

# **The relationship between the perception of spectral information and the effects of dynamic pitch on older individuals' speech recognition in noise**

Jing Shen<sup>\*#</sup>

Department of Speech Language and Hearing Sciences

Western Michigan University

\*Submitting Author

#Presenting Author

## **Abstract (Word Count 394/400)**

Dynamic pitch, as defined by the variation in fundamental frequency, is an acoustic cue that aids speech perception in noise. We know stronger dynamic pitch is beneficial and weaker dynamic pitch is detrimental for listeners to understand speech in background noise. While older listeners are able to benefit from dynamic pitch cues for speech perception in noise, the inter-subject variability is substantial. In search of the individual factors that contribute to this variability, the present study examines the relationship between older listeners' ability to perceive spectral information and the effects of strengthened or weakened dynamic pitch cues on speech perception in noise. Specifically, it is hypothesized those listeners who have poor ability to perceive static and dynamic spectral information receive less benefit from stronger dynamic pitch, and are more susceptible to the negative effect of weaker dynamic pitch.

The study investigates the following questions: 1) Is the benefit from stronger dynamic pitch related to individuals' ability to perceive static spectral information? 2) Is the benefit from stronger dynamic pitch related to individuals' ability to perceive dynamic spectral information? 3) Is the negative effect from weaker dynamic pitch related to individuals' ability to perceive static spectral information? 4) Is the negative effect from weaker dynamic pitch related to individuals' ability to perceive dynamic spectral information?

The experiment measures speech reception thresholds (i.e., speech-noise-ratio) of a group of older listeners with a variety of hearing status ranging from near-normal hearing to mild-to-moderate sensorineural hearing loss. Stimuli are low-context sentences that are produced by a female talker, embedded in non-speech noise that preserves temporal and spectral characteristics of 6-talker babble. The pitch contour of the target speech is manipulated to create three levels of dynamic pitch strength

(original dynamic pitch, stronger dynamic pitch, and weaker dynamic pitch). Individuals' static and dynamic spectral perception abilities are measured using a spectral ripple test and a frequency modulation discrimination task, respectively.

Results to date suggest that, older listeners' benefit from dynamic pitch for speech recognition is strongly related to their ability to perceive dynamic spectral information, but not to the perception of static spectral information. There is an emerging relationship between both spectral perception metrics and the negative effect of weaker dynamic pitch, in the direction that those with poor ability to perceive spectral information tend to be more susceptible to weaker dynamic pitch cues for speech perception in noise. (Work supported by NIH)

*Poster (Please assign to the Monday session due to a Tuesday outbound flight)*

*No COI*