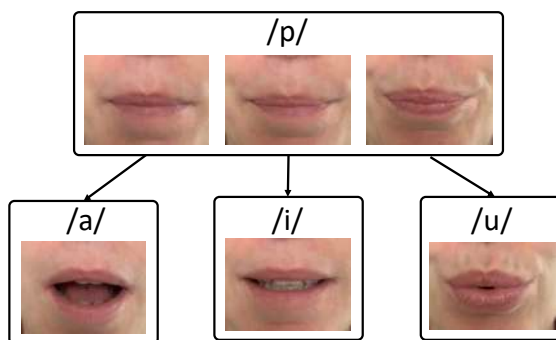


## Motor planning in people who stutter

**Context:** Stuttering is a disorder of speech fluency, resulting in repetitions, prolongations or blockages of sounds. Its causes are not yet completely identified. Among the various hypotheses proposed, one suggests that people who stutter have deficient speech planning processes (EXPLAN model: Howell & Au-Yeung 2002; Howell, 2004). This deficit is reflected in people who stutter not only by dysfluencies in the speech produced, but also by other phenomena, such as a reduced degree of “co-articulation” and motor anticipation (Robb & Blomgren, 1997; Zmarich & Marchiori, 2004).

**Research question:** The aim of this project is to explore motor planning in people who stutter and to examine to what extent this is a deficit specific to speech or generalized to other body movements. In particular, the question arises as to whether the grapho-motor gestures involved in writing or drawing also show disruptions and a degree of co-articulation comparable to those of speech gestures.



**Project:** An experiment will be run, with the aim to compare speech and writing gestures in typical adults and adults who stutter. In a first task of speech production, the audio signal and lip kinematics will be measured (with a microphone and a video camera) during the production of syllables like /papa/, /papi/ or /papou/, in order to characterize the degree of anticipation of lip spreading or rounding gestures (involved in /i/ or /ou/) in the preceding articulatory movements. Comparably, a second writing task will explore, with the production of sequences like /ll/, /le/ or /ln/, the degree of anticipation of a reduction in character size, or of a change in direction of rotation, on the preceding gestures. The position, speed and force of the writing gestures will be recorded using a dedicated graphic tablet (Wacom Bamboo).

**Required skills:** Knowledge of speech production and behavioral psychology. Basic programming and signal processing skills in Matlab, Python, R and Praat will be appreciated, as well as empathy and good interpersonal skills to deal with the adults who stutter.

**Developed skills:** Theoretical knowledge in motor control; Familiarity with various methods of investigating speech and writing production, Management of a human experiment from start to finish, Skills in acoustic and kinematic signal processing, Matlab or Python programming and statistical analysis.

**Supervision:** The project will take place over a period of 4-5 months, supervised by Maëva Garnier, Sonia Kandel and Marine Verdurand.

**Internship bonus:** Monthly allowance of about 400 €.