

Velar fronting in Russian emerges from a bidirectional phonology-phonetics interface

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I present a detailed computational simulation along the lines of Boersma & Hamann (2008) of a well-studied known sound change, namely velar fronting in Russian. The ingredients are (1) children who acquire the phonology-phonetics interface by optimizing their perception, (2) phonological structures consisting of feature values, (3) bidirectional use of the phonology-phonetics interface (i.e. the learner uses in production the same constraints or connections that optimized her perception), and (4) an evolution of iterated learning over the generations. After the fall of the jers, the high central vowel turns out to automatically move to the front within five generations or so. The simulation confirms Padgett's (2003) point that in the Russian velar fronting case auditory dispersion plays a role, although our simulation does not require Padgett's teleological assumption or whole-language evaluation (listeners are innocent). The simulation also confirms Drescher's (2009) point that Russian velar fronting requires the underspecification of the phoneme /k/ for the feature [palatalized].