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Rethinking vowel formant frequencies

We regularly use formant center frequencies as acoustic measure of vowel quality because of the well established correlation between them and properties of vowel production. While we have recognized the importance of transforming formant frequencies as measured from the spectrogram into relevant psychoacoustic scales when addressing issues of vowel perception, production studies are still largely based on the the raw, Hz-scaled, formant measurements. As a consequence, systematic studies of vowel articulation proficiency in child speech, reductions due to clinical conditions or effects of treatment are not easily afforded. A number of derived measures have been proposed to capture whole-system effect of vowel production (VSA, VAI or FCR), which generally do not given any detailed insight into the nature of the change in articulation and additionally involve a substantial loss of statistical power. In this talk, I will propose a simple idea of how formants could be rethought to better serve systematic studies of global properties of vowel production within a speaker.