Leaky phonology and language design

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Leaky grammar

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Leaky grammar

- "Unfortunately, or luckily, no language is tyrannically consistent. All grammars leak." (Sapir 1921, *Language*)
- "Leakiness" is generally understood (descriptively) in terms of lexical exceptions and/or (descriptively and historically) in terms of competition between grammatical constraints and analogies.

Leaky phonology?

Morphophonology definitely leaks:

- E.g. Eng. trisyllabic laxing in *ins**a**ne/ins**a**nity; comp**e**te/comp**e**titive; f**i**nite/inf**i**nity;* etc. etc.

  but not in *ob**e**se/ob**e**sity.*

Leaky phonology?

Morphophonology definitely leaks:

- E.g. Jap. *rendaku: nimai* 二枚 (にまい) + *shita* 舌 (した) 'tongue' ➔ *nimaijita* 二枚舌(にまいじた) 'duplicity';

  but *kutsu* 靴 (くつ) 'shoe' + *shita* 下 (した) 'below' ➔ *kutsushita* 靴下 (くつした) 'sock'. (**kutsujita* *くつじた)

Leaky phonology?

Otherwise, phonological theories are based on "non-leaky" assumptions:

- Specifiable finite inventory of phonemes
- Exhaustive analysis of words/morphemes
- Phonemes are meaningless
- No lexical exceptions (e.g. no unique phonemes, no exceptions to allophony)

Leaky phonology?

Summary of standard view:

- Phonology makes it possible to provide an exhaustive analysis of the shape of every word and morpheme of a language, and therefore ultimately of any utterance, ***independent of the grammatical analysis***.
- This is the idea of “double articulation” (Martinet) or “duality of patterning” (Hockett).

Duality of patterning

- Notion developed (independently?) by Martinet and Hockett in the 1940s and 1950s on the basis of Hjelmslev's work.
- Two completely separate analyses of any utterance: as a string of ***meaningful*** elements (e.g. morphemes) (Hjelmslev's "content plane") and as a string of ***meaningless*** elements (e.g. phonemes) (Hjelmslev's "expression plane").

Duality of patterning

- Hockett saw duality of patterning as a key "design feature" of human language that distinguished it from other biological communication systems.
- This idea is influential in work on language evolution and animal communication, in particular birdsong (e.g. Yip 2006, Fitch and Jarvis 2013).

Duality of patterning

- Duality idea also helps drive assumption of a separate phonological structure for phrases, independent of syntactic structure. (Compare Kaisse 1985 with e.g. Selkirk 1984 or Nespor and Vogel 1986.)

Duality of patterning in signed language

- Development of Al-Sayyid Bedouin Sign Language (ABSL) (Sandler et al., e.g. 2011).

Duality of patterning in signed language

- Development of Al-Sayyid Bedouin Sign Language (ABSL) (Sandler et al., e.g. 2011).
- Isolated community affected by congenital deafness beginning in early 20th century. Now a significant proportion of community members are deaf.

Duality of patterning in signed language

- Development of Al-Sayyid Bedouin Sign Language (ABSL) (Sandler et al., e.g. 2011).
- Naturally developed sign language has arisen in 4-5 generations. Everyone signs, including hearing members (who speak Arabic).
- Development of language (esp. past 25 years) very well documented.

Duality of patterning in signed language

- Development of Al-Sayyid Bedouin Sign Language (ABSL) (Sandler et al., e.g. 2011).
- Signs ***evolve*** toward phonological analysability. Phonology ***(and therefore duality of patterning)*** "emerges" in new sign languages. (Cf. Frishberg 1975 on "iconicity" in American Sign Language.)

Duality of patterning in signed language

- Development of Al-Sayyid Bedouin Sign Language (ABSL) (Sandler et al., e.g. 2011).
- Phonology emerges ***after*** grammar and some lexicon are firmly in place. Related ideas about sign phonology put forth by Brentari and colleagues.
- Aronoff (2008): “In the beginning was the word”.

Duality of patterning in signed language

- Similar to Hockett's conclusions about spoken language phonology – except that he was talking about language evolution in the species, not the development of individual languages.

