Adaption of oral-nasal balance to altered auditory feedback.

- Background & Purpose – Adaption studies have explored the role of auditory feedback on loudness and pitch regulation as well as formant spacing. The adaptive reaction is often in the opposite direction of the changed parameter, indicating that auditory feedback mechanisms help the speaker reach a constant motor target. This present study builds on this research paradigm by exploring the role of auditory feedback in the regulation of oral-nasal balance in normal speakers. The question of interest was whether oral-nasal balance is governed by similar self-monitoring.
- Method/Description - Ten participants with normal speech and hearing were recruited. Participants wore the Nasometer headset and headphones. Oral-nasal balance was quantified as a nasalance score. Two additional microphones were attached to the Nasometer sound separation plate, one for the nasal sound signal and one for the oral sound signal. The signal from the additional oral and nasal microphones was fed to a digital multitrack recorder. The participants repeated a sentence containing both oral and nasal sounds. Over the course of the experiment, the volume level of the nasal channel microphone was used to gradually change the relative loudness of the nasal channel in the mix, so that the speakers heard themselves as more or less nasal.
- Results – A Repeated Measures ANOVA of three repetitions of the stimulus at minimum, midpoint and maximum nasal feedback demonstrated a significant effect of condition ($F(2,18) = 25.44$, $p > .001$). The mean nasalance score at the midpoint (control) condition was 32.96 (6.64). When the contribution of the nasal microphone to the mix in the headset increased to the maximum setting, the mean nasalance scores dropped to 26.73 (4.85). Decreasing the nasal microphone from the midpoint to the minimum level resulted in a non-significant change to a mean nasalance score of 33.73 (7.34).
- Conclusions – The results of the present pilot study suggest that excess nasal feedback leads to a compensatory adjustment in the opposite direction. However, a lack of nasal feedback did not lead to compensatory increase in nasalance. The compensatory response in the maximum nasal feedback condition confirms that oral-nasal balance is regulated by auditory feedback. For the minimum nasal feedback condition, there was a lack of an adaptive response, indicating that hyponasality was not perceived as critically by the speakers.