

The [+spread] of the Northern Cities Shift

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Sociolinguistic research has been greatly enriched by the application of instrumental acoustic methods. This is especially true in the study of vocalic changes where formant frequencies offer detailed pictures of subtle shifts of vowel quality. In the usual shorthand, F1 and F2 are accepted as correlates of vowel height and frontness respectively though most researchers recognize that formant frequencies are affected by other articulatory factors than just tongue position. In this research, we examine one of the most significant of these factors: lip configuration. This articulatory factor plays a key role in many vowel changes including the Northern Cities Shift (NCS), the focus of our study.

Traditional accounts of the NCS (e.g. Labov 1994) describe the changes in terms of tongue position: raising of /æ/ to [ɛ], fronting of /ɑ/ to [a], and lowering and fronting of /ɔ/ to [ɑ]. Some role for labiality is often acknowledged in the latter case which involves unrounding. We argue, however, that lip configuration is also implicated in the centralization of /ɑ/. Specifically we demonstrate that the /ɑ/ shift can involve a change from a neutral lip position to a spread configuration.

We examine the effects of lip configuration in the NCS through a video study of subjects from the St. Louis region. Speakers were recorded on digital video reading prepared materials. The experimental set-up allows us to precisely measure articulatory landmarks (e.g. vertical and horizontal lip distance, lip protrusion) from a display. The audio output from the recording was subjected to acoustic analysis so that comparisons between lip configuration and acoustic outcome could be made. Preliminary results confirm our hypothesis that speakers participating in the NCS demonstrate significant lip spread on the vowel /ɑ/.

To make sense of these findings we consider the acoustic consequences of lip rounding and spreading. By lengthening the vocal tract, rounding acts to lower formant frequencies, while unrounding and spreading have the opposite effect. In this way the changes in lip configuration observed in the NCS serve to enhance the acoustic effects of the changes in tongue position. For /ɔ/, lowering, fronting, and unrounding all result in higher formant frequencies, and fronting and spreading produce similar results for /ɑ/. These observations also shine light on some previously puzzling findings in our work on the NCS: fronted tokens of /ɑ/ often show extremely high F1 values in addition to the expected higher F2 values. In some cases, the formant data suggested that the primary direction of movement for this vowel was lowering rather than fronting. The present study leads us to reconsider this articulatory interpretation and suggest that increased F1 (and F2) values may indicate that lip spreading is being employed by NCS speakers as a complement to shifting tongue positions. Finally, we also weigh the possibility that lip configuration could be adopted by some NCS participants as an alternative to lingual positioning.

Reference:

Labov, William. 1994. *Principles of Linguistic Change, Vol. 1: Internal Factors*. Oxford: Blackwell.