduction. Duration is the main cue for stress (Delgado-Martins 1977, Andrade & Viana 1989) and there is low co-variation between stress and pitch accent, due to a sparse pitch accent distribution (Vigário & Frota 2003). EP patterns with Spanish, Catalan and English against French in having variable stress, therefore stress "deafness" is not expected. EP patterns with English and Catalan against Spanish in the diversity of cues used to signal stress. Finally, EP differs from Spanish, Catalan and English in the low co-variation between stress and pitch accent. In the absence of vowel reduction, EP might provide evidence for prosodic-based cross-linguistic perception of word stress (Ortega-Llebaria et al. 2010).

We investigated the perception of word stress in EP in the absense of vowel reduction, both in nuclear (NP) and post-nuclear position (PF), by means of two experiments. Experiment 1 was an ABX discrimination task (Dupoux et al. 1997), with di- and trisyllabic nonsense words contrasting in stress location (e.g., ['mipu]/[mi'pu], [ˈdɐmitu]/[dɐˈmitu]/[dɐmiˈtu]). A phoneme contrast was used as a control condition (e.g., [ˈdɛsu]/[ˈdɛtu]). Acoustic analysis of the stimuli showed that duration was a cue to stress (Table 1). Thirty-two subjects participated in Exp1 (16 in each of the NP and PF conditions. ANOVAS were run for 2 dependent variables: error rate and reaction times. The results of show that the error rates were significantly higher in the stress contrast condition than in the control condition, in both NP ($F1(1,14) = 71.07$, $p < .001$, $\eta^2 = .84$; $F2(1,98) = 23.8$, $p < .001$, $\eta^2 = .2$) and PF ($F1(1,14) = 108.88$, $p < .001$, $\eta^2 = .89$; $F2(1,98) = 52$, $p < .001$, $\eta^2 = .35$ – see Fig. 1). Experiment 2 was a sequence recall task (Dupoux et al., 2001) with a disyllabic nonsense word contrasting in stress location ([ˈnumi]/[nuˈmi]). A phoneme contrast was used as a control condition ([ˈmupɐ]/[ˈmunɐ]). Again, duration was a cue to stress, both in NP and PF (Table 2). Twenty-four subjects participated in Exp2 (12 in NP condition; 12 in PF condition). ANOVAS were run for position (NP and PF) as a between-subject factor, and type of contrast (stress *vs* phoneme) as a within-subject factor. The results showed a significant effect of type of contrast ($F(1,22) = 66.93$, $p < .001$, $\eta^2 = .75$), with more errors in the stress than in the phoneme contrast. No difference was found between NP and PF for the phoneme contrast ($F(1,23) < 1$), but a significant difference was found between NP and PF for the stress contrast ($F(1,23) = 10.01$, $p < .01$ – see Fig. 2).

Our findings demonstrate that, in the absence of vowel quality, a stress “deafness” effect may occur in a language with non-predictable stress that combines both suprasegmental and segmental information to signal word stress. Moreover, suprasegmental properties alone are not enough to perceive stress, contra claims on prosodic-based cross-linguistic perception of word stress.

	Stressed syllables	*Unstressed syllables*	*Sig. difference*
NP	M=251; SD=63	M=156; SD=56	*p*=.03
PF	M=169; SD=42	M=130; SD=36	*p*=.000

Table 1. Experiment 1: *Mean duration and standard deviation of stressed and unstressed syllables, in nuclear position and in post-nuclear position*

	Stressed syllables	*Unstressed syllables*	*Sig. difference*
NP	M=233; SD=28	M=166; SD=29	*p*=.000
PF	M=151; SD=22	M=129; SD=16	*p*=.000

Table 2. Experiment 2: Mean duration and standard deviation of stressed and unstressed syllables, in nuclear position and in post-nuclear position

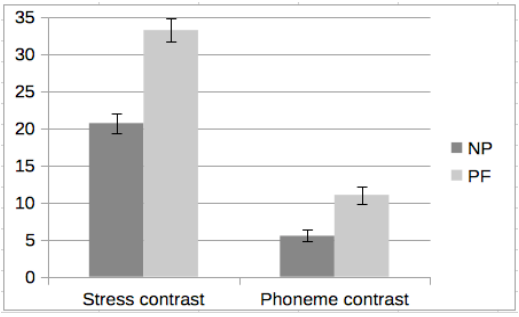

Figure 1. Error rate for stress contrast and phoneme contrast (NP and PF) – Exp. 1

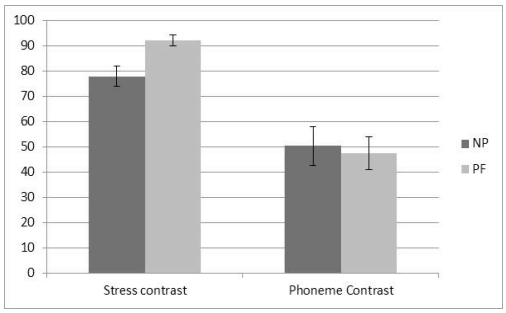

Figure 2. Error rate for stress contrast and phoneme contrast (NP and PF) – Exp. 2

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Stress clash resolution in French. A corpus-based account

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Stress clash gave birth to numerous studies in the Prosodic Theory framework. Briefly resumed, the main issues scholars focused on are twofold: (i) What are the strategies used by speakers to avoid stress clash situations? (ii) Within which domain(s) stress clash resolution apply? The aim of this paper is to address such issues in a corpus-based perspective, and to answer, in addition, to the two following questions: (iii) Is stress clash sensitive to dialectal and speech style variation? (iv) To which extent speakers tend to avoid stress clashes in natural speech? To which extent speakers tend to avoid stress clashes in natural speech?

In French, stress clash can occur at different levels of the prosodic hierarchy: within a Clitic Group (Type I) or a Phonological Phrase (Type II), between two PPs which are restructurable (Type III) or not (Type IV). Table 1 here after exemplifies each of these contexts. Based on previous studies, and especially Post [1999], we predict that a stress clash resolution rule obligatorily applies for Types I and II, while it is optional for Type III and tends to be preferentially avoided for Type IV.

For this study, a 4-hours long corpus was used. The corpus includes 5 varieties of native French (1 variety spoken in Paris, 4 varieties spoken in different parts of Switzerland), 40 speakers (4 male and 4 female speakers per variety, aged between 20 and 80). Each speaker was recorded in a reading task (the text is 398 words-long) and a conversation task. The entire text and a stretch of 3 minutes of spontaneous speech for each speaker were transcribed and automatically aligned with the EasyAlign script [Goldman 2011] within Praat [Boersma & Weenink 2012]. Alignments were manually checked and corrected by one of the authors. Pitch accents were identified independently by two experts on the basis of their perceptual judgment only. A third expert intervened in cases of disagreement between the two annotators and decided the final value of the syllable (+/- prominent). PP boundaries (Clitic Groups carrying a pitch accent on their rightmost syllables) were then identified by one of the author in a dedicated tier.

In all 728 sites of potential clashes were identified in the corpus. Application of stress clash resolution (yes/no), strategy used by speakers to avoid stress clash and prosodic level at which stress clash occurs were coded according to the typology presented in Table 1. The analysis of the strategies showed that deaccenting was the most common (83.4%), followed by stress shift (7.2%) and schwa or silent pause insertion (7.6% and 1.5%, respectively). An acoustic analysis of the data was performed. Generalized Estimated Equations with duration and F0 ratio measurements as dependent variables revealed significant differences between the last syllable of the first word of the couple of words where stress clash resolution does not apply and where stress clash resolution does apply, the former being longer and presenting a more important pitch rise compared to the latter ($p < .001$). Statistic tests also revealed no interaction between dialectal origin and speech style, and no effects of dialectal origin or speech style ($p < .001$), stress clash resolution applying in 70% of the cases in average. Statistic tests also revealed an effect of condition: stress clash resolution applies more often for Type I than for the other types; Types II and III do not show significant differences between each other; stress clash resolution takes place in a significant lesser extent for Type IV ($p < .001$). Finally, statistics revealed an effect of constituent length: the more syllables the first element of the clash contains, the higher the probability for stress clash resolution not to apply increases ($p < 0.01$). The impact of such results on French prosodic phonology will be discussed in the light of the issues (i)-(iv) raised above.

Table 1. From the left to the right, prosodic structure condition within which stress clash resolution should apply, prediction, Post [1999]'s results and results of the present study.

PROSODIC LEVEL	PREDICTION	STRESS CLASH RESOLUTION APPLIES IN		
		POST [1999]	PRESENT STUDY	
Type I: within a CG	Stress clash resolution obligatorily applies	Not tested	168/196	85.7%
V+clitic (1) on dormait plus]$_{GC}$ (2) qui me racontaient ça]$_{GC}$				
Type II: within the same PP		100%	108/160	67.5%
Adj+N / Adv+N / Adv+Adv (3) les mêmes villes]$_{PP}$ (4) le plus court]$_{PP}$ (5) ça va très bien]$_{PP}$				
Type III: between 2 restructurable PPs	Stress clash resolution is optional	60%	179/244	72.17%
N+Adj / N+PP / V+NP / V+PP (6) des championnats]$_{PP}$ suisses]$_{PP}$ (7) un pot]$_{PP}$ de thé]$_{PP}$ (8) j'aime pas]$_{PP}$ le plat]$_{PP}$ (9) la moyenne]$_{PP}$ d'âge]$_{PP}$				
Type IV: between 2 non-restructurable PPs	Stress clash resolution should be avoided	35%	48/128	37.2%
Adj+NP (10) à vaste]$_{PP}$ taux d'audience]$_{PP}$, (11) une petite]$_{PP}$ carte de visite]$_{PP}$,				

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No stress, no pitch accent, no prosodic focus: The case of Moluccan Malay

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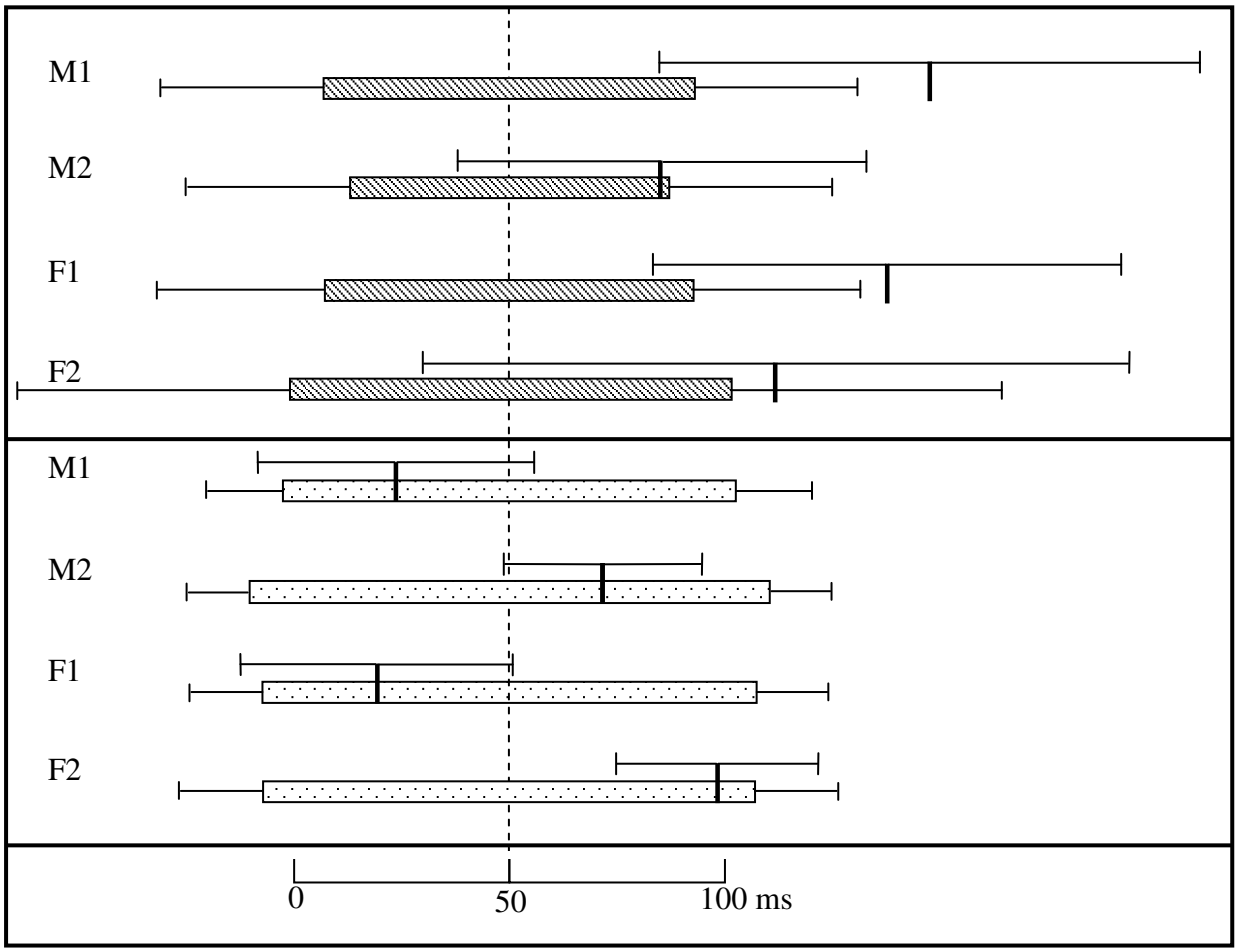
Word prosodic structures have been characterized as having stress, as in Spanish (obligatory, culminative syllabic prominence, Hyman 2012), a tonal representation, whether or not mediated by an accent on a mora or syllable, as in Northern Bizkaian Basque (Elordieta 2007), or both, as in Papiamentu, where a tone contrast occurs if the stress is penultimate (Remijsen & van Heuven 2005). A fourth option is the absence of either stress or tone. French has been argued to have no word prosodic structure (beyond an organization into syllables) on the basis of the inability of speakers to reproduce prominence locations in a sequence recall task (Peperkamp et al. 2010). It has however been shown to have pitch accents located in phrasally defined syllables. Also the reality of stress in varieties of Malay, which have widely been claimed to be penultimate, has been called into question (e.g. Goedemans & van Zanten 2007). In order to establish the word and sentence prosodic structure of a variety of Malay, we collected recordings of a corpus of 96 sentences designed to show variation due to focus (neutral, given, contrastive), discourse meaning (nonfinal, interrogative, declarative final) and position in the phase (IP-final, IP-medial), with eight target words embedded in mini-dialogues. It was recorded twice by four speakers of Moluccan Malay in the city of Ambon. We present data that will enable us to answer the following questions:

1. What are the intonation melodies of the language?
2. Is focus expressed prosodic structure, and if not, are there phonetic reflexes of focus?
3. Do words have stress?
4. Is there a pitch accent, either in any syllable with word stress or located phrasally?

There are two intonation melodies, a rise-fall for final declaratives and a rise for non-declaratives. We compared the declarative contour in the 'contrastive' condition with that in the 'given' condition. There was no difference in duration. There was a significant difference 4.5 Hz, pooled across the sixteen sets 20 measurement points over the eight IP-final target words, indicating that focus is not expressed structurally and leads to negligible phonetic differences. The third and fourth questions were also investigated on the basis of the rise-fall contour, in both IP-medial and IP-final positions of the target words. Duration measurements do not support the hypothesis of penultimate stress. In IP-medial position, the penult is shorter than the final syllable, while in IP-final position it is unaffected by phrase-final lengthening. The location of the peak, just as the duration of the word, the penultimate syllable and the final syllable, is highly variable in comparison with equivalent data from a Dutch baseline corpus recorded by four speakers (see Figure). Mean peak locations fell after the penult in Moluccan Malay, as opposed to inside it in Dutch, while the Moluccan Malay standard deviations were three times those of the Dutch data. Correlations between time stamps of six segmental landmarks and peak locations are all lower in Moluccan Malay than in Dutch, while a Principal Component Analysis shows that the time stamps for landmarks in the penultimate syllable determine the peak location in Dutch, but not in Moluccan Malay. We conclude that Moluccan Malay has neither word stress nor phrasal pitch accents, and that intonation melodies are non-associating boundary tone complexes.



Mean durations of the penultimate syllable with standard deviations indicated by the hairlines, together with mean peak alignments with hairlines indicating the means of the standard deviations relative to the vowel onset and those relative to the end of the syllable for four speakers separately for Moluccan Malay (above) and Dutch.

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The Role of Tonal Onglides in German Nuclear Pitch Accents

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Background

Models within the Autosegmental-Metrical framework differ with respect to which tonal movements they consider to be part of a pitch accent. A movement towards the starred tone target can be represented as a leading tone, whereas one after the target a trailing tone. Models of German intonation within the AM framework differ as to whether they employ both leading and trailing tones (GToBI: Grice & Baumann 2002) or trailing tones only (Peters 2009). Moreover, some models have a leading tone in their inventory but treat it as an exception that leads to a tri-tonal pitch accent, e.g. HH*L (Mayer 1995). The use of trailing tones exclusively has been called an "off-ramp-analysis" while the leading tones are part of an "on-ramp-analysis" (Gussenhoven 2004). In this study our aim is to assess the importance of the movement towards the starred tone target, the *onglide*, for the perception of pragmatic meaning. If the onglide plays a significant role in the distinction of accent types, it should be possible to change the pragmatic meaning of an utterance by solely manipulating the pitch contour before the starred tone target.

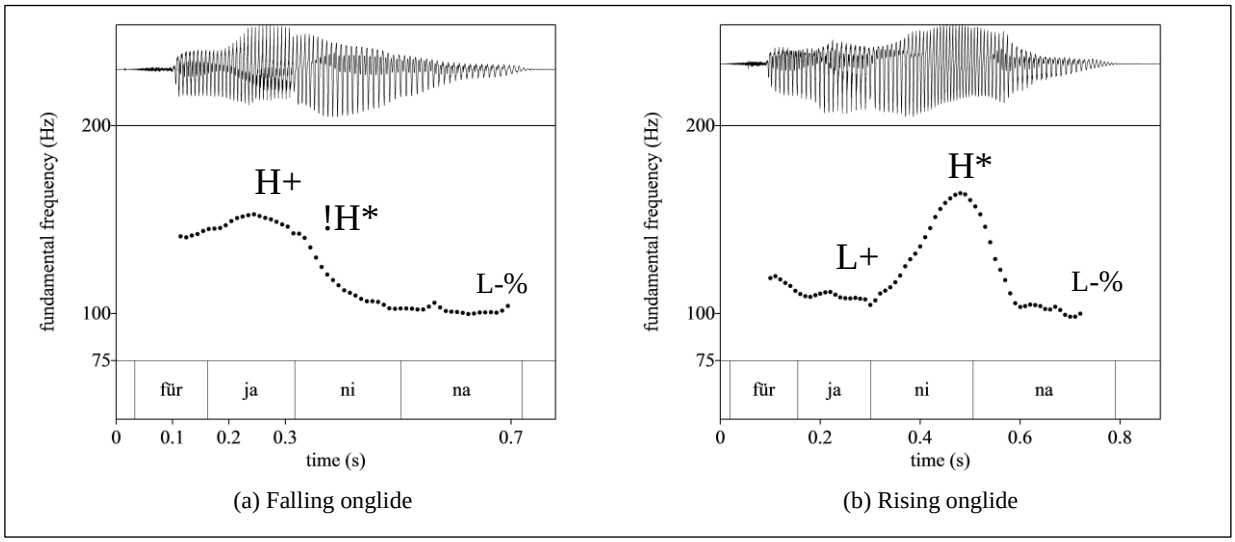
Method

20 monolingual German native listeners (12 f., 8 m.) were presented with resynthesised intonation contours of three short phrases: "Für Janina" (For Janina), "Für Marlene" (For Marlene) and "Für Ramona" (For Ramona). In each sentence there was an accent on the second syllable of the name. Fig. 1 displays two naturally produced pitch contours of "Für Janina". In (a) the onglide is falling, represented with a H leading tone followed by !H*, whereas in (b) it is rising, represented by a L leading tone followed by H*. The synthesized stimuli were constructed with a falling, level and rising onglide (see Fig. 2). The tonal target on the accented syllable, as well as the pitch contour after the accent was kept constant. The listeners were asked to match the sentences to one of two small dialogues displayed on the screen (see Fig 3 for an example). In context (i), the target sentence provides an affirmative answer and contains given information. We refer to this as *given/non-contrastive*. In context (ii), the target sentence negates the proposition of the preceding sentence. It contains new information and has a corrective focus with an explicit contrast. We refer to this meaning as *new/contrastive*. Each subject listened to 8 repetitions of the sentences, so that there was a total of 72 items for each subject (3 names * 3 manipulations * 8 repetitions). Because 9 items from one subject had to be excluded due to technical reasons, the analyzed dataset contained 1431 items.

Results

Fig. 4 shows the proportion of ratings as new/contrastive as means for all subjects. A falling onglide was less often judged to encode new/contrastive information (27 % of the time) than a rising onglide (75%), whereas a level onglide was judged as new/contrastive 55 % of the time. Using generalized linear mixed models and controlling for the effects of repetition, gender, presentation order, manipulation base and by-subject variability, we established that the onglide had a significant effect on the response ($\chi^2(2)=15.043$, $p<0.001$). We thus show that the onglide does indeed contribute to the interpretation of pragmatic meaning, and consequently provide motivation for leading tones in the analysis of pitch accents in German.

Figures



(a) Falling onglide (b) Rising onglide

Fig. 1 Examples of falling and rising onglides

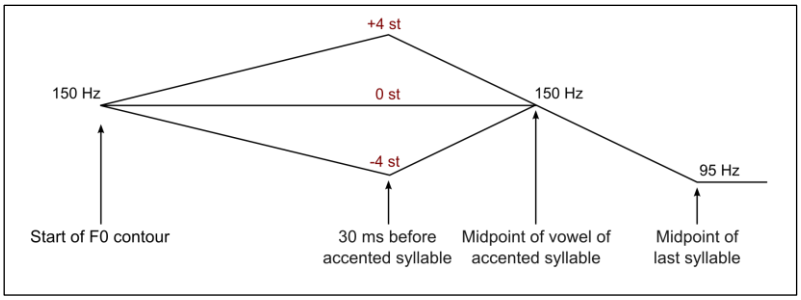


Fig. 2 Schema of manipulation

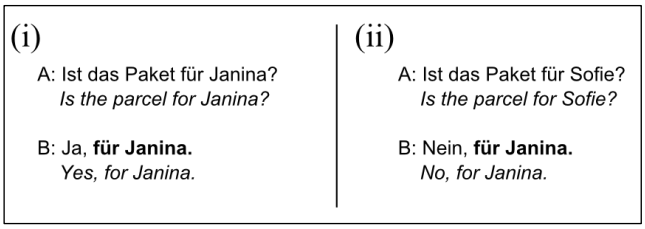


Fig. 3 Examples of mini-dialogues

Fig. 4 Mean responses as 'new/contrastive' (all subjects pooled)

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Segmental anchoring in the context of vocalic deletion

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Much research within intonational phonology has shown that tonal targets are realized on specific landmarks with respect to the segmental string (Arvaniti et al. 1998, Auer et al. 2000, Schepman et al. 2006), a phenomenon known as *segmental anchoring.* While the operation of segmental anchoring has been examined in many languages (e.g. Xu 1998, Ladd et al. 1999, Ishihara 2003), much debate still exists about its nature (see e.g. Prieto & Torreira 2007 and references therein); some propose that it is *phonological* and relies on a secondary association of each of the tonal targets with syllabic/phonemic edges (e.g. Ladd et al. 2000), while others suggest that it is *phonetic*, i.e., each dialect/language has its own specific phonetic rules to account for the tones' behavior (Arvaniti & Garding 2007, Ladd et al. 2009). To provide some new evidence on the phonological vs. phonetic debate, we examine cases where the putative anchor point for the tonal target is deleted.

Standard Modern Greek (SMG) uses L*+H prenuclear pitch accents, in which the L tone appears just before the onset of the stressed syllable's consonant, while the H tone just after the onset of the first post-accentual vowel (Arvaniti et al. 1998). Interestingly, in Northern Greek dialects (NG) high vowels can get deleted in certain environments (e.g., /ma'loni/→ [ma'lon] 'scolds'; Topintzi & Baltazani 2012) therefore providing potential sites where vocalic deletion deprives the H tone of its expected anchor point. In view of this high vowel deletion, a phonological account of segmental anchoring would predict that the H tone will seek the next available vowel edge to dock onto (among other predictions that will be discussed in this paper) while a phonetic account would allow for gradient resolutions.

Five native speakers of Northern Greek (40-70 years old), in a semi-directed speech task, produced 20 sentences containing words with a deleted post-accentual vowel (see 1) and aligned with a L*+H pitch accent (henceforth L*+Hdel), matched with 20 sentences without deletion (see 2, L*+H). The results showed, firstly, that the alignment of each of the tonal targets in NG is similar to that in SMG; on average, the L aligned 5ms into the stressed syllable's consonant and the H 4ms into the first post-accentual vowel. Importantly, in L*+Hdel the L showed somewhat earlier alignment (10ms before the stressed syllable's consonant), while the H alignment depended on the sonority of the first post-accentual *consonant*, appearing well into the first post-accentual consonant when that was a sonorant (~30ms into the sonorant) and 10ms *before* the consonant's onset when that was an obstruent. This difference in alignment indicates a phonetic reflex rather than a phonological rule, given that a phonological account whereby the H carries a secondary association to a domain's edge would predict a complete change in the H alignment, allowing it to anchor to the next available phonological target.

(1)	/e'lafi/$_{\text{NOM.SINGULAR}}$	[e'laf]	L*+Hdel	'dear'
(2)	/e'lafia/$_{\text{NOM.PLURAL}}$	[e'lafça]	L*+H	'dears'

The current findings bear significance on a number of important topics; first, they provide an indirect means of supporting a phonetic account of segmental anchoring. Second, they add to existing literature on fine-grained cross-dialectal differences with respect to pitch accent realization (Atterer & Ladd 2004, which has also been used as support for a phonetic account of anchoring). Third, they support a view of keeping the phonological level economical when no further phonological associations are absolutely required.

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The production and perception of Portuguese consonant clusters and CVC-sequences

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The focus of this paper is on consonant cluster coordination in European Portuguese (EP) in the framework of Articulatory Phonology (Browman&Goldstein 1986), and more specifically on timing and overlap differences between lexical CVC-sequences that may be realised as phonetic clusters which often arise following high vowel deletion in unstressed position, and lexical clusters that are specified in the lexicon. European Portuguese high vowels [ɨ, u] in unstressed position are mostly deleted in connected speech (Mateus & Martins 1982; Martins et al 1995; Freitas 1997; Cunha 2011). Consequently there are post lexically many clusters that are similar to lexical clusters resulting in near homophones (e.g. PL /k(ɨ)rer/, "to want" and L /krer/, "to believe"). How similar these PL and L consonant clusters are, was one of the main aims of this study. A second aim was to test whether there was a greater likelihood of vowel deletion and increasing overlap associated to the place of articulation of the first consonant. Following the place-order hypothesis (Chitoran et al. 2002, Kühnert et al. 2006) front-to-back cluster (e.g. /pr/) could be more overlapped than the back-to-front counterparts (e.g. /kr/), because they are more easily recoverable in perception and in some cases are produced with independent articulators (e.g. lips and tongue tip for /pr/, following Kühnert et al. 2006). In the EP case, this would contradict some previous research that showed smaller difference on perception between clusters and CVCs with velar C1 /k/ than with the bilabial one (*perece* vs. *prece* comparing with *crer* vs. *querer*, Mateus & Martins 1982).

A perception experiment showed that the difference between clusters and CVC-sequences are partially neutralized when produced by European speakers. Nevertheless, an unresolved issue is whether there are fine phonetic timing differences between clusters and CVCs that may be scarcely audible and therefore how good is the match between perception and perception. Consequently, we ran a physiological study with the aim of testing whether both consonants of the lexical CVC-sequence show a comparable gesture overlap as has been shown for lexical clusters in other languages (e.g., Byrd 1996; Marin & Pouplier 2010).

Physiological movement data were recorded using a 3D electromagnetic articulograph from five to seven first language speakers of European Portuguese. The sensors were fixed mid-sagittally on the lips (upper and lower lip), jaw and three on the tongue (tip, mid, back). The remaining were reference sensors. The speakers repeated every target word embedded in a carrier sentence 8 times. The stimuli consisted of lexical words containing velar or boilabial plosive in C1 position and liquide in C2 (i.e. /pr/, /pɨr/, /pur/, /kr/, /kɨr/, /kur/ and /pl/, /pɨl/, /pul/, /kl/, /kɨl/, /kul/ in initial position. The following vowel was held constant for each stimulus set. For the measures of consonant overlap we defined a) the interval between the end of the constriction plateau of the first consonant (C1) and the beginning of the gesture movement of the second (C2) (Chitoran et al 2002; Gafos 2010, Kühnert et al 2006) and b) the time interval between the end of the constriction plateau of C1 and the begin of the constriction plateau of C2. The distances were analyzed as independent variable with ANOVA in R for lexical category, place of articulation and C2 and post-hoc t-test for each significant interaction between the factors. The results showed that lexical clusters and CVC-sequences show both some overlap for both places of articulation. The overlap is generally greater for clusters than for CVC-sequences, and for stimuli with laterals than with rhotics. back-to-front CVCs (/ker, kel/) were overall more similar to lexical clusters than front-to-back PL clusters (/per, pel /). Taking the results together, European CVC showed less overlap than consonant clusters, but this difference was found to be gradual, not categorical and this influences the perception of these token.

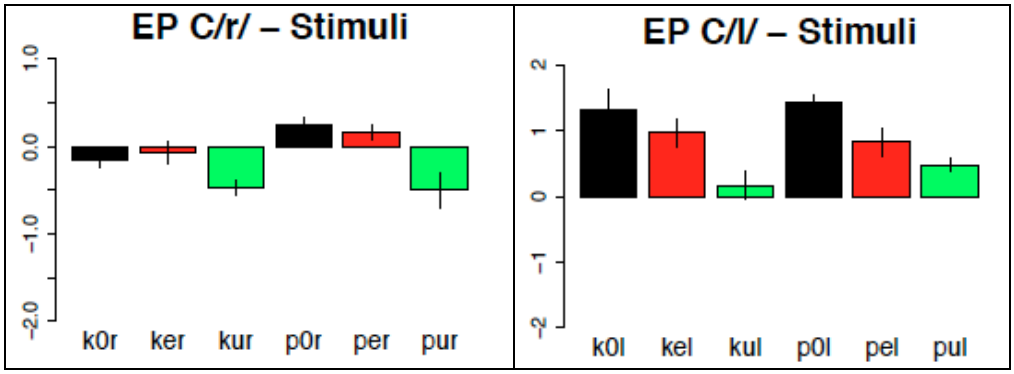

Fig. 1 Results of the consonants overlap measurement in the production of lexical clusters and CVC-sequences with the vowels /ɨ, u/.

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Phonologization of unstressed vowel reduction patterns in Catalan compounds

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In Catalan and in Spanish, V+N compound nouns (e.g. *tocadiscos* 'record player') contrast with segmentally identical syntactic phrases (e.g. *toca discos* 's/he plays records') in their stress contours, with de-stressing in the first member of the compound (Hualde 2007). Whereas in Spanish compound formation has the same effects on stress patterns as derivation—e.g., the compound *lavaplatos* 'dishwasher' has the same stress contour as, e.g. the derived word *lavadero* 'washing place'—, in Catalan the facts are more complex, given its phonological rule of vowel reduction in unstressed syllables. The seven stressed vowels of Central Catalan (/i e ɛ a ɔ o u/) are reduced to three in unstressed syllables, with /e ɛ a/ replaced by /ə/ and /ɔ o u/ neutralized as /u/ (e.g. *renta* [ˈrentə] 's/he washes' vs. *rentar* [rənˈta] 'to wash'; *toca* [ˈtɔkə] 's/he plays' vs. *tocar* [tuˈka] 'to play'). Interestingly, in V+N compounds the vowel in the lexically stressed syllable of the verb is said to be unreduced (Gràcia 2002). Thus, for instance, the compound *r*[e]*ntaˈplats* 'dishwasher' has a single stressed syllable, just like Sp *lavaplatos*, and contrasts with the phrase *ˈrenta ˈplats* 's/he washes dishes', but, as shown in the transcription, has a full vowel in the first member. One interpretation of the facts is that the lexically stressed syllable in the first member of V+N compounds retains secondary stress (Wheeler 2005:279). This view, however, has been disputed and other authors prefer to speak of unstressed but unreduced vowels, since they do not find any acoustic correlates of stress, other than the presence of a vowel belonging to the unreduced phonological inventory (Mascaró 1983, Prieto 2003).