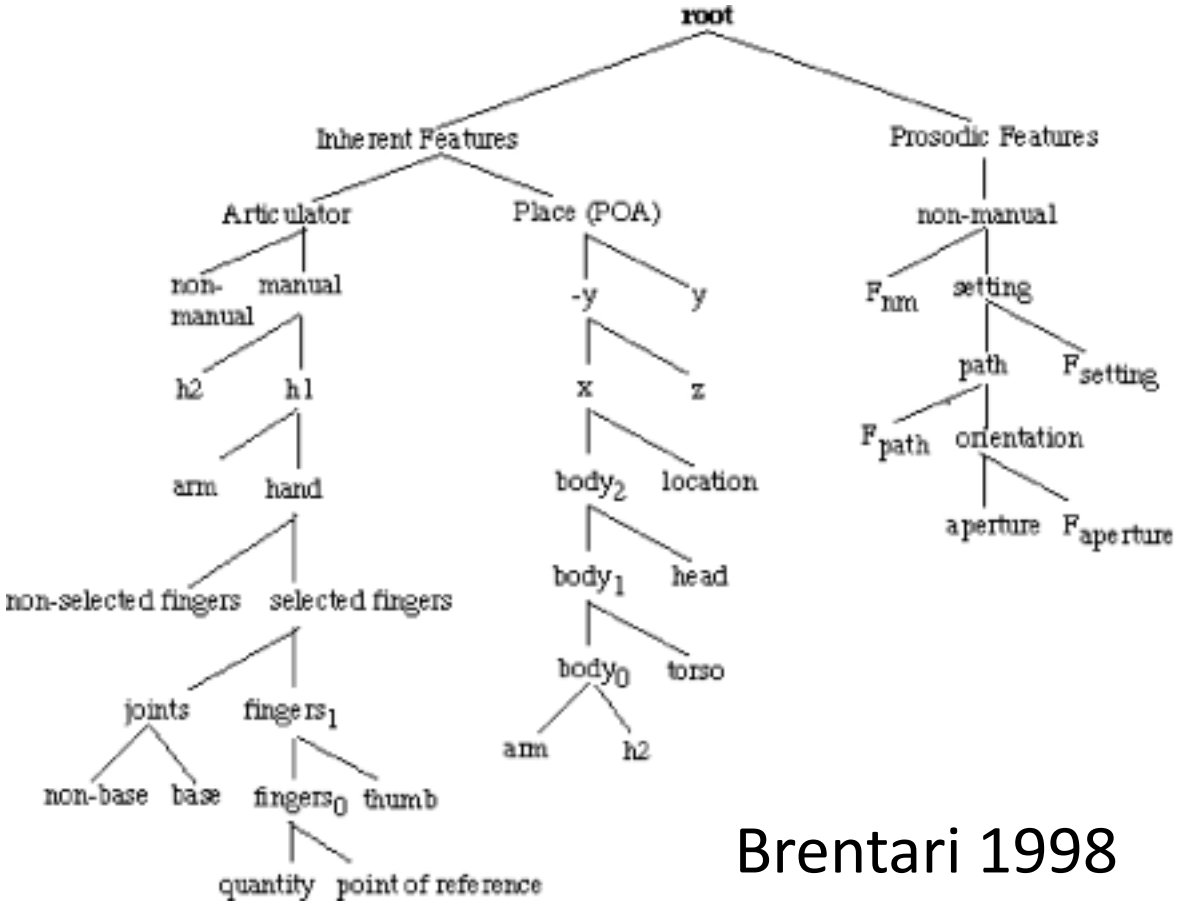
Duality of patterning in signed language

- Similar to Hockett's conclusions about spoken language phonology – except that he was talking about language evolution in the species, not the development of individual languages.
- ***Sign language work suggests a different understanding of duality of patterning.***

Duality of patterning in signed language

- Important problem in all sign language phonology is ***large number of primitives***.
- Classic analysis (Stokoe 1960) in terms of **handshape, location,** and **movement.**
- Elaborated since then; e.g. Brentari 1998

Duality of patterning in signed language



Brentari 1998

Duality of patterning in signed language

- ***Yet despite the large number of primitives*** it is sometimes difficult to analyse signs in terms of a fixed phonological inventory.

e.g. ASL “INTERNALIZE” is exceptional in having two places of articulation (chest and non-dominant hand). (Image : Brentari 1998)

Duality of patterning in signed language

- ***These problems are exactly what we should expect if phonology gradually emerges.*** Signs do not suddenly become exhaustively analysable phonologically. A residue of exceptions – “leaks” in the phonology – is therefore no surprise.

Duality of patterning in signed language

- ***These problems are exactly what we should expect if phonology gradually emerges.*** Signs do not suddenly become exhaustively analysable phonologically. A residue of exceptions – "leaks" in the phonology – is therefore no surprise.
- ***Are such leaks also found in spoken phonology?***

Leaky phonology in spoken language?

- Phonemes are not always meaningless:

(1) onomatopoetic or imitative words (e.g. Eng. *moo, bow-wow,* etc.; e.g. Jap. *giongo* 擬音語)

(2) "sound symbolism" of various types (e.g. Eng. *flash, flicker, flare, flame* etc.; Eng. <-*y*> in *sorry, holy, silly, happy* etc.; e.g. Jap. *gitaigo* 擬態語).

Leaky phonology in spoken language?

- Some words contain sounds that are not part of a language's normal phoneme inventory:

(1) Interjections, etc.

