



Speech synchronization abilities in people who stutter

Maëva Garnier, Anneke Slis, Pascal Perrier, Christophe Savariaux

► To cite this version:

Maëva Garnier, Anneke Slis, Pascal Perrier, Christophe Savariaux. Speech synchronization abilities in people who stutter. SMC 2022 - 8th International Conference on Speech Motor Control (SMC2022), Aug 2022, Groningen, Netherlands. , pp.Poster Session I - n° 27. hal-03920114

HAL Id: hal-03920114

<https://hal.science/hal-03920114>

Submitted on 3 Jan 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Speech synchronization abilities in people who stutter

Maëva Garnier, Anneke Slis, Pascal Perrier, Christophe Savariaux
 Univ. Grenoble Alpes, CNRS, Grenoble INP, GIPSA-lab, 38000 Grenoble, France

Context and questions

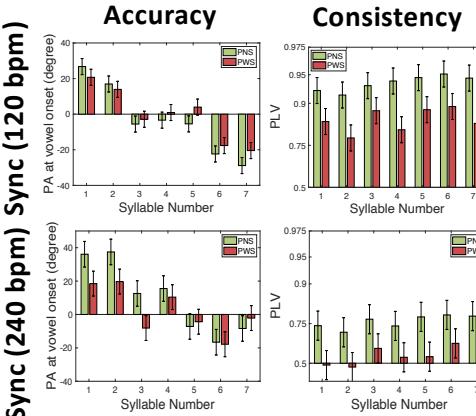
People who stutter have their fluency improved by :

- a metronome (Brady 1969; Hanna & Morris 1977; Hutchinson & Navarre, 1977; Kalinowski et al., 2000)
- singing (Perkins et al., 1976; Healey et al. 1976; Glover et al. 1996; Falk et al. 2016)
- choral reading or joined speech (Adams & Ramig, 1980; Kalinowski et al., 2000; Ingham et al. 2006)
- a delayed auditory feedback (Andrews et al. 1982; Sparks et al. 2002)

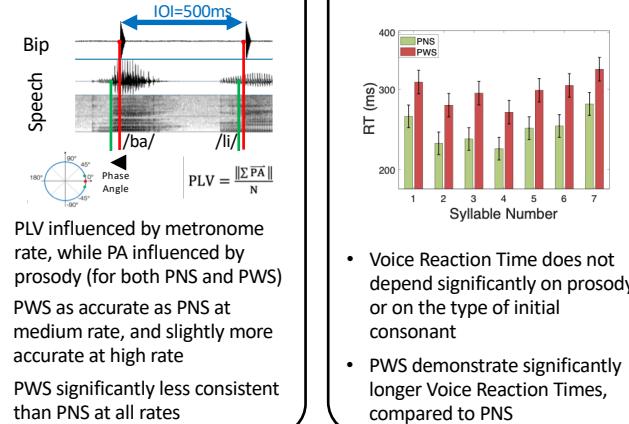
→ How to explain these positive effects ?
 What deficits may be « restored » by these rhythmic stimulations/alterations ?

- Hyp1: External trigger for the initiation of prosody movements
 Hyp2: Imposed « musical » rhythm replacing prosody
 Hyp3: Switch from automatized to feedback control

Synchronization accuracy and consistency



Voice Reaction Time



Conclusions

- Clear difficulty of PWS with the initiation of speech movements, reflected by longer Voice Reaction Times (Hyp1)
- For both PNS and PWS, synchronized speech does not abandon prosodic marking in favor of musical meter (like finger tapping), nor accentuates prosodic cues → External rhythm does not seem to help with prosody (Hyp2).
- No systematic negative mean asynchrony in speech, like in finger tapping. Unexpected tendency towards improved synchronization accuracy in PWS
- Reduced synchronization consistency in PWS (like finger tapping), especially at high metronome rate

Material and method

- 32 participants matched in age, gender and musical training



16 Typical adults
PNS



16 Adults who stutter
PWS

- 5 tasks

AUDIO STIMULUS 7-SYLLABLE SENTENCES

1 reading
 (no external rhythm)

3 synchronization
 (predictable)

1 reaction
 (unpredictable)

Isochronous
 Medium rate (120bpm)
 Fast rate (240 bpm)

Non-isochronous (not presented here)

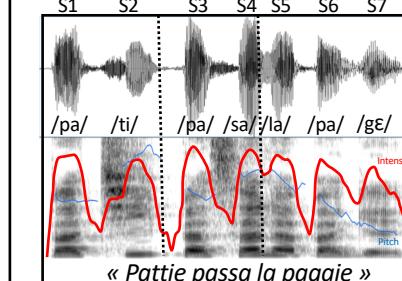
Interaction between musical meter and prosody

French prosody:

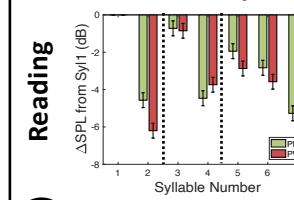
Word stress on the final syllable
 Primary accent at the end of accentual phrases (F0 rise + syllable lengthening)
 Final pitch fall at the end of an utterance

Musical meter

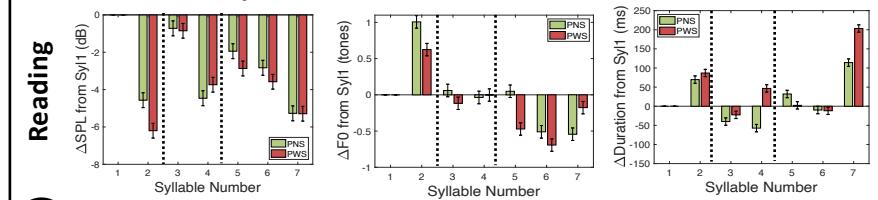
Quadruple, duple or triple meter
 Accented events every 4, 2 or 3 beats



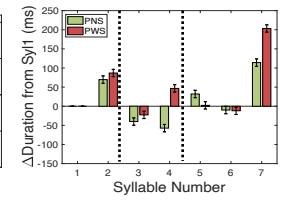
Intensity



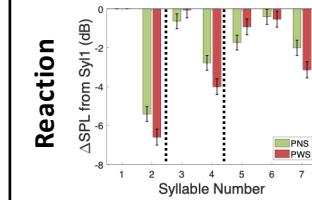
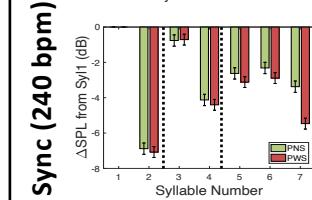
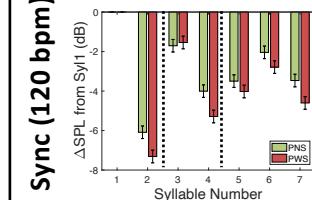
Reading



Duration

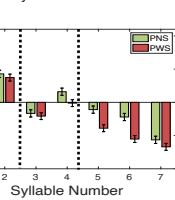
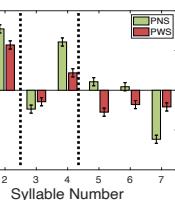
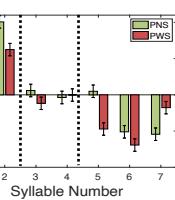


Sync (120 bpm) Sync (120 bpm)



Reaction

Pitch



→ No different syllable pattern in synchronization tasks, compared to Reading and Reaction tasks