We conducted a production experiment in which the vowel of the lexically stressed syllable of the first root of compounds of the productive type represented by *to͟caˈdiscos* is compared with the same syllable in segmentally identical phrases (*ˈto͟ca ˈdiscos*) and in derived words (*to͟caˈdor* 'dresser'). 20 speakers of Central Catalan read sentences where these words were embedded, in accented and deaccented position. The results show that absence of stress results in shorter full vowels as well as in a compression of the vowel space, indicating vowel centralization (Fig. 1). Somewhat unexpectedly, given previous descriptions, we find a certain amount of qualitative variation in the production of the target vowel. Some of the compounds in our experiment admit both a full vowel and a reduced vowel in their first root, the full vowel being the most common variant for all of them. This variation is clearly related not only to speaker preferences—one speaker did not produce any reduced vowel in compounds, whereas one speaker produced 16 (out of 60) —, but also to vowel identity (see Table 1) and, possibly, lexical frequency. In our data *parallamps* 'lightning rod' (more frequent) presented a reduced vowel in 48% of its occurrences, whereas *pesacartes* 'letter scale' (less frequent) was never reduced. In fact, the higher frequency compound *paraigua* 'umbrella' admits now only /ə/ in its first root. This effect of frequency on vowel reduction also extends to other types of compounds, e.g. *f*[ɛ]*rromagnetisme* vs. *f*[ə]*rrocarril* 'railroad'.

We interpret the facts in terms of a frequency-driven word-specific process of destressing (see Fig. 2). From a diachronic perspective, a relevant fact in the loss of stress is degree of lexicalization, which in turn is related to frequency. We will report on a follow-up experiment which directly manipulates lexical frequency in compounds with the same verb form (e.g. *rentaplats* 'dishwasher' vs. *rentamans* 'lavabo'). As in Hualde's (2009) proposal, we relate destressing in compounds and in phrases containing function words with a single mechanism of prosodic word formation, elaborating the phonological analysis in order to account for the complex facts of vowel reduction that we find in Catalan.

Figure 1. Vowel plot of Catalan vowels (mean z-normalized F1 and F2 values for 20 speakers) in the stressed (*str*) and unstressed (*uns*) position, and in compounds (*uns_full*).

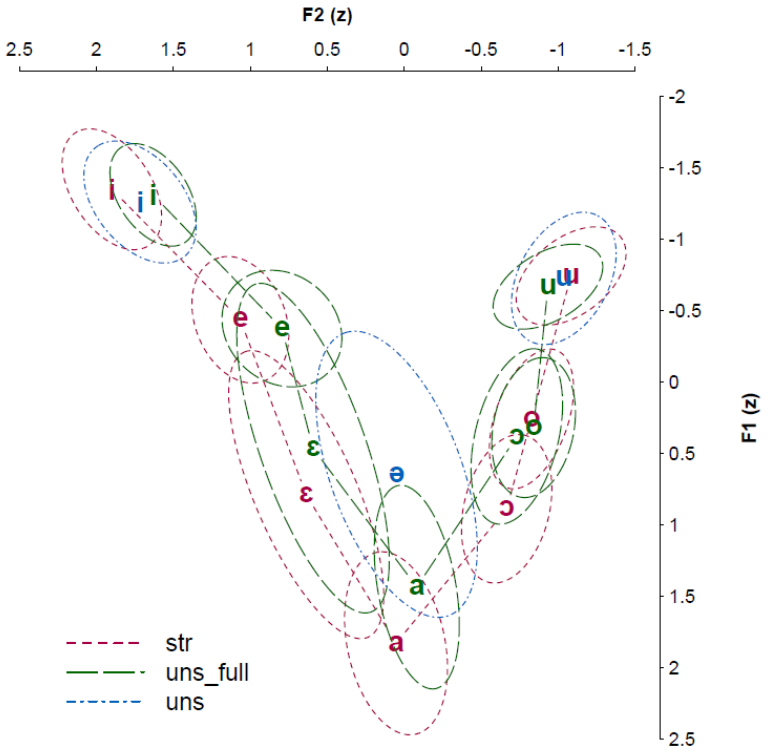
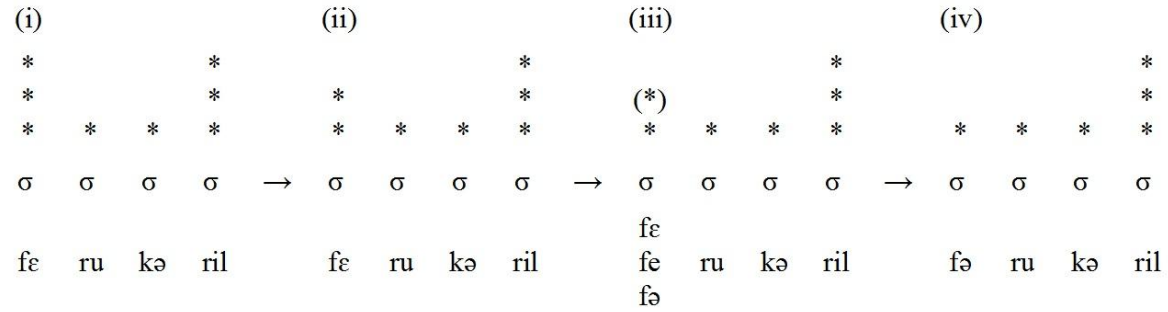


Table 1. Frequency of occurrence of reduced vowels in compound words by vowel.

Vowel	/e/	/ɛ/	/a/	/ɔ/	/o/	Total
Occurrence of Reduced Tokens	0% (0/192)	13.98% (33/236)	39.74% (93/234)	4.66% (11/236)	0.45% (1/220)	12.34% (138/1118)

Figure 2. Proposed compound word evolution.



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Lexical vs phonological categories in L2 learners

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Perceiving and producing the sounds of a second language, particularly sounds that are not contrastive in the L1, is an especially difficult task. The current study examines whether L2 learners of English have formed separate phonological categories for sound contrasts differing in a feature that is non-distinctive in their L1, *e.g. cat* /kæt/ vs *cut* /kʌt/ vs *cot* /kɑt/ ('single-category' assimilation, Best 1995). Specifically, we examine how difficulties in creating separate phonological categories impact on lexical representations. A medium-term auditory repetition priming task was used to investigate if a prime-target pair (e.g. /kæt/ vs /kʌt/) differing only by sounds that are subsumed perceptually under a similar L1 sound (/a/) yield the same amount of priming as (i) a repeated prime-target pair (/kæt/ vs /kæt/) or (ii) a prime-target pair differing by features that are distinctive in the L1 (/kæt/ vs /kɪt/).

It was hypothesized that if L2 learners have not formed distinct categories for English-specific contrasts (contrasts differing in features non-contrastive in the L1), e.g., /æ/ vs /ʌ/, they will process *cat* and *cut* as homophones that will show priming effects. This would be consistent with lexical models in which words are represented in the lexicon as abstract phonological representations (McClelland & Elman 1986). According to exemplar models, in contrast, words are stored in the lexicon in the form of detailed acoustic traces (Goldinger 1992). If words are stored directly as concrete exemplars, and L2 adult listeners have not lost the ability to perceive the acoustic properties of the speech signal (Werker & Tees 1984), then L2 learners might be sensitive to non-native contrasts when identifying words, and therefore minimal pairs such as *cat* and *cut* will not be homophones and will not show priming effects.

Forty-six Spanish/Catalan advanced learners of English and 18 American English speakers were tested in a lexical decision task involving real English words and nonwords produced by an American English speaker. Accuracy and reaction time were analyzed. Figure 1 shows the facilitation effect, or reaction time decrease between the first and second occurrence of an item (same) or between the occurrence of an item and its counterpart in a minimal pair (MP). Comparison of the top panels in Figure 1 shows smaller priming effects and inhibition in prime-target pairs with English-specific (/æ/-/ʌ/) compared to common contrasts (/æ/-/ɪ/) for both language groups. The greater inhibition in English-specific contrasts may be attributed to the greater similarity between the low vowels /æ/-/ʌ/ (than between a low and a high vowel in common contrasts) which would require a finer analysis when the two words are activated (Luce and Pisoni 1989).

More importantly, comparison of the left panels shows that there are no facilitation effects for *words* differing in an English-specific contrast for L2 speakers (suggesting that they keep *cat* and *cut* separate), but there is facilitation for *non-words* (e.g. /ʃæb/ primes both /ʃʌb/ and /ʃæb/). The fact that an English-specific vowel contrast is in part confusable in nonwords, whereas the different lexical items are kept separate suggests that the sound categories may only be abstracted from lexical contrasts at a later stage. This is compatible with exemplar models in which lexical representations consist of memory traces of tokens, with phonological patterns emerging as abstractions over the raw data. The implications of the results for models of speech processing and L2 learning will be considered.

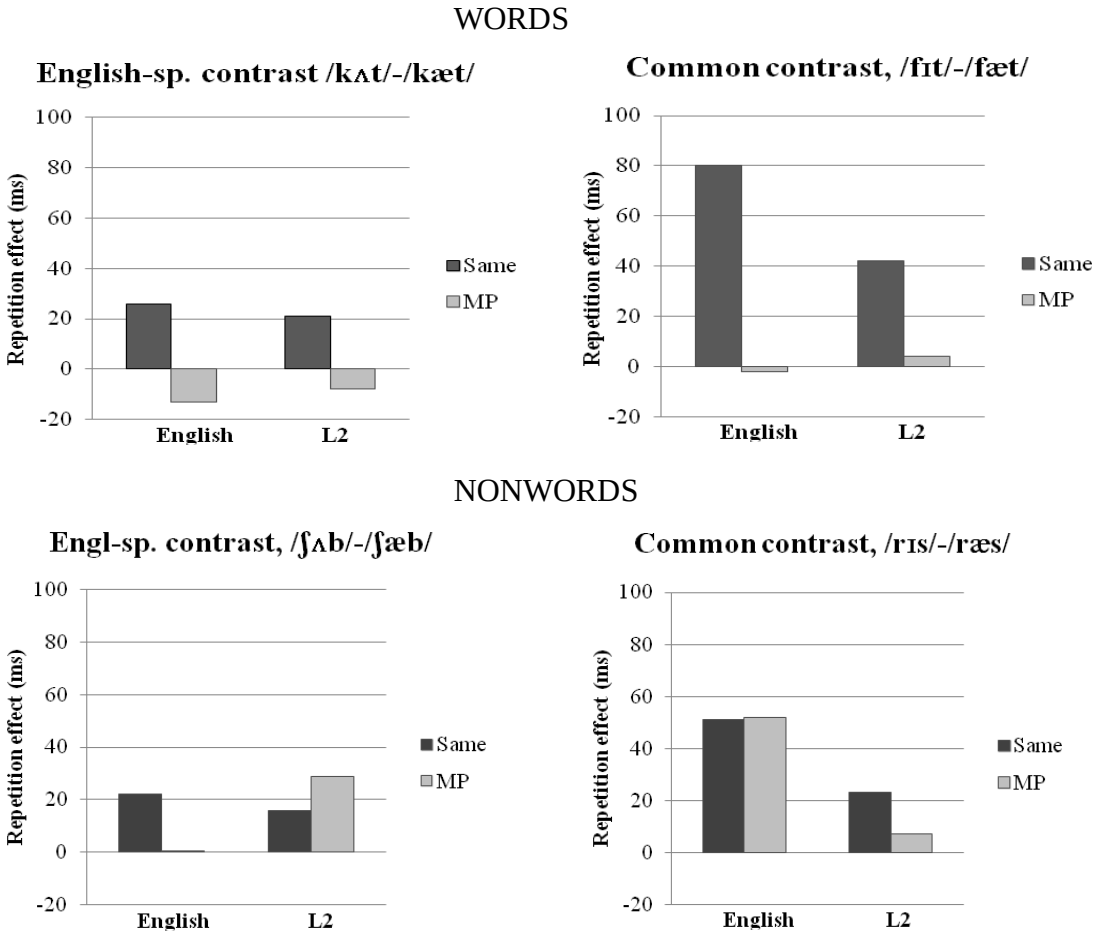

Figure 1. Facilitation effects for words (top) and nonwords (bottom) with English-specific contrasts (left) and contrasts common to Catalan/Spanish and English (right). Results are shown separately for the two language groups (English and Catalan/Spanish learners of English – L2) for the two conditions: same and minimal pair.

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POSTER SESSIONS

High Rise Terminals in Southern Californian English

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Rising melodies used with statements, commonly referred to as *high rise terminals* or *HRT*s, have been examined in the context of English varieties spoken in Australia, New Zealand, North America and the UK (e.g. Fletcher, Grabe & Warren, 2006, and references therein). These studies document that different tunes are used as HRTs across varieties but that by and large within each variety the same tunes are used both for statements and questions. For example, Fletcher et al. (2006) report that in Australian English L* H-H% and H* H-H% are used in this manner.

Here we present data from Southern Californian English HRTs. Our data show that the HRT tunes in this variety are different from those reported for other varieties of English, and that speakers retain systematic differences between HRTs used in statements and those used in questions both in terms of tunes employed and in terms of the scaling of the final rise.

The study included 11 male and 12 female Southern Californian speakers. Thirteen were monolinguals, while the other ten were bilingual in English and one of the following languages: Vietnamese, Japanese, Armenian, Assyrian, Spanish, Cantonese. Four types of data were collected from each speaker: (a) a map task with local landmarks and the participant as leader; (b) reading of the transcript of a sitcom scene; (c) retelling of the sitcom scene; (d) specially designed isolated questions and statements that were read aloud.

Preliminary qualitative analysis of tasks (a) and (d) shows that HRTs of different types are used in Southern Californian English for four purposes: (i) to ask questions; (ii) to request confirmation; (iii) to make a statement without any additional pragmatic nuances; (iv) to hold the floor. Although variation among speakers and even within the data of each speaker is observed, there are by and large consistent differences among these four uses.

Questions show a L* H-H% pattern with the stressed syllable of the last word in the question having a pronounced dip and F0 rising immediately afterwards (Fig. 1). In contrast, neutral statements display a L* L-H% tune: they show a pronounced dip on the stressed syllable of the last word but F0 remains low until the very last nucleus of the utterance at which point F0 rises abruptly (Fig. 2). L* H-H% can also be used with statements, but usually with a substantially smaller range for the final rise than that used with questions. Similarly L* L-H% can be used to hold the floor but with a smaller scale rise than used with final statements. In addition, speakers often use high plateaux (H-L%) rather than rises to hold the floor (Fig. 2). Finally, statements requesting confirmation show the most variability—possibly due to their dual status as both statements and questions—with L* L-H%, L* H-H% and H* H-H% being observed (see Fig. 3 for an example of H* H-H%). Further analysis investigating differences among speakers based on their gender, ethnicity and socioeconomic class is underway.

The patterns described above document the use of tunes in Southern Californian English that differ from those described for other varieties of English. Second, they show that Southern Californian English makes a principled distinction between HRTs for statements and questions; this distinction is typically reflected in the choice of tune but can also be signalled by differences in the scaling of the final rise. If such differences turn out to be used by listeners to interpret the pragmatic intent of an utterance, the results would suggest the need to incorporate scaling contrasts beyond H vs. L in phonological representations of intonation. Finally, this study underlies the importance of including dialectal variation in the investigation of intonation, and indicates that such variation exists even within dialectal areas often described as uniform, like the USA West (Labov 1998).

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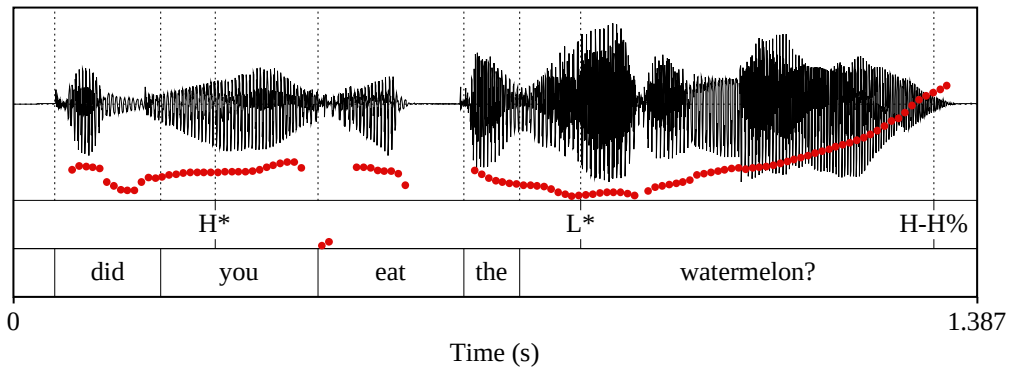

Figure 1. Question with L* H-H% tune.

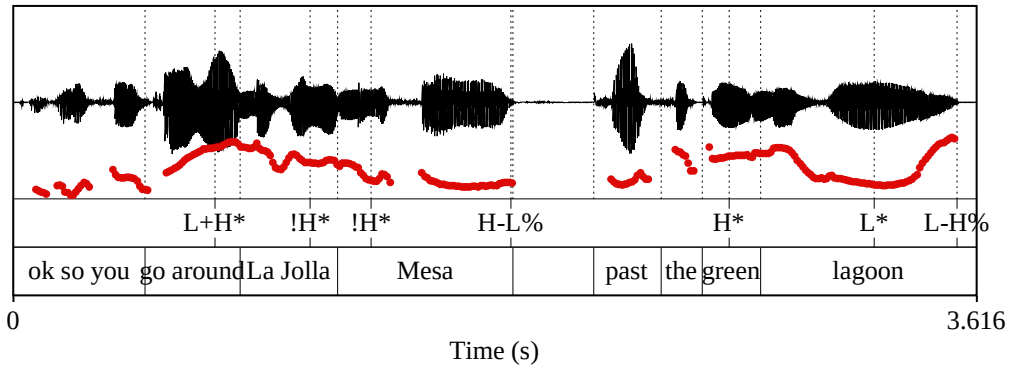

Figure 2. Holding the floor plateau (H-L% on *Mesa*) followed by final HRT on simple statement (L* L-H% on *lagoon*).

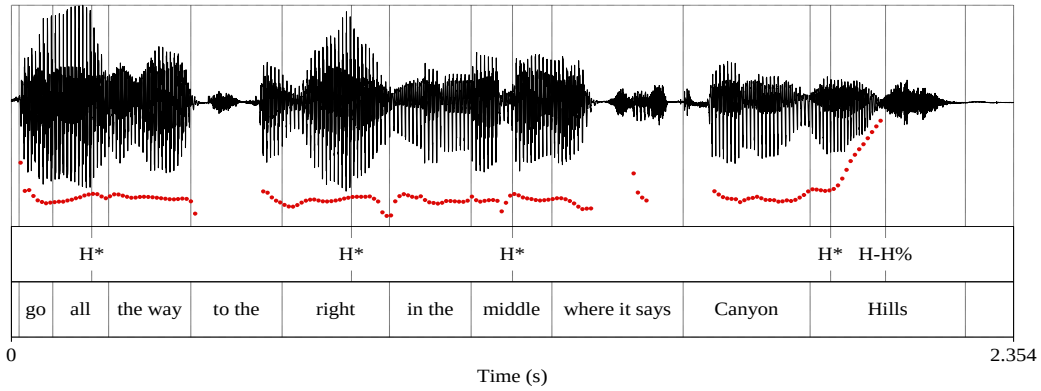

Figure 3. Statement requesting confirmation with H* H-H% tune.

Prosodic structure constraints and neurophysiological mechanisms

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In its most common acceptation, the prosodic structure consists of a hierarchical organization of prosodic words PW, or stress groups, into two or three levels. Sequences of PW form an (optional) intermediate intonation phrase ip, whose sequences form in turn another level of prosodic phrase IP, to finally form the whole sentence prosodic structure PS. Prosodic words normally contain a lexical word (Noun, Verb, Adverb or Adjective) and grammatical words such as conjunctions, pronouns, etc.
Besides well-established alignment constraints with syntax, this presentation investigates about the constraints pertaining to the PS itself, independently from any other any other structure of the sentence, syntactic, semantic or pragmatic. Such constraints limit the possible number of prosodic structures that can be associated with a given text. An explanation principle based on recent neurophysiological mechanisms is proposed here, essentially pertaining to the characteristics of short-term memory in the perception of syllables.
The Prosodic Structure constraints considered are:

1. Maximum number of syllables allowed in a prosodic word;
2. Stress clash preventing the advent of consecutive stressed syllables;
3. Eurhythmy, i.e. preference among all possible prosodic structures for balanced number of syllables at every level or for adjustment of speech rate to balance the duration of groups at the same level;
4. The syntactic clash preventing PW to contain certain sequences violating syntactic groups.

These constraints appear quite related if considered in the time domain:

1. The maximum number of syllables of a PW depends on the speech rate, the limit pertains to the duration of the PW rather than its number of syllables;
2. Stress clash is allowed, provided enough time (about 250 ms, eventually due to a pause) exists between the consecutive stressed syllables;
3. Eurhythmicity: either the PS balances the total number of syllables of IP (and possibly ip) at the expense of non-congruence with syntax, or the rate of speech is adjusted and slowed down for IP with few syllables and accelerated for IP with many syllables;
4. The syntactic clash explained by the identification time necessary to recognize unfamiliar syllabic sequences, contradicting syntax in the PW domain. The

violation of this constrain involves a time consuming revision of the initial phrasing realized by the listener on the base of prosodic information (P600 effect).

Following the proposals of Friederici & Wartenburger (2010), and others, all these observations lead to an hypothetical set of explanations to give an appropriate account of the constraints given above. Cortex waves Delta and Theta, among others, govern the flow of information from neuronal sets to other neuronal sets. Their frequencies vary roughly for Delta waves from 1 to 4 Hz, and for Theta waves from 4 to 10 Hz, i.e. periods of 250 ms to 1000 ms for Delta, and 100 ms to 250 ms for Theta waves. Commonly observed syllabic durations, 100 ms to 250 ms, and PW duration, about 250 ms (including pauses in the case of consecutive stressed syllables) to 1000 ms suggest that 1) Theta waves synchronize syllabic perception by listeners, and 2) that Delta waves synchronize the transfer of sequences of syllables into another part of memory storing larger linguistic units. Furthermore, boundary tones in final position of IP (and possibly ip) trigger the transfer of concatenated PW into IP.

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Norwegian tonal accents and the mental lexicon: 2 psycholinguistic experiments

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Norwegian and Swedish are two of the few Germanic languages that have tonal contrast. Polysyllabic words either have one of two tonal melodies - Accent 1 or Accent 2 in most dialects, yet there are also peripheral dialects that have no tonal contrast at all. Tonal dialects in Swedish and Norwegian are said to have approximately 350 and 2,400 minimal pairs respectively (Elstad 1972, Jensen 1958). Although segmental information usually suffices to identify the correct word, tonal information plays an important role in the morphophonology of these tonal dialects.

The lexical representation of the word accents has been a topic of much theoretical debate. The approaches can roughly be divided up into three major camps: Two privative approaches: A1 is lexically specified and A2 default (Lahiri et al. 2005, Kristoffersen 2006), the opposite lexical A-2 approach (Riad 1998, Kristoffersen 2000) and theories claiming a 3-way accent specification, i.e. morphemes can be specified for bearing A1, A2 or for being neutral (Withgott & Halvorsen 1984, and similarly Basbøll 2010 for word accents in Danish). Furthermore, another approach claims that there is no tonal accent in these dialects at all (Morén-Duolljá 2013).

In this study, we investigate how word accents are represented in the mental lexicon of East Norwegian speakers and also how/whether accent factors into speech perception. In light of the fact that the tonal accents seem to play a modest role in North Germanic – there are indeed dialects that get by with no tonal contrast – and there are in fact only few minimal pairs in the tonal dialects, a further goal is to shed light on the significance of segments as compared to word accents in word recognition.

We report on two crossmodal priming experiments using real words and words with incorrect accent as auditive primes. In both experiments (Exp A. semantic priming and Exp. B. form priming) participants had the task of deciding whether the visual targets were words or nonwords of Norwegian (Bokmål). The targets were either semantically related to the real word primes in Exp. A or form related in Exp. B (cf. Figure 1 below). Differences in reaction times and error rates were measured.

The results showed that the segments play a dominant role in word recognition; that is, the change in accent did not prevent lexical access. Both primes with correct and incorrect accent allowed for semantic and form priming. However, the error data show a much more interesting pattern of results particularly for form priming. Listeners made significantly many more errors when Accent 1 words were mispronounced with the incorrect accent. That is, on encountering the wrong accent, there was greater difficulty in matching the percept to the stored form of the word. There was no significant difference in the other direction. We argue that this indicates support for a specification for Accent 1 words while the Accent 2 words are underspecified.

(Figure 1 Form & Semantic priming: Test & control words)

Nos	**TEST words & controls**	Auditory Prime	**A.**Visual Target **Semantic** Priming	**B.**Visual Target **Form** Priming
36	identity A1S	*hummer*$_1$ 'lobster'	KRABBE 'crab'	HUMMER 'lobster'
	*identity (wrong accent)	**hummer*$_2$		
36	control(same accent as identity)	*villa*$_1$ *'villa'*		
	*control(opposite accent)	**villa*$_2$		
36	identityA2	*humle*$_2$ 'bumble bee'	BIE 'honey bee'	HUMLE 'bumble bee'
	*identity (wrong accent)	**humle*$_1$		
36	control(same accent as identity)	*panne*$_2$ *'pan'*		
	*control(opposite accent)	**panne*$_1$		

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The role of French intonational contrasts in encoding speaker certainty: The case of neutral vs. incredulity declarative questions

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While recent cross-linguistic studies have shown that the degree of speaker's commitment or certainty is encoded intonationally either in a gradient (Crespo-Sendra et al. 2010, Lee et al. 2008) or categorical fashion (Savino & Grice 2007, Vanrell et al. 2013), our understanding of how French speakers use Intonational-Phrase (IP) final contours to signal their degree of certainty is limited. In French, the contrast between information-seeking questions and confirmation-seeking questions can by conveyed through at least two strategies. First, as in English, a change in the order of constituents could be used. In this case, a closed-interrogative characterized by subject-auxiliary inversion contrasts with an incredulity declarative yes-no question, which uses the same form as a statement (Table 1). Another strategy to mark this contrast consists in using prosody rather than subject-auxiliary inversion. Here, both sentences are declarative questions (they are syntactically identical) and the speaker certainty is only intonationally marked. It is widely accepted that neutral declarative questions are mainly realized with a final rising movement ((L)H*H%). Additionally, previous descriptions of French intonation system have suggested that a fall from a penultieme unaccented f0 peak, which functions contrastively with the final rise at the end of the IP, might convey greater uncertainty (Fónagy & Bréard 1973, Mertens 1987, Post 2000).

The goal of this study is to investigate whether the presence of an unaccented f0 peak in the penultieme syllable of the Intonation-Phrase encodes the contrast between neutral vs. incredulity declarative questions in French. Specifically, we hypothesize that (L)H*H% would encode neutral declarative questions whereas (L)H+H*H% would encode incredulity declarative question (Fig. 1). Since no experimental data have investigated the phonetic and phonological properties of the French penultieme peak contour yet, the secondary goal of this paper is to precise the properties of this contour in terms of tonal targets' scaling.

To do so, we used a production experiment in which 6 native speakers of French read target sentences in a neutral vs. incredulity declarative question context. Target sentences consisted of 12 pairs of SVO utterances containing a 1-syllable subject, a 4-syllables-transitive verb and a 3-syllables object. For the neutral declarative question context, we used a question for which the speaker had no particular bias with respect to the answer he/she expected. For the incredulity declarative question context, the participant was explicitly asked to put back in doubt what his/her interlocutor has just said. We performed both a prosodic annotation (through a ToBI-style annotation scheme) and acoustic analysis (in which we measured duration and scaling of the penultieme syllable).

Prosodic annotation revealed that incredulity declarative questions consistently exhibited the presence of an f0 peak in the penultieme syllable of the IP (Fig. 2). The penultieme peak was mainly followed by a rise (LH+H*H%) or a fall to mid (LH+H*0%, Table 2). Acoustic analyses also showed that the H tone of the penultieme peak was approximately scaled at the same height as the last pitch accent, confirming his unaccented status since it was free from the downstep affecting subsequent pitch accents within the IP. The findings of this study provide the first quantitative description of a phonological contrast between (L)H*H% and (L)H+ H*H% to signal speakers' certainty in declarative questions in French. Additional perception experiments will be necessary to determine (i) whether French listeners are able to use the presence of a penultieme peak in a categorical fashion and (ii) whether speaker certainty could also be gradually encoded though the height of the penultieme peak.

Tables and Figures

	Syntactic strategy	Prosodic strategy
Neutral context	Maud a-t-elle amené des raviolis? 'Has Maud brought ravioli?'	Maud a amené des raviolis? 'Maud has brought ravioli!?'
Incredulity context	Maud a amené des raviolis!? 'Maud has brought ravioli!?'	Maud a amené des raviolis!? 'Maud has brought ravioli!?'

Table 1. Syntactic vs. prosodic strategy to convey speaker certainty in neutral vs. incredulity question contexts.

All speakers	57	10	33
AT	90	0	10
BB	100	0	0
CS	75	0	25
LL	25	75	0
MD2	0	0	100
MG	72	0	28

Table 2. Percentage of realizations of H+H*H%, H+H*L% and H+H*0% contours in our data.

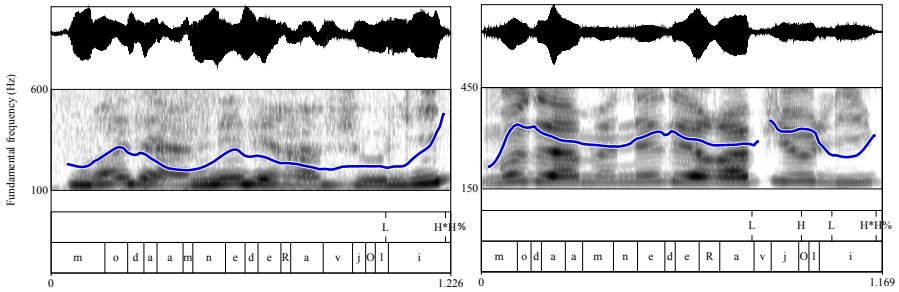

*Figure 1. Two renderings of the utterance Maud a amené des ravioli 'Maud brought ravioli' with a LH*H% (left) or a LH+H*H% contour (right) at the end of the IP.*

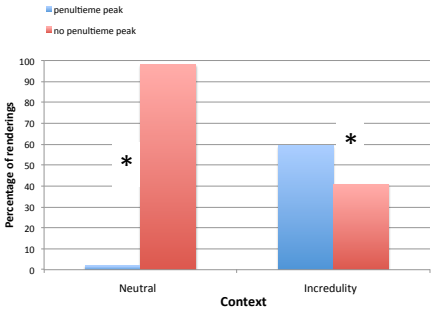

Figure 2. Percentage of realizations of a penultieme f0 peak depending on context (neutral vs. incredulity declarative context).

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Prosodic transfer in a contact variety: The case of *Olivenza* Spanish

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Olivenza Spanish (OLI-SPA) and *Olivenza* Portuguese (OLI-PORT), spoken in Olivenza (Extremadura), provide remarkable examples of Spanish-Portuguese contact. They are said to be influenced by one another due to the existence of Spanish-Portuguese bilingualism in this area until the middle of the 20th century (Matias, 2001; Sánchez Fernández, 1997). This study investigates the intonation and the speech rhythm of OLI-SPA, spoken by monolingual speakers, and of OLI-PORT, spoken by the 'last' Olivenza's bilingual speakers (all older than 60 years). Its goal is to examine if and to what extent prosodic features that are typical of Portuguese and Spanish, respectively, show up in OLI-SPA and OLI-PORT. It is hypothesized that the prosody of both varieties is crucially influenced by the contact language (Portuguese or Spanish). In order to detect the traces of the long-lasting contact, OLI-SPA and OLI-PORT are compared with another Portuguese variety: the Portuguese spoken in Évora (Alentejo), which, in turn, is not influenced by Spanish.

