The acoustic correlates of question signaling in Peninsular Spanish: Three sentence types compared
Nicholas C. Henriksen
Northern Illinois University
nhenriksen@niu.edu

The most recurrent prosodic characteristic used to communicate question intent is high pitch, either locally (i.e., on a specific tonal movement) or globally (i.e., across the course of the utterance) (Haan, 2001; van Heuven & van Zanten, 2005). van Heuven & Haan (2000; 2002) express the relative prosodic marking of question intent with respect to the continuum of lexicosyntactic devices available for use in question marking. For a given question type, the number of interrogativity markers is tallied. The prediction is that prosodic marking should be weaker in wh-questions than in declarative questions since the former use a wh-word and syntactic inversion to signal question intent, whereas the latter do not. As for work on the phonetic correlates of the question-statement contrast in Spanish and whether van Heuven & Haan’s prediction may be borne out in the language, current knowledge is extremely limited. Although experimental work has focused on local F0 and alignment differences for declarative questions and statements (Face 2005; 2007), little has been said in the way of global characteristics or even how declarative questions may be differentiated from wh-questions. This paper is designed to fill this gap in the literature as it investigates the acoustic properties of a series of question contours produced by 16 speakers of Manchego Peninsular Spanish. The acoustic measurements were: baseline slope; speech rate (syllables/sec); stressed syllable duration; and utterance duration.

As for research protocol, 52 wh-questions, 52 declarative questions, and 52 declarative statements were produced by each speaker in a sentence reading task. In total, five question contours were attested: declarative question early rise; declarative question late rise; wh-question final rise; wh-question early fall; and wh-question late fall (see Figure 1). Baseline slope was calculated by dividing the change in F0 of a contour’s L turning points by the temporal distance between the two. These are labeled as ‘L1’ and ‘L2’ in the contours provided in Figure 1. Duration measurements were taken as well: total duration; prenuclear syllable duration; and nuclear syllable duration. Speech rate was calculated by dividing the number of syllables of each production by the total duration. Utterances varied from 3 to 8 syllables in length.

Results showed that, in terms of the baseline slope, all question contours except the declarative question late rise significantly differed from the statement contour (Figure 2a). As for speech rate and syllable duration (Figures 2b and 2c, respectively), Tukey post hoc tests indicated that the early rise and the early fall were not significantly different from one another, as they were the fastest of the six contours on speech rate and the shortest on stressed syllable duration. Similarly, the late rise, final rise, and late fall were not found to significantly differ from one another on the same measurements (i.e., they were the slowest and longest). Clearly, speech rate and syllable duration differences were not related to sentence type, and this would run counter to the predictions made in van Heuven & Haan (2000; 2002). The claim made here is that longer stretches of H tones in the ‘early’ contours and the interleaving of L and H tones in the ‘late’ contours – that is, the tonal categories themselves and not the pragmatic intent of a given sentence type – are responsible for overall faster rates in the former, but slower rates in the latter. Finally, we consider whether faster speech rate in certain question contours may be understood as ‘hyper-articulation’ (Baker & Bradlow, 2009) of phonetic signals of interrogativity and whether situational and communicative factors motivate the observed findings.
Figure 1. L1 and L2 labeling for: statement (a); declarative question early rise (b); declarative question late rise (c); wh-question final rise (d); wh-question early fall (e); and wh-question late fall (f).

Figure 2. Boxplots for baseline slope according to CONTOURTYPE (a); Bar chart for mean speech rate according to CONTOURTYPE (b); Bar chart for mean prenuclear syllable duration according to CONTOURTYPE (c).

References