

Perception-production relationships in weighting phonetic cues of vowel contrasts

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The present study set out to investigate phonetic cue weighting for phonological contrasts in production and perception. Specifically, we investigated the effect of normalization for individual perceptual acuity on the correlations between perceptual cue weighting and produced contrast. Our hypothesis was that production and perception are balanced based on just noticeable difference (JND) units.

Participants were 47 young adult speakers of Dutch (age 19-29). The stimuli consisted of the Dutch /a/-/a/ vowel contrast (which differs both in spectral properties and duration). Measurements comprised JND's for spectral and durational differences, perceptual cue-weighting, and produced differences in formants and duration. Cue-weighting and produced contrast were converted into a non-normalized- $(\text{value_formants}/\text{value_formants}+\text{value_duration})$ and a JND-normalized ratio $((\text{value_formants}/\text{JND_formants})/(\text{value_formants}/\text{JND_formants})+(\text{value_duration}/\text{JND_duration}))$.

The results showed a significant effect of normalization and a pattern of negative correlations (if a cue is more important in perception, it is expressed less in production) turned into a pattern of positive correlations after JND-normalization. These findings suggest that production and perception are balanced based on relative perceptual acuity. The driving mechanism thus could be summarized as egocentrism or subjective balance. If speakers are perceptually more sensitive to changes on a dimension, they express objectively smaller differences on that dimension.