Regarding **speech rhythm**, it was shown that Standard Portuguese (STA-PORT) has mixed rhythm exhibiting great durational variability of consonantal intervals that places it in the stress-timed class, but variability and proportion of vocalic intervals that locates it in the syllable-timed class (Frota & Vigário, 2001). Thus, it is hypothesized that both OLI-SPA and OLI-PORT have syllable-timed rhythm, like Castilian Spanish (CAST-SPA) (see Benet et al., 2012 for CAST-SPA). **Intonational** differences between CAST-SPA and STA-PORT concern, e.g.: 1. The pitch accent distribution in declaratives (stressed syllables between the first and last one of the IP tend to be accentless in STA-PORT, in contrast to CAST-SPA) (Vigário & Frota, 2004); 2. The tonal realization of the nuclear contour in broad focus statements (L* L% in CAST-SPA vs. H+L* L% in STA-PORT); 3. The realization of nuclear contours in neutral yes-no questions (L* HH% in CAST-SPA vs. H+L* LH% in STA-PORT); 4. The realization of nuclear contours in neutral wh-questions (L* L% or L* HH% in CAST-SPA vs. H+L* L% or H+L* LH% in STA-PORT) (see Estebas-Vilaplana & Prieto, 2010 for CAST-SPA and Vigário & Frota, 2004 for STA-PORT); 5. The prosodic phrasing patterns in simple SVO declaratives ((S)(VO) in CAST-SPA vs. (SVO) in STA-PORT) (D'Imperio et al., 2005); and among others.

Preliminary results on OLI-SPA prosody have shown that OLI-SPA has a syllable-timed rhythm. Interestingly, vowel reduction was attested in unstressed syllables in OLI-SPA. Regarding the intonational differences between CAST-SPA and STA-PORT presented here, it was found out that: 1. Only 25% of the IP-internal stressed syllables were desaccented in the OLI-SPA data; 2. Broad focus statements were produced with a L* L% nuclear contour; 3. The most frequent nuclear contours in neutral yes-no questions in OLI-SPA are L* HH% (47.5%) and H+L* HL% (or H+L* L%) (37.5%); 4. The most common nuclear contours in neutral wh-questions in OLI-SPA are H+L* L% (55.5%) and L* HH% (28%). 5. The predominant prosodic pattern in OLI-SPA is (SVO) (occurring in 70% of the cases).

These findings can be interpreted as follows: First, OLI-SPA seems to be influenced by Portuguese in exhibiting vowel reduction and the (SVO) prosodic phrasing. Second, it appears to have generated both prosodic features typical of Spanish and of Portuguese (see the realization of broad focus statements, neutral yes-no questions, and neutral wh-questions) which can be interpreted as result of convergence between the intonational systems of Spanish and Portuguese. Nevertheless, the current study is in progress. Thus, a further step is to provide the analysis of the intonation and speech rhythm of *Olivenza* Portuguese and *Évora* Portuguese.

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Quantifying the perceptual salience of the differences between two dialects of Spanish

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Between any two dialects of a language we find various differences. Some of these differences might be more prominent or noticeable than others, that is, we might say that some dialectal differences are more salient than others (Siegel 2010). The purpose of this study is to quantify the perceptual salience of 6 phonetic or phonological differences between two dialects of Spanish (Buenos Aires Spanish and Madrid Spanish) at the individual listener level via a perceptual test.

The 6 dialectal differences included in this study reflect differences in phonemic inventory, differences in the articulation of shared sounds, or differences in the treatment of vocalic sequences. As an example of a difference in inventory, Madrid Spanish (MS) includes the voiceless interdental fricative /θ/ in its phonological inventory, while this phoneme is not found in the Buenos Aires Spanish (BAS) inventory (Piñeros 2009). Where MS uses /θ/, BAS uses /s/.

To quantify the perceptual salience of the 6 dialectal differences, 22 native speakers of BAS and MS (11 from each dialect) participated in a perception experiment, run in Praat (Boersma & Weenink 2013). The methodology used in the perception experiment builds on that used in previous experimental studies on the ability of listeners to accurately identify speaker ethnicity, regional dialect, or foreign accent, based on the presence of particular linguistic features (Clopper & Pisoni 2004; Fridland, Bartlett & Kreuz 2004; Graff, Labov & Harris 1986; Thomas & Reaser 2004; Torbert 2004, 2010). Following the logic and findings of Fridland et al. (2004), the prediction was that the participants would perform more accurately on trials involving the more salient dialectal differences than on those containing the less salient differences.

The stimuli included in the perception task were short sequences of sounds that captured only one of the dialectal differences under investigation. The stimuli were recorded being produced by 4 MS speakers and 4 BAS speakers (2 males and 2 females each). In the perception experiment, the 22 participants saw the orthographic form of each stimulus on the screen then heard two recordings of the stimuli being produced. Their task was to decide which of the two recordings had been produced by a speaker of their own dialect. The measure used to quantify perceptual salience was the percentage of the trials involving each dialectal difference that each participant responded to correctly.

Statistical analysis using mixed-effects models finds that the dialectal differences do vary in perceptual salience, as illustrated in Figure 1, and that there is an effect of dialect of the listener on how salient the differences are. For the BAS speakers the dialectal differences can be split into two salience groups (high and low), but for the MS speakers there is an intermediate level of salience comprising just one of the dialectal differences (gliding of /e/ in a vocalic sequence), a difference that was found to have low salience for the BAS speakers. I argue that the intermediate level stems from stigmatization of this particular variable in MS, but not in BAS (Hualde, Simonet & Torreira 2008). Furthermore, significant variation in the perception of salience between the participants was found, indicating that we cannot assume that individual speakers perceive the salience of linguistic variables in the same way.

The methodology and results of this study have applications in investigations of the role of perceptual salience in phonetic accommodation, second dialect and second language acquisition, and patterns of community-level sound change.

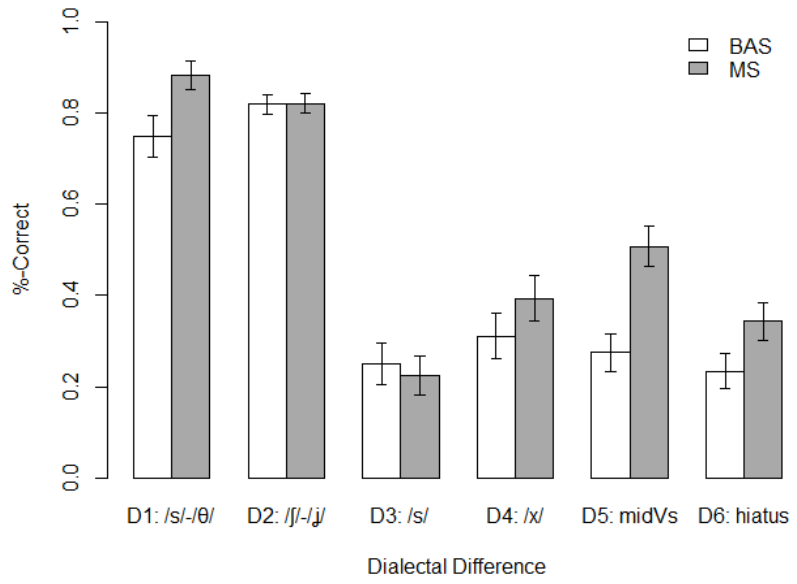

Figure 1: *Percentage of correct responses by dialectal difference by dialect of the participants*

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Trends in the acquisition of *tonality* and *tone* in L2 English prosody: perception and production.

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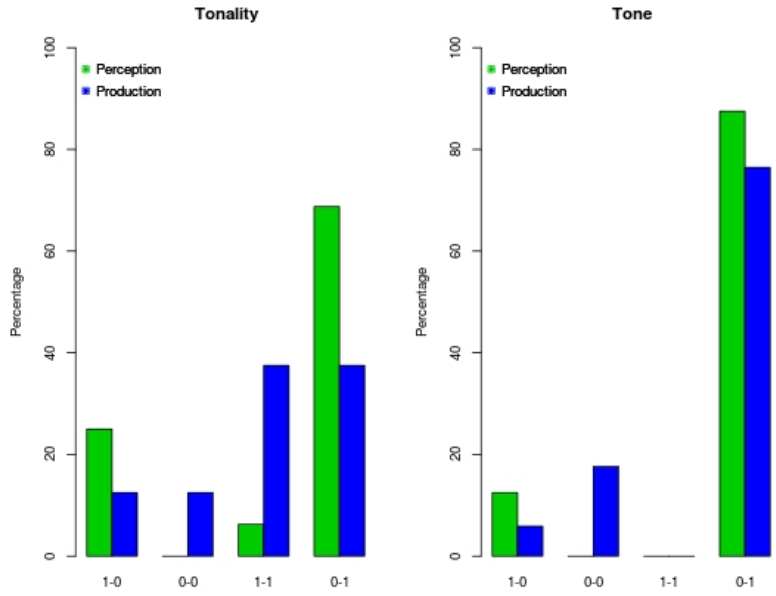
Learners of English as a foreign language either neglect prosody, or they transfer their L1 prosody into the prosody of L2, something which results in abnormal effects and also communication failure (Ramírez Verdugo 2006). When teaching and learning English prosody (if any), traditionally, too much attention is paid to a list of different prosodic patterns which are associated loosely with a set of communicative effects or meanings, at the expense of giving an opportunity to the learner to understand the system underlying such patterns. In order to improve and better understand the acquisition process of L2 English prosody, we undertake a series of experiments which evaluate individually to what extent the perception and production of the parameters *tonality* and *tone* (Brazil et al. 1980) improve in the student's performance. The stimuli for the perception tests consist of recordings of t-shirt slogans of the type *This land is your land*. They are recorded twice so that one rendition is produced with a natural intonation pattern, and the other shows an unnatural intonation pattern. Subjects are asked to judge the degree of naturalness of the renditions on a two point scale (1= natural; 0 = unnatural). In the production tests, subjects are asked to record their own rendition of t-shirt slogans. Such recordings are then judged by a trained phonetician. In the case of *tone*, the experimental design integrates prosody and pragmatic effects (Prieto and Roseano 2010), as it incorporates brief contextual descriptions which set the frame for understanding the intended meaning (House 2006, Wells 2006). In the case of *tonality*, however, no context was provided. The subjects involved in the experiments are sixteen B2-level (Common European Framework of Reference) learners of English who take the same perception and production tests before and after being instructed as to *tonality* and *tone*. For *tonality*, each subject listened to a total number of 28 paired stimuli and produced a total number of 20 recordings. For *tone*, the number of paired stimuli presented was 10, and subjects produced 10 recordings.

The results for *tonality* turn out to be inconclusive as to whether or not there is an improvement in perception and production in the post-test condition (0-1 in the left panel of figure 1) (McNemar's chi-squared = 2.4, df = 1, p-value = 0.1213 for perception, and McNemar's chi-squared = 1.125, df = 1, p-value = 0.2888 for production). This may be due either to the small size of subjects participating in the experiment, or to the fact that *tonality* stands as a parameter which shares common characteristics between English and Spanish, and consequently, needs no instruction; to what extent this might be true or not is further investigated in this paper. As for *tone*, the distribution 0-1 observed in the right panel of figure 1 for perception (McNemar's chi-squared = 7.5625, df = 1, p-value = 0.00596) and production (McNemar's chi-squared = 8.6429, df = 1, p-value = 0.003283) indicates a significant improvement in the post- instruction condition. Furthermore, there seems to be a greater improvement in perception than production, although this still remains to be confirmed statistically.

In general, these results confirm that the pre- and post- methodology used contributes to a gain in the acquisition of *tone* in L2 English prosody, and that while the improvement in perception seems to reach a higher level, production stays at a more conservative level. Finally, an analysis of incorrect responses in both the *tonality* and *tone* production experiments point in the following direction: 1) the *tonality* used by subjects exhibits a clear interference of the typical theme/rheme (rising-falling tune) organization found in their L1; 2) L2 falling tones produced by subjects exhibit a compressed pitch range, and L2 falling-rising tones show a low rise configuration. A detailed analysis of these findings is also further investigated in the present paper.



Left panel ***Right panel***

Figure 1. Distribution of student's knowledge before and after instruction on tonality *and* tone *(1-0 = pre-test with knowledge and post-test without knowledge; 0-0 pre-test without knowledge and post-test without knowledge; 1-1 pre-test with knowledge and post-test with knowledge; 0-1 pre-test without knowledge and post-test with knowledge).*

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Aspects of rhotic production in /Cr/ clusters in Greek

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The Greek rhotic sound is a tap in intervocalic position according to recent phonetic studies (Arvaniti 1999; Nicolaidis 2001; Baltazani 2009). However, when it occurs in consonant clusters it has similar realization to that found in clusters in Catalan, several Spanish dialects, in Romanian, and in Hungarian (e.g., Bradley & Schmeiser 2003; Bradley 2004; Recasens & Espinosa 2007; Vago & Gósy 2007; Savu (in press)): it is a complex segment consisting of a tap accompanied by a vocalic element (Baltazani 2009). This vocalic element, a vowel-like transition between the [r] and the second member of the cluster, is interpreted in other languages as a result of reduced overlap between the two existing consonantal gestures which leaves space between them for the realization of this brief vowel (e.g., Romero 1996; Bradley 2004; Recasens & Espinosa 2007). To explore these questions we designed a production experiment involving collection of both acoustic and articulatory (EPG) data. We have examined /r/ realization through several production experiments in several prosodic positions, including Cr and rC clusters, word-initial (#rV) and phrase initial positions (##rV) as well as word medially in intervocalic position (VrV).

In this study, we report on acoustic results from /Cr/ clusters. The speech material consists of words with a /VCrV/ sequence, where C = [p, t, k, f, θ, x] and V= [i, e, a, o, u], embedded in the carrier phrase [*I 'leksi_'ine a'pli*] 'The word _ is simple'. All words were up to four syllables long. The location of the stress varied so that the majority of items in the speech material were real words. Five Greek speakers were recorded repeating the materials five times, resulting in a corpus of 750 tokens (6 Cs X 5 Vs X 5 repetitions X 5 speakers). Durational and formant frequency measurements were based on the acoustic data and are reported in this study. Selected electropalatographic data are also reported; more detailed EPG data are examined in (anonymous). Our acoustic analyses included measurement of the duration of the rhotic and vocalic intervals as well as F1 and F2 formant frequencies at the midpoint of the vocalic element, as well as variability due to context and speaker. Factorial analyses of variance on duration and F1, F2 formants were run including subject (speakers 1-5), consonant manner (stop or fricative) and vocalic environment (i, e, a, o, u) as factors.

Our acoustic results clearly show the production of a tap, which is however frequently articulated as an approximant. Moreover, we typically found a vocoid present, intervening between the constriction phase of the rhotic and that of the preceding consonant, which is typically longer in duration than the constriction phase of the rhotic. The duration and formant frequencies of this vocoid are highly variable and depend on the speaker, the transconsonantal vowel and on the place and manner of the contextual consonant. Our results suggest that the vocoid has relatively similar quality to the transconsonantal vowel, with somewhat more centralized F2 values for the high and mid vowels.

Previous accounts for the articulation of /r/ rely on the existence of a consonant next to the rhotic, whose lack of overlap with the articulatory gesture of the rhotic results to the appearance of the vocoid. However, we have evidence for the appearance of a vocoid in our experiments on phrase-initial *singleton* /r/, where /r/ articulation is not affected by an adjacent consonant and yet the vocoid is present: in such environments, overlap with another consonantal gesture cannot be evoked. Our proposal, therefore, argues against such accounts, and instead we propose that the rhotic is superimposed on a rhotic-specific vocalic gesture, which is necessary for the execution of the ballistic gesture (cf. Blecua 2001), i.e the brevity/ballistic nature of the tap gesture requires an undelying vocalic gesture for its

execution. Coarticulatory effects are expected in different contexts, which can account for the spatial and temporal variability present during the vocoid and constriction phases of the rhotic.

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The role of discourse context, prosody, and gesture in the perception of verbal irony

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Most accounts of verbal irony agree in considering it a purely pragmatic phenomenon in which the contextual characteristics (e.g. specific situation, shared beliefs, and common ground between speaker and listener) are a key factor in its interpretation (Kreuz & Gluksberg, 1989; Gibbs, 1994; Kumon-Nakamura et al., 1995; Utsumi, 2000; inter alia). For example, Ivanko & Pexman (2003) showed experimentally that an ironic utterance will be interpreted differently depending on the degree of incongruity between the context and the statement. Concurrently to pragmatic accounts on verbal irony, some research has also focused on its linguistic expression and recognition. Regarding verbal irony expression, it has been clearly shown that speakers of different languages use specific prosodic modulations (e.g., Bryant, 2010; Cheang & Pell, 2008; Scharrer et al., 2011) and gestural markers (e.g., Attardo et al., 2003; González-Fuente et al., submitted) to convey information not explicitly encoded on the linguistic surface, thus facilitating the ironic interpretation. For example, González-Fuente et al. (submitted) analyze ironic utterances in a corpus of Catalan spontaneous speech, and found that prosodic information such as slower tempo and visual information such as general facial expressions, laugh/smiles, and the presence of gestural codas are very consistent markers of ironic speech. Regarding the perception of verbal irony, some studies have shown that listeners use prosodic information when recognizing verbal irony in spontaneous speech. For example, Bryant et al. (2005) and Capelli et al. (1990)'s studies demonstrate that, in the absence of contextual cues, the combination of multiple acoustic cues might be sufficient for the detection of ironic intent. Examining together contextual and prosody cues to irony perception, Woodland et al. (2011) found that both contextual cues and tone of voice influence the perception of a sarcastic utterance. However, as far as we are aware, little is known about: (a) the effect of contextual cues together with prosodic and gestural ones on the perception of verbal irony; and (b) the relative contribution of prosodic and visual cues in the perception of verbal irony. The goal of this study is twofold and will represent an attempt to answer these two questions.

First, in order to assess the audiovisual cues to verbal irony in Catalan, ten Catalan native speakers participated in a DCT (Blum-Kulka, 1989) in which 5 ironic and 5 non-ironic contexts were presented to them. A total of 100 utterances were obtained, and a part of them were used as stimuli (below called 'target utterances') in two perception experiments that aimed at investigating (a) and (b) as stated above. The first experiment was aimed at testing how acceptable ironically performed and non-ironically performed utterances are in ironic and non-ironic contexts (see 1a and 1c in Appendix). Sixty native Catalan speakers were presented with a set of 5 ironic and 5 non-ironic story-frameworks framing an ironically or non-ironically performed utterance. These target utterances were presented in (1) 'Audio' or (2) 'Audiovisual' modality conditions and in (1) 'Ironic' or (2) 'Non-ironic' performance conditions. Also, the target utterances were matched with the congruent contextual conditions (ironic context with ironic utterance performance and non-ironic context with non-ironic utterance performance) and with the incongruent conditions. Participants judged the 4 utterances-context pairs in both 'Audio' and 'Audiovisual' modalities on a Likert scale from 1 'Adequate' to 5 'Non-adequate'. The second experiment was aimed at testing the relative contribution of prosodic and visual cues in verbal irony perception in a neutral context (neither ironic nor non-ironic context; see 1b in Appendix). Thirty native Catalan speakers were asked to judge how much irony they perceived in a selection of the ironic and non-ironic utterances performed in the production task. These target utterances were presented in a neutral context in (1) Ironic and (2) Non-ironic performance conditions and in one of these four modality conditions: (1) 'Audio', (2) 'Video Only', (3) 'Audiovisual congruent' (prosody and gestures match) or (4) 'Audiovisual incongruent'. The participants judged the utterances on a Likert scale from 1 'Non-ironic' to 5 'Ironic'. The results are being analyzed and will be presented at the conference.

Appendix. Example of a story framework with 3 alternative contextual paths (a,b & c)

(1) John and Peter live on the same street and they are about the same age. Her sisters are friends, but they know each other only by sight. Today they have met by chance at bus stop. When they have met, they have cordially greeted and now both are waiting for the bus seated side by side.

(a) 'Non-ironic context. We are in July, the sun is shining, the sky is clear and it is a very hot day. John looks at the bright sun, and then tells Peter:
(b) ('Neutral' context). Today the weather is neither hot nor cold. John looks at the sky, and then tells Peter:
(c) 'Ironic context). We are in July, but it's raining cats and dogs. John looks at the enormous clouds in the sky and then tells Peter:

–"I feel like going to the beach now!"

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Spectral and temporal cues to nasality: insights from a speech perception study.

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Speech can be represented as a combination of temporal and spectral acoustic cues. Several studies have suggested that these two types of cues can be used to identify nasality in natural speech. In the case of nasal vowels, earlier studies argued in favour of a specific nasal formant around 250 Hz called *nasal murmur* (Delattre, 1954 ; Fant, 1960 ; Ohala, 1975) along with a loss of intensity (House & Stevens, 1956 ; Jakobson & Halle, 1956 ; Guth, 1975). Later, several authors have shown that one of the main correlates of nasality is a reduction of F1 intensity associated with a widening of the bandwith (Lieberman and Blumstein, 1988 ; Stevens, 1998). Some studies have investigated the availability of temporal cues to nasality : velum movements (Amelot, 2002), temporal modifications of formant structure (Reenen, 1982). Finally, Korowski & Blumstein (1984) argued that the recognition of nasals increases with both temporal and spectral cues.

Though most dynamic cues to nasality may relate to spectral changes through time, global intensity changes have also been evidenced (Kurowski & Blumstein, 1987). As a matter of fact, recent studies have shown that spectral channels may contain specific energy envelope modulations that seem to massively contribute to speech identification (Van Tasell, 1987).

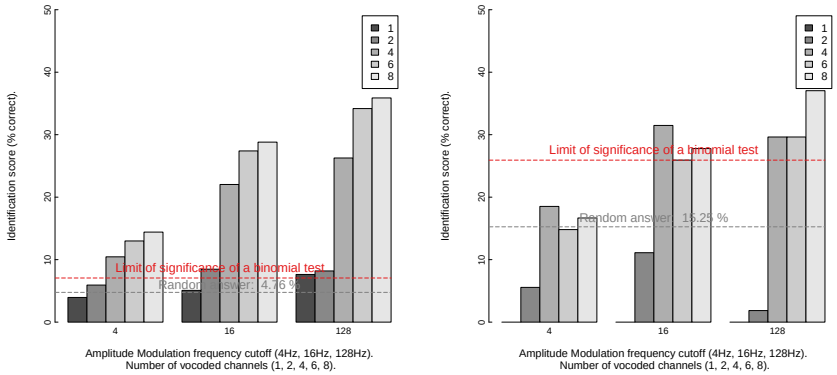
The aim of this study was to investigate the impact of such amplitude modulation envelope cues on the perceptual identification of nasals. Natural speech signals were passed through a channel noise vocoder. Each signal was processed to contain noise that covered either 1, 2, 4, 6 or 8 independent spectral channels, giving rise to various levels of spectral resolution. For each of the 5 spectral parameters, temporal modulations of the utterances were manipulated in order to be limited to three different low-pass modulation frequency cutoffs (4Hz, 16Hz, 128Hz). The speech signals that were submitted to the listeners were therefore a combination of two within-subjects variables : the spectral parameter is associated with an improvement of spectral resolution, while the temporal modulation parameter is associated with a finer temporal resolution.

Six French speaking adults volunteers (three men and three women) were enrolled in this study. Experiment 1 dealt with the identification of nasal consonants in VCV sequences (C = {p, t, k, b, d, g, f, s, ʃ, v, z, ʒ, ʁ, l, w, j, m, n, ɲ} and V = {i,a,u}), while Experiment 2 investigated the identification of natural steady-state vowels with V ={i, a, u, y, e, ɛ, œ, ø, o, ɔ, ɑ̃, õ, ɛ̃}.

Recognition rates were computed and compared to the theoretical random recognition rates for corresponding N-alternative forced-choice paradigms. In both experiments, correct recognition rates increased with spectral and temporal parameters ; most rates

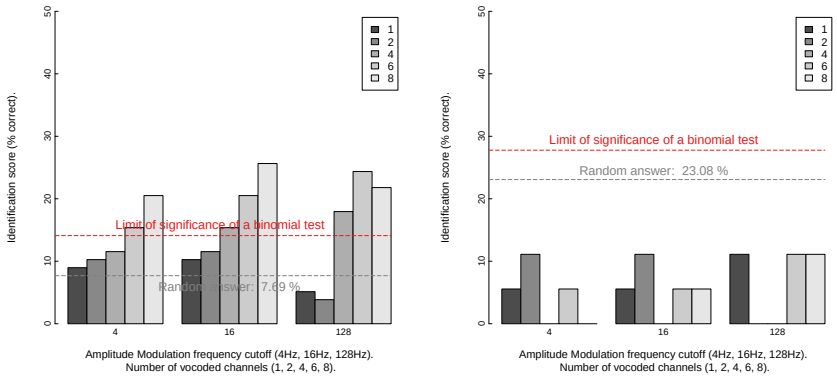
significantly departing from random starting from 4 spectral channels and a 16 Hz modulation frequency cutoff. However, one of our main findings was that, though oral and nasal consonants, as well as oral vowels, seem to resist to these manipulations quite well, nasal vowels show a dramatic reduction of recognition performance, with no single condition reaching recognition rates significantly higher than random.

Consonant recognition results may be explained by the presence of both spectral and temporal cues in the signal. As steady-state vowels are only associated with static spectral information, our results seem to indicate that, contrary to oral vowels, temporal cues may have a major impact on nasal vowel recognition.



(a) (b)

FIGURE 1 – Results of the Consonant Identification experiment (percent correct identification) : Fig. 2(a), global identification of oral and nasal consonants ; Fig. 2(b) : identification of nasal consonants only.



(a) (b)

FIGURE 2 – Results of the Vowel Identification experiment (percent correct identification) : Fig. 2(a), global identification of oral and nasal vowels ; Fig. 2(b) : identification of nasal vowels only.

Phonetic cues, the principle of parsimony, and morphology: the case of Arabic emphatics

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This paper discusses cross-linguistic and language-specific strategies to set up optimal phoneme inventories from phonetic data and presents a case where a phoneme inventory both goes against perceptual salience and sacrifices simplicity at the phonological level for simplicity at the morphological level.

If an articulatory gesture is regularly shared between a consonant and a vowel as is lip rounding in French *su* [sʷy] 'known' vs. *si* [si] 'if' then the principle of parsimony demands that the feature cannot be distinctive for both the consonant and the vowel. If the difference between unrounded [i] and rounded [y] is distinctive then the difference between [s] and [sʷ] is allophonic, or the other way round. Opting for lip rounding as a distinctive feature for vowels and allophonic for consonants is the better choice for both perceptual and theoretical reasons: (i) the acoustic cues of lip rounding are perceptually more salient in the vowel than in the preceding consonant and (ii) the phoneme inventory remains more economical.

In varieties of Arabic where emphasis spread is not blocked by high vowels, plain consonants co-occur with ATR vowels and pharyngealized, aka. emphatic consonants co-occur with RTR vowels as in سوس [su:s] 'licorice' vs. صوص [sˤʊ:sˤ] 'chick'. As with lip rounding in French, the acoustic cues of pharyngealization are perceptually more salient in the vowel than in the consonant (for a perception study with cross-spliced natural stimuli cf. Jongman et al (2011)). Setting up a phoneme inventory where ATR/RTR is distinctive for vowels and the difference between plain and emphatic consonants is allophonic will add 6 vowels to the phoneme inventory if long vowels are represented as single segments or 3 if they are represented as geminates. On the other hand, if emphasis is distinctive for consonants and allophonic for vowels then one has to add 7 consonants to the phoneme inventory: /tˤ/ (ط), /dˤ/~/ðˤ/ (ض/ظ), /sˤ/ (ص), /lˤ/, /rˤ/, /bˤ/, /mˤ/ (for the latter four cf. Watson (2002: 275)). Both perceptual salience and economy of phonemic analysis indicate a phoneme inventory with contrasting ATR vs. RTR vowels and allophonic plain vs. emphatic consonants. Nevertheless most authors assume a phoneme inventory where emphatic consonants are separate phonemes and ATR/RTR is allophonic for vowels. Is it a bias influenced by orthography or can it be justified?

Arabic is a language with root and pattern morphology where the root morpheme is a discontinuous string of consonants filled with the vowels of inflectional and derivational morphemes as in كتاب [kitæ:b] 'book' vs. كتب [kutub] 'books'. As shown in the example, changing the vowels does not change the root. However, plain vs. emphatic pairs such as سوس [su:s] 'licorice' vs. صوص [sˤʊ:sˤ] 'chick' have different roots, so what differentiates them is best assigned to the root morpheme. Since the root morpheme is a string of consonants, the feature that distinguishes roots must be consonantal, too.

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Prosodic Structure and Speech Cycling in Korean

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Korean is a language that does not fit easily into current conceptualizations of speech rhythm. Korean is not clearly classified as either stress- or syllable-timed (Arvaniti 2012 for reviews). In addition, it has neither lexical stress nor foot structure (Jun 2005) and thus challenges views that speech rhythm rests on alternations of prominence (e.g. Arvaniti 2009). Given the above, the aim of the present research was to examine what, if any, elements are used in Korean to create rhythm and how they relate to the language's prosodic structure. We used the speech cycling task which involves speakers repeating a phrase in time with a metronome (Cummins & Port 1998). Under these conditions, speakers keep prominent elements in stable phase. The hypothesis was that the initial syllables of Korean accentual phrases—the only prosodic constituent of Korean between the syllable and the intonational phrase (Jun 2005)—would show comparable and stable phasing independently of their order in the phrase. However, if Korean is syllable-timed (e.g. Kim et al. 2008) and at the same time lacks stress, then cycling should reveal no other regularities beyond those due to syllable order.

Twelve sentences, all with nine syllables in three accentual phrases (APs), were used for Experiment 1. The number of syllables in each AP varied following one of three patterns: 3-3-3, 2-4-3, 2-2-5; cf. [norɛga]$_{AP}$ [nɔmuna]$_{AP}$ [niɾida]$_{AP}$ 'the song is too slow' vs. [muɾi]$_{AP}$ [nɔmu]$_{AP}$ [midʒigɨnada]$_{AP}$ 'the water is too lukewarm'. This allowed for syllables that have the same order in the phrase to be in different prosodic positions within an AP; e.g. σ3 is AP-final in the 3-3-3 pattern, but AP-initial in 2-4-3 and 2-2-5. Five male and five female native speakers of Seoul Korean repeated each sentence as many times as they could in one breath fitting each repetition into the interval between the beats of a metronome set at 32, 36 and 40 beats/min. AP phase was calculated as a ratio of the cycle *d*: a/d is the phase of the AP2-initial syllable, and b/d that of the AP3-initial syllable (Fig. 1). Small (but statistically significant) phase differences were found due to syllable order and composition (CV or CVC). Despite these effects, phase was largely stable for syllables initial to AP2 and AP3 which presented bimodal distributions (Fig. 2). This applied across speakers and speaking rates.

In Experiment 2, a different group of nine native speakers of Korean produced a subset of the materials in Experiment 1 following the same procedures, but also making each phrase conform to a waltz rhythm with the waltz downbeat coinciding with the metrnonome beat. The recording of one speaker was of poor quality and was discarded. As shown in Fig. 3, the results for the other eight speakers were the same as those of Experiment 1 and exhibited even less variation in phase for AP2- and AP3-initial syllables. At the same time, however, speakers' productions did not differentiate between the initial downbeat and the other two AP-initial syllables (i.e. AP1-initial syllables did not sound more prominent than AP2- and AP3-initial syllables). This effect can be explained by the prosodic structure of Korean which does not allow for metrical strength differences between APs (Jun 2005).

The results of these two studies support our hypothesis that in Korean AP-initial syllables operate similarly to stresses; by extension they also suggest that speech rhythm can be seen as a phenomenon based on the alternation of constituents of greater and lesser prominence even in the absence of lexical stress, since languages like Korean can create prominences akin to stress post-lexically. At the same time, the second experiment clearly shows that cross-linguistic research on rhythm should take into account prosodic structure restrictions that pertain to each language and expectations should be adjusted to fit those restrictions. Finally, the effects of syllable order and composition on phase suggest that isochrony, even in a rhythmical task like cycling, is impossible to achieve.

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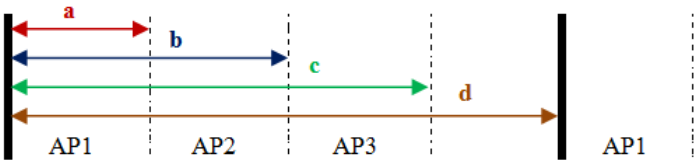

Figure 1. Measurement of phase; thick lines represent phrase onsets; broken lines AP offsets.

