Prosodic analysis of a corpus of Brazilian Portuguese attitudes

Introduction

A speaker may express his opinion, belief and knowledge to his interlocutor through the use of prosodic attitudinal expressions (Wichmann, 2000). Such prosodic expressions differ from emotional expressions and are conventionally encoded by languages and cultures, and may vary with them. The typologies of attitudinal expressions may vary with authors and their specific point of interest. The present study is based on a separation already used by Martins-Baltar (1977) and Fónagy et al. (1984), who separate propositional and social attitudes: propositional attitudes address the propositional content of the sentence (e.g. doubt, obviousness, irony), while social attitudes refer to the interpersonal relationship between the speaker and the receiver (e.g. politeness, irritation, arrogance). Wichmann (2000) proposes a similar distinction between what she calls propositional and behavioural expressions.

This study describes the prosodic analysis of a corpus of such attitudes in Brazilian Portuguese (BP). After describing the corpus of BP attitudes, the process of prosodic analysis is detailed, and the main results observed on the corpus are given.

Corpus and analysis

All attitudes are performed by two native speakers of BP (a female and a male), on a set of sentences (cf. table 1), which don't have any particular meaning in relation to the attitudes. Two sets of attitudes are performed on these sentences, associated with an assertive or an interrogative mode.

Table 1: sentences of the corpus, with their length in syllables, the place of lexical accent on their last word and a translation.

BP sentence	Length	Lexical accent	Translation
Ta	1	oxyton	
Vai dançar	3	oxyton	Go dancing
Dançava	3	paroxyton	Danced
Roberta vai dançar	6	oxyton	Roberta go dancing
Roberta dançava	6	paroxyton	Roberta danced

Assertive mode:
- *Social:* arrogance (ARR), authority (AUT), contempt (CON), irritation (IRR), politeness (POL) and seduction (SED);
- *Propositional:* doubt (DOU), irony (IRO), incredulity (INC), obviousness (OBV) and surprise (SUR).

Interrogative mode:
- *Social:* arrogance (ARR), authority (AUT), contempt (CONT), irritation (IRR), politeness (POL) and seduction (SED);
- *Propositional:* confirmation (CONF), incredulity (INC), rhetoricity (RET) and surprise (SUR).

These attitudes (plus the neutral assertive and interrogative sentence), performed on the 5 sentences, were recorded (both in the audio and video modality) in three repetitions by the two speakers. The recordings were phonetically aligned by hand, and the following prosodic parameters were extracted: the fundamental frequency (F_0, expressed in semitones), the intensity (in dB, both measured on vowels) and the syllabic duration.

These attitudes have been presented to native listeners in order to measure their ability to recognize the performed attitudes. The perception results are described in de Moraes et al. (2010, 2011), and provide a validation of the pertinence of the measured parameters.

Results

Inspection of the measured prosodic parameters shows that a wider range is used for propositional attitudes than for social ones (cf. Figure 1 for the F_0 parameter). This is in line with the perception results that show better recognition scores for propositional than for social attitudes.
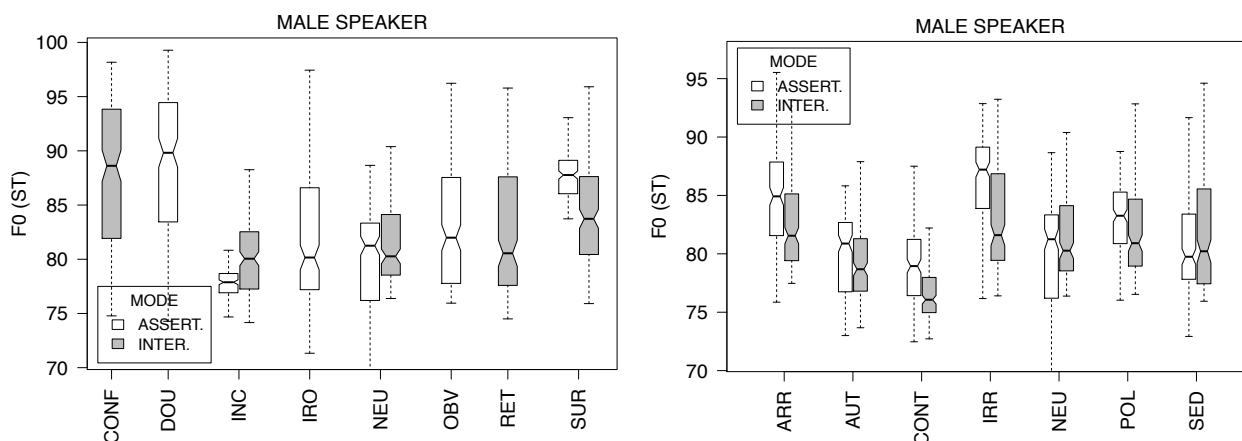

Figure 1: Dispersion of the F_0 values measured for the male speaker on the propositional (left) and the social (right) attitudes, for both assertive and interrogative modes.

