# Articulatory compensation: Interaction between target achievement, optimisation and properties of the vocal apparatus

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The aim of the study is to investigate the interaction of different factors involved in speech motor control: articulatory and acoustic targets, the properties of the vocal apparatus and articulatory movement optimisation.

A perturbation experiment with nine German speakers was carried out. Speakers wore palatal prostheses changing the shape of the palate for two weeks and adapted their speech. Over this period, they were recorded several times via electromagnetic articulography.

Our results show that differences in articulatory variability are in part due to the properties of the vocal apparatus. Furthermore, we found evidence for a compensation towards acoustic targets, but there are also instances of adaptation towards articulatory targets. Furthermore, there is evidence for optimisation towards minimal jerk trajectories.

Our results provide evidence for articulatory representations at least as an intermediate layer in the representation of phonemes, even if the ultimate phoneme target might be acoustic. The low variability in movements towards the end of the adaptation period is in part the result of movement optimisation rather than due to an achieved articulatory target. Movement optimisation seems to be secondary in the adaptation process. It starts in general later for sounds which are adapted later than for sounds adapted earlier.