A stumbling block in the development of motor theories of speech: Relating EMG to force-related changes in articulation

Abstract

The present study addresses the problem of how one may observe speech-relevant changes relating to the force output of muscles involved in the production of a bilabial stop. In the production of bilabial stops, the level of activity of the orbicularis oris inferior muscle should correlate with changes in intraoral pressure. If the orbicularis oris is used by speakers to control pressure during a bilabial occlusion, then one can suppose that contraction potentials would relate to changes in pressure. The Ss were three males and three females (aged 23-36 yrs) with no history of speech or hearing disorders. The speakers were asked to produce uninterrupted series of syllables at different intraoral pressures while monitoring their pressure levels on a computer screen. During these productions, activity of the orbicularis oris inferior presented substantial variability especially at higher-end values of pressure. However, best-fit regression lines for each subject present a degree of parallelism suggesting that pressure increases with rises in peak myographic activity. In fact EMG and pressure are highly correlated.