

## **‘Transparent’ Vowels in Hungarian Vowel Harmony**

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A fundamental property of any phonological system is that it maintains a macroscopically stable form under varying environmental conditions. Yet, the system is also flexible in that category boundaries can be shown to vary smoothly and categories can be changed by continuous scaling in stimulus (environmental) parameters. If the units of phonological structure and their organizational principles are dynamical in nature, then stability and change follow as natural consequences of their (non-linear) dynamics. Stability, one consequence of non-linearity, refers to the capacity of dynamical systems for maintaining preferred modes in the face of variations in environmental parameters or perturbations due to noise. Change, the other consequence of non-linearity, results when environmental variables are scaled beyond certain critical values.

We seek to instantiate stability and change in studying how language-particular grammars are built on the dynamics of articulation and perception. Based on theoretical and experimental work, we present a model of spatial dynamics in a specific but nevertheless generalizable language-particular situation, the problem of how low-level spatial phonetic properties of vowels determine the high-level phonological behavior (of suffix choice) in the phenomenon of vowel harmony. To determine the dynamics, we consider if and how changes in appropriate control parameters (vowel height in vowel harmony) result in qualitative changes or phase transitions from one stable pattern to another. The key idea, from our perspective, is that categorical aspects of phonological behavior (suffix choice and variation therein) emerge from the non-linear interactions of lower-level continuous dynamical systems. Stability and change are then follow as natural consequences of this organization.