

The phonological lexicon, usage factors, and rates of change: Evidence from Manchester English

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This paper reports the results of research conducted jointly with George Bailey (University of Manchester), Maciej Baranowski (University of Manchester), and Danielle Turton (University of Newcastle upon Tyne).

In classical modular feedforward architectures of grammar, phonetic implementation does not have access to information about lexical items beyond the discrete properties encoded in phonological representations. This hypothesis accounts for fundamental facts of human language such as double articulation and the existence of neogrammarian change, but it fails to explain the fact that fine phonetic detail is also affected by gradient usage-related properties of lexical items such as token frequency and neighbourhood density.

Exemplar Theory seeks to explain the phonetic effects of usage factors by abandoning the classical hypothesis that lexical phonological representations consist solely of categorical information. Less radical approaches, however, continue to uphold this assumption: some, such as Baese-Berk & Goldrick's (2009) account of neighbourhood density effects, rely on the notion of gradient symbolic computation, according to which phonological representations are made up of symbols that are discrete but exhibit continuously varying degrees of activation (Smolensky & Goldrick 2016).

These two approaches to the phonetic effects of usage factors differ in their diachronic predictions. In the case of lexical token frequency, in particular, it has been repeatedly observed that, synchronically, high-frequency words exhibit more lenition than low-frequency words. From this observation the proponents of Exemplar Theory infer that, during historical language change, high-frequency words undergo reduction at a relatively faster rate due to greater exposure to reductive phonetic biases, whose effects are claimed to be directly registered in phonetically-detailed lexical representations. *Pace* Hay & Foulkes (2016), however, this diachronic pattern has never been reliably observed, and these accounts fail to consider another logical possibility: namely, that high-frequency words are ahead synchronically but actually change at the same rate as low-frequency words.

In this talk I report the findings of an investigation into the effect of lexical token frequency on the glottal replacement of word-medial /t/ in Manchester English, using apparent-time data from 62 speakers born between 1926 and 1985 (2131 tokens). Two stringent tests (mixed effects logistic regression and comparison between curve-fitting models) show that lexical token frequency gives rise to a 'constant rate effect' in the sense of Kroch (1989): high-frequency words exhibit more glottalization at all points in apparent time, but the size of their advantage remains unchanged. This suggests that glottalization advances historically through an increase in the probability of application of a single process targeting both high- and low-frequency words, whilst the impact of frequency is produced by time-invariant orthogonal mechanisms, possibly involving gradient symbolic computation. Thus, the evidence is consistent with the classical assumption that lexical phonological representations consist solely of discrete categories and do not encode fine phonetic detail.

Baese-Berk, Melissa & Matthew Goldrick. 2009. Mechanisms of interaction in speech production. *Language and Cognitive Processes* 24 (4), 527-54.

Hay, Jennifer & Paul Foulkes. 2016. The evolution of medial /t/ over real and remembered time. *Language* 92 (2), 298-330.

Kroch, Anthony. 1989. Reflexes of grammar in patterns of language change. *Language Variation and Change* 1 (3), 199-244.

Smolensky, Paul & Matthew Goldrick. 2016. Gradient symbolic representations in grammar: the case of French liaison. Ms, Johns Hopkins University and Northwestern University. Available as ROA 1286 at the Rutgers Optimality Archive, <http://roa.rutgers.edu>.