- e.g. Eng. *uh-huh, uh-uh*
- e.g. Eng. *ow, ouch*; Fr. *aïe*; Ger. *aua*; It. *aia*; Jap. /ite/ 痛っ; Eng. *yuck*; Fr. *beurk*; Ger. *igitt*; It. *peh*; Jap. /ge/ げっ

(2) Foreign words (e.g. Eng. *Debussy, loch*)

(3) "Special" words (e.g. Arabic *Allah*)

Leaky phonology in spoken language?

- Some allophonic rules have exceptions:

(1) Foreign words:

- e.g. Jap. /t/ before /i/
  tisshu ティッシュ　'tissue (paper)'
  charitii チャリティー　'charity'

(2) Paradigm uniformity effects:

- e.g. Scot. Eng. *tide/tied, brood/brewed*

(3) Dialect mixture:

- e.g. NE Am. Eng. *bad, mad, glad, sad*

Leaky phonology in spoken language?

- Phonemes are not always meaningless
- Some words contain sounds that are not part of a language's normal phoneme inventory
- Some allophonic rules have exceptions

Rationalisations of leaky phonology

(Phonemes are not always meaningless)

(1) Easy to justify treating onomatopoeia as marginal.

(2) Easy to justify treating sound symbolism as marginal, ***especially for linguists who are speakers of European languages.***

Rationalisations of leaky phonology

(Some words contain sounds that are not part of a language's normal phoneme inventory)

- Easy to justify treating interjections as marginal – ***but treatment is typically inconsistent.*** (Descriptions emphasise arbitrariness and language-specificity of interjections, yet they also ignore non-phonemic sounds because interjections are "expressive".)

Rationalisations of leaky phonology

(Some words contain sounds that are not part of a language's normal phoneme inventory)

- Similarly easy to ignore truly foreign sounds, but difficult to decide when a foreign sound has been integrated into borrowing language's phonology.

Rationalisations of leaky phonology

(Some words contain sounds that are not part of a language's normal phoneme inventory)

- More difficult to ignore unique phoneme in "special words" like *Allah* (but I know of no attempt to deal with the implications of such cases).

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- Easy to treat allophonic exceptions involving foreign words as historical change "in progress". But again we have the problem of deciding when a foreign sound has been integrated into the borrowing language's phonology.

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

Japanese orthographic convention for dealing with exceptional allophony:

- e.g. Jap. /t/ before /i/

  tisshu ティッシュ ‘tissue (paper)’

  charitii チャリティー ‘charity’

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- Paradigm uniformity effects are harder to ignore, but they can often be analysed in terms of allophony conditioned by morpheme boundaries or similar structural abstractions.

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- "Dialect mixture" traditionally counts as a reason in its own right for ignoring the problems of exceptions to allophony. But there is a fundamental problem with falsifiability if we accept this; and in any case there is again the problem of deciding when a borrowed feature has been integrated.

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- A recent attempt by Kiparsky (2014) to address this problem involves positing **intermediate phonological status** for some phenomena.
- He draws a distinction between "distinctiveness" (native speaker phonetic awareness) and "contrastiveness" (lexical phonological difference).

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- Kiparsky 2014:

	contrastive	*non-contrastive*
distinctive	**phoneme**	**quasi-phoneme**
non-distinctive	**near-merger, incompl. neutr.**	**allophone**

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- Some cases are difficult to classify even in Kiparsky's extended scheme, e.g. quasi-contrastive higher and lower mid vowels in Italian and French (Renwick and Ladd, work in progress).

Rationalisations of leaky phonology

(Some allophonic rules have exceptions)

- Kiparsky 2014: “The conjecture is that all phonemes arise as quasi-phonemes, and that all mergers pass through a near-merger stage”.

This seems to imply that these categories only arise as transitional phenomena.

If phonology is “emergent”…

- Accept that there can be lexical exceptions to phonological generalisations, just like lexical exceptions to grammatical generalisations.
- Phonology is systematic internal structure for words or morphemes, as grammar is systematic internal structure for phrases and utterances.

If phonology is “emergent”…

- This view of phonology (which seems clearly justified for sign language) does not preclude iconicity, non-morphemic “meaning”, unique phonological features of specific words, etc.
- It does not require abrupt historical reanalysis of borrowings, or assume that intermediate status is only transitional.

If phonology is “emergent”…

- This view of phonology ***does*** put duality of patterning in a different light: Duality of patterning involves an intrinsically ***hierarchical*** relation, not two independent parallel structures, grammatical and phonological.
- “In the beginning was the word.”

A broader view of “phonology”?

- This view is consistent with psycholinguistic work on speech perception and word recognition, and may make it possible to reconcile word-based exemplar models with the extensive evidence for the psychological reality of the phoneme.

A broader view of “phonology”?

- This view also points toward a theory of “phonology” independent of spoken medium:

“Phonology, construed broadly as an abstract theory of linguistic form, applies not only to speech but to other forms of communication (handwritten, printed, signed, etc.) as well.” (Kornai 2008)

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This talk is based on chapter 5 of my book *Simultaneous Structure in Phonology* (O.U.P., 2014).