

Evolutionary Phonology and Sound Change Typology

Lecture 1: What is Evolutionary Phonology?

0. 21st century landscapes.

Over the course of the past several hundred years, advances in our understanding of sound change along with 20th century advances in phonetic science and phonological typology have given rise to a new landscape of sound patterns. A particular sound pattern in a particular language forms part of a population of similar sound patterns, often with similar phonetic bases. Looking at this population, we can explore evidence for phonetic and non-phonetic factors in shaping the topography of synchronic phonologies, and ask questions like:

- Can the majority of recurrent sound patterns be explained in terms of phonetically based sound change?
- Are particular sound patterns rarer or more frequent than expected on purely phonetic grounds?
- Are particular sound patterns more or less prevalent in languages or language families with identifiable structural features?
- Are particular sound patterns associated with geographic areas?
- Are particular sound patterns associated with language contact?

I. What is phonology?

Phonology is the study of sound patterns of the world's languages. In all spoken languages, we find sound patterns characterizing the composition of words and phrases. These patterns include overall *properties of contrastive sound inventories* (e.g. vowel, consonant, tone, etc. inventories), as well as patterns determining the *distribution of sounds* or contrastive features of sounds (stress, tone, length, voicing, place of articulation, etc.), and their *variable realization* in different contexts (alternations). A speaker's *implicit knowledge of sound patterns* is assumed to be evident in these patterns ("internal evidence"), and may also be evident in "external evidence" of the following sort:

- extension of the pattern to novel items (wug tests, Berko 1958; loan phonology, Lovins 1974)
- language games (Bagemihl 1995)
- poetic devices (Steriade 2003)
- other experiments probing phonological well-formedness (Prunet 2006)
 - priming experiments
 - gating experiments
 - neurological impairment/function
- human population genetics?? (e.g. Dediu and Ladd, 2007)

[See Zwicky 1980 on the general distinction between 'internal' and 'external' evidence.]

This *implicit knowledge* - its content, formalization, and representation, - is the central focus of many modern theoretical approaches, including Generative Phonology and many of its derivatives (Natural Phonology, Government Phonology, Particle Phonology, Dependency Phonology, Lexical Phonology, Optimality Theory, Biolinguistics, etc.), even though, it may be greatly underdetermined by the data (again, see Zwicky 1980).

However, just as important as speaker's implicit knowledge of sound patterns are *explanations for the distribution of sound patterns across attested spoken languages*. Some sound patterns, are extremely common, while others are rare, and a comprehensive theory of sound patterns should explain these distributional patterns. Common sound patterns may be *recurrent sound patterns*, recurring with greater than chance frequency across the world's languages. [Excursus 1: significance/assessing overall probabilities of sound patterns; Excursus 2: *not* a theory of performance.]

Some examples of recurrent sound patterns involving segment/feature inventories, distribution, and alternations are listed in (1). The sound patterns in (1i,iii,iv,v,viii) are exceptionless across the world's attested spoken languages, while those in (1ii, vi, vii, ix-xii) are recurrent and frequent. Exceptionless patterns like (1i) are sometimes regarded as 'linguistic universals' (1i), while common patterns like (1ii) are often viewed as 'universal tendencies'.

(1) Some recurrent sound patterns in the world's languages (see Blevins 2004, 2006a for refs.)

Inventories

- i. All spoken languages have consonants and vowels.
- ii. Most languages with only three vowels have the vowels /i, u, a/
- iii. If a language has click consonants, it has other consonants as well.
- iv. No language has more than five level tones.

Distribution

- v. In all languages with a voicing contrast, this contrast is found before vowels.
- vi. In many languages with a voicing contrast, this contrast is not found at the end of words.
- vii. In many languages, long vowels are stressed in preference to short vowels.
- viii. There are no languages where short vowels are consistently stressed in preference to long vowels.

Alternations

- ix. In many languages /k/ is pronounced as [tʃ] when followed by /i/.
- x. In many languages /n/ is pronounced as [m] when followed by /p/, /p^h/, or /b/.
- xi. In many languages voiced stops (/b/, /d/, /g/, etc.) are pronounced voiceless at the end of words.
- xii. In many languages, a high tone is lost when there is another high tone in the word.

Other sound patterns, like those in (2) are rare, and might be considered impossible if not for the one or two languages described in sufficient detail. In some cases, the discovery of rare features has forced expansion of the notion of 'possible contrast' (2iii, iv) or 'possible sound pattern' (2vii) in very recent history, highlighting the fact that *the simple non-occurrence of a particular sound patterns should not be interpreted as primary evidence of its impossibility.*

(2) Rare sound patterns in the world's languages (see Blevins 2004, 2006a for refs.)