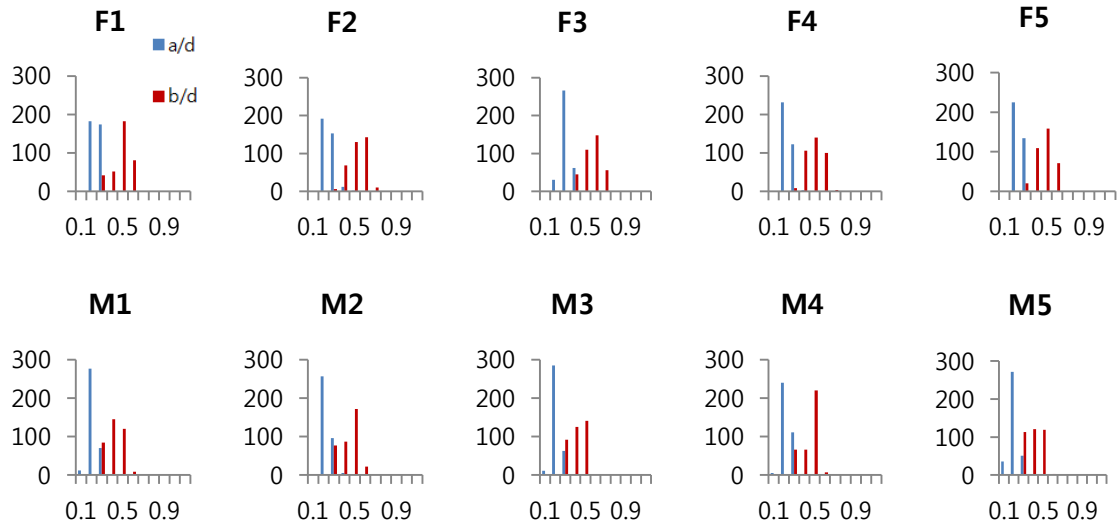

Figure 2. Histograms of a/d (phase of AP2-initial syllable) and b/d (phase of AP3-initial syllable) separately for each speaker; results from Experiment 1.

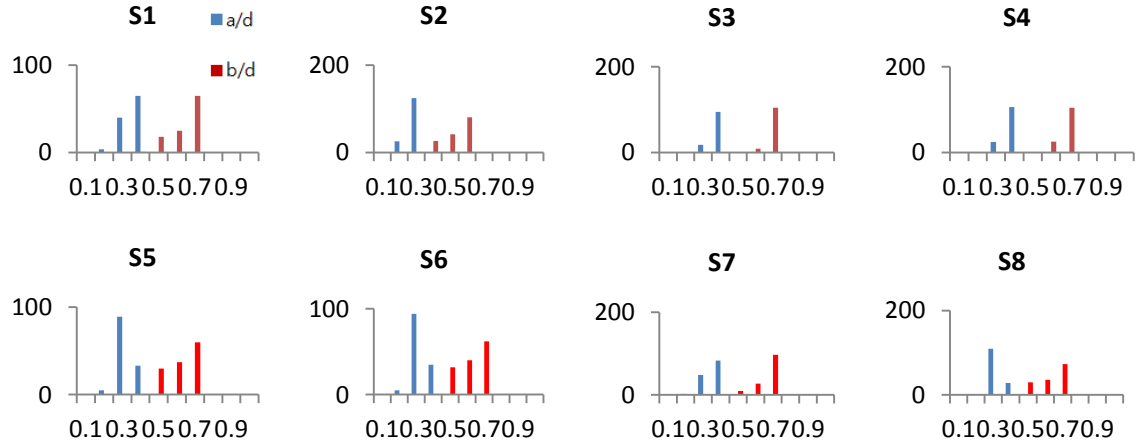

Figure 3. Histograms of a/d (phase of AP2-initial syllable) and b/d (phase of AP3-initial syllable) separately for each speaker; results from Experiment 2.

Regional Variations of Tempo in French

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The aim of this paper is to compare the tempo (pace at which speech segments are produced without taking silent pause into account) of 8 varieties of French spoken in three countries: France (Lyon, Paris); Switzerland (Neuchâtel, Geneva, Martigny, Nyon); Belgium (Tournai, Liège). The objective is twofold. First, we aim at checking empirically the hypothesis according to which Swiss and Belgian speakers articulate slower than speakers from France. Second we would like to assess the existence of differences between various regional varieties in the same country. Besides the "regional" factor, this study takes into account further factors that may have an influence on articulation rate: gender and age of speakers, speech style (reading or conversation) and constituent length.

Previous studies dealing with tempo led the contradictory results concerning the effect of the variety on articulation rate in French: some studies found no differences between a "standard" and a "regional" variety of French [Mahmoudian & Jolivet 1984; Sterling Miller 2007; Goldman & Simon 2008], while other scholars found significant differences between speakers from France and from Belgium or Switzerland [Avanzi, Obin et al. 2012; Avanzi, Schwab et al. 2012; Schwab & Racine, 2012, Schwab et al. 2012]. According to us, such discrepancies can be explained by the fact that in these studies, factors such as age, speaking style, gender and constituent length were not always controlled. Yet they play a crucial role on articulation rate (see Quené [2008], Schwab & Racine [2012]). In this context, our study takes into account all these factors in order to shed new light on the regional effects on articulation rate variations in French.

For each of the 8 examined varieties, we selected the recordings produced by 8 speakers (4 males/4 females of different ages). The speakers were asked to read carefully a journalistic text (22 sentences, 398 words, see Durand et al. [2009]) and to speak freely 20-25 minutes in pairs. The entire text and 3 minutes of spontaneous speech for each speaker were semi-automatically processed under the Praat software [Boersma & Weenink 2012]. Speech samples were orthographically transcribed and automatically aligned with the EasyAlign script [Goldman 2011]. Alignments were manually checked and corrected by one of the authors. APs boundaries (clitic groups carrying a pitch accent on their rightmost syllables, see Jun & Fougeron [2002], among others) were then identified by one of the author in a dedicated tier. Articulation rate for each AP was finally computed. The results were expressed in ms/syll (corresponding to syllabic duration, see Miller et al. [1984]) instead of syll/sec, given that some short APs (for example 2 syllables) were examined. Data were analysed by means of a generalized linear model (with repeated measures) with syllabic duration as a dependent variable and with the following predictors: speaker's variety, gender and age, speech style and number of syllables within the AP.

Preliminary results obtained for the reading data show that speakers form France (Paris and Lyon) articulate faster than speakers from the Swiss speakers, but not than the Belgian speakers. In other words, speakers from France and Belgium behave similarly regarding articulation rate, but differ from Swiss speakers. Next, gender and age also play a role of great importance in the articulation rate: male speaker articulate faster than female speakers; and the older the speakers, the slower they articulate. Finally, our results show that articulation rate varies as a function of constituent length. The longer the constituent, the shorter the syllabic duration. If the same results are obtained in spontaneous speech, this will mean that the observed differences are not due to the task, but have to be explained by other factors (such as accentual phenomena, schwa maintain, etc.).

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Prosodic lengthening and **verum focus** *in Spanish. Duration as main cue for information structure and evaluative function*

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Prosodic lengthening in Spanish has been studied from many different perspectives: lexical stress and accent (Toledo 1997, Almeida 1997, Toledo 2001, Prieto & Ortega-Llebaria 2006, among others), rhythmic variation (White & Mattys 2007, Toledo 1994), dialectal variation (Mora et al. 1999; Asuaje 2002), diaphasic variation (Payne et al. 2010), discourse structure (Cid & Maluenda 2005), humour and politeness (Hidalgo Navarro 2006, 2009, 2012), and even stress and focus (Prieto and Ortega-Llebaria 2007; Ortega-Llebaria 2008).

This paper deals with the prosodic marking of *verum focus* in Spanish (i.e., contastive focus on the positive polarity of a propositional content already introduced in discourse). While languages such as English and German mark *verum focus* by a high rise on verbal inflection (Höhle 1992), Spanish, in contrast, resorts to a low F_0 and the lengthening of the syllable receiving the nuclear stress. This pattern is used for declaratives and non-declaratives.

Our hypotheses are that native speakers will consistently match the lengthened pattern with discourse situations that involve repetition and that they will consistently associate this prosodic structure with a value of *insistence / impatience.*

We created a sample of 12 natural phrases (from Escandell-Vidal 2011); one of them was resynthesized with four different values for F0 and duration. Our aim was to contrast "neutral" *versus* "marked" contexts with a contrastive focus. Two perceptual tests have been conducted by 89 subjects (15+74). The tasks performed by the participants were identification of the dialogue from which the target phrase had been removed (natural stimuli and resynthesized) and assessment of the evaluative value.

The results confirmed our hypothesis: duration differences have an effect on the evaluation and interpretation of sentences in Spanish speakers. Correct identification rates of the prosodic pattern under analysis are over 70% of hits, 80% when the increased duration falls on the syllable receiving the nuclear stress; a long duration on the verb can be identified also as repeated discourse, but to a lesser extent (60-65%). A low pitch co-occurs in natural utterances with vowel lengthening, but its role, according to the synthesized stimuli, is not as crucial as duration. A high rise in the verb gives the poorest results in perception test (11%), suggesting that the Spanish pattern is a conventional, language-specific solution. No differences in the identification rate arose between grammatical modalities (declarative *versus* imperative). And almost 80% of the evaluative values associated with the marked pattern were *insistence* and *impatience*, far ahead from other possible values. We find some persistent variation in the accuracy in detecting the prosodic pattern among Spanish dialects, Madrilenian speakers showing better and more consistent results, but without statistical significance.

In this pattern, duration seems to be a relevant perceptual parameter *per se*, not merely a phonetic realization associated with high F_0 or complex pitch gestures; on the contrary, it can be independent from it and have a role in its own as a conventional means of encoding a specific information structure distinction.

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On some phonetic and phonological properties of the Greek glide

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The phonological behaviour of the Greek glide [j] is perplexing (see Rytting 2005, Topintzi & Baltazani 2013 and references therein) because of its propensity to act both as an independent phoneme /J/ (with /J/ as a shorthand for the different phonetic realizations of the glide, see below) contrasting with /i/ (1), as well as an allophone of /i/ as in the highly productive alternation in the paradigm of neuter nouns ending in *–i* (2). We argue that /i/ and /J/ are phonemes that surface intact word-internally (1). In specific contexts though, they neutralize due to a morphophonological pressure to preserve the number of syllables across the paradigm constant, as evinced in (2), where the addition of the plural marker *–a* forces the final [i] of the singular to become a glide in the plural. The glide's phonetic realization is variable: next to /n/ or /l/ it merges with them and surfaces as palatal nasal [ɲ] (2a) or lateral [ʎ] (2b); after palatals it is absorbed (1d, 2c); with all other consonants it undergoes fortition and emerges as a voiced [ʝ] or voiceless [ç] fricative (1c, 2d,e).

Based on the above criteria, we distinguish two types of palatalization in Greek: *Simple palatalization* (SP) occurs in underived environments, as in [cípos] "garden" and [ní.çi], (Velar+i,e → Palatal+i,e). *Extreme palatalization* (EP) (cf. Bateman 2007) involves consonant palatalization before a glide and the latter's subsequent absorption by the newly created palatal (C+J+V → Palatal+V, where C is velar obstruent, *n* or *l*). Extreme palatalization occurs both in derived environments (EDP; cf. [ní.ça]), and underived ones (EUP; e.g. [çóni] "snow"). Consequently, palatals in Greek – apart from /J/, that is – are always the outcome of either SP or EP application.

In a production experiment, we investigated the acoustic realization of palatals in the aforementioned palatalization processes, to detect possible phonetic reflexes. 7 female native Greek speakers uttered words containing /C+i/ and /C+J+a/ sequences (C = [ç, ʝ, c, ɟ, ɲ, ʎ, p, b, t, d, f, v, s, z, θ, ð, m, r]). The sequences were created for three palatalization (SP, EDP, EUP) and two word position conditions (initial, final). We measured, among other parameters, the duration of the consonant involved, as well as the duration and the quality (F1 and F2 formants) of (a) the C-to-V transition and (b) the steady state of the vowel following the C. Preliminary results for the palatal C sequences indicate first, that SP is distinguished from EP by C duration. Specifically, while in Greek it has been shown that there is word-final shortening (Baltazani 2006; Katsika 2007) and this holds true for comparisons between word-initial and word final vowels ($t(41) = 4.285$, $p<.000$), the opposite trend was found for word final SP consonants, whose duration was not different from word initial SP consonants ($t(27) = -.774$, $p<.446$). Second, derived sequences involve a significantly lower F1 position for the C-to-V transition in the F1XF2 space ($t(27) = -2.618$, $p<.012$), that is, closer to the F1 values of the following [a] vowel than in the underived sequences. These results suggest that the C-to-V transition is more prone to coarticulatory influence, in the derived condition, from the [a] that follows.

In sum, our experimental findings provide quantitative support to the phonological distinctions made above and furthermore show how experimental and quantitative evidence can shed light on phonological representation.

(1)

a. á.ði.a "permission" c. á.ɟa "empty-FEM-NOM-SG"

b.	sci.á.zo	“shade”	d.	scá.zo	“scare”

(2)

	SINGULAR			PLURAL	
a.	pçó.n**i**	“pawn”	f.	pçó.**ɲ**a	“pawns”
b.	vó.l**i**	“bullet”	g.	vó.**ʎ**a	“bullets”
c.	ni.ç**i**	“nail”	h.	ni.**ç**a	“nails”
d.	pó.ð**i**	“foot”	i.	pó.ð**j**a	“feet”
e.	má.t**i**	“eye”	j.	má.t**ç**a	“eyes”

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1 acquisition of variable truncation in Puerto Rican Spanish

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Puerto Rican Spanish (PRS) has the nuclear configuration ¡H* L% as the default contour for polar question marking. When the nuclear pitch accent ¡H* is realized on an IP-final stressed syllable (i.e. IPs ending with an oxytone word), PRS speakers may either truncate the low boundary tone (L%) (Figure 1) or compress it (Figure 2) (Armstrong, 2012). Thus part of acquiring the PRS intonational grammar involves becoming sensitive to the fact that truncation of the low boundary tone is variable for the ¡H* L% nuclear configuration. Falling contours have been claimed to be more natural and less 'marked' than rising contours in child speech based on Lieberman's breath group theory (Snow 2006; Behrens & Gut 2005) under the assumption that falls are a natural result of decrease in subglottal air pressure at the end of a breath group (Lieberman, 1967). While Lieberman's claim was about infants that could not yet control their intercostal muscles, this "biological" or "physiological" idea has been extended to toddlers and preschool age children (Behrens & Gut 2005; Lleó et al. 2004). Under this reasoning, we would predict that children will have a preference in production for compression (a final fall) rather than maintaining subglottal pressure to maintain the utterance final extra-high tone. On the other hand, where there is variation in the input, children have been shown to mirror their parents' production (Estigarribia, 2010). I explore the implications for these two points of view investigating how children acquire the variable truncation rule in PRS.
In this presentation, I examine longitudinal data from the speech of two PRS-acquiring toddlers between the ages of 1;7 and 3;6 (Ana and Cristina) and their caretakers. Ana's data come from the Cross Linguistic Study of Early Syntax (CLESS) corpus (Lillo-Martin & Snyder, 2002), and Cristina's data come from the Proyecto de la adquisición del español como lengua maternal (PAELMA) (Universidad de Puerto Rico – Río Piedras). 971 adults utterances and 657 child utterances were analyzed to ascertain the frequency of truncation vs. compression in yes-no questions where ¡H* L% is found phonologically. This was investigated for tokens with the appropriate phonological environment for truncation (henceforth truncation candidates) as in (1) but also those that did not present such an environment (non-candidates), as in (2). Overall, different truncation patterns were observed in child-directed speech (CDS) and child speech (Figure 3). In general, Cristina's parents truncated significantly less than Ana's parents ($p<0.01$) and Cristina truncated significantly less than Ana ($p<0.01$). Ana's parents truncated significantly less than Ana ($p<0.05$), though there was no significant difference when comparing Cristina to her parents ($p>0.05$). When the corpus was broken into four stages (Figure 4) we find that Ana truncates significantly more than her parents in Stages 1 through 3, but

reflects her parents' truncation rate better by Stage 4 (there is no longer a significant difference). Cristina truncates less than her parents during Stages 2-41 (significantly so at Stage 3) but like Cristina, is more similar to her parents' truncation pattern by Stage 4. Ana showed a decreasing tendency not shown by Cristina to truncate L% on non-candidates that disappears by Stage 4. The two CDS inputs are different, and unsurprisingly, we find different patterns for each toddler relative to those inputs. A physiologically-based hypothesis cannot explain the results presented here. Ana clearly prefers to truncate, which is the opposite of what such a hypothesis would predict. The results presented here imply a relationship between the specific input available in CDS and the children's production of truncation, though both children's production mirrors their parents' by the end of the corpus. The data suggest the importance of frequency in the input (Estigarribia, 2010)

(1) ¿Lo pudiste alcan**zar**? 'Could you reach it?' (truncation candidate)
(2) ¿Pudiste alcan**zar**lo? 'Could you reach it?' (non-truncation candidate)

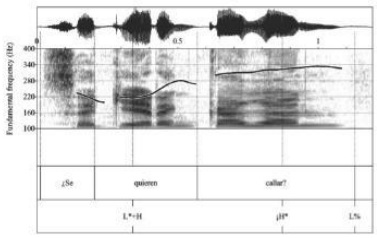

Fig 1. *¿Se quieren callar?* 'Can you guys be quiet?' – truncated low IP boundary tone L%

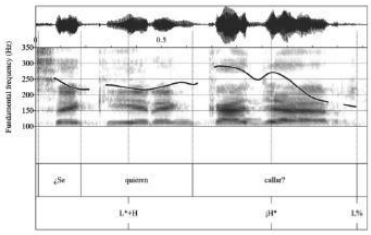

Fig 2. *¿Se quieren callar?* 'Can you guys be quiet?' – compressed low IP boundary tone L%

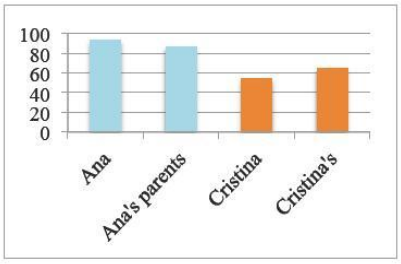

Fig 3. Mean truncation rates for each toddler and their parents (%)

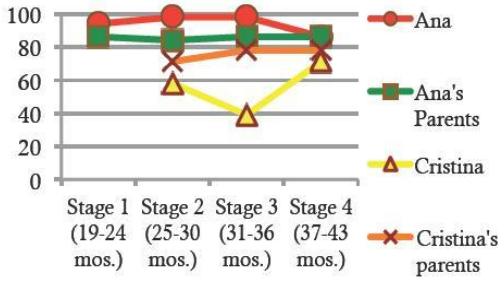

Fig 4. % truncation on good truncation candidates in child speech and CDS

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Speech rate in a gradient process: Intervocalic /s/ voicing in Lojano Spanish

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With the number of studies in laboratory phonology increasing, linguists are becoming more concerned with the phonetic nature of phonological processes. Two such studies have looked at voicing assimilation of /s/ before voiced consonants in Spanish (Campos-Astorkiza 2011, Schmidt and Willis 2011) and determined that it is a gradient process. On the other hand, while previous studies looking at intervocalic /s/ voicing in Highland Ecuadorian Spanish (HES) have argued it is a categorical process (Robinson 1979, Lipski 1989), these claims have not been corroborated with fine-grained acoustic analysis. The present study reports on production data from Lojano Spanish, a sub-dialect of HES. I will argue that intervocalic /s/ voicing in this dialect is not categorical, but rather a gradient process that is conditioned by speech rate, position with a word, stress, and gender.

Sixteen natives of Loja, Ecuador, half males and half females, were recorded in two tasks: a sociolinguistic interview and a reading task. The reading task included 64 tokens of intervocalic /s/ evenly balanced to test for the effects of stress and position, more precisely word initial (*la sonrisa* 'the smile'), word medial (*casa* 'house'), and word final (*los amigos* 'the friends'). From the sociolinguistic interviews, 20 tokens of each position were extracted for each speaker. After exclusions, percent voicing of /s/ was measured for 1,720 tokens. Following Campos-Astorkiza (2011), I consider voicing as a ternary category: unvoiced (less than 20%), partially voiced (20-90%), and fully voiced (100%). Each token was also coded for the following factors: local speech rate, stress, and position. Speech rate was measured in syllables per second for the three word sequence surrounding the target /s/ (*todos los amigos* 'all of the friends'). Stress was coded as the stress of the preceding and following vowel, for example 'stressed-unstressed' (*autobús azul* 'blue bus'). Separate mixed effects models were fitted to the data for the two tasks using pairwise comparisons, with individuals' speech rate as a random effect.

Overall, the results show that intervocalic /s/ voicing in Lojano Spanish exhibits much more variation than has been found for other varieties of HES (Chappell 2011). In the read data, there is a main effect of speech rate, position, stress, and gender, with a significant random effect of individual speech rate. More voicing is found in faster speech, in word final and initial contexts as opposed to medial, when /s/ is between unstressed syllables, and in males' speech. In the interview data, all of these same trends hold except that stress is no longer a significant predictor.

Based on these results, I argue that voicing in intervocalic contexts in Lojano Spanish can be seen as a reduction process given that it occurs more between unstressed syllables and in faster speech. As speech rate increases, there is more gestural overlap between /s/ and the surrounding vowels (Browman and Goldstein 1989). This gestural overlap counteracts the aerodynamic requirements that disprefer voiced fricatives (Stevens et al. 1992) and the interaction of these two opposing forces results in the gradient voicing of /s/. Nevertheless, voicing in this dialect is more complex in that it is also dependent on social factors, namely gender. In addition, this study shows the importance of looking at acoustic information, not only for voicing, but also for speech rate, which is usually considered merely 'faster' or 'slower' depending on the type of task. The use of these acoustic measures allows for a clearer understanding of the relationship between voicing and both linguistic and extralinguistic factors.

The results presented here on the gradient nature of this linguistic variable add to the growing body of studies that problematize the line between phonetics and phonology, showing that it is even blurrier than previously thought.

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Is L2 perception influenced by pronunciation instruction?

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Background: Formal instruction has been shown to have a positive effect on the acquisition of pronunciation in second language (L2) learners (Castino 1992; Elliot 1995, 1997; Lord 2005, among others). However, it is less clear whether it can influence L2 perception. The present study investigates the impact of pronunciation instruction on L2 perception in two sections of a third-year course on Spanish grammar at an American university. It is hypothesized that formal instruction will impact perception positively, since it would make L2 learners more conscious of speech patterns in Spanish (Ausín and Sutton 2010).

Methodology: Participants were 33 native speakers of English attending two sections taught by an instructor not involved in the experiment. Subjects in the experimental section (*EG*; n=15) received 10 to 15 minutes of formal pronunciation instruction weekly; subjects in the control section (*CG*; n=18) received extra grammar practice. Formal instruction was provided entirely in Spanish and included basics of articulatory phonetics, visual and aural contrast of sound differences, and student practice in the classroom. A pre-test was conducted at the beginning of the semester and a post-test towards the end. Both included (i) an AX word discrimination task, (ii) a closed set word identification task, and (iii) an open set word identification task. All tasks involved real Spanish words in natural speech pronounced by a native Spanish speaker. A grammar task was also included to determine whether incorporation of pronunciation instruction detracted from the main focus of the course (Elliot 1995).

Results: Subjects fared very well in all perception tasks, with averages ranging from 8.41 to 9.5 out of 10 possible points (Tables 1, 2). Results from the pre-test and post-test show minimal differences for perception between the groups. The only significant result occurred in the closed set identification task in the post-test, where CG fared slightly better than EG (Tables 1, 2). T-tests comparing pre and post-tests for each group reveal no significant differences, which indicates a lack of impact of pronunciation instruction on perception. Additionally, pronunciation instruction did not have an effect in grammatical learning (pre-test grammar scores: *EG*: 4.14; *CG*: 5.12; post-test grammar scores: *EG* 5.15; *CG:* 5.57; p=0.12, p=0.35, respectively).

Discussion: The perceptual results obtained were not expected but are along the lines of Bailey and Brandl (2012), who did not find significant differences in perception between formal instruction, implicit instruction, and control groups for beginning L2 students of Spanish. However, perception scores for both groups were very high in the present study, which could mean that students at this level have as a whole very good perceptual skills (see also Ausín & Sutton 2010). The examination of the most frequent misperceptions in this study for the pre-test and post-test reveals specific perceptual difficulties (Tables 3, 4). In particular, most subjects found the contrast between voiced and voiceless stops problematic for velars and labials (as in ‘casa, gasa’ or ‘peso, beso’). Additionally, many of the subjects misperceived stress, especially in the context of vowel sequences that can be syllabified as diphthongs or hiatus (as in ‘hacia, hacía’). The contrasts between /li, ʝ/ (as in ‘polio, pollo’) and /ɾ, l/ (as in ‘arma, alma’) were also frequently misperceived. These findings raise interesting questions regarding the relative perceptibility of the contrasts mentioned above for L2 speakers of Spanish, compared to others such as /n, ɲ/ (as in ‘cana, caña’) which were perceived correctly by most subjects. They also

suggest the need to supplement phonetic and phonological instruction with a specific perception component, along the lines of the contrasts indicated in Tables 3, 4.

Table 1: Pre-test perception averages (maximum points per task:10)

Group	Discrimination	Closed-set identification	Open-set identification
Experimental	8.71	9.14	8.79
Control	8.77	9.41	9.24
T-test	*p*=0.44	*p*=0.18	*p*=0.11

Table 2: Post-test perception averages (maximum points per task:10)

Group	Discrimination	Closed-set identification	Open-set identification
Experimental	8.46	9	8.54
Control	8.8	9.47	8.67
T-test	*p*=0.23	*p*=0.03*	*p*=0.38

Table 3: Most frequent misperceptions (pre-test; control and experimental groups pooled)

	Discrimination	Closed set	Open set	Total, all tasks	% (N=31)
/p, b/	12	1	6	19	61%
/k, g/	1	10	6	17	55%
V'V, VV	2	5	5	12	39%
/r, l/	5	2	4	11	36%
/j, li/	3	0	5	8	26%

Table 4: Most frequent misperceptions (post-test; control and experimental groups pooled)

	Discrimination	Closed set	Open set	Total, all tasks	% (N=28)
V'V, VV	3	8	13	24	86%
/kɾ, gɾ/	4	10	6	20	71%
/p, b/	6	1	5	12	43%
V', V	3	0	7	10	36%
/k, g/	8	0	0	8	29%
/j, li/	5	0	3	8	29%

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Duration as perceptual voicing cues in whisper

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This study concerns the production and the perception of the phonological voicing contrast in whispered speech in French.

Whisper is a mode of phonation naturally used in order to reduce the perceptibility of speech, mainly substituting the periodic sound source of modal voice by a noisy sound source. Whispered voice induces many changes: (i) intensity lowering, frequency flattening and formant rising [1-6]; (ii) lengthening of speech units and speech rate decrease [3, 5-7]; (iii) increase of airflow and air consumption [8]; and (iv) some kind of hyperarticulation [9]. Concerning perception, segmental and suprasegmental information is generally well perceived, with a recognition level above the chance: (i) vowel identity [10]; (ii) consonant place and manner [11]; even (iii) intonation, accent [3, 6, 12] or tone [13]); and strikingly (iv) voicing feature [6, 11, 14-16], as it is targeted here for French.

This study focuses on duration of pre-consonantal vowels and obstruents as secondary phonetic cues in production and perception of the phonological voicing in whispered speech, i.e. without phonetic (physiological and acoustic) voicing. In modal speech, these properties are part of numerous secondary phonetic cues commonly reported for voicing [17]. Duration of consonants and pre-consonant vowels are long frequently observed: (i) vowels are longer before voiced than voiceless consonants [2, 19, 20] and, (ii) voiceless obstruents are longer than voiced ones [2, 21, 22] (for a review and discussion).

A first experiment on production confirms that the phonological voicing contrast is also realized in whisper. Alternatively in modal and whisper phonations, 4 French speakers read 12 non-sense and 12 lexical words embedded the voiced and unvoiced obstruents /b-p/, /t-d/, /k-g/, /f-v/, /s-z/, /ʃ-ʒ/ in median-word position. The list-reading recordings were experimentally controlled: random order, fillers, anechoic room, etc.

As in modal phonation, in whisper acoustic durations show that unvoiced consonants are significantly 31 ms longer than voiced ones. The difference between unvoiced and voiced fricatives reduces from modal (Δ = 52 ms) to whisper (Δ = 37 ms). For stops, the difference remains constant: 28 in modal speech and 26 ms in whisper. Similar significant differences are observed whatever the phonation mode for pre-consonantal vowels: Δ = 11 ms before stops and Δ =19 ms before fricatives. So, the durational differences associated with the phonological voicing contrast of obstruents are also kept in whisper production.

In a second experiment on perception, durations of median-consonant closure and pre-consonantal vowel were acoustically manipulated to fit the duration of the counterpart member of a minimal pair (e.g. [d] to [t]… and vice versa). The proportion of the temporal lengthening or shortening of segments were based on the empirical results of the production test. The perception test was experimentally controlled: stimuli, random order, fillers, intensity level, experimental materials, etc.

First analyses show that the perception decreases slightly for whispered voiced obstruents (close to 90% of correct responses), but surprisingly very dramatically for unvoiced ones (around the chance level). Crucially, the results showed that consonant duration has more impact on the recognition of the voicing than vowel duration. These effects are cumulative, depending on the case. These results are discussed in relation to previous studies.

Finally, to our knowledge, this study is the first attempt (at least in French) to clear duration effects on voicing perception in whisper.

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Contrastive topics in L1 and L2 French: acquisition of phonetics and phonology

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This study compares the phonological and phonetic implementation of intonational rises by German speakers of L2 French in the context of an information structural contrast, i.e. *contrastive topics* (Büring, 1997). According to the literature, the function and the tonal alignment of pitch rises differ in German and French. In French, rises do not carry a *prominence-lending* function, as they do in a pitch-accent language like German. In German, depending on the alignment and scaling of the high and low tonal targets, a rising accent signals a contrastive or non-contrastive topic (Braun, 2006). The tonal targets in French, on the other hand, do not have stable segmental anchor points and varying them does not create a meaning contrast (Welby, 2006). Conceivably, such cross-linguistic differences represent a learnability problem for L2 learners. In this study, we investigate whether German learners of French produce French rises in a "German way", i.e. with different accent patterns than French natives and/or different phonetic implementation.

Our data set is comprised of 4 French natives and eight German L2 speakers of French (4 low-proficient and 4 high-proficient speakers). Utterance-initial phrases containing contrastive topics (*sur mon image*, "in my picture") were extracted from semi-spontaneous data collected in the contexts of a dialogue-game where people were comparing each other's pictures. Those phrases were labeled according to Jun and Fougeron's model for French (2002). Level of proficiency was assessed following CEFR (2011) criteria.

French natives mostly produced an L2H on the word *image* (Fig.1, Table 1). Low proficient L2 speakers differed from French natives and from advanced L2 speakers in the distribution of accent patterns: they produced significantly more LHH accent patterns (Fig.2(a), Table 2), whereas this accent pattern was absent in the French control group and in the advanced L2 group. From an acquisition perspective, the absence of the LHH pattern in the advanced L2 group indicates that learners eventually acquire French intonational phonology.

Although advanced learners show a near native-like distribution of accent patterns (L2H, Table 2), their rising accents differ from those of native speakers in terms of *f0*-excursion of the rise, *slope* of the rise, *alignment* of the elbow before the rise, and *convexity* of the rise (e.g., Cangemi, 2009). Results of linear mixed effects regression models showed differences in the *f0*-excursion of the rise (L1:3.8st, L2:6.7st, t=3.37), the slope of the rise (L1:28.1st/sec, L2:39.3st/sec, t=2.15), the alignment of the elbow with respect to the onset of the stressed vowel /a/ of *image* (L1:-22.25ms, L2:25.4ms; t=3.84), and the convexity (L1:-85.4 st./(seconds^2), L2:1994.3 st./(seconds^2); t=2.562). In other words, *contrastive topics* are marked by the same accent pattern in advanced learners and native speakers but advanced learners still differ from French natives in the phonetic implementation of the rise (compare Fig.1 and Fig.2(b)).

Taken together, these findings on contrastive topic marking suggest that the French rise is treated as a pitch accent in the Germanic way. Conceivably, French rising accent patterns are mapped onto the German pitch accents L*+H and L+H* by German learners of French (Kuhl & Iverson, 1995) and therefore produced in a non-French like way.

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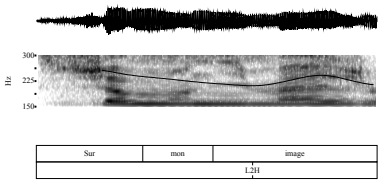

Figure 1: Example of L2H accent pattern by a French native.

