

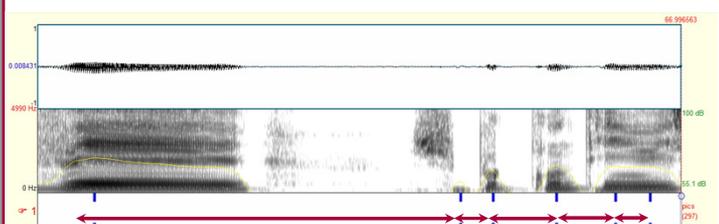
Goal of this paper: The contribution to stuttering assessment of a phonetic tool originally devised for fluency analysis in simultaneous interpreters in French.

1.Introduction

Persons who stutter (PWS) encounter various difficulties in delivering the speech sounds corresponding to the phonetic realizations of the messages. This results, for the listener, in a **global sensation of dysfluency**. Usually, the descriptions of the phenomena remain quite macroscopic: e.g.: number of stuttered words or stuttered syllables, assessment of stuttering severity degree.

- ⇒ Very often based on subjective expertise, sometimes relying on scales aiming at objectivising the judgment , or even based upon self assessment.
- ⇒ What's the base of this expertise?
- ⇒ Which indices help expert judgment?

2. Experimental design

Subjects	Task	Inter Syllabic Interval (ISI)
<p>-3 contrasted subjects (to maximize the inter-subject variability) - Belgian French speakers</p> <p>➢ 1 Non Stuttering Person (NSP) ➢ 2 Persons Who Stutter (PWS)</p> <p>➢ PWS1 = considered as "clonic" (characterized by a large amount of repetitions of phonemes, syllables, words and sentences) ➢ PWS2 = considered as "tonic" (characterized by frequent blockings)</p>	<p>In french</p> <p>Map task under 4 conditions:</p> <ul style="list-style-type: none"> - NAF = Normal Auditory Feedback - DAF = Delayed Auditory Feedback <ul style="list-style-type: none"> - 80 ms - 120 ms - 160 ms <p>⇒To maximize the intra-subject variability</p> <p>4 corpora by subject</p>	<p>The ISI is the time differentiation between intensity peaks (see ←→). For each peak, the time interval separating it from the preceding peak is calculated.</p>  <p>Figure 1: ISI for PWS1 under NAF condition [be'psk0'ti'nye]</p> <p>Long ISI characterized a momentary reduction of speech rate</p>

3.Results

2 groups of phonic events

'**α events**': sound or group of sounds resulting from the normative pronunciation of a syllable of a word belonging to the French lexicon
'**β events**': any other isolated sound or group of sounds recognizable as a pronunciation unit and not contributing to the normative pronunciation of a word of the French language

Distribution of phonic events:

α + β

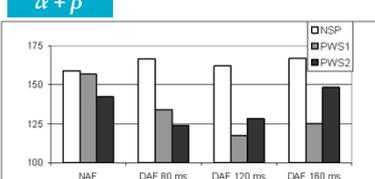


Figure 2: global amount of phonic material by minute (ordinate), for each subject, in each experimental condition

% of β

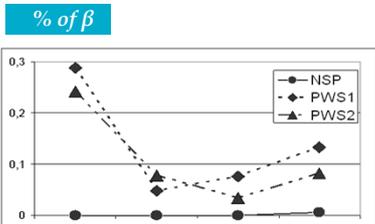


Figure 3: proportion of β events relative to the global amount of phonic material by minute (ordinate), for each subject in each experimental condition.

Variations in the flow of speech

The Inter Syllabic Interval

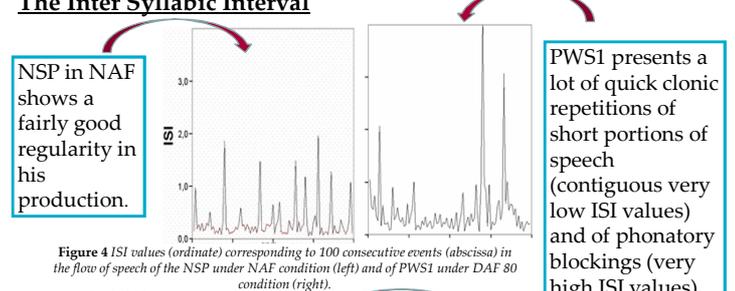


Figure 4 ISI values (ordinate) corresponding to 100 consecutive events (abscissa) in the flow of speech of the NSP under NAF condition (left) and of PWS1 under DAF 80 condition (right).

NSP in NAF shows a fairly good regularity in his production.

PWS1 presents a lot of quick clonic repetitions of short portions of speech (contiguous very low ISI values) and of phonatory blockings (very high ISI values).

ISI variability

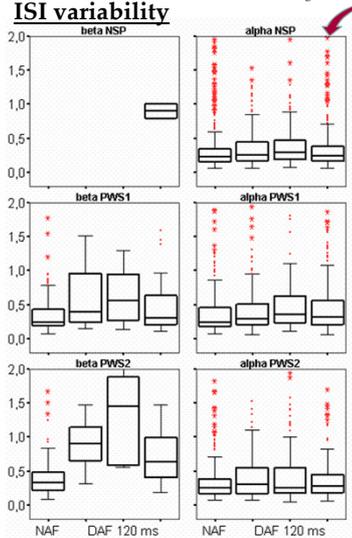


Figure 5: Boxplots (medians, .25 and .75 percentiles and outliers) for the ISI values (ordinate) for each event type, for each subject and for each condition.

Analysis of variance
DV = ISI, IV = subjects and conditions

- significant subject effect (F_(2,3354)=14.788, p < .001),
- significant interaction effect (F_(6,3354)=2.300, p=.032)
- weakly significant condition effect (F_(3,3354)=2.470, p=.060).

Mainly PWS affected by DAF:
ISI increase under DAF 80/ DAF120

4. Conclusions and perspectives

The use of a very simple phonetically based index (the Inter-Syllabic Interval, ISI) allows to point out striking differences in the speakers behaviours, depending upon their speaker profile (NSP vs. PWS), the conditions they have to cope with while speaking (NAF vs. DAF) and the kind of stuttering (clonic vs. tonic), if any.

In future research, experiments should be conducted with the aim of setting up a semiology of the ISI values, with the double aim of better

- (1) describing and assessing the stutterers performance under varying conditions,
- (2) understanding the processes involved in coping with feedback alteration, in stutterers, as well as in non-stutterers.