Inventories

- i. egressive, voiced, lateralized apico-alveolar/sub-laminal double-flap (Pirahã)
- ii. oral/semi-nasalized/nasalized vowel contrast (Palantla Chinantec)
- iii. pharyngeal vs. epiglottal fricative contrast (Burkikhan dialect of Agul)
- iv. contrastive labiodental nasals (Kukuya dialect of Teke)

Distribution

- v. word-initial CCCCCC and even CCCCCCCC clusters (Georgian)
- vi. word-initial geminate /h:/ (Taba)
- vii. all words begin with vowels (Eastern Arrernte)
- viii. lexical tone on mono- and di-syllables, stress elsewhere (Ket)

Alternations

- ix. rhotic vowel harmony (Yurok)
- x. {t, t^h, d} > s/_m (Ancient Greek)
- xi. Voiceless /t/, /k/ are pronounced as voiced word-finally under emphasis (Somali)
- xii. Shift of M to L tone after voiced obstruents, sonorants, glottal stop, & implosives (Zina Kotoko)

In addition to these sorts of typological observations involving synchronic sound patterns, there is also a striking similarity between recurrent sound patterns and common instances of sound change:

(3) Panchronic sound pattern generalization

There is a strong correlation between the frequency of sound change and synchronic sound pattern frequency. For example, common sound changes of velar palatalization, regressive nasal-place assimilation, and intervocalic consonant lenition are matched by common synchronic alternations of the same kinds.

II. What is Evolutionary Phonology?

Evolutionary phonology is the study of *synchronic sound patterns* as (partial) reflections of their evolution or history.

A. What does Evolutionary Phonology attempt to explain?

Central to Evolutionary Phonology (Blevins and Garrett 1998, 2004; Blevins 2004, 2005, 2006a, 2006b, 2015) is the attempt to explain why certain sound patterns have the typological distributions they do. Leading research questions include the following:

- Why are certain sound patterns extremely common, while others are rare?
- What factors play a role in determining similar sound patterns across languages?
- What explains the striking identity between recurrent context-dependent instances of sound change and recurrent alternation types across the world's languages?

B. What kinds of explanations are available in Evolutionary Phonology?

Within Evolutionary Phonology attempts to explain recurrent sound patterns give equal consideration to *all* potential sources of similarity. As with similar biological characteristics, two languages may have similar sound patterns due to any of the following:

- 1) inheritance from a shared mother tongue
- 2) parallel evolution in the form of parallel phonetically motivated sound change (where "phonetic" = based on aspects of speech perception & production)
- 3) non-phonetic constraints on form & function, including: general cognitive mechanisms, potential phonological (non-phonetic) universals, emergent effects of feedback loops in the course of language acquisition/maintenance
- 4) 'non-natural' or external factors including: language contact, prescriptive norms, literacy, and second-language learning
- 5) chance

	Contrast	Distribution	Alternation
B1 Inheritance	/p/ vs. /t/ vs. /k/ Eastern Algonquian	non-homorganic NC Pama-Nyungan	Long vowel lowering/ General Yokuts
B2 Parallel phonetic basis	/u/ vs. /y/ German, Rotuman	homorganic NC Bantu, Zoque	Velar palatalization/ Polish; Ivatan; Nenets
B3 Non-phonetic constraints (or B2 + B3)	?? Some attributed to markedness, but...??	no closed syllables/ Austronesian C-loss	liquid-sandhi-epenthesis/ English, Ritwan
B4 External factors	/w/ vs. /ʍ/ in English/ prescriptive, spelling	No initial clusters/ Contact Englishes	Karaim pal-harmony /Slavic-Turkic contact
B5 Chance	/w/ vs. /ʍ/ English and Klamath	Word-final V or nasal Japanese, Gilbertese	Final voicing (?)/ Aka-Bea, Somali

C. What is the basic typology of sound change in Evolutionary Phonology?

A general typology of sound change, S = speaker, L = listener

- i. CHANGE: The phonetic signal is misperceived by the listener due to: acoustic similarities between the utterance and the perceived utterance and/or biases of the human perceptual system.

S says [anpa]

L hears [ampa]

- ii. CHANCE: The phonetic signal is accurately perceived by the listener but is intrinsically phonologically ambiguous. The listener associates a phonological form with the utterance which differs from the phonological form in the speaker's grammar.

