Two levels of regularity in writing systems

Evidence from frequency effects

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Overview

- **Morphology** shows **negative** frequency effects, as memory lapses regularize **rarer** words (Pinker 1999)
  - ↘ Regular past tense: ***flow ~ flowed*** vs. *grow ~ grew*
- **Phonology** shows **positive** frequency effects, as more **common** words regularize through use (Bybee 2001)
  - ↗ Trochaic foot: *hómily* vs. ***fám'ly***
- **Writing systems** show the same contrast, suggesting written analogues to morphology and phonology

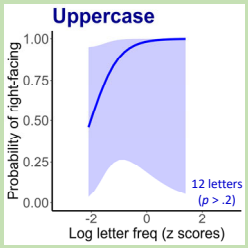
Two levels in writing systems (Gelb 1963, Meletis & Dürscheid 2022)

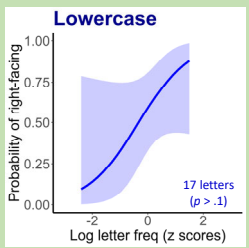
- **Inner structure** (graphematics) describes the mapping between written unit combinations and spoken language
  morphemes (logographies), syllables (syllabaries), subsyllabic groups (abugidas), phonemes (alphabets), ...
- **Outer form** (graphetics) describes the shapes of the written units themselves

English (alphabet) (theory: Watt 1975; regularity: Seidenberg & McClelland 1989; corpora: Brysbaert & New 2009, Carnegie Mellon University 2015; Constant 2012)

- **Letter combinations**
  Regular pronunciations *decrease* as frequency increases
  <cove> /ow/ vs. <love> /ʌ/
  <braid> /ej/ vs. <said> /ɛ/

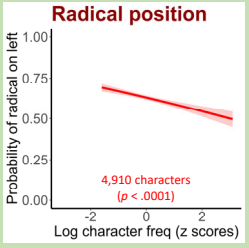
- **Letter shapes**
  - Asymmetrical letters tend to **face right** <B, b>
  - This regularity *increases* as freq. increases
    <J, j> vs. **<B, b>**



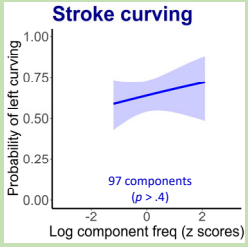


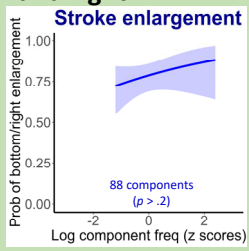
Chinese (logography) (theory: Myers 2019; corpora: Chuang & Teng 2009, Tsai, 2006)

- **Component combinations**
  - Most characters are **phono-semantic**, with the **semantic radical on the left:** 媽 *mā* 'mother' = 女 'woman' + 馬 *mǎ*
  - Both regularities *decrease* as freq. increases
    姝 *shū* 'pretty' vs.
    好 *hǎo* 'good'*
    娟 *juān* (name) vs.
    婆 *pó* 'old woman'
    *(女 'woman' + 子 'child')



- **Component shapes**
  - Character components favour **stroke curving on the left** and **stroke enlargement on the bottom and right**
  - Both regularities *increase* as frequency increases
    丙 *bǐng* 'third' vs.
    月 *yuè* 'month'
    士 *shì* 'scholar' vs.
    土 *tǔ* 'earth'





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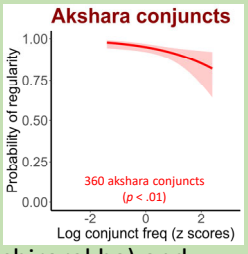
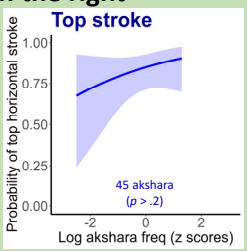
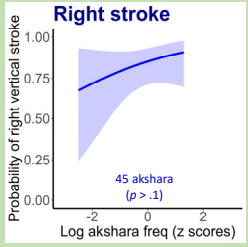
Sanskrit Devanagari (abugida) (theory: Gnanadesikan 2022; corpora: *Sanskrit frequency list* n.d., Stiehl 2007)

- **Akshara combinations**
  Consonant conjuncts *decrease* in regularity as frequency increases
  त्म *tma* = त *ta* + म *ma* vs.
  त्र *tra* = त *ta* + र *ra*



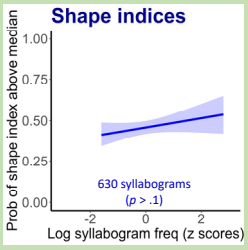
- **Akshara shapes**
  - Akshara favour **top horizontal strokes** (shirorekha) and **vertical strokes on the right**
  - Both regularities *increase* as frequency increases
    थ *tha* vs. ऊ *ū*
    ठ *ṭha* vs. त *ta*





Yi (syllabary) (corpora: Walters et al. 2015, *Yi script index book* 1984)

- **Syllabogram combinations** are fully regular
- **Syllabogram shapes** are grouped by conventional indices (e.g., index ꑍ for ꑍ *njyt* and ꑎ *jip*)
  - Index group size *increases* as token frequency increases
    ꒉ *siep* [ꒉ: index size 6] vs.
    ꓑ ***la*** **[ꓑ: index size 70]**



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