

# Naturalness of scripts and writing systems

Prolegomena to a *Natural Grapholinguistics*

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# Evaluations

“I have taken it as given that some writing systems are better than others. This question could certainly be debated.” (Rogers 1995: 31)

“In the course of this long evolution, a language usually got the sort of writing system it deserved.” (Halliday 1977, 2010: 103),  
sometimes cited as “Every language gets the writing system it deserves” (Frost 2012: 266)

# 1. Motivation

- Alleged supremacy of the alphabet due to phonocentric and Eurocentric views (Ehlich 2007; Yan 2002) has led to the often unchallenged assumption that the alphabet is the “best” type of writing system
- Political hegemonies and technological advances still clearly favor alphabets, so does theorizing within research on writing systems

## 2. Relevance

- An interdisciplinary field of research titled *grapholinguistics* is emerging
- There exists little research on the universals of writing (systems)
  - First findings in this area suggest that scripts share salient features (Changizi/Shimojo 2005; Changizi et al. 2006)
- *Naturalness Theory* (also *Naturalism* or *Naturalness Program*) has not yet been systematically applied to writing (vs. *Optimality Theory*)

# 3. Naturalness

Two most prominent sub-branches:

1. *Natural Phonology* (Stampe, Donegan)

- physiologically motivated (articulation/perception)
- natural processes/unnatural rules
- fortitions/lenitions

2. *Natural Morphology* (Dressler, Mayerthaler, Wurzel)

- semiotically motivated (cognitive processing)
- naturalness parameters based on extralinguistic evidence (esp. language acquisition, language disorders, language history/change)
- three levels: (1) system-independent, (2) typological, and (3) system-dependent naturalness
- central concept: naturalness conflicts

# Criteria for a *practical/optimal* script/writing system

Venezky (1977)	Coulmas (2009)	Cahill (2014)	Baroni (2011)
<ol style="list-style-type: none"> <li>1. mechanically suited for the language it is to reflect</li> <li>2. compatible with [...] its social-cultural setting</li> <li>3. psychologically/ pedagogically appropriate for its speakers</li> </ol>	<ol style="list-style-type: none"> <li>1. convenience</li> <li>2. tools</li> <li>3. general applicability and linguistic fit</li> <li>4. expressive power</li> <li>5. simplicity</li> <li>6. stability through time</li> <li>7. monochrome coding</li> </ol>	<ol style="list-style-type: none"> <li>1. linguistically sound</li> <li>2. acceptable to all stakeholders</li> <li>3. usable</li> </ol>	<ol style="list-style-type: none"> <li>1. maximum distinctiveness</li> <li>2. size of the graph(em)ic inventory</li> <li>3. cognitive salience</li> <li>4. maximum naturalness</li> <li>5. inner consistency</li> <li>6. other criteria</li> </ol>
		<p>Smalley et al. (1963)</p> <p>maximum</p> <ol style="list-style-type: none"> <li>1. motivation for the learner</li> <li>2. representation of speech</li> <li>3. ease of learning</li> <li>4. transfer</li> <li>5. ease of reproduction</li> </ol>	

# 4. Proposal of *Natural Grapholinguistics*

## 1) *Graphetics*

- system-independent naturalness: physiologically and semiotically motivated
- complexity (*macro-level*: size of inventory, distinctiveness, variability of graphs, direction of writing; *micro-level*: type and quantity of segments, topological configuration)

## 2) *Graphem(at)ics*

- typological adequacy, system-dependent naturalness: semiotically motivated
- *How does a writing system cater for the needs of a language and its features?*
- biuniqueness, iconicity/iconism, optimal shape, depth ...

## 3) *Extralinguistic parameters*

- social/cultural fit, political factors, (technological) availability, operability, adaptability/transferability

# 5. Method

- *Comparative Graphematics* (Weingarten 2011)
  - Gradual analysis of (initially maximally) *diverse* writing systems (e. g. Chinese, Arabic, Thai, German)
  - External (extralinguistic) evidence
    - Reading and writing acquisition
    - Disorders of reading and written expression
    - Development and diachronic change of scripts and writing systems (as a result of the former two)
1. *What are the naturalness parameters of writing?*
  2. *What are the type- and writing system-specific naturalness conflicts?*
  3. *How are they dealt with?*

## 6. Example: Symmetry

- extrinsical symmetry ( $\langle b \rangle$ ,  $\langle d \rangle$ ) as a difficulty of visual recognition due to cognitive factors (object constancy, “mirror invariance” phenomenon)
- macro-level: reduces perceptual distinctiveness within an inventory, increases economy of production (polyfunctionality of shapes = reduced size of inventory)

# 6. Example: Symmetry

- *Reading/writing acquisition*: many children initially make mirror errors (Pegado et al. 2011)
- *Disorders*: readers/writers with impairments show difficulty in discriminating symmetric letters (Lachmann/Geyer 2003)
- *Diachronic change*: Extensive study by Wiebelt (2004): 41 scripts analyzed, “perfect” symmetry abandoned after 350 years in use; only 3% extrinsical left-right-symmetry
- Remaining symmetry results in avoidance strategies in font design (serifs, stroke thickness ...)

# 7. Conclusions and outlook

- The principles and methods developed in *Natural Phonology* and *Natural Morphology* can be used analogously to uncover naturalness parameters (and possibly universal preferences thereof) of scripts and writing systems and generally offer a framework for theory construction (and/or modification).
- One of the goals is to find/build/explore a *tertium comparationis* for further comparative analyses within grapholinguistics.

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