What we can learn from comparing gradient and categorical patterns

Statistics Colloquium
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Phonology versus phonetics

✓ A pattern that may be productive and categorical in one language often has gradient, less productive correlates in others.
Obligatory Contour Principle in Arabic versus English

✓ Arabic categorically forbids adjacent identical consonants within stems. Productive?
✓ English displays the same phenomenon, but gradiently and non-productively:
  ✓ Words like *pup, dad, rare* are phonologically well-formed, but significantly less well represented in the lexicon than would be expected by chance (Frisch1996).
✓ How did we find this out? By counting and applying statistics.
Implications

✓ Consistent with models of grammar in which ‘phonologization’ proceeds by recognizing and transforming independently caused gradient patterns in the data (e.g., Barnes, Bybee).

✓ By comparing grammatical patterns to their phonetic sources, we can learn more about both.
Derived phonological pattern

Gradient, phonetic pattern

Non-phonologized, phonetic residue

Contribution of grammar
Quantity-sensitivity and acoustic energy of the rime.

✓ Most quantity sensitive weight systems count as heavy either:
  ✓ CVV alone
  ✓ CVV + CVC


✓ Shows that total acoustic energy of the rime is strongly correlated with weight, suggesting a causal relationship.
But the mapping isn’t perfect…

- Sonorant codas are high energy
- Obstruent codas are low energy
- Very few languages develop quantity sensitive systems that count only CVV, CV[+son] as heavy.
But the mapping isn’t perfect...

- Instead, languages with more sonorants than obstruents in their coda inventories count CVV, CVC as heavy.
- Languages with more obstruents than sonorants in their coda inventories count only CVV.
- How does he know? Counting plus statistics!
Mapping this study onto our diagram:

Gradient energy differences

High energy, not heavy
Low energy, heavy

CVV versus CVV, CVC weight systems

Generalization on the basis of the feature C