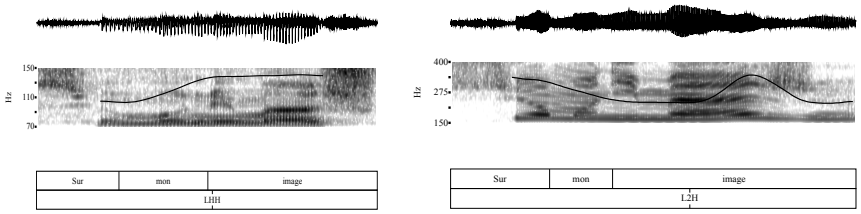

Figure 2(a)-(b): Example of LHH accent pattern by a low-proficient speaker L2 French speaker (left-side panel) and of L2H accent pattern by a high-proficient L2 French speaker (right-side panel).

L1 French		
Accent patterns	**M(%)**	**SD(%)**
LHLH	4.1	7.2
L2H	70.2	19.4
LLH	23.8	23.5
LH	1.9	2.6
LHH	0.0	0.0
Total	*100*	

Table1:average% and standard deviations of native accents

L2 French	**Low Proficient**		**High Proficient**	
Accent patterns	**M(%)**	**SD(%)**	**M(%)**	**SD(%)**
LHLH	3.7	2.5	14.7	23.9
L2H	19.0	10.5	66.2	22.4
LLH	20.2	19.2	18.0	18.7
LH	19.1	16.8	1.1	2.5
LHH	38.0	18.8	0.0	0.0
Total	*100*		*100*	

Table 2: average% and standard deviations of L2 French accents

Devoicing of phonologically voiced stops in European Portuguese – a comparative production and perception study

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Previous studies on European Portuguese (EP) (Lousada et al. 2010; Pape & Jesus 2011) have shown that phonologically voiced stops often do not have a discernible burst, and thus hinder the perceptual system to extract VOT cues. Further, recent studies showed that, in contrast to other Romance languages (Shih et al. 1999), EP has a considerable percentage of devoicing of phonologically voiced consonants (Jesus & Shadle 2003; Pape & Jesus 2011). However, the time characteristics and actual distribution of the devoicing behaviour are not known yet.

The present study explores the behaviour of devoicing in production and the importance and interplay of voicing maintenance and duration cues for stop perception *in absence of a facilitating burst*. We conducted a comparative production and perception experiment. The production study aimed to (1) examine the actual voicing behaviour of voiced vs. voiceless stops, (2) shed light to the time-variant devoicing behaviour of phonologically voiced velar stops /g/, and (3) extract the language-dependent temporal cues like vowel durations, stop durations and voicing maintenance during stop closure. These parameters are then used to conduct the perception experiment to examine the effects of these different factors on voicing identification.

For the production study, we recorded 6 native EP speakers (acoustics and EGG; same dialectal region – setentrionais/durinses-beirões) who produced CVCV clusters consisting of velar stops /k g/ in four *vowel contexts* /i e o a/ in two different *consonant positions* (intervocalic *initial* and *medial* position) with identical speech rate (9 repetitions). We manually labelled the preceding and following vowel durations and stop durations. Further, we computed a time-dependent *voicing profile* consisting in 10 consecutive points spread evenly throughout the stop closure.

For the perception study, we recorded 32 native EP listeners from the same dialectal region. The speech material generated for the perceptual experiments (extensively described in Pape et al. 2012) consisted of biomechanically modelled stimuli acoustically synthesized with a parametric model of the vocal tract and a three-mass vocal fold model. We aimed to examine three different factors for the perception of stop voicing: *consonant duration*; *contextual vowel duration*; *voicing maintenance*. From all different levels of the three continua (3x3x7) we constructed a forced choice identification experiment where the listener had to identify each stimulus (/g/ or /k/). Further, we conducted a discrimination experiment to test for the listeners' ability to distinguish the voicing maintenance continuum.

For the production study, we found that devoicing of phonologically voiced velar stops was very high for all EP speakers, with higher devoicing for stops associated with open *vowels* (see figure 1). There was no significant difference on *consonant position*. *Devoicing* occurred very early during stop production and was maintained throughout the complete stop closure.

For the perception study, we found that all factors (*vowel duration, stop duration, voicing maintenance*) were significant for the listeners' decision whether the stimuli were judged voiced or voiceless. Further, we could show that perception of voicing in EP is strongly dependent on the ambiguity of duration values, with higher influence of the *stop voicing maintenance* cue for stimuli with ambiguous duration values (see Figure 2). The results of the discrimination experiment showed that nearly all EP listeners are able to distinguish voicing maintenance differences above certain thresholds.

A strong devoicing behaviour (production experiments) for all EP velar stops resulted in an increased perceptual sensitivity for the perceptual cue *voicing maintenance*.

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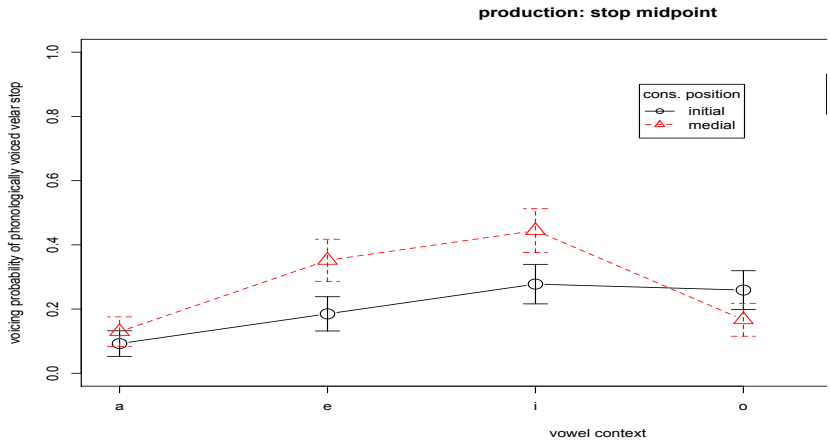

Figure 1: *Production study: voicing probability at the stop acoustic midpoint split by contextual vowel identity (x-axis) and consonantal position.*

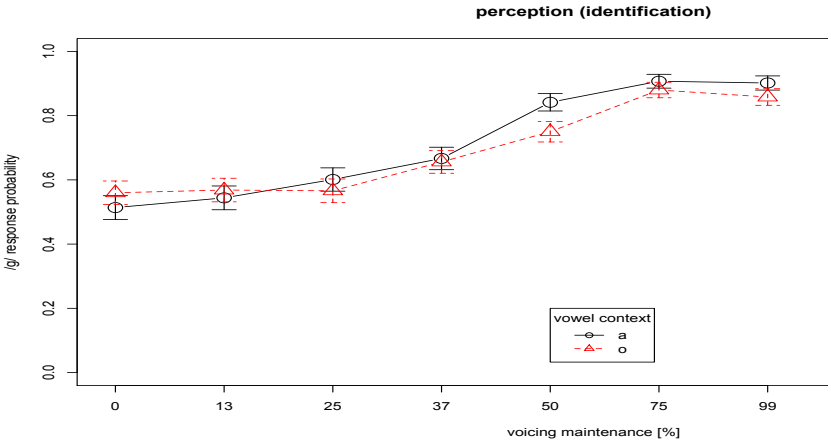

Figure 2: *Perception study: Probability of the listeners' "stop in stimulus is voiced" decision versus voicing maintenance during stop closure (x-axis) for stimuli with ambiguous duration values (vowel duration = 100 ms; stop duration = 125 ms).*

Early acquisition of word stress: a cross-linguistic infant study

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According to the Metrical Segmentation Hypothesis (Cutler & Norris 1988), metrical structure is used by infants to segment words from the speech stream. However, the evidence for this hypothesis comes mainly from initial stress languages (Höhle et al. 2009). Consequently, it is unknown how language-specific this hypothesis is and a cross-linguistic approach should be adopted to tackle this issue (Nazzi et al. 2006). Infants learning metrically opposed languages, namely infants learning Dutch (initial/ pre-final stress) and infants learning Turkish (final stress), are tested. In order to use metrical cues for word segmentation, infants first have to build a representation of the metrical structure of their native language. Therefore, we test the emergence of rhythmic preference in Dutch- and Turkish-learning infants during the first year of life.

Instead of using the traditional head turn preference procedure, an innovative preferential listening paradigm using eye tracking is employed to test the emergence of rhythmic preferences. Do Dutch- and Turkish-learning infants show a language-specific rhythmic preference and at what age does this preference appear? In total, 90 Dutch-learning and 90 Turkish-learning infants aged 4, 6 and 8 months have been tested. The first results of the Dutch-learning infants showed that they do not present a rhythmic preference at 4 months of age, but that they do show a language-specific rhythmic preference at 6 months of age. However, since there was no interaction between the factors stress pattern and age, we cannot yet speak of a development between 4 and 6 months. Therefore we tested an additional group of 8-month-olds for both language groups. These 'fresh off the shelf'-results will be presented in this paper and will give us more insight into the development during the first year of life, as well as allow us to interpret the results in a cross-linguistic perspective.

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Temporal Effects and the Multidimensionality of Spanish Stop Lenition

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Stop spirantization is perhaps the most frequently-discussed phenomenon in Spanish phonetics and phonology. It has been described as an instance of consonant lenition or weakening whereby voiced stops /b,d,g/ surface as continuants ([β̞, ð̞, ɣ̞]) in all contexts except in initial position, after nasals, and exceptionally after /l/ in the case of /d/ (Harris, 1969; Hualde et al, 2010; Martínez-Celdrán, 1991, 2008; Romero, 1995). Although stop spirantization in Spanish has been viewed as complementary distribution of two allophones, a number of studies have also provided evidence of some variability in the outcome of the phenomenon, which points to a gradual view of the process (Cole et al, 1999; Hualde et al, 2011; Martínez-Celdrán, 1991, 2008; Ortega-Llebaria, 2004; Romero, 1994; Soler and Romero, 1999).

Previous experimental studies have attempted to describe the phonetic features of the spirantized realizations and the factors that intervene in the phenomenon. Mainly based on information provided by acoustic data, they report a range of closure degrees in the spirantized realizations (Colantoni and Marinescu, 2010; Hualde et al, 2011; Martínez Celdrán, 1991; Soler and Romero, 1999). However, a more controversial issue is the role that different factors play in the spirantization process, which has motivated a number of studies on the effects of flanking segments and stress conditions on the spirantized consonants (Cole et al, 1999; Hualde et al, 2010; Kingston, 2008; Lavoie, 2001; Romero, 1994). Similarly, other factors have also been posited to play a role in the spirantization process, such as speaking style, and speaking rate (Soler and Romero, 1999).

The different issues raised in the description of Spanish spirantization depict it as a multi-dimensional process which deserves further consideration. The present work investigates how the variability observed in the spirantized allophones may be crucially conditioned by the temporal dimension. We hypothesize that the principle underlying stop spirantization in Spanish involves decreased gestural magnitude whereby the target realization is undershot and so is not completely achieved due to timing constraints. The resulting realization of the process will thus show reduced constriction degree and reduced duration, which would go along in this phenomenon.

In order to test our hypothesis, a laboratory experiment was designed including a range of contexts and two speaking rates to test how the outcome of spirantization of /b, d, g/ is driven under different conditions. The contexts include flanking vowels (/a, e, u/) and flanking consonants, comprising fricative/C, rhotic/C, lateral/C, and the control group nasal/C, where spirantization does not occur; additionally, the homorganic voiceless stops were also considered. Following Kingston (2008), we also developed a highly reliable automatic event identification procedure based on first derivative traces of signal intensity which allowed us to overcome well-known segmentation inconsistencies in the analysis of lenited tokens. Three subjects participated in the experiment.

Preliminary results show some clear trends in the hypothesized direction, indicating that the realizations of /b,d,g/ are affected by time and contextual factors. For individual subjects, the results for each of the dependent variables (consonant duration and C-V intensity ratio) were submitted to an analysis of variance. Global results show that both duration and intensity ratios are significantly affected by speaking rate. Similarly, results for both dependent variables are significantly affected by context. Intervocalic positions seem to be most clearly affected by speaking rate, and spirantization may fail to occur in intervocalic position at a

slower rate. In addition, context patterns can be altered as a function of temporal effects, which also seems to point to a crucial role of time in Spanish stop spirantization.

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The impact of vowel duration on locus equation slopes.

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Formant transitions are among the most described patterns in speech production. They represent frequency changes that happen because of the movements of the articulators in the vocal tract ; they are therefore associated with the articulatory transitions from a consonant to a vowel or from a vowel to a consonant. Classical studies [1] held that the directions of these transitions provide information about the place of articulation of stop consonants. But Öhman [8] argued that the concept of the fixed *locus* is not consistant with the dynamic nature of speech production. The concept of *locus equation* was originally proposed by Lindblöm [3] and has later been developed by Sussman [5] to solve this issue. Locus equations represent the linear relationship between the initial and the mid point of the second formant. According to Sussman [6, 4], locus equations constitute a source of relational invariance for the identification of stops' place of articulation.

Vowel duration is considered as an important cue in speech perception [7]. It may be associated to vowel length phonological contrasts as well as to variations in speaking rate and vowel accentuation depending on languages. As a matter of fact, changes in formant frequencies may occur in relation to vowel length [2]. It is also of particular interest that the computation of locus equations does not involve any temporal dimension, although it is derived from a representation that contains time.

The purpose of this research was to study the influence of temporal differences that are associated with vowel length contrasts (long vs. short vowels) on locus equations. We expect that variations of vowel duration in CVC patterns should have a non-negligible impact on locus equation slopes. Five male native speakers of Jordanian Arabic participated in a speech production experiment in order to investigate this hypothesis. C1VC and CVC1 words were selected from the Arabic lexicon (with C1 = /t,t',k,q,?/ and V = /a,u,i,aː,uː,iː,oː,eː/). Among all, each of these conditions (8 vowels, 5 consonants, 2 syllabic positions) was combined to select 80 actual arabic words that were read by the speakers within a carrier sentence (/ħaka ... marteːn/ : he said ... twice). Each of these 80 sequences was repeated 15 times in a random order. Formant frequency tracks along with their corresponding temporal positions were extracted using the *Praat* software.

Preliminary results of two speaker data (other data analyses are in progress) indicate that there is a significant difference between locus equation slopes of long vowels and those of short vowels. The slopes of a consonant associated with long vowels are significantly lower than the slopes of the same consonant associated with short vowels, see Table 1. These results seem to support our hypothesis. In the final paper, we will detail various issues concerning this effect, particularly issues pertaining to methods of computation for the parameters of locus equations as well as issues concerning the relationship between time and frequency in acoustic measurements. These issues will provide the opportunity to address several questions concerning the modelling of place of articulation acoustic linearities through locus equations.

	S1		S2		Mean	
Consonant	Short V.	Long V.	Short V.	Long V.	Short V.	Long V.
t	0.54	0.48	0.86	0.67	0.7	0.58
t'	0.66	0.3	0.8	0.68	0.73	0.49
k	0.75	0.68	1.12	1.06	0.93	0.87
q	0.52	0.56	0.95	0.83	0.73	0.69
?	0.96	0.86	1.02	0.94	0.99	0.9

Table 1: Mean values of locus equation slopes computed for each consonant coarticulated with respectively short and long vowels. Acoustic data are currently available for subjects 1 and 2.

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Prosodic development: A Link to Executive Functions?

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Few studies explore the relations between prosodic development and executive functioning skills. Executive function (EF) is a neuropsychological construct corresponding to a complex set of processes that are responsible for goal-directed behavior, such as planning, cognitive flexibility, inhibition, organization and working memory. Both prosody and EF begin to develop during the early years and some aspects continue to develop throughout the individual's life. So far, little is known about the nature of the relationship between prosodic development and EF. In the present study we aim to understand how executive functions are related to different measures of prosody.

A total of 109 participants (5 to 18 years old) were organized in six age groups: 5/6 years (n = 14; M = 5.14 years; SD = 0.36); 7 years (n = 19); 8 years (n = 18); 9/10 years (n = 20; M = 9.40 years; SD = 0.50); 11/14 years (n = 22; M = 12.91 years; SD = 1.06); and 15/18 years (n = 16; M = 16.25 years; SD = 1.29). All were native speakers of European Portuguese without visual or hearing problems.

Participants were evaluated with the Portuguese version of the Profiling Elements of Prosodic Systems-Communication (PEPS-C; Peppé & McCann, 2003) and parents responded to the Behavior Rating Inventory of Executive Function - Short Parental Version (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000; Teles & Vicente, 2011). The PEPS-C is a test addressing receptive and expressive prosodic skills in parallel. The tasks are at two levels: formal and functional. The formal level assesses auditory discrimination and voice skills required to perform the tasks, whereas the functional level evaluates receptive and expressive prosodic skills in four domains: (1) Affect – liking vs. disliking; (2) Turn-end – questions vs. statements; (3) Chunking – prosodic phrase boundaries; and (4) Focus – emphasis in a particular word. The BRIEF - Short Parental Version assesses EF behaviors with 35 items organized in six clinical scales (Internal Emotion Regulation, External Emotion Regulation, Inhibition Control, Planning/Working Memory, Initiation/Flexibility and Organization of Materials)

Our findings showed significant correlations between EF and prosodic abilities, which ranged from small to strong in different ages. Specifically, it was observed a significant correlation between prosodic abilities (in both receptive and expressive skills) and metacognitive aspects of executive functioning (namely, planning/working memory, initiation/flexibility and organization of materials). As metacognitive strategies increase individual's awareness of their thought processes and actions while completing tasks (e.g., Purdy, 2011), one possible explanation is that prosodic performance signals the abilities to use metacognitive strategies.

In sum, our findings suggest a possible correlation between prosody and metacognitive aspects of executive functioning. Therefore, the nature of this association should be considered in future research. These results may be of considerable interest for clinical practice, since executive function and prosodic deficits are characteristic of many neurodevelopmental disorders (e.g., Pennington & Ozonoff, 1996), such as autism.

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'Poster only'

Factors affecting prosodic prominence in Occitan, French, and Italian

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As a minority Gallo-Romance language, Occitan is in longstanding contact with – and on the way of being substituted by – French in the southern third of France, Catalan and Spanish in the Pyrenean Aran Valley, and Piedmontese and Italian in the Alpine region of Piedmont (Italy). This contact situation has led to interference on all linguistic levels, among which phonetic and prosodic features stand out. Bridging between French and southern Romance, Occitan shares prosodic features with both sides: Accent location is lexically contrastive as in Italian (Schultz-Gora 1924; Roca 1999), yet F0 rises have been observed on non-lexically-accentable syllables, and some content words are – at least partially – deaccented (Hualde 2003; Sichel-Bazin et al. 2012, submitted). These findings suggest that the Accentual Phrase or AP, the basic prosodic unit for accentuation in French, plays a role in the prosodic system of Occitan, as it may contain several lexical words and is constrained by syntactic, semantic, and prosodic factors (Jun & Fougeron 2000, 2002; Post 1999, 2000, 2011; Avanzi to appear).

The present work aims at characterizing the factors that may influence the realization of prosodic prominences in the speech of Occitan-French and Occitan-Italian bilinguals. The materials under consideration consist in summaries of the Aesop fable "The Northwind and the Sun" that our subjects spontaneously produced after listening to a recording. Alignment and annotation in Praat enabled us to extract phonetic, syntactic, and lexical information for all syllables, which were also judged as being perceptively prominent or not. In a pilot study we analyzed the data of two bilingual speakers: one from the Italian Alps in Occitan (IA_Oc) and in Italian (IA_It), and one from the neighboring French Alps in Occitan (FA_Oc) and in French (FA_Fr).

Accentable syllables display a significantly longer duration in all four varieties, as well as a significantly higher increase in intensity in FA_Fr, FA_Oc, and IA_It. As for F0, the accentable syllables are mostly associated with rising movements in FA_Fr and FA_Oc, and with falling ones in IA_Oc. However, while more than 75% of the accentable syllables are perceived as prominent in Italian and Occitan, only 50% of them are in FA_Fr. Non-accentable syllables perceived as prominent are rare in IA_It (18%), FA_Oc (13%) and IA_Oc (8%), which thus differ significantly from FA_Fr, where 34% were observed. The position of accentable syllables within a syntactic phrase (defined as an XP-projection) influences their perceived prominence in Occitan and in Italian: while these syllables show a strong tendency to be judged as prominent in final position (IA_It 95%, IA_Oc 96%, FA_Oc 90%), this is significantly less often the case non-finally (IA_It 70%, FA_Oc 44%, IA_Oc 22%). By contrast, the position does not show any effect in French, where 50% are obtained for final as well as for non-final accentable syllables. This strongly suggests that the French AP corresponds to a bigger constituent than the XP-projection.

These first results seem to confirm the particularity of the French accentual system within Romance: the proportion of accentable syllables perceived as prominent is low, and the amount of prominent non-accentable syllables, quite high. Occitan displays some non-accentable syllables that are judged as prominent and some accentable ones that are not, but so does Italian – at least the variety in contact with Occitan –, and both do so in much smaller proportions than French. Moreover, the final position in the syntactic phrase, which stands out as a prevalent site for accentuation in both Occitan and Italian, does not appear to be relevant in French. Even in close relation with French, Occitan thus seems to maintain an accentual system that distinguishes it from its contact language, underlining its typological similarity with Italian.

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On prosodic phrasing of *tag questions* (*"né?/¿no?"*):
Brazilian Portuguese, Argentinean Spanish and Mexican Spanish

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This paper focuses on prosodic phrasing of *tag questions* ("*né?/¿no*?"/ isn't it?) in Brazilian Portuguese (BP), Argentinean Spanish (AS) and Mexican Spanish (MS), in order to observe: (i) whether tag questions are produced as one single Intonational Phrase (IP), together with the precedent IP, or are produced in different IPs; (ii) which are its intonational characteristics (Pierrehumbert, 1980; Ladd 1996; Sosa, 1999), both of the IP which contain the tag question and of the precedent IP; and (iii) the relation between production and perception of these tag questions. This research will contribute to the cross-linguistic knowledge about the placement and shape of prosodic boundaries and to the understanding of how prosodic boundaries are realized and perceived.

Although there is no isomorphism between prosodic structure and any other grammatical structure (Nespor & Vogel, 1986/2007, i.a.), it is long attested that the location of prosodic boundaries is somehow related to the location of syntactic boundaries. Many researches have also provided evidences that phrase weight/size affects prosodic phrasing (Selkirk, 2000; Guini, 1993; Frota et al., 2007; Serra, 2009). According to traditional prosodic hierarchy perspective, tag questions *"né/¿no?"* should be phrased separately, as far as they are generated outside the root sentence. The formation of IP, however, is also affected by prosodic length conditions: long phrases (in number of syllables and of prosodic words) tend to be divided, as well as small phrases tend to form one single IP with the adjacent IP, which leads to the formation of balanced length phrases (Nespor & Vogel, 1986/2007; Frota, 2000).

The *corpus* under analysis includes informal interviews (Rio de Janeiro dialect – Brazil, around 30 minutes with five female speakers) and colloquial long distance telephone calls (Argentinean Spanish and Mexican Spanish). The Spanish data were extracted from seven colloquial long distance telephone calls (with male and female speakers) from USA to Buenos Aires or to Mexico City. For the perception task, 11 Brazilian University students were involved. All speakers -- for the two tasks -- are from 22 to 38 years old. Until now, 89 occurrences of *IP+tag questions* were analyzed: 37 from Brazilian Portuguese, 27 from Mexican Spanish and 25 for Argentinean Spanish.

Regarding the realization of tags in BP, the results show that only two *IP+né* of 37 *data* (5,4%) constitute one single IP (H*+LL% and L+H*LH%) and all other *data* present two separate IPs. It was observed that BP presents a wider variety of intonational contours, which include the configuration H+L*L%+ H+L*L% (Figure 1), and also (11%) the configurations H+L* L% + **L%**, H+L* L% + **H%**, L+H* L% + **L%** ("degenerated" IPs – Ladd, 1996), which are characterized by the occurrence of a boundary tone, without pitch accent, in the tag itself. In Spanish *data*, both from Buenos Aires and Mexico varieties, there is a tendency to the realization of *IP+no* as two IPs, with both IPs presenting a nuclear contour. We verify that in 47/52 data (90%) the boundary tone of the first IP is low (L%) and in 51/52 *data* the tag IPs (*¿no?*) display raising configurations (H%), also containing a pitch accent LH*, L+H* L+¡H* or L* (Figures 2 and 3). Regarding perception, the analyses pointed out to a preference for marking the break after *IP+né*, despite the presence of a nuclear contour in both IPs and the presence of a pause between the IP and the tag question.

We conclude that small phrases tend to constitute a compound domain with adjacent IP, although there is a strong tendency to realize as separate forms the tag question and the precedent IP.

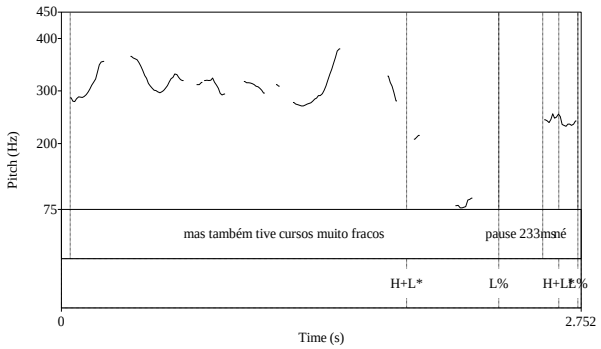

Figure 1: Example of Brazilian Portuguese
[mas também tive cursos muito fracos]IP [né?]IP
[but I have had very weak courses]IP [*isn´t it*?]IP

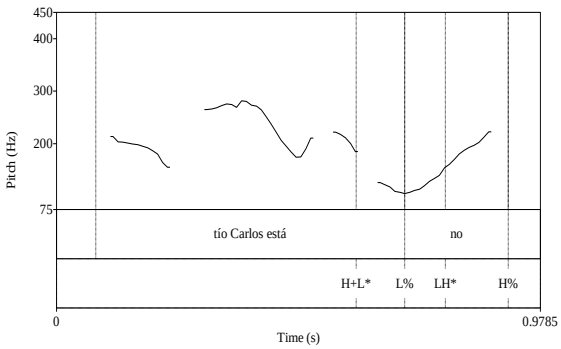

Figure 2: Example of Argentinian Spanish
[Tío Carlos está]IP [¿no?]IP
[Uncle Carlos is here]IP [*isn't it*?]IP

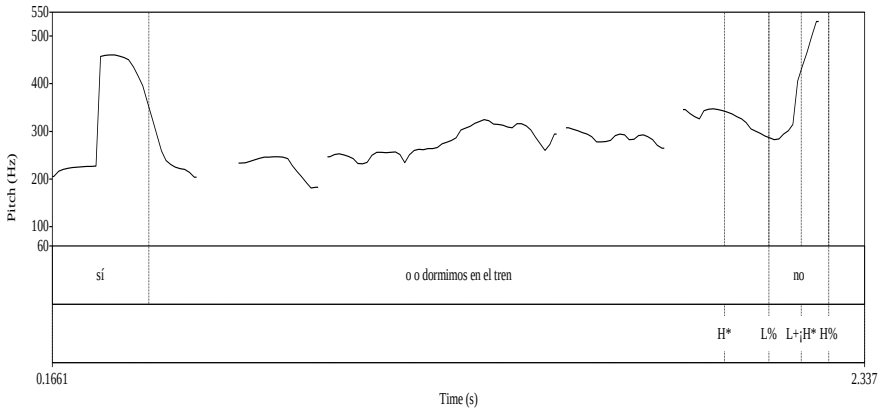

Figure 3: Example of Mexican Spanish
[Sí]IP [o o dormimos en tren]IP [¿no?]IP
[Yes]IP [or we'll sleep in the train]IP [*isn't it*?]IP

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The Prosody of Clitic Left-Dislocations in Romance and Bantu - An OT approach

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Clitic Left-Dislocations (CLLD) are characterized by expressing the informational status of givenness across (non-polysynthetic) languages (e.g. López 2009). This special syntactic configuration is very common in Romance and Bantu languages. However, the prosodic marking of CLLD is quite diverse in these language families. While Romance languages typically display a prosodic boundary after the CLLD constituent, Bantu languages strongly differ in the obligatoriness of that boundary. In a first step, the paper examines the prosodic phrasing of CLLD in different Bantu and Romance languages. In a second step, an analysis of the phrasing patterns is presented in an Optimality-Theoretic (OT) version of the edge-based framework, in which the constraint ALIGNTOPIC,R (Feldhausen 2010 – which requires the alignment of the right edge of a left-dislocated topic phrase to the right edge of a prosodic phrase) plays a fundamental role.

Left-Dislocations are "characterized by the presence of a phrase in the first position of the clause [bold letters in (1)] which is connected with that clause through the intermediary of some anaphoric element [italic letters in (1)]" (Alexiadou 2006:668).

(1) (**La lámpara**)$_{H}$ (*la* regalamos a unos vecinos). [Spanish]
'The lamp, we offered some neighbors.'

The Spanish example in (1), illustrates the typical phrasing pattern of CLLD objects in Romance. In simple clauses, the CLLD constitutes a prosodic phrase of its own (phrasing is indicated by parentheses), and the prosodic boundary at its right edge is marked by a high edge tone $_{H}$ (see Delais-Roussarie et al. 2004 for French, Astruc 2005, Feldhausen 2010 for Catalan, Frascarelli 2000 for Italian, and Feldhausen 2012 for Spanish).

In Bantu languages, there are three phrasing patterns: (a) CLLD displays an obligatorily boundary at its right edge, similar to Romance languages (see Jokweni 1995 for Xhosa, Downing et al. 2004 for Chichewa, and Patin 2008 for Shingazidja), (b) CLLD obligatorily phrases with following material (cf. (2), see Zerbian 2006 for Sotho), and (c) the right boundary is optional (cf. (3), see Cheng & Downing 2009 and Downing 2011 for Zulu). In both Sotho and Zulu, penultimate lengthening marks the prosodic boundary at the right edge.

(2) (mo-sádi ke a mmó:na) [Sotho]
CL1-woman 1st -A- OC1-see
'The woman, I see her.' (Zerbian 2007: 252)

(3) a. (ámá-bhayiséki:li) (si-wá-ník-ê: ábá-ntwa:na) [Zulu]
6-bicycle we-OM6-give-TAM 2-child
'The bicycles, we gave them to the children.'

b. (ama-thíkíthí [e]si-tímel' u-wa-théng' e-m-shín-i:-ni)
6-ticket 7-train you-OM6-buy Loc-9-machine
'The train tickets, you buy them from the machine.'

In our analysis, we argue for a reranking of ALIGNTOPIC,R together with different constraints that are generally relevant for prosodic phrasing (such as ALIGN-XP,R (Selkirk 1995), *P-PHRASE (Truckenbrodt 1999), and MAX-BIN (Selkirk 2000, Sandalo & Truckenbrodt 2002). By ranking the constraint ALIGNTOPIC,R either high (Romance, Xhosa) or low (Sotho) or in the middle range (Zulu) in interaction with the other constraints, we explain the different groupings of CLLD structures in these languages. The arising 'factorial typology' does not only match the different prosodic patterns, it also provides evidence for the universal status of ALIGNTOPIC,R.

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"Early development of multimodal communicative strategies"

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Recent studies have shown that communicative gestures correlate with both vocabulary and grammar acquisition stages (Özçaliskan & Goldin-Meadow, 2005; Rowe & Goldin-Meadow, 2009). Specifically, the early appearance of pointing gestures with a declarative motive seems to predict earlier vocabulary development (see Colonnesi, Stams, Koster & Noom, 2010 for a meta-analysis on the joint development of pointing and language skills). The findings on early pointing development demonstrate that intentional motive, social factors or motor development are relevant aspects to this important achievement (Matthews et al. 2012), but little is known about the interplay between early production of gestures together with speech, and specifically whether these productions are related to early vocabulary development. Murillo & Belinchón, (2012) observed parent-infant dyad interactions (*N*=11) in structured play context at three longitudinal moments, namely 9, 12 and 15 months. The results of the study showed that the use of pointing gestures at 12 months, especially when they are accompanied with vocalizations and the social use of gaze, correlates with vocabulary development at 15 months of age. In the present study we will test whether infant's fine-tune temporal alignment between gesture and speech at 12 months correlates with early vocabulary acquisition. Adult studies have shown that the most prominent parts of the pointing gestures (i.e., the stroke) are temporally integrated with the most prominent parts of the speech (i.e, the prominent syllables) (Esteve-Gibert & Prieto in press). The present research experimentally tests the hypothesis that the infant's ability to temporally integrate gesture and speech is correlated with earlier vocabulary acquisition.