S says [ʔaʔ] for /aʔ/

L hears [ʔaʔ], thinks /ʔa/

- iii. CHOICE: Multiple phonetic variants of a single phonological form are accurately perceived by the listener. The listener (a) acquires a proto-type or best exemplar which differs from that of the speaker; and/or (b) associates a phonological form with the set of variants which differs from the phonological form in the speaker's grammar.

S says [tuʔəlan], [tuʔʰlan], [tuʔlan] for /tuʔəlan/

L hears [tuʔlan], [tuʔʰlan], [tuʔəlan], and assumes /tuʔlan/

D. What kinds of structural principles are proposed in Evolutionary Phonology?

- i. Feature-to-segment Mapping Principle (Blevins 2004:152)

In the learning which allows listeners/learners to interpret the phonetic string as a sequence of segments, a phonetic feature or feature complex whose domain overlaps with other segment-defining phonetic features is assumed to have a unique featural source in the phonological (categorical) representation.

- ii. Structural Analogy (Blevins 2004:153-55, 246-48, 297-99; Blevins 2009)

In the course of language acquisition, the existence of a (non-ambiguous) phonological contrast between A and B will result in more instances of sound change involving shifts of ambiguous elements to A or B than if no contrast between A and B existed.

- iii. Lexical Character Displacement (Blevins and Wedel 2009)

Lexical character displacement occurs when differences among similar words whose syntagmatic distributions overlap are accentuated, while the same differences may be minimized or lost where syntagmatic distributions do not overlap. Lexical character displacement is based on the principle that, to coexist in a stable environment, two competing words must occupy distinct phonetic niches.

E. What makes Evolutionary Phonology different from other approaches?

- Attempts to *explain* recurrent sound patterns
- Directly addresses sound pattern frequency
- Attempts to identify structural features that play a role in sound change
- Proposes testable hypotheses
- Makes no reference to phonological markedness

III. General approaches to explanation in phonology (revised; refs. in Blevins 2004, 2006a)

- i. Synchronic/non-phonetic, not goal-directed
(e.g. Saussure 1949; Hockett 1955; Chomsky and Halle 1968)
- ii. Synchronic/non-phonetic, goal-directed
(e.g. Trubetzkoy 1939/1969, Prince and Smolensky 1993)
- iii. Diachronic/phonetic, goal-directed
(e.g. Grammont 1950, Lindblom 1986)
- iv. Diachronic/phonetic, not goal-directed
(e.g. Andersen 1973, Ohala 1981)
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- v. Synchronic/phonetic, goal-directed
(e.g. Boersma 1998; Hayes and Steriade, 2004)
- vi. Diachronic & synchronic/phonetic & non-phonetic, not goal-directed
(e.g. Ehala 1996, 1999; Blevins 2004; Hume 2004, 2007)

The primary goal of Evolutionary Phonology is to explain recurrent sound patterns in spoken languages across time and space. One domain of explanation is diachronic, and much of my own work has focused on diachronic explanations ... Another domain of explanation is synchronic. A range of synchronic factors, from the mechanics of speech perception and production ... to aspects of languages use ... to general cognitive strategies in learning, categorization, and pattern-matching ... are likely to play a major role in defining recurrent aspects of sound patterns. (Blevins 2006b:245)

IV. Common misconceptions about Evolutionary Phonology and related approaches

a. *The goal of Evolutionary Phonology is to eliminate Universal Grammar.*

FALSE.

Though EP challenges the existence of many *phonological* universals, it does not deny, and, indeed, it embraces work in phonetics and cognitive sciences more generally which demonstrates effects of innate knowledge or innate processing effects in these two domains.

b. *The EP challenge to phonological universals is based solely on alternative phonetic explanations.*

FALSE.

Some proposed phonological universals, like markedness constraints resulting in word-final devoicing, are replaced with alternative phonetic and usage-based accounts (Blevins 2006a). But other phonological universals, like the OCP-based account of antigemination, are challenged on the basis of alternatives that are not purely phonetic (Blevins 2005). Additional challenges to phonological universals come from complementary research showing the basic empirical inadequacies of the proposed systems (e.g. Mielke 2008) on distinctive features.

c. *Every language-specific sound pattern has a historical-phonetic (natural) explanation.*

FALSE.

Though many recurrent sound patterns have well studied phonetic bases, a language-particular sound pattern that is regular and productive can be the result of analogy (Garrett and Blevins, 2009; Blevins and Lynch 2009), or any combination of factors in Table 1.

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