The evolution of the prosodic parameters has also been inspected (cf. figures 2 and 3 for F0, for the male speaker). Interestingly, the shapes of contours for propositional attitudes are characteristically different for each one, while the shapes of social attitudes are more similar. Visual inspection also shows the influence of the linguistic constraints of prosody on the global contours of attitudes: oxytonic and paroxytonic sentences show differences mainly in relation with the stress position, while the other parts of the contours remain similar.

The analysis of the data for the two speakers shows main trends associated with each of the attitudes, as well as possible variability in individual strategies; the variations are accounted for in the perception test results, where each speaker receives recognition scores that differ depending on the mode of presentation (e.g. audio or visual).

References:

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[5] Wichmann A. (2000). The attitudinal effects of prosody, and how they relate to emotion. *Proc. ISCA Workshop on Speech and Emotion*, Newcastle, North Ireland, 143-148.
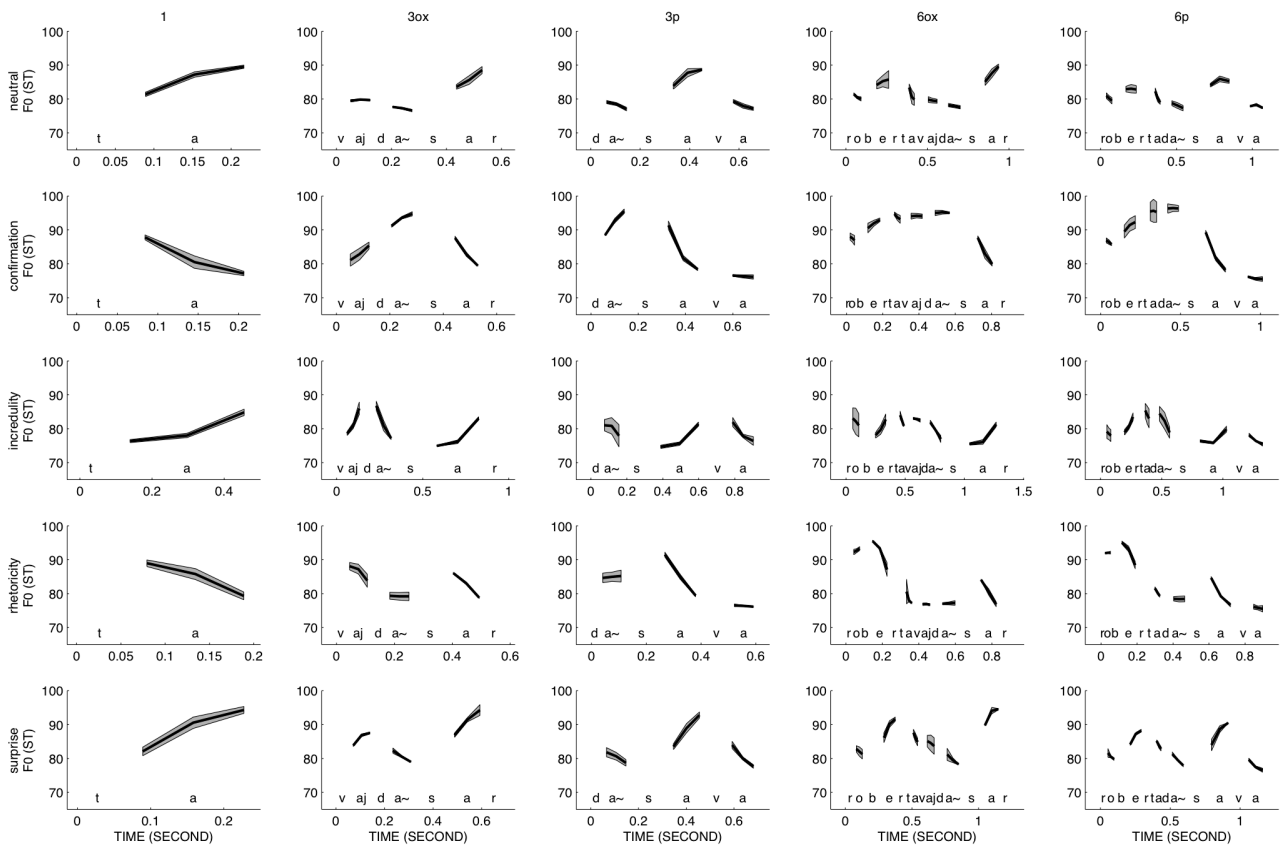
Figure 2: F₀ contour (mean of 3 repetitions) for the interrogative sentences with the 4 propositional attitudes plus the neutral interrogation (in rows), as performed by the male speaker, with the different sentences (in columns).
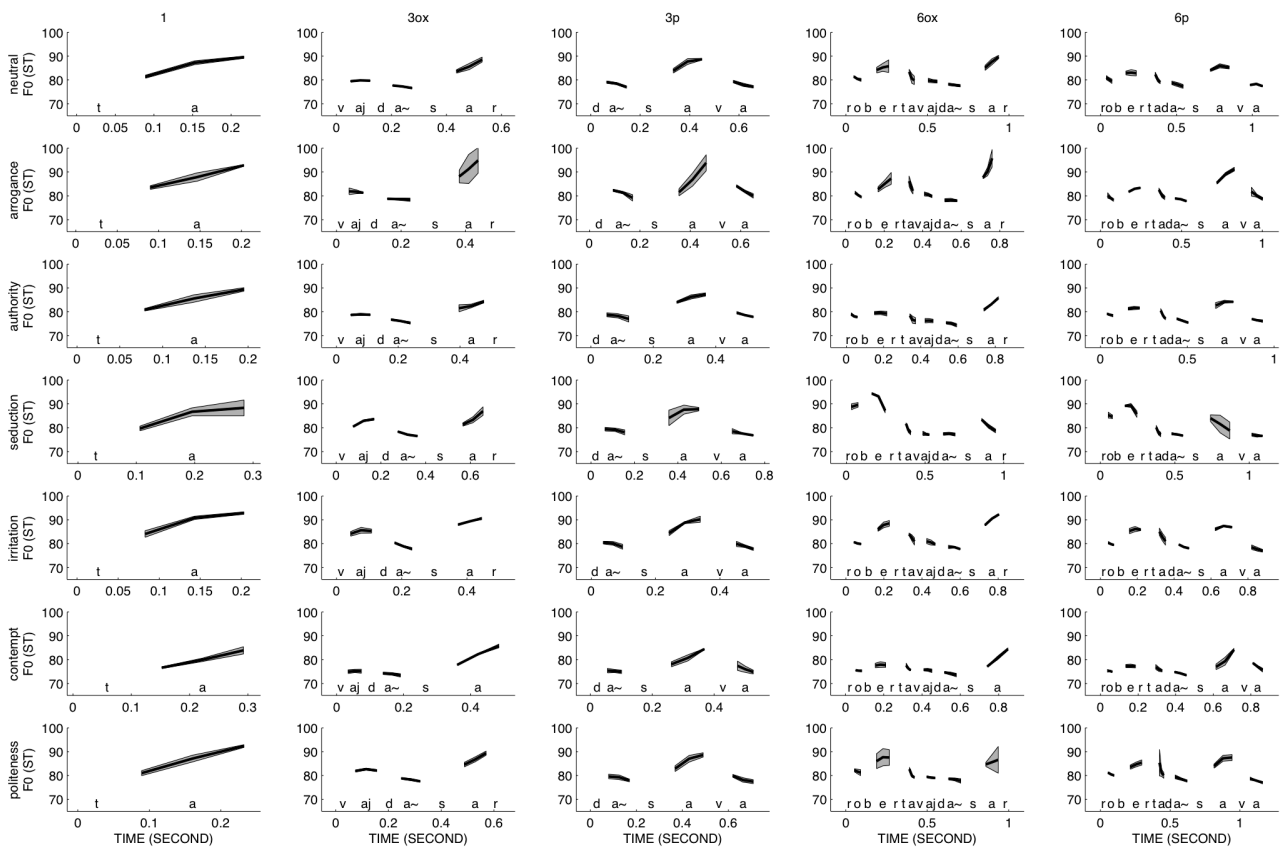

Figure 3: F₀ contour (mean of 3 repetitions) for the interrogative sentences with the 6 social attitudes plus the neutral interrogation (in rows), as performed by the male speaker, with the different sentences (in columns).