

# Natural and Unnatural Constraints in Hungarian Vowel Harmony

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Phonologists hold a spectrum of opinions on the closeness of the connection between Universal Grammar (UG) and language structure. One view, common in Optimality-theoretic research (e.g. work of McCarthy, Prince, Tesar & Smolensky), is that all languages are constructed from the same universal constraint set—hence, *all* of phonology is “natural”. At the opposite end (e.g. Ohala, Blevins), there is the view that UG in the case of phonology is empty, and that processes of inductive learning suffice to give the learner access to the phonological pattern of a language. In this view, one might say that *no* phonology is natural. Lastly, there are mixed views (e.g. Wilson, Moreton), in which *some* phonology is natural. Here, UG provides biases that guide learning: language learners consider both natural and unnatural hypotheses, but are more likely to formulate natural hypotheses and take them seriously when evaluating the ambient language data.

This talk will describe some research meant to help sort out these issues. We have been examining vowel harmony in Hungarian. This is a classic, well-studied area in phonology, in which the standardly-observed data patterns can be treated entirely with natural constraints (constraints which have broad typological support, and also have a sensible phonetic basis; Hayes and Londe 2006).

We began with corpus work: inspection of a lexical corpus indicates that Hungarian vowel harmony is actually influenced to some degree by consonants. For example, stems (of the kinds that permit lexical variation) tend to take front-harmonic suffixes most often when they end in a consonant cluster, or in a bilabial stop. Constraints expressing these environments appear to be quite unnatural, having neither typological nor phonetic support. Yet, they have statistically-significant effects in the Hungarian lexicon.

We then did an experiment whose goal was to determine whether the unnatural consonant effects actually get noticed by Hungarian speakers. Our experiment was a “wug” test (Berko 1958), carried out over the Internet with speakers living in Hungary. The test indicated that the unnatural consonant-based generalizations actually are learned and applied productively by Hungarian speakers.

Lastly, we attempted to reach a closer understanding by undertaking a computational model of the acquisition process. Our learning model was based on weighted constraints, using the maxent approach described in Wilson (2006). The end result was support for the UG-as-bias theory outlined above: Hungarian speakers construct their grammars out of both natural and unnatural constraints, but they give the natural constraints greater credence when the constraints are weighted.

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