Twenty-five Spanish infants participated in a longitudinal experiment at 12 and 15. The experimental task was based on Liszkowski et al.'s (2008) declarative pointing task, and it was chosen because it is able to successfully elicit infant's declarative pointing in a natural and controlled communicative environment. To investigate the patterns of early multimodal integration, children's productions were coded for prosody, gesture, and gaze coordination patterns. To control for vocabulary development, the Spanish version of the MacArthur-CDI was administered to all children at 12, 15 and 18 months of age. Preliminary results indicate that the presence of a set of productive parameters during early infant intentional interactions at 1;0 (early pointing production, gesture-speech temporal alignment, hand configurations of pointing, and infant looking sequences) correlate with the subsequent appearance of gesture-speech combinations at 1;3. Moreover, infants who are able to integrate pointing and speech at 12 show better vocabulary abilities at 18. All in all, pointing in combination with early vocalizations may be a strong early signal of intentional communication, in which semantic, pragmatic and phonological information are integrated for the first time in development.

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Focus assignment in complex words with two prosodic words in Brazilian Portuguese

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Phonological focus may be assigned to prosodic words (PW) that are non-final within the phonological phrase (ϕ), both in European and in Brazilian Portuguese (EP and BP, respectively) – Frota (2000, 2002), Fernandes (2007). Vigário (2010) claims that not all PW can bear focus in EP. Instead, when a morphosyntactic word includes more than one PW, focus is restricted to the prominent PW of the Prosodic Word Group (PWG) (i.e. the prosodic domain that includes all the material within a morphosyntactic word) – see (1). The impossibility of focalizing words' internal elements has also been reported for other languages, such as Swedish (Bruce & Hermans 1999; Gussenhoven & Bruce 1999). This work aims at testing whether this restriction extends to Brazilian Portuguese.

In EP prosodic focus marking is achieved by means of a specific pitch accent (H*+L), associated with the head of the focused constituent, followed by pitch range compression (Frota 1995, 2000). This is also true for BP, where L*+H may also signal the focused constituent, optionally followed by a phrasal tone (Lp) (Fernandes 2007). Contrastive focus differs from emphatic stress both in pragmatic meaning and in the phonological grammar. Emphatic stress, signalled by high pitch at the beginning of the word, has been reported to highlight the whole word in several Romance languages (e.g. Vigário 2003, Hualde 2007).

We conducted a production experiment involving the elicitation of contrastive focus targeting PWs that are internal to morphologically complex words (e.g. root-compounds, V+N compounds, *-mente* adverbs). Focus was elicited on (i) the 1st PW (PW1), and on (ii) the 2nd PW (PW2) or the whole word (PWG). The corpus contained 32 sentences in contexts that elicited focus (22 on PW1, and 10 on PW2 or the whole PWG). 30 sentences in broad focus context were also included for comparison. Three speakers from Cascavel, Paraná (Brazil) produced three repetitions of each sentence. Speakers had to read a context sentence on a screen, listen to a question referring to that sentence, and give an appropriate answer to the question using the material displayed on the screen; in contrastive focus contexts, there was a mismatch between the question and the sentence previously read (see 2). A total of 558 sentences were obtained (62 x 3 speakers x 3 repetitions).

Preliminary results based on the analysis of the full set of data from one speaker indicate that a variety of means are used in the contrastive focus conditions, in particular when the contrast involves PW1. Sentences in the contrastive focus condition show non-neutral prosody. When focus is elicited on PW1 (i) PW1 may show an emphatic stress marked with an initial L+H accent, showing a sharp rising slope and an extra-high pitch, on the first syllables of PW1 – see Fig. 1 (30% of the tokens in this condition); (ii) PW1 may be assigned an [L+H] realized on the stressed syllable (33% of the tokens in this condition); (iii) PW1 may bear focus stress marked by what looks like a tritonal LH*+L associated to the stressed syllable – see Fig. 2 (35% of the tokens in this condition); when focus was elicited on PW2 or PWG, the most common pattern found is the association of [L+H] realized on the first/stressed syllable of PW1 and an H+L* or an H*+L on the stressed syllable of PW2/PWG – see Fig. 3. In all cases, the element in contrast is followed by tonal compression. Similar patterns are also common in the productions of the other two speakers.

These results suggest that focus in BP may be assigned to PWG internal PWs. They raise the question of what is the lower domain for focus assignment in the/a language, if any.

(1) A: *Ele é um poligâmico convicto*?
He is a polygamous convinced
'Is he a convinced polygamous?'
B: *(Não). Ele é um ((MOno)$_{PW}$ (GÂmico)$_{PW}$)$_{PWG}$ convicto.*
H*+L (tonal compression →)
'No. He is he a convinced monogamous' Vigário (2010)

(2) EXPERIMENTAL PROCEDURE [Elicitation of focus on PW1 of ((TEle)$_{PW}$(processaMENto)$_{PW}$)$_{PWG}$]

Sentence displayed on the screen: *Os técnicos ensinaram teleprocessamento aos alunos.*
'The technician taught teleprocessing to the students.'
Question heard on headphones: *Os técnicos ensinaram autoprocessamento aos alunos?*
'The technician taught self-processing to the students?'
Answer produced: *(Não). Os técnicos ensinaram teleprocessamento aos alunos.*
'(No). The technician taught teleprocessing to the students.'

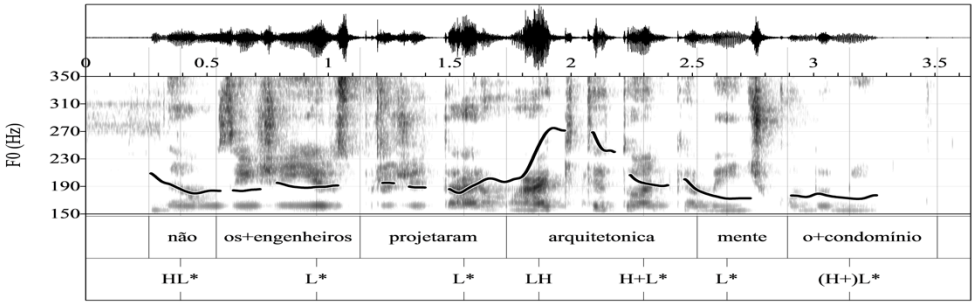

Figure 1: Initial emphasis on PW1 of ((arquiteTOnica)$_{PW}$(MENte)$_{PW}$)$_{PWG}$. Focus elicited on PW1.

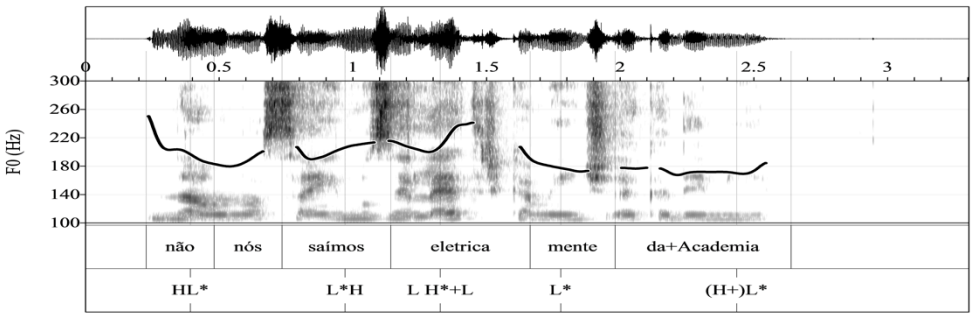

Figure 2: Focus produced on PW1 of ((eLEtrica)$_{PW}$(MENte)$_{PW}$)$_{PWG}$. Focus elicited on PW1.

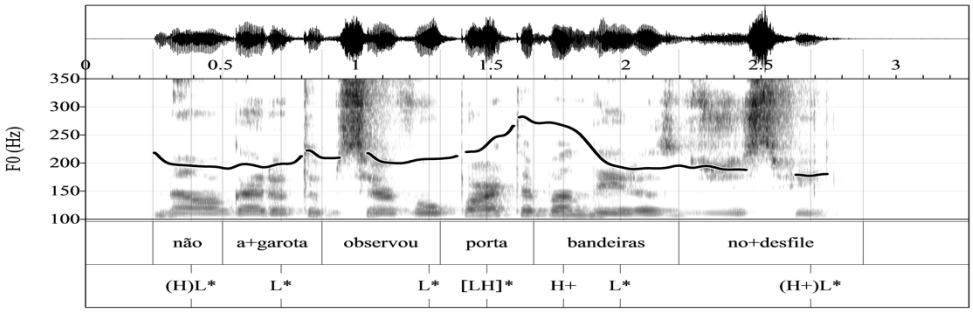

Figure 3: Initial emphasis on PW2 of ((PORta)$_{PW}$ (banDEIras)$_{PW}$)$_{PWG}$. Focus elicited on PWG.

Perception and production of Spanish /f/: the role of the listener

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Spontaneous speech sound variation has been widely examined in studies of different kinds that put forward and reduction processes to explain different acoustic realizations for a single phoneme (Kirchner 2004, Lindblom 1990a, Kohler 1991), although there is still need to check the perceptual effects of such differences.

This study, which is based on previous research (Batllori *et al*. 2009, 2010), focuses on voiceless labiodental fricative in Spanish. The aim of this paper is twofold. On the one hand, checking if there is acoustic variation concerning /f/ and establishing the factors on which it depends. On the other hand, testing the perceptual effects of this variation in speakers.

For this purpose acoustic characteristics of /f/ in Spanish were studied, and hence 421 items obtained from a sample of spontaneous speech were analysed. 6 male subjects were interviewed and recorded. Two variables were taken into account: distributional context and stress. The resulting segments were analyzed using Praat, and classified into four categories regarding presence or absence of voicing and formants. Duration was also measured. Our results show that there is variation in the realizations of voiceless labiodental fricative indeed, since four allophones could be identified: [f], [f̬], [v] and an approximant sound quite similar to [β̞]. We consider that the last three are relaxed or weaken forms, typical of hypoarticulation in spontaneous speech, and regard them as different steps in a continuum of articulatory reduction. In fact, 36.7 % of segments were voiced or partially voiced sounds.

These data allowed us to work out some perception tests so as to assess the influence of the aforementioned realizations on listeners (Flemming 2004, Heeren and Schouten 2008). Two kinds of perception tests were carried out to check whether the listeners perceived any difference or not and which phoneme they identified. Both tests consisted of the same 25 (C)V_V nonsense stimuli, which were extracted from our spontaneous sample, and examples of the four manifestations of /f/ were included. In test 1, listeners had to identify each stimulus as /f/ or /b/. In test 2, [v] was also an option. Each task was done by 30 subjects, so that 1.500 answers were obtained. The results of these tests showed that relaxed realizations of /f/ were mainly associated to /b/ (97.6 % of the approximant realizations and 44.2% of the [v] ones), which proves that such variation has effects at a perceptual level and can be related to phonetic change factors (Colantoni 2008; Lindblom 1990b; Ohala 1996, 2005). Acoustic variation entails the interlocutor's reanalysing the signal and relating it to a phonological category different from the speaker's. According to evolutionary phonology (Blevins 2004), that would be a case of *chance*.

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An acoustic study of /l/ velarization in three dialects of European Portuguese

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The European Portuguese (EP) /l/ has been traditionally described as having two contextually determined allophones: a non-velarized allophone ("clear") in syllable onset, and a velarized one ("dark") that appears in coda position (Mateus & d'Andrade 2000). The main articulatory difference between the two variants lies in tongue dorsum configuration. The production of dark /l/ involves greater tongue dorsum retraction towards the uvular region or the pharyngeal wall than clear /l/ (Giles & Moll 1975; Sproat & Fujimura 1993; Narayanan 1997). Acoustically, these differences yield a relatively high F2 for clear /l/ and a lower F2 for dark /l/ (Recasens, 2012). However, articulatory and acoustic evidence from recent studies (Andrade 1999; Oliveira et al. 2011) have shown that, despite the syllabic affiliation, EP /l/ is consistently dark, even in onset position. Unfortunately, these studies had several limitations (e.g. data collected from a small number of speakers and contexts; speakers from a specific region/ dialect).

An acoustic study was conducted to investigate whether there are systematic differences in velarization of /l/ as function of syllabic position. Moreover, our investigation includes speakers from three dialect groups (Aveiro, Bragança, Porto) in order to elucidate dialect-dependent differences in /l/ velarization.

Thirty-seven EP native speakers (10 speakers from Porto, 11 speakers from Bragança and 16 speakers from Aveiro), with ages ranging from 18 to 28, read short meaningful expressions (e.g. "laca de cabelo" 'hair spray'), where /l/ occupies simple and complex onsets and coda positions. The lateral was flanked by vowels /a/, /i/, /u/. Each stimulus was repeated three times. The recordings were performed in a sound-treated room (Aveiro) and in quiet spaces (Porto and Bragança) with a condenser microphone connected to an external 24-bit sound system (sampling rate of 22 kHz). Each lateral consonant was manually segmented and labeled by using the program Praat. Burg algorithm as built into the Praat program was used to compile values for F1 and F2, in Hertz, at the mid-point of the liquid. Two acoustic measures were taken as indicative of the degree of /l/ velarization: F2 frequency, and distance between F2 and F1 (F2-F1). The statistical investigations were conducted with SPSS 15.0. A three-way mixed analysis of variance (ANOVA) was carried out, with word position and vowel context as within-subject factors and dialect as a between-subject factor. In all statistical analysis, the level of significance was $p<0.05$.

The results in terms of means (M) and standard deviations (SD) for F2 and F2-F1 are shown in table 1. Regarding F2, neither the syllable position ($F(1,4;44,6)=0,9$; $p=0,398$) nor dialect ($F(2;31)=2,6$; $p=0,3$) were statistically significant. Vowel context ($F(1,6;48,6)=16,9$) was statistically significant ($p<0.05$). As revealed by table 1, mean F2 frequencies were found to vary in the progression /i/ > /a/> /u/. A statistical difference was found between /i/, /a/ and /u/ (Bonferroni multiple comparisons). ANOVAs on the F2-F1 data revealed that only vowel context was statistically significant ($F(1,7;47,9)=15,0$; $p=0,00$). This parameter presented higher values when the contextual vowel was /i/, followed by /u/ and /a/ (see table 1). A statistical difference was found between /a, u/ and /i/.

Regardless of syllable position and dialect, F2 values were always below the splitting boundary defined by Recasens (2012), which separates clear from dark /l/ (1300‑1400 Hz in the /i/ context and roughly at 1000 Hz in the /a/ context), and suggest a narrowing of the vocal tract at the velar and/or pharyngeal regions, due to raising and/or retraction of the posterior tongue body (Oliveira et al. 2011). Results obtained in this work point to a strongly dark

realization of /l/ across all country (cf. Andrade 1999), although data from more regions must addressed in future investigations.

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Figures:

Table 1: Mean F2 and F2-F1 values as function of syllable position, vowel context, and dialect. The results are in M±SD.

		F2 (Hz)	**F2-F1 (Hz)**
Syllable Position	Onset	972,9±117,6	602,3±93,2
	Complex Onset	982,0±99,9	589,5±97,5
	Coda	1006,6±171,5	652,6±187,0
Vowel Context	/a/	987,2±128,6	553,9±110,1
	/i/	1067,5±131,9	702,4±105,1
	/u/	905,2±135,7	588,1±136,1
Dialect	Bragança	1022,8±91,4	641,9±73,2
	Porto	966,8±91,4	590,1±73,2
	Aveiro	970,2±91,4	612,4±73,2

The perception of L2-intonation: How do Italians perceive English focal and non-focal accents?

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The paper focuses on the perception of L2 intonational events that correspond to linguistic categories. The first aim is to check whether Italian-L1 subjects (variety XX) are able to detect variations that signal the non-focal (NF) and focal-correction (FC) accents in English-L2; a second aim is to check how hypotheses and methods found in L2 investigations may be adopted in studying L2-intonation.

The NF and FC English pitch accents mainly differ in peak height [1], while in Italian they differ in both height and alignment [2] and, in particular, the FC accent is phonetically similar to both English patterns as for alignment and, similarly to the English NF, it shows higher pitch scaling in comparison to the other pattern – see fig. 1. Hypotheses concerning the perception of L2 pitch accents by subjects are formulated here by adopting the Perception-Assimilation Model (PAM) proposed by Best for segments ([3]; see [4] for L2). According to PAM, subjects may be variably good in discriminating two sounds, depending on the way they assimilate them to native phonemes. In this study, the hypothesis is that Italians assimilate both English accents to the Italian-FC category (due to alignment) and that they take English-NF as a better example of Italian-FC in comparison to English-FC (due to scaling; PAM's categ. goodness assimilation); accordingly, Italians may obtain medium-to-good results in discriminating English pitch accents, depending on goodness values. However, as intonational categories signal functional differences (FC vs NF), a working hypothesis formulated in this paper is that discrimination capabilities can be predicted along the lines of PAM as long as a context is provided for reference to function. Indeed, in principle, phonetic characteristics could help in discriminating pattern, although they may be misinterpreted, being associated to a wrong category/function (e.g., NF pattern to FC category).

3 speakers of English and 3 speakers of Italian produced both NF and FC interpretations of the word "Guendalina", inserted in an English sentence and context for English L1 speakers and in an Italian sentence and contest for Italian L1 speakers. The realization and possible interpretation of the target word as NF and FC was checked by means of informal listening by 3 mother tongue listeners. Then the target word was segmented to be used in following experiments, and a copy of it was acoustically manipulated to copy the English prosody on an Italian base stimulus by means of prosodic-transpantation [5]. In line with L2 studies [e.g., 6], stimuli were then proposed in identification (with reference to Italian categories), goodness-rating and discrimination-oddity (ABX) tests. In order to avoid influences of English pronunciation, apart from the pitch accent production, in identification and rating tasks prosodically transplanted stimuli were used (showing Italian segments and English prosody; for discussion, see [7]) and Italian stimuli were added as controls; on the other hand, in the discrimination task, L2 (English) stimuli were used. Moreover, as suggested in L1-intonation literature [8] and in order to ensure that the linguistic function associated to stimuli was the correct one, contexts were always given to suggest the intended intepretation; therefore, discrimination-oddity tests were split in two parts for reference to two different contexts/functions necessary for interpreting the two pitch accents.

Italian subjects (15, variety-X, low-to-medium competence in English L2), participated in the experiments. Results show that, consistently with expectations, English-NF and FC are scarcely discriminated by Italians (see fig. 1, left) and, indeed, they may be misinterpreted (see fig 1, right, grey cells). Moreover, the investigation also shows that predictions concerning discrimination of L2-intonation patterns may be made with reference to Best's PAM and that, though, they should be extended to account for misinterpretations of pattern functions. Finally, the study shows that investigating L2-intonation may take advantage of methods used for studying both L1-intonation and L2, though with some adaptations.

FIGURES

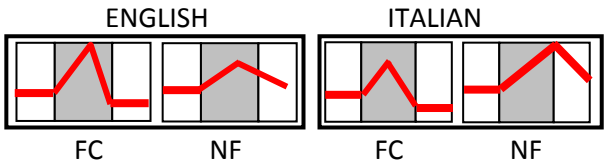
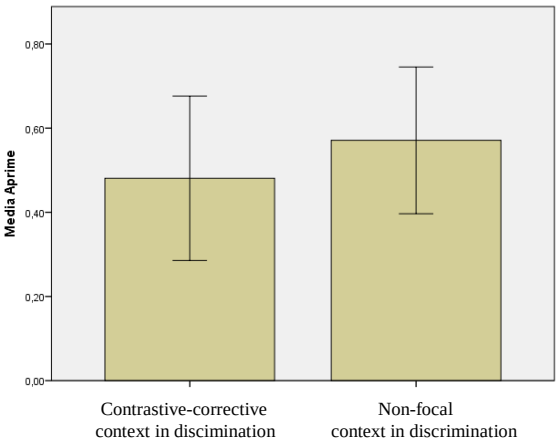


Figure1. Representation of Non-Focal and Focal-Correction pitch accents in English (left) and Italian (right)



	FC% (goodness rate)	NF% (goodness rate)	None%
FC-Ita	0.78 (5.12)	0.18 (4.17)	0.04
FC-Ita_Eng-Pros.	0.74 (4.56)	0.22 (3.8)	0.04
NF-Ita	0.13 (3.92)	0.8 (4.82)	0.07
NF-Ita_Eng-Pros.	0.2 (3.54)	0.67 (4.23)	0.13

Figure 2. LEFT PANEL: Results of oddity-discrimination tests with English stimuli: Responses expressed by A' values (A'= 1.0 : perfect discrimination of a contrast; A'<= 0.5 : indicates insensitivity): discrimination given a contrastive-corrective context (left) and discrimination given a non-focal context (right); RIGHT TABLE. Percentage of identification and goodness rating results (in brackets) for Italian FC and NF (1st and 3rd line) and for Italian base stimuli with transplanted FC and NF English prosody (2nd and 4th line): FC responses (first column), NF (second column) and None responses (third column).

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Title: Alignment of H(igh) boundary tone in emerging prosodic breaks

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The alignment of F0 targets associated with prominent syllables, i.e. pitch accents, with the oral gestures has been the subject of intensive research in past decades. Additionally, it was shown that articulatory landmarks might provide a more stable anchor to F0 targets of pitch accents than acoustic landmarks (Mücke et al. 09, D'Imperio & House 97). Similar alignment of boundary/edge tones seems to be phonetically varied while lacking clear phonological or pragmatic contrasts as with pitch accent alignment. For example, phrase tones (ToBI's H/L-) frequently migrate 'leftward' even several syllables before the prosodic break (e.g. Gussenhoven 00, Barnes et al. 06, Grice et al. 00).

In this paper, we address two gaps our understanding of phonetic realizations of phrase tones. First, the bulk of our current knowledge about phonetic signatures of prosodic structure comes from paradigms that elicit discrete prosodic variation intentionally produced by subjects. We analyze the corpus of speech elicited through a novel paradigm of multiple repetitions of two sentences under continuous variation in tempo and articulatory precision. We explore the alignment of H(igh) boundary tone as one of the signals for spontaneous emergence of high-level sentence-internal prosodic boundaries as a means of resolving low-level tempo and precision demands. Second, the alignment of oral gestures and F0 targets associated with pitch accents have been extensively investigated, but similar studies looking at articulatory landmarks and F0 phrase tones are rare or missing. In this study, electromagnetic articulatory data were collected and the relationship between articulatory landmarks and F0 targets could thus be explored.

The corpus represents 952 tokens of 2 Slovak sentences, shown in (1) and (2), labeled for both acoustic and articulatory information and produced by 4 subjects. The locus of our analysis is the disjuncture between the first and second words which syntactically creates the opportunity for a prosodic break; hence, in both sentences we analyzed the F0 contour of the stretch of voiced segments */…im(#)abi mu/* and */am(#)iba mu/* with identical labial consonants. F0 in these intervals was extracted, pitch track errors and spurious points were manually removed, the resulting contour was interpolated, and the target for the (H)igh tone, if present, was labeled.

Figure 1 shows all F0 curves overlaid in these 2 intervals normalized and aligned to the articulatory onset of the lip-closing for /b/. We see that each subject does something else: late H-elbows (S1), smooth declination (S2), relatively early peaks (S3-S4). We also labeled the intervals of non-modal voice that occurred in 37% of all the tokens and were taken to signal the emergence of a prosodic boundary. The pattern of this non-modal voice distribution complements the F0 pattern in Figure 1 since S1 had very few non-modal intervals, S2's intervals were mostly glottalizations, and S3-S4 had silences more commonly. While no consistent pattern of articulatory landmarks alignment to H-targets across all 4 subjects was observed, the release of phrase-final /m/ and peak velocity of the tongue movement toward the post-boundary vowel had the most stable alignment landmarks. Finally, we examined the relationship between the relative timing of CV in the vicinity of the potential break (in this case between post-boundary /b/ and the following vowel) and several features characterizing F0 contour (e.g. Max F0, slope, curvature). We found very weak support for the additive effects of temporal and F0 signals of a prosodic break.

To sum, we studied the interplay among signals of prosodic boundary in a corpus with low functional load of prosodic breaks emerging from resolution of demands for speech rate and

precision. We examine 3 such signals: H-target, non-modal voice, and temporal coordination of oral gestures in the vicinity of the potential boundary. Our results suggest that despite some dependencies, these signals are utilized in highly subject-specific fashion.

(1)	*Cítim*	*aby*	*mu*	*krásne*	*pristali.*
	[fsi:cim	abi	mu	kra:sɲe pristɑli]	
	'Feel-1st Sg	so that	him	nicely	fit-3rd Pl'
(2)	*Čítam*	*iba*	*mu*	*krásne*	*po grécky.*
	[ʧi:tam	iba	mu	kra:sɲe pogrɛ:fski]	
	'Read-1st Sg	only	him	nicely	in Greek'

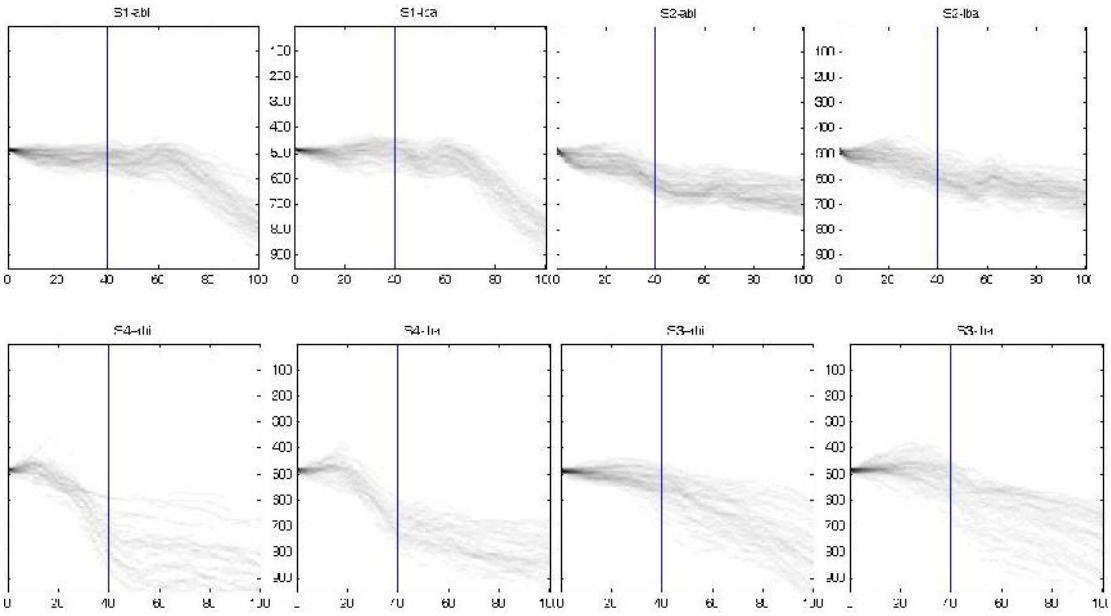

Figure 2

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A crossdialectal comparative study of pitch accent tonal alignment in the Spanish of the Basque Country

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In this paper we investigate the alignment of accentual tones in the variety of Spanish of monolingual or L1 Spanish speakers from two urban areas (the cities of Bilbao and Donostia-San Sebastian) and of L1 Basque speakers from a non-urban area (Goierri). We also explore the possible influence from Basque pitch accent alignment.

We recorded four female speakers from each variety, ages 19-22. Speakers were asked to read five declarative sentences with the shape Subject-Verb-Object (cf. (1)), as broad focus declarative sentences, in as natural a style as possible. The stimuli were almost exclusively composed of voiced and sonorant segments so that the resulting F0 track was as measurable as possible. A total of 180 utterances were analyzed (5 sentences x 3 renditions x 3 varieties x 4 speakers), and a total of 864 pitch accents were analyzed for tonal alignment (144 utterances x 5 stressed syllables and 36 utterances x 4 stressed syllables). Following the same methodology as in Face (2002), Elordieta (2003) and Elordieta and Calleja (2005), for each L+H pitch accent we measured the distance (in *ms*) from the L target tone to the onset of the stressed syllable and the distance from the H target tone to the offset of the stressed syllable.

For the three varieties studied (monolingual or L1 speakers of Spanish from Bilbao, monolingual or L1 speakers of Spanish from San Sebastian, and L1 Basque speakers from Goierri), a fundamental difference in peak alignment is observed: peaks are phonetically aligned with the posttonic syllable in prenuclear accents and with the tonic syllable in nuclear accents. For Bilbao, H targets are realized an average of 56.37 ms after the offset of the stressed syllable in prenuclear accents, and 42.78 ms before the offset of the stressed syllable in nuclear accents. In Donostia-San Sebastian, H tones awere realized 56.47 ms after the offset of the stressed syllable in prenuclear accents and 67.77 ms before the offset of the stressed syllable in nuclear accents. In Goierri, H targets are found 77.23 ms after the offset of the stressed syllable in prenuclear accents, and 39.21 ms before the offset of the stressed syllable in nuclear accents. The differences between prenuclear and nuclear peak alignment are all significant at $p<.001$. This is a pattern which is similar to the one of monolingual speakers of Castilian Spanish (from Madrid, cf. Face 2002), and different from Lekeitio Spanish, spoken by L1 Basque speakers of Northern Bizkaian Basque. In this variety of Spanish, peaks are realized within the tonic syllable in all accents, both prenuclear and nuclear. This pattern was explained as a partial transfer from Northern Bizkaian Basque, specifically the strict alignment of H* tones (of H*+L pitch accents) with the tonic syllable in this variety of Basque (cf. (Elordieta 2003, Elordieta and Calleja 2005). The fact that tonal alignment in the variety of Spanish spoken by the L1 speakers of this experiment (Goierri) is not different from Madrid Spanish means that there is no unique influence from Basque intonation. Preliminary results of an ongoing experiment on Goierri Basque pitch accents (see sentences in (2)) reveal that this local variety of Central Basque has rising accents, and that peaks are realized on the posttonic syllable on average. Thus, the absence of differences of Goierri Spanish with Madrid Spanish could be explained if pitch accents in Goierri or Central Basque are L*+H or L+>H*, as in Madrid Spanish (cf. Face & Prieto 2007).

As for valleys or L targets, they are aligned with the tonic syllable in Donostia-San Sebastian and Goierri, as well as in nuclear accents in Bilbao. This alignment would be similar to the one in Madrid Spanish. Only in prenuclear accents in Bilbao are L tones aligned before the tonic syllable, as in Lekeitio and Vitoria Spanish. Hence, L tone alignment presents more variation in Basque Spanish than H tone alignment.

In sum, the findings obtained in this study will contribute to our understanding of the properties of Spanish intonation in the Basque Country, and the possible influence from Basque intonation.

1. Set of Spanish sentences (stressed syllables are boldfaced) (cf. Face (2002))

(a) El her**ma**no de Ma**no**lo le **da**ba el **nú**mero de **vue**lo.
'Manolo's brother gave him/her the flight number.'

(b) El **ni**ño ga**lle**go ad**mi**ra a la **ni**ña de **Má**laga.
'The Galician boy admires the girl from Malaga.'

(c) La **ma**dre de Ma**rí**a exa**mi**na la **na**ve mo**ra**da.
'Maria's mother examines the purple ship.'

(d) La boli**via**na de Bada**lo**na rememo**ra**ba la merme**la**da de Magda**le**na.
'The Bolivian from Badalona remembered Magdalena's marmalade.'

(e) La boli**via**na rememo**ra**ba la merme**la**da de Magda**le**na.
'The Bolivian remembered Magdalena's marmalade.'

2. Set of Basque sentences (stressed syllables are boldfaced)

(a) Ne**re**aren a**la**bak be**le**aren i**ru**dia e**ra**mango du.
'Nerea's sister will bring the picture of the crow.'

(b) A**du**naren he**da**durak a**nai**aren la**gu**na a**la**itu du.
'The width of Aduna pleased the brother's friend.'

(c) Na**go**reren a**mo**nak li**bu**ruen ga**le**ria be**gi**ratu du.
'Nagore's grandma observed the book gallery.'

(d) Be**gi**raleak bi**le**raren a**gi**ria e**ra**man du.
'The inspector took the minutes of the meeting.'

(e) Vi**lla**bonako be**gi**raleak bi**le**raren a**gi**ria e**ra**man du.
'The inspector from Villabona took the minutes of the meeting.'

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The Rhythmic and Intonational Properties of Spanish/English Bilinguals in California

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Although there is a growing interest in the prosodic properties of Spanish, intonation and rhythm have not been studied in detail in language contact situations. This paper demonstrates that the rhythmic and intonational properties of the Spanish (syllable-timed language) spoken by the Mexican community in California can change across generations due to contact with English (stress-timed language). It also demonstrates that the English spoken by groups of this community is still influenced by the prosodic properties of their mother language.

