ACOUSTICS2008/3175
Perceptual Clarity of Speech Modulates Activity in Left Temporal-lobe Regions: fMRI Correlates of Top-down Influences

Conor Wild[a], Matthew Davis[b], Alexis Hervais-Adelman[c] and Ingrid Johnsrude[d]
[a]Queen's University, Centre for Neuroscience Studies, 62 Arch Street, Kingston, ON, Canada K7L3N6
[b]MRC CBU, 15 Chaucer Rd., CB2 7EF Cambridge, UK
[c]Centre for the Neural Basis of Hearing, Department of Physiology, Development and Neuroscience, University of Cambridge, Downing Site, CB23EG Cambridge, UK
[d]Queen's University, Dept Psychology, 62 Arch Street, Kingston, ON, Canada K7L 3N6

Behavioral evidence supports the idea that perception is guided by mechanisms that compute an input's most probable interpretation. For example, four-band noise-vocoded speech, which is largely unintelligible to naive listeners, becomes perceptually clear when listeners possess prior knowledge of the signal content - a phenomenon we call 'pop-out'. Feedback connections within and among auditory cortical regions may allow cognitively 'higher' levels of processing to predict and thus 'explain' the bottom-up signal. In the present study, we use fMRI to investigate the network underlying pop-out. We use written primes (matching or non-matching text strings) to manipulate a subject's perception of single noise-vocoded words, thereby creating acoustically matched conditions that elicit the perceptions of intelligible or unintelligible speech. Whole brain fMRI data were gathered from 21 subjects using a sparse-imaging procedure. Preliminary analysis reveals regions of statistically significant signal change along the left superior and middle temporal gyri and superior temporal sulcus for matching trials that induce perceptual pop-out. Functional connectivity analysis will allow us to investigate coupling among these auditory regions, and how connectivity is modulated depending on the perceptual coherence of a noise-vocoded utterance.