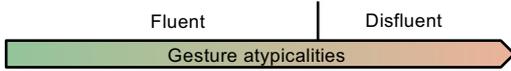


Context and questions

Preliminary study : Searching for descriptors to characterize a physiological continuum of speech atypicality underlying the discontinuous perception of « fluency ».



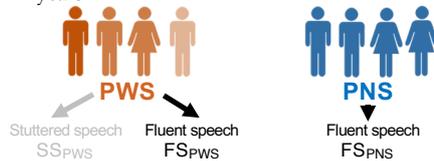
- Do people who stutter demonstrate atypical speech gestures, even when they sound fluent ?
- At what production level(s): breathing, glottal behaviour, articulation ? or in the coordination of these gestures ?
- Do these atypicalities rather correspond to enhanced or reduced efforts ?

Material and method

8 speakers of French :

- 4 Adults who stutter since childhood
Self-evaluated as light (1), mild (2) and severe (1) stutters
Some form of speech therapy in the past 3 to 5 years.

- 4 typical adults without speech disorder



30 words of 3 syllables C(C)V-CV-CV

	/p/	/pn/	/b/	/bn/	/m/
/a/	Paradis	Praticien	Banancier	Brasero	Macaron
/a/	Panama	Praliné	Bahuchon	Bracomnier	Maquillage
/i/	Pissenlit	Prisonnier	Bikini	Bricoleur	Mirabelle
/i/	Piranha	Professeur	Bijoutier	Britannique	Minibus
/o/	Potager	Promoteur	Boléro	Brocoli	Mocassin
/o/	Policier	Privation	Bolognaise	Brocanteur	Mobilier

3 bilabial consonants, with /without initial cluster
3 vowel contexts

Two tasks :

- Fast reading of lists
- Semi-spontaneous task :
Formulate a sentence as quickly as possible, using three target words presented on flashcards



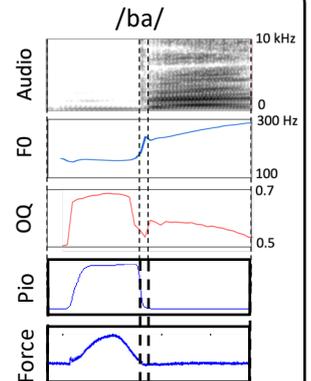
Data acquisition :

- Audio signal (B&K microphone)
- EGG signal (EG2 Glottal Enterprise)
- Interlip force (Gauge strain sensor)
- Intra-oral pressure (EVA system)



Measurements:

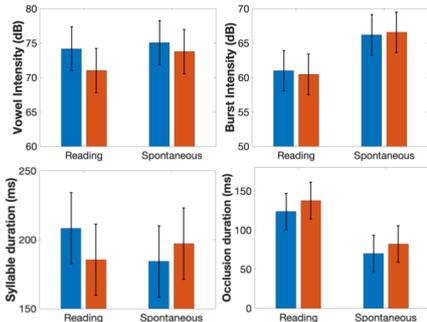
- Acoustics :
 - Vowel and burst intensities (calibrated)
 - Syllable rate
 - Occlusion duration
- Aerodynamics :
 - Maximum Intra-oral pressure (Pio) during occlusion
 - Building and Release velocities
- Glottal behaviour :
 - During occlusion : Open quotient (OQ)
 - Difference btw occlusion and next vowel :
 - f_0
 - OQ
 - EGG amplitude



- Articulation :
 - Maximum interlip force during occlusion
- Coordination :
 - Voice Onset Time (VOT)
 - Voice Termination Time (VTT)

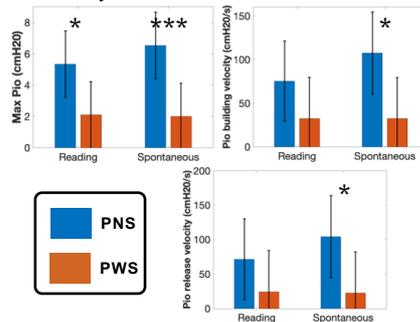
Results

• Acoustic outcome



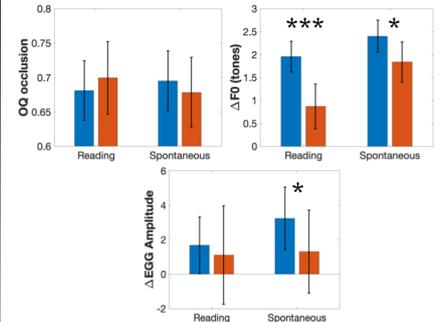
Comparable intensities (vowels and bursts) and durations (syllables and occlusion phases)

• Aerodynamic behaviour



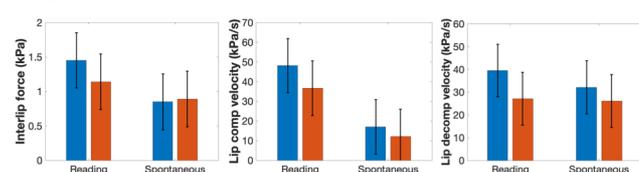
Lower levels of Pio and a slower building and release of Pio

• Glottal behaviour



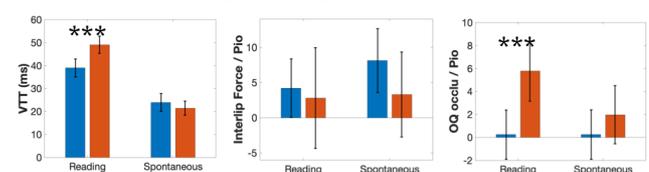
Comparable OQ_occlu, reduced pitch rise and variation in EGG amplitude at occlusion release

• Articulation



Slightly weaker inter-lip compression forces and articulation velocities

• Gesture coordination behaviour



Longer Voice Termination Times (VTT), greater OQ/Pio ratios

Conclusions

Atypical patterns in the speech production gestures of PWS were found, even during their fluent utterances, at the aerodynamic, laryngeal and articulatory levels.

Despite the perceptual discontinuity of « fluency », stuttering appear to be a permanent disorder, modulated by several factors, underlied by an atypicality continuum of the production gestures.

In particular, Pio waveform, laryngeal variations at occlusion release and VTT appear to be relevant descriptors of that atypicality continuum.