Calculating Inherent Weights
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Introduction

- Unnatural processes
  - Natural: phonetically grounded
  - Unmotivated: lack phonetic motivations
- Post-nasal devoicing
  - Sh. /χ/m-bón-á/ → [χơmpíná] /χ/m-düy-á/ → [χıntra] (Sole et al. 2010, Couture and Potorosa 2010)
- Inter-vocalic devoicing
  - Long Terawan

Markedness Constraint: X → Y

- Unmotivated markedness constraints already in Con

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- Harmony (HG) can be transformed to percentages, but given richness of the base, we cannot derive a system in which the unnatural element is more frequent
- Faith and a markedness constraint X

A New Proposal

- Both X and Y → Z
- If we admit X → Z into Con, we have to encode rarity of unnatural processes
- A new proposal: INHERENTLY WEIGHTED CONSTRAINTS
- Derives such systems and encodes typology
- IWC enables us to capture previously unaccounted-for typological generalizations

Inherently Weighted Constraints

- 2 languages with post-nasal devoicing (*ND) of altogether 17 with either devoicing or voicing post-nasally (Loecher 1983, Hayes and Stivers 2003)
- No cases of final voicing (*T#) (cf. Yu 2004)

N-map

- Two factors in typology: CHANNEL BIAS, LEARNING BIAS (Morfessor 2008)
- N-map: two factors influencing Inherent Weights
- Combination of sound changes

BLURRING CYCLE
B > C / Z
B > C / X
B > A
C > D
C > B
D > A

Minimal requirement
- Natural: 1 sound change
- Unmotivated: 2 sound changes
- Unnatural: 3 sound changes

\[ P(A \cap B) = P(A)P(B) \leq P(A) \]

Historical scores
- Poisson process
  - \( P(T_n) = \int_0^\infty \sum_{i=0}^n f(t)dt_i \times \int_0^\infty f(t)dt \)
  - \( f_i = \lambda e^{-\lambda t} \)
  - Historical score:
  \[ P(Alt) = P(T_n \cup T_{n+1} \cup \cdots \cup T_m) \]

Future work

- Solution for the Too Few Solutions and Too Many Solutions problems (Streilein 2003)
- Just enough solutions: faithfulness and markedness constraints inherently weighted
- Experimentally test learnability: Learning score
- IWC and learning
- Ultimate goal to provide grounds for disambiguating between channel and learning bias effects on typology

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NAPhC 9
Concordia University
May 7-8, 2016

References


I would like to thank Kevin Ryan for his useful comments. All mistakes are my own.