Cross-Dialect Word Recognition in Noise

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Recent research has shown that familiar dialects are more intelligible than unfamiliar dialects (Clopper & Bradlow, in press; Labov & Ash, 1997). Labov and Ash (1997) attributed these differences in intelligibility to phonetic differences between the vowel systems of the dialects they examined. Phonetic differences led to systematic perceptual phonological confusions which, in term, led to a decline in intelligibility.

The current study used a spoken word recognition task to explore perceptual phonological confusions between the Northern and Midland dialects of American English. Based on previous sociophonetic research on the Northern and Midland vowel systems (e.g., Labov et al., 2006), we developed a set of predictions about potentially confusable vowel variants across the dialects. For example, the lowered /ɛ/ in the Northern dialect should be confusable with the Midland /æ/ and the fronted /ow/ in the Midland dialect should be confusable with the Northern [ʊ]. The stimulus materials consisted of five different monosyllabic English words for each of 11 monophthongal vowels. The stimulus words were selected so that the predicted perceptual confusions would result in real English words. For example, all of the stimulus words containing /ɛ/ had a minimal pair in English containing /æ/. The stimulus materials were produced by three female talkers from the Northern dialect region and three female talkers from the Midland dialect region. Nineteen listeners were presented with each of the words mixed with speech-shaped noise and were asked to orthographically transcribe what they heard. The residential history of the listeners varied, but most were lifetime residents of the Midland dialect region.

The responses were scored for vowel recognition accuracy. Overall vowel recognition performance was 81% correct for the Midland talkers and 82% correct for the Northern talkers. Vowel recognition performance was not significantly different across the two dialects. However, the response patterns revealed systematic errors related to dialect-specific vowel variants. For the Midland dialect, /ʌ/ was misidentified as [ʊ] and /ow/ was misidentified as [u] significantly more often than chance. For the Northern dialect, /ɪ/ was misidentified as [ɛ], /ɛ/ was misidentified as [æ], and /ʌ/ was misidentified as [ɔ] significantly more often than chance. For both dialects, /ɔ/ was misidentified as [ɑ] and /ow/ was misidentified as [ʊ] significantly more often than chance.

These error patterns reflect the vowel variants observed in these two dialects, including the Northern Cities Chain Shift in the Northern dialect, /ʌ/ raising in the Midland dialect, and back vowel fronting in both dialects that is more extreme for the Midland than the Northern talkers. The confusion between /ɔ/ and /ɑ/ for both dialects most likely reflects the listeners' perceptual merger of these two vowels. Taken together, the results of this study suggest that sociophonetic descriptions of vowel variation can be used to make accurate predictions about perceptual phonological confusions across dialects.

References

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