The Normalized Pairwise Variability Index (nPVI–Low et al. 2000), consisting of measurements of successive pairs of vowels, was used to analyze the rhythms of 46 participants belonging to five groups: G1) 12 native speakers of L.A. English; G2) 8 Mexican Spanish/English adult bilinguals who moved to L.A. in their childhood; G3) 10 Mexican Spanish/English young bilinguals who are descendants of Mexican immigrants born in L.A.; G4) 7 Mexican Spanish/English bilinguals who moved to L.A. in their adulthood; and G5) 9 Mexican Spanish speakers who have stayed in L.A. for a short time. The passage "The North Wind and the Sun" in its English and Spanish versions was used to ensure results were comparable across participants. Results indicate that G1 and G2 show English-like rhythm (more variability in vowel length) in both languages. In contrast, G4 and G5 groups present Spanish-like rhythms in both languages. Finally, G3s, due to their younger age, still have distinct rhythms for each language. One-way ANOVAs indicated a significant effect of group in English (F (4,39) = 20.644, $p < .001$) and in Spanish nPVI scores (F (4,37) = 22.085, $p < .001$). Post-hoc Scheffe tests revealed significant differences between G1, G2, G3 vs. G4 and G5 in English and G1, and G2 vs. G3, G4 and G5 in Spanish (Fig.1 and Fig.2).

Thirty subjects (8 in G1, 8 in G2, 6 in G3, 4 in G4 and 4 in G5) were requested to produce 10 declarative sentences in English and Spanish. A total of 186 pre-nuclear pitch-accents and 216 nuclear pitch-accents were labeled following the AM model of intonational phonology (Pierrehumbert et al. 1988, Beckman et al. 2005) and M. Butragueño (2006); (Tables 1&2). L+>H* was the most common pre-nuclear tone. H*s were exclusively produced by G1, G2 and G3, but never by G4 or G5. In contrast, L*+H accents were only found in G3, G4 and G5 (Fig.3). Intermediate productions between L*+H and L+>H* were frequently attested, requiring the inclusion of a new tone in the analysis (L*+H int.). In nuclear pitch-accents, G4 and G5 favored circumflex patterns and maintained boundary tones characteristic of Mexican Spanish (L+H*!H%-Fig.4) even in English. G2 and G3 also showed sporadic uses of such configurations, indicating retention of the intonation of their mother tongue. G1 did not use them as much.

These results suggest that the prosodic properties of Spanish in language contact situations should be studied in detail due to the attrition and transfer processes that may take place. Influences are exemplified in the rhythm and intonation of G4 and G5 in English (e.g. with syllable-timed rhythm and L+¡H* tones) and G1 in Spanish (e.g. with stress-timed rhythm and H* tones). G2 speakers show attrition in their rhythmic Spanish properties due to an extensive contact with English; however, the intonational properties of their mother tongue are marginally maintained. Finally, younger speakers (G3) have the ability to accommodate their prosody depending on the language they are producing; indicating that age and the length of exposure to the target language play a role in the acquisition and retention of prosodic features.

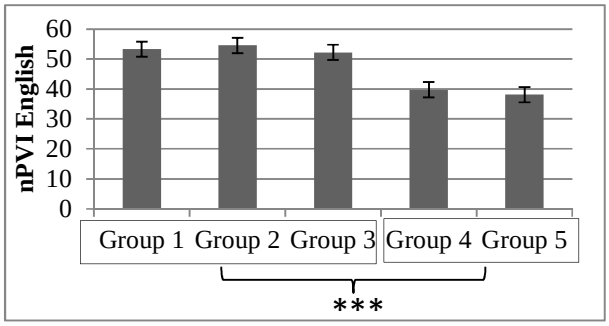

Figure 1: NPVI values per Group in English.

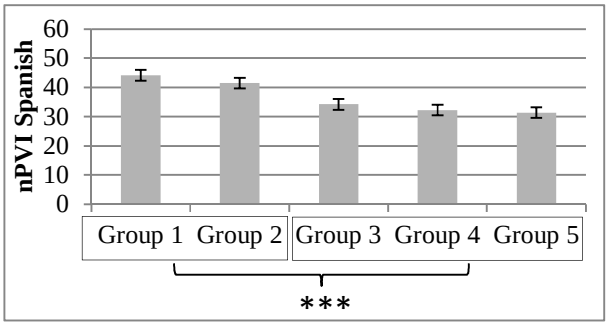

Figure 2: NPVI values per Group in Spanish.

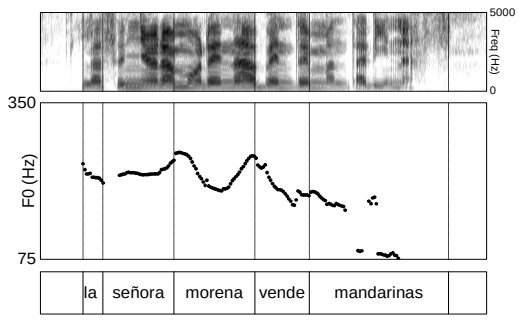

Figure 3: L*+H tone in *señora* 'lady' (G5 speaker)

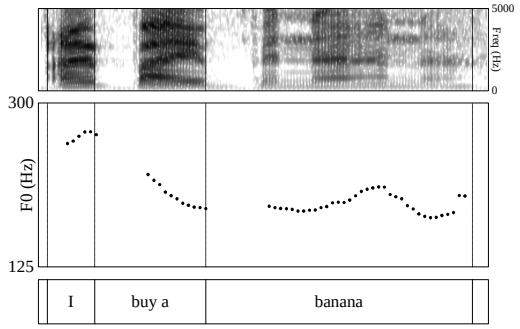

Figure 4: L+H* !H% tone in *banana* (G4 speaker)

SP pre	H*	L*+H	L*+H int.	L+>H*	H% L*+H	EN pre.	H*	L*+H	L*+H int.	L+>H*	H% L*+H
G1	21.4%	0%	14.2%	64.2%	0%	G1	16.7%	0%	8.3%	70.8%	4.1%
G2	13.3%	0%	13.3%	63.3%	10%	G2	13%	0%	8.7%	56.5%	21.7%
G3	4.3%	8.7%	21.7%	52.1%	4.3%	G3	11.1%	5.5%	11.1%	50%	22.2%
G4	0%	20%	33.3%	20%	26.6%	G4	0%	8.3%	16.7%	25%	50%
G5	0%	13.3%	26.6%	60%	0%	G5	0%	8.3%	16.7%	50%	25%

Table 1: Percentage of tones in pre-nuclear pitch-accents in Spanish (SP) and English (EN)

SP nuc.	L*L%	H*L%	L+H* L%	L+¡H* L%	!H%	EN nuc.	L*L%	H*L%	L+H* L%	L+¡H* L%	!H%
G1	40.9%	54.5%	0%	4.5%	0%	G1	9%	81.8%	4.5%	4.5%	0%
G2	12.5%	60%	12.5%	2.5%	12.5%	G2	30%	55%	0%	5%	10%
G3	44.4%	25.9%	18.5%	11.1%	0%	G3	28.5%	35.7%	7.1%	21.4%	7.1%
G4	82.6%	8.6%	0%	8.6%	0%	G4	58.3%	0%	0%	25%	16.6%
G5	45.8%	16.6%	0%	12.5%	25%	G5	25%	25%	8.3%	16.6%	25%

Table 2: Percentage of tones in nuclear pitch-accents in Spanish (SP) and English (EN)

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Perceptual evaluation of tonal and contextual cues to sarcasm in French

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Verbal irony is a mode of expression in which what is stated differs from (or is even opposed to) what is meant. Irony exists in the majority of the languages and cultures of the world (Pexman, 2008). For an ironic meaning to be conveyed, the communicative effect is based on success on the part of the listener to understand the ironic intent of the utterance, i.e. the incongruity between the literal and the intended meaning (Ivanko & Pexman, 2003). Some researchers have proposed that acoustic irony cues are only employed if the common ground is not sufficient to indicate the intended message (Cutler, 1974). Note, though, that more recent research has shown that ironic content can be identified even in absence of contextual cues thanks to global acoustic/prosodic cues (Bryant & Fox Tree 2002). Specifically, it has also been shown that young children can recognize the intonational markers of sarcasm, and this ability is developmentally distinct from the ability to recognize sarcasm through semantic or contextual cues (Ackerman, 1981; *inter alia*). However, we still do not know what is the actual role of prosody, in particular of intonational phonology features (Ladd, 1996/2008), in irony comprehension.

Concerning actual acoustic cues, sarcasm appears to be encoded in speech through various global manipulations in acoustic parameters such as fundamental frequency (f_0), amplitude, speech rate, voice quality and vowel hyperarticulation (Attardo et al., 2003; Bryant & Fox Tree, 2005; Cheang & Pell, 2008; Rockwell, 2000; Sharrer & Christman, 2011; *inter alia*). A previous study on global prosodic features of sarcastic speech in a corpus of declarative French utterances (Ben Jannet, 2012; Loevenbruck et al., submitted) suggests that sarcastic productions are characterized by utterance lengthening, by increased f0 modulations and a global raising of the pitch level and range. In this study, we explore the expression of sarcasm in French, for which phonological data are still lacking. Specifically, here we test the acceptability of prototypical sarcastic tonal contours in presence of matching or conflicting contextual cues.

First, a set of 14 sentences with the same syntactic structure (Noun-Verb-Noun-Adjective) were produced by 34 speakers, divided in 2 groups, so that each group read each sentence only after a neutral (NC) or a sarcastic context (SC), as exemplified in (1). Contexts were produced by a trained speaker and recorded in a soundproof booth on a DAT recorder. Target sentences included either long (6 syllables) or short (4 syllables) final Accentual Phrases (AP), in order to test prosodic variability induced by lenght.

(1) *Alain a convaincu Marion d'aller au bar de karaoké.*

'Alain has convinced Marion to go to a karaoke bar'.

SC- *Lorsqu'il a chanté, les gens ont commencé à lui lancer des tomates.*
'When he started singing, people started to throw tomatoes at him'.

NC- *Alain a chanté et après sa performance, les gens l'ont applaudi.*
'Alain has started singing and after his performance, people have applauded him'

Marion dit : *Alain est un musicien merveilleux.*

Marion says ‘Alain is a marvellous musician’.

From this database (which was intonationally labeled), 14 neutral and 14 sarcastic renditions of each utterance were extracted according to prototypical prosodic features as identified in Loevenbruck et al. (submitted). Context sentences and stimulus sentences were digitized into individual sound files, ready to be cross-spliced. We hence created 28 matching pairs (7 short sentences, 7 long sentences in 2 context types, neutral and sarcastic). Stimuli were interspersed with 28 fillers and presented to 2 groups of listeners. Each group listened to each utterance in only one of the two contexts, either neutral or sarcastic. Both groups listened to an equal number of sarcastic and neutral utterances. 28 non-matching and 28 matching-pairs were evaluated by 40 native French subjects for their acceptability. The two groups judged the utterance-context pairs as being either acceptable or non-acceptable in a two-alternative forced choice procedure. They also had to rate their confidence level in interpretation using a 5-point Likert scale. Results are currently being analyzed and will be presented at the conference.

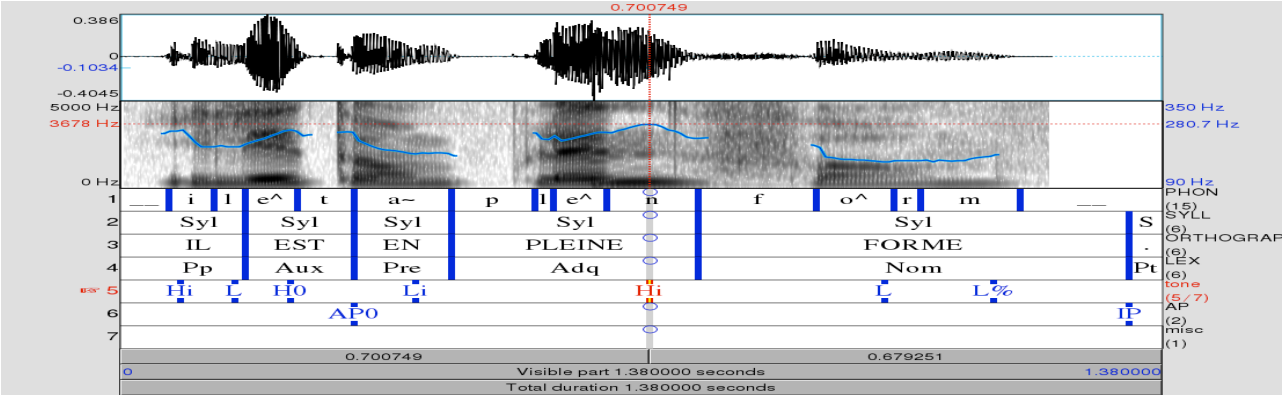

Figure 1. *Example of a prototypical sarcastic contour.*

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Rhythm across European Portuguese varieties

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Rhythmic distinctions among languages have been proposed to result from a series of phonological and phonetic properties, such as syllable structure, vowel reduction and the correlates of stress (e.g., Dasher & Bolinger 1982, Dauer 1983). If for some languages there is a long standing agreement about their rhythm type (English and Dutch as stress-timed, Spanish and Italian as syllable-timed, Japanese and Tamil as mora-timed), other languages have been considered to be mixed or intermediate languages (e.g., Catalan, Brazilian Portuguese, Polish) (Nespor 1990). This, together with acoustic results from different kinds of measures of rhythm which do not always distinguish between languages arguably belonging to different classes (Arvaniti 2012, Grabe & Low 2002), has raised a debate on the organization of languages into rhythmic classes or along a rhythmic continuum. However, perceptual experiments with adults (Ramus & Mehler 1999, Ramus et al. 2003), and infants (Mehler et al. 1996, Nazzi et al. 1998, 2000) have convincingly shown that languages are discriminated on the basis of rhythm according to the rhythmic classes. Importantly, among the measures of rhythm that have been proposed, %V and ΔC (Ramus et al. 1999) seem to be those that better predict listeners' discrimination between languages. The analysis proposed by Ramus et al. (1999) has been applied to several languages and language varieties, including Standard European Portuguese (SEP) and Brazilian Portuguese (BP) (Frota & Vigário 2001). In their study, the authors used %V and ΔC and suggested normalized measures of the variability of intervals (Δ%V and Δ%C). They concluded that %V and Δ%C successfully distinguished between SEP and BP, in accord with the known phonological properties that set the two varieties apart. A cross-language comparison with the 8 languages studied by Ramus et al. (1999) showed that SEP clusters with stress-timed languages in the ΔC dimension and with syllable-timed languages in the %V dimension, while BP clusters with syllable-timed languages in the ΔC dimension and is closer to mora-timed languages in the %V dimension. These results support the mixed nature of Portuguese rhythm.

The present study examines the rhythmic properties of two southern varieties of EP – Alentejo (Ale) and Algarve (Alg) –, previously shown to differ from SEP in their intonational contours, phrasing patterns and pitch accent distribution (Cruz & Frota submitted, Frota et al. submitted). The corpus from Frota & Vigário (2001) was used: 54 sentences were read twice, randomly, by 3 speakers per variety, between 20-45 years-old. Vocalic and consonantal intervals were marked in Praat (Boersma & Weenink 2007), on the basis of both auditory and acoustic cues, following standard criteria of segmentation (Turk et al. 2006, Frota & Vigário 2001). Measures of rhythm (%V, ΔC) were then automatically extracted with *Correlatore* 2.1 (Mairano 2009) and manually cross-checked. Δ%C was also computed.

Preliminary results show that both Ale and Alg present higher scores of Δ%C than SEP, and lower scores of %V than SEP (Fig.1). Both southern varieties are stress-timed in the Δ%C dimension, with Ale within the range of %V shown by syllable-timed languages, just like SEP, but Alg with %V pointing to stress-timing (Fig.2). Thus Ale seems to display mixed rhythm, like SEP, whereas Alg is clearly stress-timed, suggesting a tendency towards stress-timing as we move from Lisbon (SEP) to the south. A comparison with the Arabic dialects described in Gazhali et al. (2002), shows that Alg is closer to Western Arabic (Fig.2), in line with previous descriptions showing similarities between Alg and Arabic in intonational phrasing choices and pitch accent distribution (Cruz & Frota submitted). Correlations between these results and other prosodic properties of EP varieties will be explored in future research, together with the study of the perception of rhythm within and across varieties.

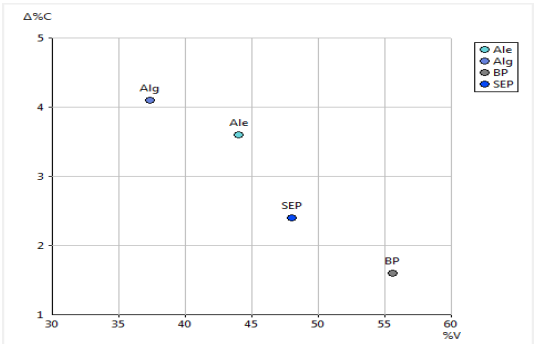

Figure 1: Δ%C vs. %V for Portuguese varieties. Data for SEP and BP from Frota & Vigário (2001).

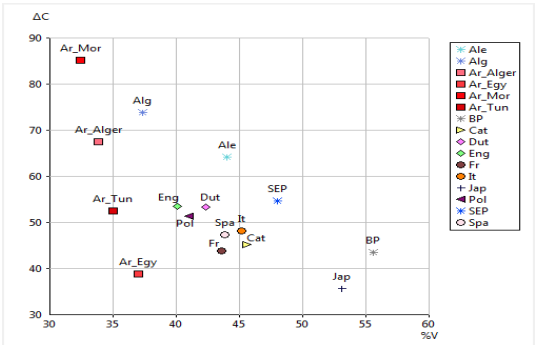

Figure 2: ΔC vs. %V for Portuguese varieties, the 8 languages from Ramus et al. (1999) and 4 Arabic dialects from Ghazali et al. 2002. Data for SEP and BP from Frota & Vigário (2001).

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A preliminary study on the nasal diphthongization in cariocas' speech

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In this paper, we investigate the nasal diphthongization in cariocas's speech, understudied phenomenon in Brazilian Portuguese (BP) (DEMASI, 2009; OLIVEIRA, 2008; BISOL, 1998; MORAES, in-press). We restricted the analysis to the environment /eN/ as in *p*en*s*e (he thinks), *v*en*ç*o (I win), *b*en*z*er (to bless), *par*en*tético* (parenthetical) e *pres*en*tear* (to gift). Our hypothesis is that there is a favoring of the nasal glide epenthesis if the following syllable nucleus is a coronal vowel, either [i, e, ɛ] or [ɪ], after a stressed syllable.

Our goal is therefore to perform an acoustic analysis of two small samples in order to confirm or refute the hypothesis. The prosodic parameters of formants and the duration were considered for this work. To do so, we used PRAAT to analyze the sounds recorded.

Our first speech sample consists of 9 statements and 6 distractors. Each sentence was produced by two BP native speakers (a man and a woman from Rio de Janeiro). We were interested in these words: pense-penso-pensa (I think [subjunctive], I think [indicative], he thinks [indicative]); vence-venço-vença (he wins [indicative], I win [indicative], I win [subjunctive]); and pertence-pertenço-pertença (he belongs, I belong, I belong [subjunctive]). In all these cases, the diphthongization may show up in the stressed syllable, and the final unstressed one may contain a [ʊ, ɪ, ɐ], typical of posttonic contexts in BP.

In the second sample, two speakers read 15 statements, in which 6 are distractors. Differently from the first corpus, we observed the phenomenon ocurrence in unstressed syllables. We intend to verify if the insertion of the glide would occur regardless the following vowel is [e], [ɛ] or [i], as in parent[e]sco (kinship), parente[ɛ]tico (parenthetic) and present[i]ar (to gift).

We intend with this second sample to answer if there would be the nasal glide epenthesis before any coronal vowel. Our hypothesis is that, regardless the height of the vowel, the nasal diphthongization takes place, because the trigger is the backness, not height.

The results we achieved show that the glide insertion is correlated with the occurrence of a coronal vowel in the immediately following syllable, suggesting thereby a phonotactic harmonization. Moreover, the phenomenon is not linked to the incidence of the accent, because it can happens either on stressed syllables, as on nonstressed ones.

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Dynamics of vowel-to-vowel assimilation in French

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Vowel-to-vowel assimilation in French is described as an anticipatory process affecting non-final mid vowels (V1) : [e], [ɛ], [ø], [œ], [o], [ɔ] that assimilate in height to the final tonic vowel (V2). The non-final mid vowel tend to be mid-high before a high or mid-high vowel (e. g. *aimer* [eme] 'to love'), and mid-low before a low or mid-low vowel (*aimable* [ɛmabl] 'kind')[1, 2, 3]. The present study investigates the nature of vowel harmony (VH) in French. Does vowel assimilation in French represent instances of a 'true' VH or of other types of assimilatory change ? Are the effects of this process gradient, continuous and therefore more typical of coarticulatory effects than harmony ? On the basis of the collected experimental data, we conducted a systematic study of the acoustic patterns involved in this process, i.e., vowel durations, F1 and F2 vocalic trajectories and formant slopes in line with previous research conducted by Noël Nguyen and Zsuzsanna Fagyal [4]. According to these authors, both spectral and durational differences exist in mid vowels depending on the following word-final vowel :

- mid vowels generally tend to have a more peripheral position in the vowel space, i.e., to have more extreme F2 and F1 values, prior to a non-low vowel compared to a low vowel.
- mid vowels have a longer duration when the word-final vowel is non-low rather than low.

Two issues will be addressed in this respect. Nguyen & Fagyal's [4] spectral analyses were performed at the acoustic midpoint of each vowel. In fact, there is agreement that the vowel quality can be quantified with precision by measuring the midpoint center frequencies of the first two or three formants ; this midpoint is supposed to be the point nearest the vowel target. However, as reported by Lindblom & Sundberg [5], an alternative indicator of the location of the vowel target may be the point in time where the first formant reaches its maximum frequency. According to this issue, the harmonic effects that have been evidenced by Nguyen & Fagyal [4] may, at least partly, be explained by the quantification methods that were chosen for the location of the vocalic target. We offer two predictions:

- if a systematic influence of word-final vowel on the preceding mid-vowel is only observed for vocalic targets taken as the acoustic midpoints, then the variation in formant frequency may be interpreted as the direct consequence of the formant movement that is associated with the articulatory transition.
- if, however, both methods lead to the observation of the same harmonic phenomena, then we may consider that there is an actual influence of V2 on V1, independently of coarticulatory transitions.

Data from 5 adults (2 males and 3 females) were collected. The corpus consisted of 80 pairs of disyllabic nouns (V1-C-V2 sequence). The first syllable always contained a mid vowel (V1) and was phonemically identical in both words of the pair. The mid consonant was identical in both words of the pair too. The second syllable contained a non-low vowel in one word and a low vowel in the other word of the pair (V2) e. g. /epis/ *spice* - /epat/ *impress*, /ete/ *summer* - /etɛʁ/ *ether*. Each speaker read a total of 320 V-to-V word sequences embedded in

carrier sentences. The frequencies of the first four formants were extracted every 5 ms along with their temporal location. An R script transformed these raw data in order to compute the duration of vowels, the F1 maximum frequency and temporal position, the F1 temporal mid-point and corresponding frequency along with the corresponding F2 frequencies, both for V1 and V2. Data for 3 speakers have been extracted. The R scripts for data transformation are currently being finalised. The final results and their interpretation will be described in the final paper.

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On the verge of phonetics and phonology: pre-sonorant voicing in Spanish

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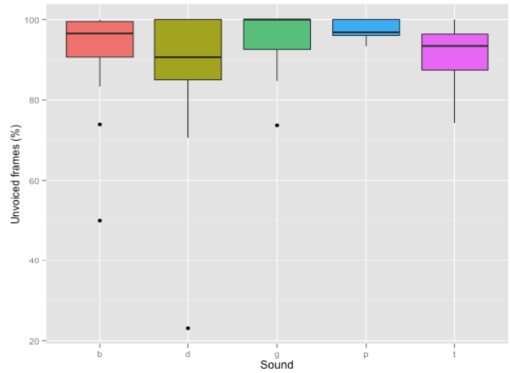
This paper aims to be a contribution to the typology of pre-sonorant voicing, a subclass of voicing assimilation: namely, when a voiceless/devoiced obstruent assimilates in voicing to a following sonorant. The process of pre-sonorant voicing has raised recurrent interest among phonologists mostly due to the apparent activity of a non-contrastively specified segment acting as a trigger in voicing assimilation. In most languages pre-sonorant voicing targets word-final (or syllable final) obstruents (e.g. Dutch, De Schutter & Taeldeman, 1986). In some languages vowels pattern with sonorants in that they also trigger voicing assimilation (e.g. Slovak, Rubach, 1994), while in others vowels do not trigger voicing (e.g. Peninsular Spanish, Hualde, 2005) or contrary, it is mostly vowels that voice the preceding obstruent and not sonorant consonants (e.g. Catalan, Jiménez & Lloret, 2008; Ecuadorian Spanish, Lipski, 1989). The process often targets only subclasses of obstruents (e.g. West-Flemish, Strycharczuk & Simon, to appear). In some accounts sonorant voicing seems to be a gradient phonetic process (e.g. Mexican Spanish, Schmidt & Willis, 2010) while in others it shows up as categorical (e.g. Slovak, Rubach, 1994).

A crucial observation regarding pre-sonorant voicing is that it occurs in languages where obstruent voicing is neutralized word-finally or syllable-finally. Jansen (2004, 2007) suggests that devoiced obstruents can fall prey more easily to the effect of voicing coming from neighboring vowels/sonorant consonants, since they have no inherent/local voicing control so as to counterbalance the voicing spill-over from these neighboring sounds. Although the above claim is very simple it is not so straightforward to demonstrate in the case of Spanish due to the phonotactic restrictions holding in the language. In an earlier study (including the following test words: *pub*, *virtud* 'virtue', *blog, ketchup* and *donut*) we have demonstrated that all these stops are realized voiceless in utterance-final position by speakers of Northern Peninsular Spanish (on average, with 90% or more of unvoiced frames), although, the actual realizations, as expected, are quite varied (1). No study so far has explicitly compared the nature of /s/ voicing in pre-sonorant and pre-obstruent position in this dialect. Note that voiced obstruents in this position are realized as approximants, however, we can still assume that their voicing target is different: they are actively voiced sounds as opposed to the modal voicing of sonorants. So this study aims to answer the following questions: (i) *Is there a difference between pre-sonorant vs. pre-obstruent* /s/ *voicing in Northern Peninsular Spanish (as there is in many other languages)?* (ii) *Is* /s/ *voicing gradual or categorical?*

A laboratory speech production experiment was carried out with six speakers of Northern Peninsular Spanish (3 male and 3 female of 22–41 years), all students or professors at the University of Oviedo. The target segment /s/ appeared in two positions either within the word or at the end of the word but within the same noun phrase as the following word and was followed by: (i) a vowel, (ii) a sonorant consonant (*m, n* or *l*), (iii) a voiced obstruent (/b or /d/), (iv) a voiceless obstruent (/p/ or /t/) or (v) nothing.

Our preliminary results show (2) that there is a significant difference in /s/ voicing before a sonorant vs. a voiced obstruent, which supports the claim that /s/ voicing in Spanish is phonetic/gradual, especially, that phonation carries on from the preceding vowel and usually dies out before the end of the sibilant. A purely phonetic account, however, contradicts the fact that /s/ in intervocalic position is realized completely voiceless (97% of unvoiced frames). The issue is further complicated by the fact that there is no voicing contrast in the sibilant dimension in Spanish. So the analysis provided by Strycharczuk (2012) for Poznań Polish that historically phonetically voiced /s/ is reinterpreted by speakers as /z/ and thus the process phonoligizes is unavailable. Pre-sonorant voicing in Spanish seems to be a language-specific phenomenon, one on the verge of phonetics and phonology.

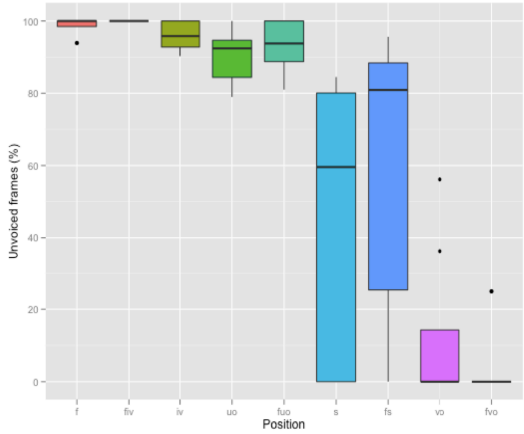
(1)



The voicing of utterance-final /b/, /d/, /g/, /p/ and /t/ in Northern Peninsular Spanish.

(2)

The voicing assimilation of /s/ depending on its position (f = utterance-final position; fiv = word-final position



followed by a vowel-initial word, e.g. *las ópreas*; iv = intervocalic position, e.g. *paso*, uo = follwed by a voiceless obstruent, e.g. *espere*; fuo = word-final follwed by a voiceless obstruent in the next word, e.g. *las potencias*; s = followed by a sonorant, e.g. *eslogan*; fs = word-final followed by a sonorant, e.g. *las motos*; vo = followed by a voiced obstruent, e.g. *esbelta*; fvo = word-final followed by a voiced obstruent, e.g. *las botas*).

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An evaluation of rule-based synthetic Korean intonation

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Speech synthesis technology has progressed remarkably over the past few years, especially with regard to segmental naturalness. Although the sound quality of segmental aspects has improved, a definition of an adequate model for the generation of prosody is largely still an unsolved problem. This is a matter of some concern, because prosody, and in particular intonation, plays a key role in the perceived naturalness of synthetic speech [2].

Of the two major speech synthesis methods, rule-based methods with unit modification and corpus-based methods with unit selection, corpus-based synthesis methods represent the current state of the art in speech synthesis. In corpus-based methods, prosody synthesis comes as a by-product of the unit selection process. By and large, these methods have been shown to produce natural-sounding prosody. However, depending on the unit coverage of the database, corpus-based synthesis remains prone to the production of unnatural prosody.

In its current state of the art, rule-based synthesized prosody achieves less natural prosody, but does perform more consistently. The main disadvantages of the rule-based approach are that rule development is a time-consuming and difficult task, that tuning the rules to a specific speaking style is sometimes very complicated, and that the set of rules may be large, and hence complex. Also, the prosody generated by rule based methods may be less varied than natural speech, leading to a repetitive speaking style. But rule-based synthesis has the undeniable advantage that it doesn't require large sized corpora.

In this study, we examine the possibility of a simplified rule-based synthesis system for Korean. Given that the language has a variety of boundary tones at the end of the sentence and that these boundary tones contain important linguistic and paralinguistic information, we decided in a first step to keep the original intonation intact for the end of the sentence and apply a simple algorithm to generate the intonation of the rest. We then made an MOS scale evaluation by Korean native speakers to compare the naturalness of synthesized sentences to the original ones.

The result shows that we can reach an acceptable level of naturalness with one single AP tonal pattern if we preserve diverse patterns of IP boundary tones.

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Attitude as a dimension of sound change

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Introduction. The quantity opposition in the Hungarian vowel system has been subject to changes in the last decades, resulting in a shortening and eventual neutralisation of long high vowels in unstressed position. This was an ongoing sound change process around 1960, as was shown in [4]. The duration ratio of long and short vowels has generally decreased compared to other quantity languages such as Slovak [1].

[3] investigated in a perception experiment to what extent tenseness information was used for distinguishing between long and short vowels. The study included old and young listeners who were also tested for their explicit and implicit attitude towards language usage. Both age and implicit attitude were relevant factors in the perception of vowel quantity: old and conservative listeners relied more strongly on the tenseness cue when identifying long and short vowels, but only in ustressed position.

However, age-related differences in the perception of F1 and F2 do not necessarily reflect a sound change process. It was shown in [2] that both F1 and F2 tend to become lower with increasing age, when speech samples of the same speaker are compared. It is possible that listeners are biased by their own vowel production when identifying vowels and that their judgements are interrelated with their own vowel space. In this study, vowel production of old and young speakers was compared and related to the midpoint of their articulatory space.

Methods. Target words contained long /o/ and /u/ in stressed and unstressed position and were embedded in meaningful carrier sentences. Sentences were read by 25 speakers (12 above 50 years, 13 in the age of 18–20 years), where gender was evenly distributed between groups. Speakers were tested for their implicit linguistic attitude by the same method as described in [3]. Additionally, the sustained vowels /a e i o u/ were recorded from all speakers. All sentences and sustained vowels were read 5 times. Results were analysed by linear mixed effect models, with the fixed effects age and implicit attitude and random factor speaker.

