A prosodic contribution to the understanding of stuttering in European Portuguese

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Background
Past studies showed that:
- There was more stuttering at initial words of long sentences than of short sentences containing exactly the same sequences of words (Tornick & Bloodstein, 1975);
- The relation between syntactic structure and fluency could vary according to the task proposed for speakers (Gordon & Luper, 1995);
- Stuttering is a prosodic disturbance (Bergmann, 1986). This is further explored by Bloodstein (1995) or Hubbard (1998), where the relevance of prosodic constituents and word stress is argued for;
- Syntactic complexity plays an important role in stuttering (Silverman & Bernstein, 1997).

More recently:
- In Gordon and Luper’s vein (1989), Logan (2001) saw that speakers produce more disfluencies in spontaneous speech;
- Logan’s results do not support the hypothesis that one type of syntactic structure affects the speech fluency of adults who stutter, more than any other type of syntactic structure;
- There are no differences in either the percent of syllables stuttered or the percent of syllables with other types of disfluency across the 4 categories of length matched sentences (Logan, 2001);
- Participants articulated syntactically complex sentences at a significantly faster rate than syntactically simple sentences (Logan, 2001);
- Arbisi-Kelm (in press) showed that stutterers appear to be sensitive to prosodic breakdowns and semantic breaks and the fluency of stuttering adults, in European Portuguese (EP).

Methodology
Procedure: sentences read in random order by two male age matched adult speakers (a stuttering and a non-stuttering speaker) and recorded in a quiet room with Marantz PMD670 and two microphones Beyerdynamic DT 158 MK II. The 44100Hz digital files were converted to 22050Hz format, edited with Adobe Audition 1.5 tool (Adobe Systems Incorporated, 2004) and each sentence was annotated using Praat 5.0.0i (Boersma & Weenink, 2007).

Corpus: a total of 30 sentences (35 Is) manipulated in terms of NP Subject, VP and Sentence (i) syntactic complexity (see table aside) and (ii) length (number of syllables: 2 to 25 – and PWs: 3 to 8) x 2 speakers.

Main findings
1. The duration of stuttering events is not dependent on: a) the syntactic complexity of NP, VP or sentence; b) in the length of NP, VP or sentence (in terms of number of syllables or number of PWs).
2. Pauses and Lengthening are the two most frequent types of stuttering events.
3. Prosodic constituency is shown to constrain stuttering patterns: PW = (I), (I), (I), (I), (I) – PHP;
   a) Stuttering occurs at the beginning of PW, (i.e., PW is usually unstressed), except lengthening which occurs at the opposite edge of PHP (the last PW – head);
   b) Lengthening occurs at the Intonational Phrase medial position, even with subjects longer than 3 syllables;
   c) Short silent pauses are predominantly produced between PHPs and between Is; unlike control, the stutterer also pauses between PHPs and PWs.

Future work: prosodic phrasing and intonation in the spontaneous and read speech of stutterers and non-stutterers (4 speakers).