

## Perceptual space induced by cochlear implant all-polar stimulation mode - DTU Orbit (08/11/2017)

### Perceptual space induced by cochlear implant all-polar stimulation mode

It has often been argued that a main limitation of the cochlear implant is the spread of current induced by each electrode, which activates an inappropriately large range of sensory neurons. In order to reduce this spread, a new stimulation mode, the all-polar mode, was tested with 5 participants. It was designed to activate all the electrodes simultaneously with appropriate current levels and polarities to recruit narrower regions of auditory nerves in the region of specific intra-cochlear electrode positions (denoted all-polar electrodes). In this study, the all-polar mode was compared to the current commercial stimulation mode: the monopolar mode. The participants were asked to judge the sound dissimilarity between pairs of 2-electrode stimuli that differed in the electrode positions and were presented in either monopolar or all-polar mode. The dissimilarity ratings were analysed using a multidimensional scaling technique and a threedimensional stimulus perceptual space was produced. For both modes, the first perceptual dimension was highly correlated with the average position of the electrical stimulation and the second dimension moderately correlated with the distance between the two electrodes. The monopolar and all-polar stimuli were separated by a third dimension, which may indicate that allpolar stimuli have a perceptual quality that differs from monopolar stimuli.

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