Lexical access in the face of degraded speech: The effects of cognitive adaptation

Francis Smith
University of Iowa, Iowa City, Iowa, United States

Bob McMurray
University of Iowa, Iowa City, Iowa, United States

Abstract

Spoken language unfolds over time. Listeners cope with this by activating multiple lexical candidates which compete for recognition (McClelland & Elman, 1986). Competition dynamics change with degraded speech (Brouwer & Bradlow, 2016; McMurray, Farris-Trimble, & Rigler, 2017; McQueen & Huettig, 2012) but it is unclear whether this reflects the degraded input, or functional adaptation. In two visual world paradigm experiments, listeners heard different levels of degraded (noise-vocoded) speech. Experiment 1 manipulated degradation level in blocks or interleaved across trials. Interleaving led to processing delays beyond that of degradation alone. We also found switch-costs when degradation level differed between trials. This suggests differences in lexical dynamics are not solely due to degradation level. In experiment 2, a visual cue indicated the degradation level before each trial. This reduced the delay and switch costs, suggesting adaptation before the input. These experiments support a role for central processing in dealing with degraded speech.