Lexical competion-driven hyperarticulation is phonetically specific relative to particular competitors

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Previous work (Wright 2004, Munson & Solomon 2004, Munson 2007) has shown that in laboratory read speech, vowels in words in denser neighborhoods are produced both with greater vowel length and greater dispersion (i.e., greater distance from the center of the vowel space). This general hyperarticulation has been interpreted in terms of lexical competition (e.g., Baese-Berk & Goldrick 2009). However, these results have recently been called into question by work with natural speech by Gahl and colleagues (Gahl, Yao & Johnson 2013, Gahl 2014) in which greater neighborhood density is found to be significantly correlated with a *reduction* in both length and dispersion.

On the basis of previous results obtained by us and others, we investigated two separate factors that may better index competition induced hyperarticulation. First, results of psycholinguistic experiments (e.g., Baese-Berk & Goldrick 2009, Kirov & Wison 2012) and investigations into lexical factors influencing diachronic change (Wedel, Kaplan & Jackson 2013) have independently suggested that hyperarticulation may be better predicted by existence of a minimal pair distinguished by the phonetic cue in question, than by neighborhood density as a whole. Second, crosslinguistic patterns of diachronic vowel shifts can be better explained if lexical competition-induced vowel hyperarticulation results in a shift away from a specific competitor vowel, rather than simply a generalized expansion of the vowel space through greater dispersion.

Here we report an investigation of natural speech tokens comparing (i) greater Euclidean distance between vowel competitors vs greater vowel dispersion as a measure of hyperarticulation in response to lexical competition, and (ii) minimal pair existence vs neighborhood density as predictors of hyperarticulation. Using linear mixed-effects modeling to assess significance, we report that given a word token, the existence of a minimal pair competitor defined by a particular vowel correlates significantly with a greater Euclidean distance of the vowel in the token to the average position of the competitor vowel. As an illustration, given tokens of the words *pet* and *jet*, we find that the [ɛ] vowel in *pet* is further from the speaker's average [ɪ] position than for the [ɛ] vowel in *jet*, correlating with the fact that the competitor *pit* exists, but **jit* does not. Neighborhood density is not significantly correlated with this distance measure. Further, neither measure of lexical competition significantly predicts greater dispersion, that is, greater distance of a vowel token in a word to the center of the speaker's vowel space. All these results together suggest that competion-driven hyperarticulation occurs in natural speech, and is phonetically specific relative to particular competitors.

Standard theoretical models (e.g. Chomsky & Halle 1968, Kenstowicz 1994, Prince & Smolensky 2004) assert that phonological information is encoded only at sublexical levels of representation; otherwise, words could develop idiosyncratic phonetics. The results we report here contribute to a range of evidence that words in fact can develop idiosyncratic phonetics (e.g. Pierrehumbert 2002), and provide support to alternative models in which phonetic/phonological information is encoded richnly, and at multiple levels of representation (e.g., Wedel 2012). Finally, these results contribute to models in which the structure of the lexicon influences phonological pattern formation over time (Wedel, Jackson & Kaplan, 2013).