

The Interaction of Phonetic Factors and Contextual Probability in Metathesis and other Phonological Processes

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It is well established in the linguistic literature that there are many factors that influence the shape of a language's phonological system. These include:

- a. perceptual factors: the quality of the acoustic/auditory cues to the identification of a sound or sequence of sounds;
- b. production factors: the amount of precision required to produce a given sound, e.g. fricative vs. stop;
- c. contextual probability: the probability that a sound or sequence of sounds will occur in a particular context, as a function of frequency (type, token), and predictability (e.g. transitional probabilities, bigrams, etc.);
- d. social factors: the amount of social value accorded a particular sound or sequence;
- e. degree of contrast: the amount of work a particular contrast does in distinguishing meaning within the language as a function of the (token) frequency of the contrast, i.e. functional load.

The influence of the first three factors, in particular, is commonly seen in phonological processes such as epenthesis, deletion and metathesis. For example, perceptual factors can play a role in epenthesis (e.g. Dupoux et al. 1999, Kabak & Idsardi 200x), production factors can influence consonant deletion (e.g. Raymond et al. 2006), and contextual probability can be a key factor in determining the output of metathesis (Hume 2004).

Despite the fact that many factors can affect phonological systems, not all come into play in every process. For example, contextual probability is significant in predicting t/d deletion when the consonant is an onset but not when it's a coda (Raymond et al. 2006). Similarly, contextual probability plays a role in determining the output of metathesis but not the input (Hume 2004).

In this paper I address several questions raised by these observations: first, why are some factors, as opposed to others, relevant in certain phonological processes?, and second, how can we model these interactions? A response to the first question comes by comparing the weighting of factors, as conditioned by phonotactics, syllable structure constraints and other considerations. With respect to the second question, I draw on insights from computer science (information theory) and psychology (exemplar theory) as a means of modeling the interactions.