Three projects on altered auditory feedback in PWS

**Project 1**: This experiment tests how quickly feedback affects speech control and how quickly the effects dissipate when altered feedback is switched off in PWS. . Two tasks are employed: One examines how fluency is affected by the alteration in PWS with fluent speakers as controls; and the other examines speech control in general under the alteration to see whether both groups of speakers are affected and, if so, whether they are affected in the same or different ways. In the task to study fluency, altered feedback is delivered on stutters that the PWS (and possibly controls) produce and time to recover fluency is compared between these and stutters that receive no alteration. In the task to study general speech control, speakers produce four syllables and one of them receives an alteration. Similar comparisons are made between altered and non-altered syllables as was done when fluency control was examined. In both tasks, the time course that the alteration has on speech control in general (PWS and fluent controls) and fluency control in particular (PWS) are established.

**Project 2**: The hypothesis is that adaptation occurs in PWS who reduce voice level as this leads to less feedback and thereby decreases the fluency-enhancing effect of the alterations (Howell & Archer, 1984). There are two parts to this study First, the hypothesis predicts that PWS who adapt will tend to reduce their voice level more than those who do not adapt. Voice level will be measured to test this. The second study tests whether an automatic gain control (AGC) reinstates fluency in PWS who adapt to altered feedback. The first part should show that speakers who adapt to the effects of altered feedback do so by reducing voice level that also decreases feedback level. This would be prevented by using an AGC. The AGC adjusts voice intensity to a preset level that neutralizes reductions in speech level leading to reductions in level of the altered sound. The boost to the intensity of the altered feedback delivered by the AGC when voice level drops allows the PWS who would have adapted to maintain the fluency-enhancing effects.

**Project 3**: General background to motor learning project and altered feedback

The study ascertains what affects learning *and* retention rates of induced fluency; comparison will be with immediate feedback where little retention of induced fluency is expected. In this project, PWS will be tested at different points over 20 sessions and learning rates will be determined. The experiments will continue for another 10 sessions without alteration in one group (and with alteration in another group) to determine transfer and its retention over time. In these studies, altered feedback delivered on stutters is considered to reinforce fluent behavior on these episodes s indicated next.

There are two parts to this project. The first tests whether targeting alterations on difficult material externally (i.e. by the experimenter) is more effective at inducing fluency than targeting them at random and possibly as effective as having the alterations on continuously.

The second part tests whether targeting alterations on material that is spoken rapidly will be more effective at inducing fluency than targeting alterations at random and possibly on speech that varies in difficulty. The combined effect of difficulty and rate (current study) will also be determined. It is expected that if material is spoken rapidly and fast, it would be more difficult than speech that is spoken in only one of these ways.

One project on categorical perception

Project: Categorical perception (CP) of Mandarin tones by English and Mandarin speakers

Hypothesis : Mandarin speakers will show CP performance, but the English speakers will show less CP effects.

Categorical perception (CP) refers to phenomena observed in the identification and discrimination mainly (but not exclusively) of speech sounds. This project uses continua that vary between a rising to a falling tone. They are identified as rise, flat and fall. We will examine identification and discrimination of these sounds in speakers who use them conventionally in their language (Mandarin-speaking students) and those who do not (English-speaking students). A further rtest will be whether speakers transfer the tones they have learned to novel syllables.

Requirements: Matlab programming.