Results. First, the centroid of the vowel space for each speaker was calculated (mean of F1 and F2 for the sustained vowels /a i u/, respectively). Age and implicit attitude and their interaction had a significant effect on both F1 and F2 of the centroid ($p < 0.05$). There was an overall shift towards lower vowels in the speech of both young and liberal speakers with a tendency for centralisation (see Fig. 1).

The comparison of F1 and F2 of embedded vowels showed a similar tendency: both formants were significantly higher for young and liberal speakers .

Discussion. We can account for the effect of attitude on F1 and F2 variation if we assume an exemplar-based model of production, in which variants are labelled for speaker, style, and context (amongst other things), and production is based on a random sampling of a sound category [5]. In such a model, differences that mostly follow from biological changes related to the aging of the vocal tract [2] can be re-interpreted as being distributed on an older/conservative–younger/liberal axis. According to the findings of [6], information on whether a word is used more by older or younger speakers is available for the individual. We argue that this is also true for phonetic concomitants of age, suggesting that the connection between age and attitude in a sound change process is a relevant and complex one.

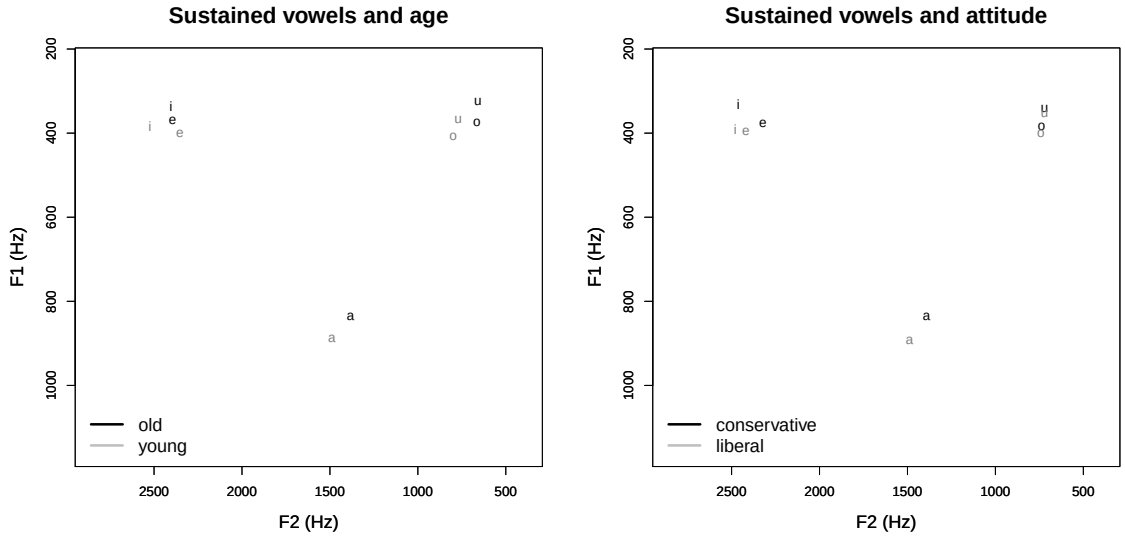

Figure 1: Vowel space based on sustained vowels, according to left: age, right: implicit linguistic attitude.

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The Nose Knows: Differences in Nasal and Nasalized Vowels as Produced by Native and L3 Speakers of Brazilian Portuguese

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Although phonologists acknowledge the phonemic contrast between oral and nasal vowels in Portuguese, few studies examine their acoustic and articulatory differences. Some of these include Kelm (1989), which focuses on the acoustic differences between /a/ and /ɐ̃/ and Gigliotti de Sousa (1994), which investigates acoustic characteristics of nasal and oral monophthongs in southern Brazil. Two studies which measure nasal airflow of nasal(ized) vowels are Medeiros (2011) and Fails (2011), which both provide evidence for different acoustic targets for nasal (contrastive) and nasalized (allophonic) vowels in Brazilian Portuguese (Medeiros 2011) and between Portuguese nasal and Spanish nasalized vowels (Fails 2011).

The current study contributes to the investigation of Portuguese vowels with an acoustic analysis of oral and nasal vowels in six L1 Brazilian Portuguese speakers and four Spanish-English bilinguals who learned Portuguese as an L3. Real words containing all Portuguese vowels (see Table 1) were embedded in naturalistic sentences as well as the carrier sentence *"Diga ____ também"* ("Say ____ as well"). Real words[1] containing Spanish vowels in oral and nasalized contexts were also included in a Spanish reading passage (see Table 2) to allow for comparisons of the L3 Portuguese group's Spanish and Portuguese production.

An analysis of the Portuguese vowels formants (F1 and F2) revealed no significant differences between groups except for /ɐ̃/, which had higher tongue height when produced by the L1 Portuguese group. Results for vowel duration revealed a significant effect for type of vowel (oral or nasal) for all cases except /a/, in which nasal vowels were longer than oral vowels in both L1 groups, suggesting that both groups used duration as a mechanism for differentiating oral and nasal vowels. The comparison between the L3 Portuguese group's Spanish and Portuguese vowels also revealed few differences in formants and vowel duration, but longer nasal consonant duration in Spanish than Portuguese. These results provide evidence not only for positive transfer, facilitated by cross-linguistic similarity, but also the creation of a new phonetic category (Flege 1995) concerning the nasal consonant that follows the vowel in these contexts.

Work currently in progress considers additional acoustic correlates of nasalization, specifically the A1-P0/P1 technique used in Chen (1997) in which nasality is calculated by the difference between the amplitude of the first formant (A1) and the harmonic near a nasal pole (P0 or P1). Preliminary results, similar to Chen (1997), revealed differences in nasal and nasalized vowels, suggesting the phonemic status of nasal vowels as a source of these differences in acoustic targets. The current study measures the A1-P0/P1 for both Spanish and Portuguese tokens with two main objectives: (i) to measure differences in the levels of nasality between Spanish nasalized and Portuguese nasal vowels for comparison to the results of both Medeiros (2011) and Fails (2011), and (ii) to determine if the L3 Portuguese speakers make a level of nasality distinction between Spanish nasalized and Portuguese nasal vowels in their speech, which would also provide insight to acquiring new contrasts in a typologically similar language. Implications for both the acquisition of phonology and underlying representations of nasal/nasalized vowels will be discussed.

[1] All Spanish tokens except "Pento" (a character's name in the reading task) were real words

Table 1: Portuguese tokens

Oral monophthongs	**Transcription**	**Orthography/Translation**	**Nasal monopthongs**
'f**a**do' (genre of music)	[ˈf**a.**dʊ]	's**a**nto' (holy, sacred)	[ˈsɐ̃.tʊ]
'v**e**jo' (I see)	[ˈv**e.**ʒʊ]	'v**e**nto' (wind)	[ˈv**ɐ̃.**tʊ]
'v**e**to' (veto)	[ˈv**ɛ.**tʊ]	----------	----------
'f**i**ca' (he/she stays)	[ˈf**i.**ka]	'v**i**ndo' (I come)	[ˈv**ĩ.**dʊ]
'f**o**fo' (cuddly)	[ˈf**o.**fʊ]	'f**o**nte' (fountain, source)	[ˈf**õ.**tʃɪ]
'f**o**ra' (out, outside)	[ˈf**ɔ.**ɾa]	----------	----------
'f**u**ga' (escape)	[ˈf**u.**ga]	'f**u**ndo' (bottom, deep)	[ˈf**ũ.**dʊ]
Oral diphthongs	**Transcription**	**Nasal diphthongs**	**Transcription**
'capitais' capitals	[ka.piˈtajz]	'capitães' captains	[ka.pi.ˈtɐ̃jz]
----------	----------	'formação' manners	[for.mə.ˈsɐ̃w]
'seiva' sap	[ˈsej.və]	'ninguém' no one	[niŋ.ˈgẽj]
'(às) oito' eight	[az.ˈoj.tʊ]	'percepções' perceptions	[per.sep.ˈsõjz]
'suite' suite, room	[ˈsuj.tʃɪ]	'muita' many	[ˈmũj.tə]

Table 2: Spanish tokens

Orthography/Translation	**Transcription**	**Orthography/Translation**	**Transcription**
'f**a**ro' (lighthouse)	[ˈf**a.**ɾo]	'p**a**nda' (panda)	[ˈp**a**n̪.da]
'v**e**lo' (veil)	[ˈbe.lo]	'p**e**nto' (nonce word)	[ˈp**e**n̪.to]
'f**i**la' (line)	[ˈfi.la]	'p**i**nta' (pint, he/she paints)	[ˈp**i**n̪.ta]
'f**o**ro' (forum)	[ˈf**o.**ɾo]	'p**o**ngo' (I place/put)	[ˈp**o**ŋ.go]
'f**u**ga' (escape)	[ˈf**u.**ga]	'p**u**nta' (point)	[ˈp**u**n̪.ta]

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Valencian Fricative Contrasts: Articulation and Perception

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Valencian Catalan dialects generally present two main contrasts among fricative sibilants: firstly, there is an opposition between the alveolar voiced segment /z/ and its voiceless counterpart /s/; secondly, there is a more dubious contrast between the /s/ and the voiceless alveolopalatal /ʃ/. While the alveolar segments occur contrastively in intervocalic position (as in *casa* /kaza/ 'house' vs. *caça* /kasa/ 'hunting'), the prepalatal consonant is regularly preceded by a glide in that position (as in *caixa* /kajʃa/ 'box'); hence, the contrast between /s/ and /ʃ/ is limited to a few pairs where these segments appear after the high front vowel /i/ (as in *París* /paɾis/ vs. *parix* /paɾiʃ/ 'she gives birth'). In Southern dialects, though, /ʃ/ is not usually preceded by the glide in intervocalic position; for these varieties, then, we expect a contrast between /s/ and /ʃ/ throughout. Previous studies have shown that, although in some varieties the /s/ - /ʃ/ contrast seems to be receding (Saborit 2010), there seems to be a persistent difference between both segments (Recasens & Espinosa 2006, 2007).

The goal of this study is, firstly, to characterize the fricative sibilants /z/, /s/ and /ʃ/ as for their length and their spectral moments (see Jongman, Wayland & Wong 2000). Our description is based on the pronunciation of these segments as proposed in the materials *Fonet. Pràctiques de fonètica*, prepared by teachers at the University of Alicante. The words contained in the materials display a hyperarticulated style of speech, which presumably should emphasize the differences among the segments. Furthermore, since in this area the segment /ʃ/ is not preceded by the glide, we expect a perfect contrast between the three sibilants. According to our data, the /s/ - /z/ contrast is clearly maintained, based both on the duration of the segments and on their spectral moments; however, the consonants /s/ and /ʃ/, whose length is not statistically different, only differ in their spectral moments. This acoustic difference first lead us to conclude that there is a difference in place of articulation between these segments, with the consonant /ʃ/ displaying, as expected, a more backed articulation. However, differences in center of gravity and maximal frequency peak do not appear as prominent as in other languages with the same contrast. Additionally, both segments display a remarkable variance in the values of their spectral moments, with some intermediate areas where values from each of the segments are superposed.

Hence, taking into account that the /s/ - /ʃ/ contrast is somehow fainter than the /s/ - /z/ contrast, we have ran several perception experiments, conducted using *Perceval* v. 3.0.5.0 (André et al., 2003), to test if Valencian speakers with advanced skills in Catalan are able to distinguish the three sibilant fricatives. In the first test, we have submitted 10 subjects to an ABX task in which there were presented with a series of /s/ - /z/ stimuli, with a duration either of 80 ms or of 60 ms. In the second test, 10 different participants were submitted to another ABX task with a series of /s/ - /ʃ/ stimuli, measuring 100 ms or 75 ms in this case. The stimuli were randomly selected from the nuclear core which, considering the center of gravity and the peak of each consonant, better represents /z/, /s/ and /ʃ/, respectively. In both tests, we wanted to check whether the participants were capable of discriminating the segments basing their decisions exclusively on differences in place of articulation, as displayed in the *Fonet* materials, and whether they were sensitive to differences in length among the stimuli. Our

preliminary results suggest that the /s/ - /z/ contrast is robust enough for the speakers to capture the differences, especially among longer segments. Contrariwise, in the /s/ - /ʃ/ test the results show that items are assigned almost randomly to each category, suggesting that the participants are not able to discriminate among these segments solely on the basis of their spectral moments.

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"Now there is a cat and a BALL over there" How information structure and intonation direct toddler attention

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Even after only a few hours, newborn infants are sensitive to their native language prosody and rhythm ([1], [2]). When children begin to speak, they are able to approximate adult-like intonation contour patterns ([3], [4], [5]) and to align these contours with the appropriate semantic and pragmatic intentions ([6]). Nevertheless, little research has been conducted on early comprehension of pitch accents as they reflect information status. The motivation for our study is to investigate how 18-month-olds are guided by the mapping from intonation to information structure during on-line reference resolution in a discourse context. We use an eye-tracker to monitor eye movements in response to speech and visual stimuli.

Grassmann and Tomasello (2010) have claimed that German-acquiring 2-year-olds attend to a referent if and only if it is both stressed and new to the discourse context ([7]). However, they used a live speaker who may have produced varying intonation contours, and they collapsed different types of pitch accents into one category "stressed." Here, we ask whether specific pitch accents more systematically predict patterns of attention. Furthermore, we better control for variation by using pre-recorded speech stimuli and by using an eye-tracker to capture more fine-grained eye movements and response times.

Our study takes a more intonationally detailed approach and differentiates stress by considering the types of pitch accents that may be used when referring. Our experiment looks at how different pitch accents facilitate attention when a referent is either *new* or *given* in the discourse setting. The pitch accents tested are H* and L+H*, with a deaccented pattern used as a control condition. We use a 2x3 mixed design to test the role that pitch plays in directing attention to *new* or *given* referents. In English, deaccentuation is typically perceived and used to express *given* information, H* pitch accents to express *new* or *contrastive* information, and L+H* accents primarily for *contrastive* information ([8]). Table 1 lists the six test conditions as well as the corresponding initial observations and predictions.

A female native American English speaker pronounced carrier sentences with H* accents on target words. Recordings were digitally edited to manipulate the pitch contours of target words only to produce L+H* and deaccented contours. All stimuli were resynthesized.

Each trial consists of a Context Phase and a Test Phase (see Fig. 1). During the Test Phase, the test utterance is played while the dependent variables of *latency to the first fixation* and *overall fixation time* to the target referent are collected using the SMI iView X RED. By testing toddler responses to changes in information status (*new* vs. *given*) and pitch, we are able to isolate the role that pitch plays in directing attention while keeping duration and intensity constant across the different conditions.

Initial observations show that an 18-month-old will fixate longer on a *new* discourse referent, even if the target word is deaccented. Additionally, it is predicted that the L+H* accent will direct attention to a referent even if the referent is *given* in the discourse. Data collection is ongoing and with the inclusion of more participants we will be better able to pinpoint the role that pitch has on directing toddler attention to a *new* or *given* referent in a single discourse scene. Analyzing how these higher-level components combine to help infants attend to a referent during discourse helps explain the various types of mechanisms that are important not only for attention but for language and word learning in general.

Table 1. Conditions and observations for 2x3 within- and between-subjects design with Information Status (*new* vs. *given*) as a within-subjects factors and Accent Type (*deaccented*, *H**, and *L+H**) as a between-subjects factor.

		Accent Type (Between-Subjects)		
		Unstressed *Deaccented*	***Stressed*** *H**	*L+H**
Information Status (Within-Subjects)	*New*	✓	✓	?
	Given	✗	?	✓

✓ = *attend to referent* ✗ = *do not attend to referent* ? = *mixed*

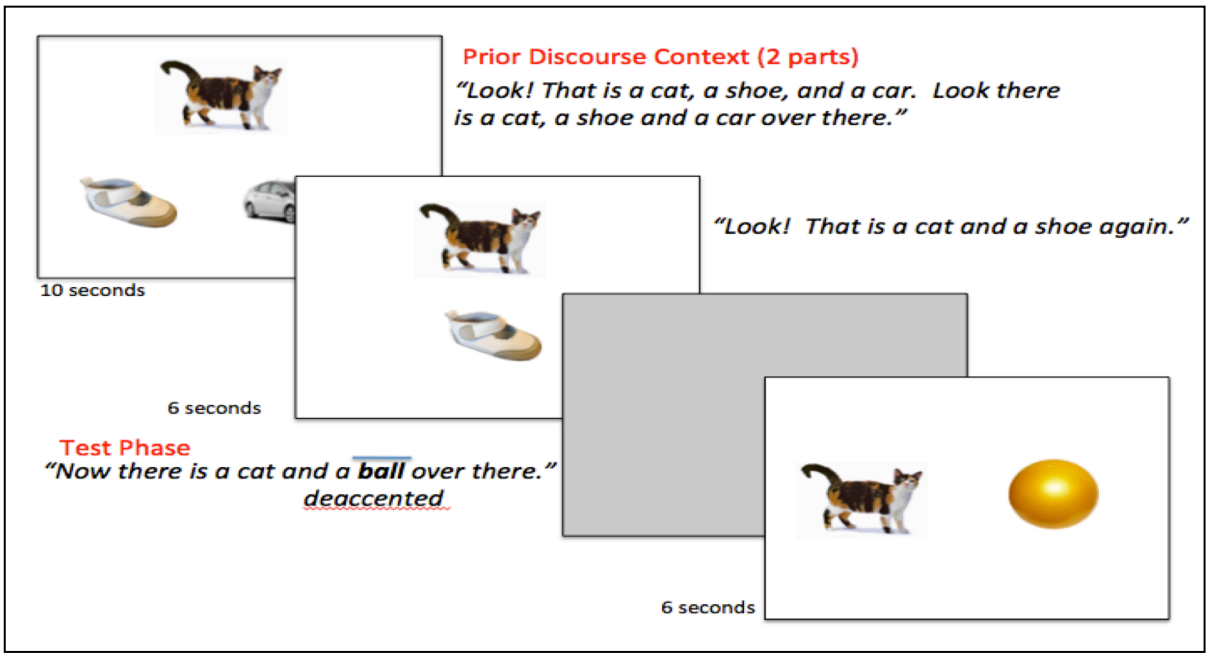

Figure 1. Example trial of a New/Deaccented condition. The first two parts establish the Prior Discourse Context. The Test Phase presents the test utterance and image.

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Variation in the realization of Prosodic Boundaries in French

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Based on data of clitic left-dislocations (CLLD) in French, we show that differences in the relative strength of the prosodic boundary occurring at the right edge of the dislocated XP (i.e. an intermediate (ip) or an intonational phrase (IP) boundary) cannot be straightforwardly derived from factors such as morpho-syntactic structure (Selkirk 1986, Mertens 1993), information structure (IS) (Truckenbrodt 1999, Frascarelli 2000, Féry to appear) and metrical complexity or branchingness (Delais-Roussarie 1996, Martin 1987, Elordieta et al. 2003). Despite the variation of the boundary strength (ip or IP), the results further show that this boundary is always the strongest sentence-internal boundary. We argue that a sort of phonological neutralization occurs, which does not allow distinguishing ip and IP boundaries. Furthermore, we argue that the global intonational pattern of the utterance is probably more important than the exact strength of the boundary.

The neutralization effect just mentioned can be nicely demonstrated by CLLD structures, because the relative weight of the three mentioned factors can be easily controlled. The syntax and the information structure does not vary: The canonical word order is changed due to the dislocation of a constituent and this constituent is considered to be a topic and to be given (Vallduví 1992, López 2009). As several studies have shown, this separation leads to prosodic boundary at the right edge of the CLLD constituent, typically associated with the IP level (Frascarelli 2000, Féry 2011). As for the third factor, non-branchingness of the CLLD can either lead to a restructuring with following material (Frascarelli 2000) or it does not show any effect at all (Feldhausen 2010). In our study, we consider CLLDs in assertions and questions as shown in (1) and manipulated the branchingness of the CLLD element in the assertive sentences.

By means of a production experiment with 6 native speakers of Standard French the boundary strength of the right edge of CLLDs in a total of 144 sentences was investigated. The data were analyzed by using the semi-automatic software ANALOR (Avanzi, 2011), in order to avoid variation due to transcriber choice. The software automatically gives to each syllable a degree of prominence ranging from 0 to 10 by taking into account the four acoustic parameters that come into play in French: (i) relative syllable duration, (ii) relative F0 average, (iii) slope contour amplitude, and (iv) presence of an adjacent silent pause, and proposes. Because of the syncretism between accentuation and phrasing (Post, 2011), this information is used to establish the boundary strength. Prominence values 3 and 4 are associated with the ip level, and values above 4 with the IP level.

The obtained results in fig. 1 show that there is always an ip or IP level boundary at the right edge of dislocated XP in assertions. In questions, the strength of the prosodic boundary may be weaker, since there are also some breaks at the AP level (value 2+). Nevertheless, a phrase break at the ip and IP level is predominantly realized in questions. Furthermore, the prominence values clearly show that the force of the prosodic boundaries is gradient, as it ranges from 2+ to 9 in our data. In all conditions, however, the prosodic boundary occurring at the right of the CLLD constituent is the strongest sentence-internally.

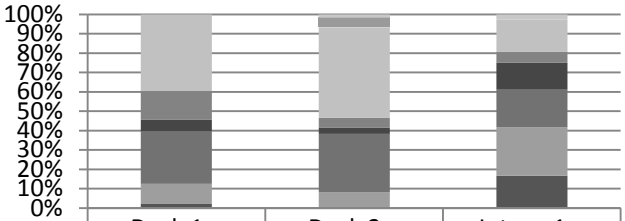
The phrasing obtained for our data show that the choice between the ip or IP level cannot be systematically explained from the three factors, since syntax and IS do not change and no correlation shows up between branchingness and boundary strength. The great variation in the realization of the boundary strength can rather be attributed to a sort of neutralization: the distinction between ip and IP boundaries is simply not relevant here.As for the weaker values in questions, the sentence type might play a role: All questions were declarative questions, which end with a rising tonal contour. In order to distinguish this

contour from the rising contour occurring after the CLLD, the speaker realizes a weaker sentence-internal rising contour. Thus, the global intonation is more important than the exact realization of the boundary strength (in line with Martin 1981, Frazier et al. 2006).

(1a) *CLLD constituent with one lexical word in declarative sentence (Decl 1w)*:
La bouteille Jean-Marie l'a donnée au voisin.
'The bottle, Jean-Marie gave it to the neighbor.'

(1b) *CLLD constituent with two lexical words in declaratives sentence (Decl 2w)*:
La bouteille de Bordeaux J.-M. l'a donnée au voisin.
'The bottle from Bordeaux, J.-M. gave it to the neighbor.'

(1c) *CLLD constituent in interrogative sentence (Interr. 1w)*:
Et ce roman tu l'as déjà lu ?
'And this novel, did you already read it?'



	Decl. 1w	Decl. 2w	Interr. 1w
9	0	1,7	2,7
8	0	5	0
7	39,6	46,7	16,7
6	14,6	5	5,6
5	6,2	3,3	13,9
4	27,1	30	19,4
3	10,4	8,3	25
2	2,1	0	16,7

Figure 1: Results in percentages for the prominence (2-9) of the boundary at the right edge of the CLLD constituent as measured by ANALOR.

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THE INTONATION OF NORTHEASTERN BRAZILIAN PORTUGUESE

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Among dialects of Brazilian Portuguese (henceforth BP), the variety spoken in the Northeast region of Brazil is popularly considered to display a distinctive use of intonation. This study presents an analysis of the intonational phonology of five main phrase types in Northeastern BP (henceforth NEBP): declarative statements, yes-no questions, wh- questions, echo questions, and imperative statements. Contrastive focus, enumeration, and disjunction were also investigated. Given that there are no existing comprehensive transcriptions of the intonation of NEBP within the ToBI system, this study aims to fill that gap by providing a description of various modal and pragmatic uses of intonation.

This descriptive analysis uses the Autosegmental Metrical framework (Beckman and Pierrehumbert, 1986; Ladd, 1996/2008; Pierrehumbert, 1980), which posits a separate level of linear organization for the pitch track of an utterance, autonomous from the segmental information but associated via tonal alignment with metrically strong syllables and phrase edges. In this model, the Tone and Break Index (ToBI) system is used to transcribe intonational features, namely pitch accents and their alignment, and boundary tones. Given the widespread agreement on the validity of AM theory and reliability of the ToBI system (Silverman, et al., 1992) as well as successful adaptations of it for many typologically distinct languages (cf. The Ohio State University Department of Linguistics, 1999), it was chosen as the framework for this research.

Early work on Portuguese within the AM model focused on European varieties, particularly the dialect spoken in Lisbon (Frota, 2002; Frota & Vigário, 2000; Vigário & Frota, 2003). Comparative works are more recent, and have analyzed patterns in this dialect in contrast with the dialect spoken in northwestern Portugal (Vigário & Frota, 2003), and with southeastern BP (Viana & Frota, 2007).

The participants were 5 female natives of the Northeast region of Brazil between 22 and 31 years. Utterances were elicited using a questionnaire designed to evoke naturalistic speech in everyday contexts (Prieto and Roseano, 2010), which I adapted to BP. Similarities with other dialects were found in neutral declarative statements and imperatives, both of which employ the nuclear contour H+L* L%. That same contour was found in some wh-questions, a pattern also described for other dialects. Findings differentiating NEBP from other dialects include the consistent use of upstep in marking contrastive focus declaratives, and the use of at least two distinct patterns for both yes-no questions and wh-questions, suggesting the encoding of different pragmatic functions. Yes-no questions seem to be most distinct, using two contours not described for other dialects, L+H* H% and L*+H L%. Table 1 presents a summary of nuclear contours as compared to findings from previous research for Southern European Portuguese (SEP) (Frota, 2002; Frota & Vigário, 2000), Northern European Portuguese (NEP) (Vigário & Frota, 2003) and Southeastern Brazilian Portuguese (SEBP) (Fernandes, 2007; Frota & Vigário, 2000).

Crucially, this study corroborates impressionistic mentions of intonational variation in BP, and shows the importance of investigating sub-dialects instead of grouping all dialects under the rubric of BP. More generally, this research adds to the growing body of work on Romance intonation, and contributes to our general understanding of intonational patterning across languages and dialects.

Table 1. Comparison of nuclear contours by phrase type across European and Brazilian dialects

Phrase type	**SEP**	**NEP**	**SEBP**	**NEBP**
Neutral (broad-focus) declarative	H+L* L%	L* L%	H+L* L%	H+L* L%
Narrow (contrastive) focus declarative	L*+H	--	L*+H L%	**¡H+L* L%**
Yes-No Question	H+L* LH% H+L* L%	L* H- L% H+L* L%	L+H* L%	**L+H* H%** **L*+H L%**
Wh-question	H+L* L% H+L* LH%	L* L% H+L* H%	H+L* L%	H+L* L% **L*+H H%**
Imperative statement	--	--	H+L* L%	H+L* L%

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Phonological categories, phonetic gradience and semantic intensification in Korean

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This paper examines the mapping between categories and gradience in meaning and speech signal in Korean colour terms. Korean has an unusual three-way categorical distinction of stops, lenis (p), aspirated (p^h), and fortis (p*). These are contrasted with, for example, VOT (fortis < lenis < aspirated), closure duration (lenis < aspirated, fortis), F0 (lenis < fortis, aspirated) and voice quality in the following vowel (see Cho, et al. 2002 for a review). Recent findings suggest that young generation of Seoul Korean speakers rely on the F0 cue for the category distinction and enhance F0 in clear speech unlike older generation (Kang & Guion, 2008) or speakers of a tonal Korean dialect (Lee et al., 2013).

The categorical distinction contributes to differentiating lexical meaning (e.g. tal, 'moon'; t*al, 'mask'; t*al, 'daughter'). In addition, the alternation between these consonants is related to phonetic symbolism (Kim, 1985); for example, Korean speakers associated fortis segments with semantic intensification from lenis segments in colour words, e.g. palgan, 'redish' vs. p*algan, 'red', whereas aspirated ones seem to have no counterpart.

The aim the study was to investigate a potential correlation between the semantic intensity scale and phonetic variations within/across the phonological category. A production experiment with four native Seoul Korean speakers in their 20s was conducted. Materials were pictures of objects in the same colour category with varying degrees of intensity (e.g. red dress) ordered along the intensity scale. Speakers described the objects as if explaining the degrees of, for example, redness to a listener who cannot see the pictures. The data analysis focused on the phonetic evidence of 1) whether intensified lenis consonants, e.g. p, s, have phonetic shapes of canonical lenis or fortis consonants and 2) strengthening of aspirated consonants which are not subject to categorical changes.

Preliminary results demonstrate that 1) there are large between-speaker differences in phonetic intensification; 2) the duration of the word with intensified meaning increases; in particular, the word-initial syllable is significantly lengthened with the increase in the colour intensity, due to lengthening of the word-initial consonant closure and word-initial vowel, in each phonological category; 3) mean pitch of the vowels did not show a clear increase in each phonological category along the colour intensity scale whilst the categorical distinction was maintained between lenis and aspirated/fortis; 4) closure duration overlaps between the intensified lenis consonant and the fortis consonant; 5) VOT does not seem to be a reliable measure for the degree of phonetic/semantic intensification; and 6) aspirated consonants do not show clear patterns related to semantic intensification.

That is, F0 seems to play a crucial role for the category distinction. Speakers opt for manipulating duration for within-category semantic intensification, whereas VOT does not show systematic variations. Further analyses focusing on the voice quality variation in relation to the phonetic/semantic intensification are in progress.

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On the influence of the Parkinson disease in vowel production

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Parkinson is a type of degenerative disease of the central nervous system more common in the elderly, with most cases occurring after the age of fifty [2]. One of the most obvious symptoms is muscle-related weakening. This involves bradykinesia, tremor and rigidity [3], therefore reducing the capacity of patients with Parkinson disease (PD) to handle common technological devices (mobile or computer keyboard, touch-screen, etc.). The number of individuals that suffer from PD is growing worldwide [2], and typically 90% of these patients are also affected in speech production [1], [9]. In this sense, speech technology can have a relevant contribution in order to integrate the PD patients within the contemporary world, improving their quality of life. This study is a first step in that direction, consisting on a preliminary analysis for European Portuguese towards identifying the acoustic-phonetic characteristics of the PD speech. The ultimate goal is to build a speech recognizer adapted to PD patients, enabling them to easily use technological interfaces. Listeners can distinguish PD speech from normal with surprising accuracy, suggesting that there is an identifiable set of measurable characteristics that contribute to the perception of the disease from the speech signal. In fact, changes in articulatory gestures accompanying the typical muscle-related weakening might be expected to affect the characteristics of the speech segments. In order to identify these changes, several studies, not for European Portuguese (EP) (e.g. [10],[11],[12]) have reported some interactions between vowel production and both F1 and F2 formant frequencies, relating them with a tendency to vowel articulatory space compression. In [11] it is showed that the PD speech intelligibility tends to be a consequence of an increase in the vowel production variability more than the restriction of vowel articulatory space. Other authors (e.g. [5], [6]) also suggest that the reduced velocity of articulatory movements during sound production justifies a tendency for producing longer segments duration. The extension of these findings to the EP language, awaits clarification so far. Considering those specific speech parameters typically associated in the literature with PD speech, we focus here on the first two formants (F1-F2) of the vowels [i] [E] [a] [O] [u], among other spectral characteristics. About 90 minutes of read speech (1002 phonetically rich sentences) collected at the neurology service of the Hospital of the University of Coimbra were used for this study. It comprises a total of 22 speakers (12 females and 10 males) between 50 and 80 years old. Two PD degree-related groups were differentiated by perceptual tests, in order to verify the changes during the disease evolution: lower and high PD degrees. All phonetic and spectral parameters evaluated in PD speech are also compared with a healthy control set of speakers. For this purpose, similar data was collected under the same acoustical environment conditions as for PD speakers. Vowels were automatically segmented by means of a phone aligner [4]. Formants and duration values of 7676 oral vowels (stressed and unstressed position) were estimated using the *software* Praat [13]. Formants were applied to the following geometric calculations: Vowels Space Area, Vowel Articulation Index and Formant Centralization Ratio [10], [11], [12]. First results show that F1 decreases during the PD progression, mainly in central and back vowels (Fig. 1). This tendency confirms the difficulty of PD patients related to the movement of the tongue's body. The articulatory restriction as an indicator of the rigidity of the vocal muscle is considerably evident in the production of open central vowel [a]. In general, the articulation of the vowels tends to be similar between control group and lower PD degree group. We argue that by studying the acoustic-phonetic changes present in the PD speech, some phonological markers of early disease progression can be found as well as a potential treatment.

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Fig. 1: Median of the first and second formants of the 7676 vowel tokens from men of the healthy control group (green), lower (blue) and high (red) PD degree groups.