Chomsky and Halle (1968) propose an Evaluation Procedure that prefers featurally simple rules and grammars, and Bach and Harms (1972) propose that this bias for structural simplicity can explain instances of historical change in terms of rule simplification in learning. In this talk, I discuss an alternative model of structural bias (Pater and Moreton 2012) cast in a Maximum Entropy framework (Goldwater and Johnson 2003, Hayes and Wilson 2008), which does not invoke an explicit simplicity metric. This MaxEnt model closely resembles the Configural Cue Model (Gluck and Bower 1988), a domain-general model of concept learning, which was abandoned twenty years ago because it does not match the classic results in visual concept learning (Shepard et al. 1961 et seq.). I present the results of an experiment that supports the predictions of the MaxEnt model against those of a model preferring featurally simple rules (Moreton et al. 2013). This phonotactic learning study differs from the classic visual concept learning studies in a number of ways. Based on a review of further studies (see esp. also Kurtz et al. 2013), it appears that the key difference is that the classic visual concept methodology encourages explicit hypothesis formation.

I also present the results of an ERP study (Moore-Cantwell et al. 2013) that provides insight into the nature of the phonotactic knowledge acquired in an experimental setting. After participants are trained on a small set of pattern-conforming words, we find that novel words that violate the pattern elicit a larger Late Positive Component (LPC) than the novel conforming items. LPCs have been observed in response to syntactic violations in language, and also violations of musical expectation. Finding an LPC rather than an N400 effect for the novel words is consistent with the view that participants in these experiments are forming an abstract generalization about the phonotactic pattern rather than directly judging the similarity of novel and trained words (see relatedly Daland et al. 2011). It is also noteworthy that the response to a laboratory learned phonotactic constraint is similar to that for a naturally learned one (Domahs 2009).

In the last part of the talk, I present a model of how structural bias can impact phonological typology, which uses MaxEnt learning in the context of agent-based modeling (Zuraw 2003). I present simulation results (Staubs and Pater 2013) that show the emergence of featural economy (Clements 2003) in systems produced by agent interaction. In these results the tendency towards simplicity is balanced by a tendency to maintain contrast between potentially homophonous words. No constraints or principles specifically demanding economy or contrast are required to obtain these results, suggesting that it is possible to maintain the standard view that phonological grammars evaluate individual representations, rather than entire systems (cf. Flemming 1995).

References
(my papers and slides are available at http://blogs.umass.edu/pater/)


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