

**EVOLUTIONARY  
PHONOLOGY**

**BLEVINS (2006)**

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# ROAD MAP

1. Overview Evolutionary Phonology
2. Case Study: Word-Final Devoicing
3. Three Distinct Features of Evolutionary Phonology
4. Conclusion/Key Takeaways

# WHAT IS EVOLUTIONARY PHONOLOGY

- Evolutionary phonology looks at sound change and what causes sound change.
  - Why are some sound patterns common and others rare?
  - What factors determine sound patterns across languages?
  - Why do we find trends in how sound patterns change?

# (ALMOST) UNIVERSAL SOUND PATTERNS

- Why are some sound patterns common?
  - All spoken languages have consonants and vowels.
  - Most languages with only three vowels have [a], [i], and [u].
  - No language has more than 5 tones.

# (ALMOST) UNIVERSAL SOUND PATTERNS

- Why are some sound patterns common?
  - No languages have short vowels consistently stressed over long vowels.
  - /n/ is often pronounced as [m] when followed by /p/, /p<sup>h</sup>/, or /b/.
  - /b/, /d/, and /g/ are often pronounced voiceless [p], [t], and [k], respectively, at the end of the word

# EXTREMELY RARE AND ALMOST NONEXISTENT SOUND PATTERNS

- Why are some sound patterns rare?
  - CCCCCCCC word initial clusters
    - Georgian has clusters like in /gvbrdyvnis/ ‘he is plucking us’
  - Rule that all words must start with a vowel
    - Eastern Arrernte spoken in Australia has this rule
  - {t, d} → s / \_m
    - /t/ and /d/ change to [s] before an m happens in Ancient Greek

# SYNCHRONIC VS. DIACHRONIC

- To better understand how languages evolve evolutionary phonology incorporates:
  - synchronic (looking at language at the present) analysis and
  - diachronic (looking at language over time) analysis

# PHONOLOGICAL EVOLUTION IS LIKE BIOLOGICAL EVOLUTION

- One BIG IDEA in evolutionary phonology is that sound change is similar in many ways to animal evolution.
  - Direct genetic inheritance
  - Adaptation by natural selection
  - Physical constraint on form and function
  - “Non-natural” or external factors
  - Chance



# PHONOLOGICAL EVOLUTION IS LIKE BIOLOGICAL EVOLUTION

Table 1. *Sources of Similarity*

Source of Similarity	Biological	Linguistic
a. Direct genetic inheritance	Shared genetic traits of identical twins, e.g. eye color	Shared inherited features of British and Australian English, e.g. <i>r</i> -loss
b. Adaptation by natural selection	Independent development of toepads in <i>Iguanidae</i> , <i>Scincidae</i> , and <i>Gekkonidae</i>	Independent development of final obstruent devoicing in Indo-European, Turkic, Cushitic, etc.
c. Physical constraints on form & function	Patterns of spots and stripes on cats and seashells, as determined by chemistry/physics	Universal gross category boundaries for consonant types, as determined by categorical perception
d. “Non-natural” or external factors	Grafting, hybridization, genetic modification	Language contact/diffusion, prescriptive norms, literacy and second language learning
e. Chance	Arctic hares and albino rabbits have white coats, but ...	Japanese and Gilbertese only allow nasal Cs word-finally, but ...

# PHONOLOGICAL EVOLUTION IS EXPLANATORY

- Another BIG IDEA in evolutionary phonology is that looking at the history of sound changes leads us to see why phonological rules and constraints are as they are.
  - human anatomy → phonetics → phonological trends
- SPE and OT do not explain why the rules and constraints exist besides an appeal to innateness, but evolutionary phonology does.

# EVOLUTIONARY PHONOLOGY CASE STUDY

- In the next slides, we will overview what an evolutionary phonological analysis looks like.
- The focus of this evolutionary phonology analysis is word-final devoicing.
- Word final devoicing is a common phonological pattern where a voiced consonant in final-syllable position becomes voiceless.
  - /bad/ → [bat]

# CASE STUDY: THEORY OF FINAL DEVOICING

- Completely unrelated languages have had parallel evolution.
- For instance, we see parallel evolution with unrelated languages having word-final devoicing.
- Blevins (2006) explains why these unrelated languages have word-final devoicing using the evolutionary phonology way of analysis.

# CASE STUDY: THEORY OF FINAL DEVOICING

- Innate (Optimality Theory) VS. Emergent (Evolutionary Phonology)
- Optimality theory implies that marking word-final voicing is **innate** to humans, so humans intrinsically prefer word-final devoicing.
- Evolutionary Phonology claims that this is nothing innate about word-final devoicing, instead word-final devoicing **emerges** from contributing factors throughout history that have made it more common to devoice the end of the word than to voice it.

# HOW LANGUAGES EVOLVE

- Language Contact
- Direct Inheritance
- Independent Development
  - \*Major Interest in Evolutionary Phonology
  - The **red arrows** point to languages from protolanguages that did not have word-final devoicing but now have word-final devoicing (No direct inheritance).
  - These same languages also never came into other languages with word-final devoicing (No language contact).

Table 2. *Final-devoicing sound patterns in unrelated languages*

Language/Family	Alternations	Data Source
→ Afar/Cushitic	yes	Bliese (1981: 242, 215)
→ Chadic Arabic/Semitic	yes	Zeltner & Tourneux (1986: 15–16)
→ Russian/Indo-European	yes	Halle (1959)
→ Ingush/Nakh-Daghestanian	yes	Geurin (2001: 90–92)
Mosetén/Mosetenan	yes (rare)	Sakel (2002)
→ Turkish/Turkic	yes (stops only) <sup>15</sup>	Johansson & Csató (1998)
Awara/Finisterre-Huon	no	Quigley (2003)
Basque	no	Saltarelli (1998)
→ Old Chinese/Sino-Tibetan	no	Sagart (1999: 25, 51)
→ Malay/Austronesian	no (levelled)	Moeliono & Grimes (1995: 451)
Fyem/Niger-Congo?	no	Nettle (1998)
Thai/Tai-Kadai	no	Smyth (2002: 5–6)

# PHONETIC SOURCES FOR FINAL DEVOICING

- human anatomy → phonetics → phonological trends
  - Laryngeal gestures at phrase-boundaries
  - Phrase-final lengthening
  - Absence of audible release

# PHONETIC SOURCES FOR FINAL DEVOICING

- The three phonetic factors below give rise to more environments that favor word-final devoicing.
- More potentially influential phonetic factors → A common phonological change
- But, this does not mean that word-final voicing is impossible (as we will see)

## Phonetic Factors Favoring Word-Final Devoicing

1. Laryngeal gestures at phrase-boundaries
2. Phrase-final lengthening
3. Absence of audible release



# PHONETIC SOURCES FOR FINAL DEVOICING

- Evolutionary phonology predicts a process of development.
- Domain factor: utterance final devoicing can lead to syllable devoicing final in a process.

*utterance final → phrase final → word final → syllable final*

# AERODYNAMIC SOURCES FOR FINAL DEVOICING

- There are also aerodynamic factors that lead to final devoicing.
  - Aerodynamic factors have to do with the human anatomy of vocal cord movement.
  - These factors make devoicing more likely in coronals.
- iii. In early stages, final devoicing may be sensitive to aerodynamic properties
- FRISIAN ca. 1900/Germanic (Tiersma 1985: 30)  
/g/ is devoiced finally, but not /b, d/.
- TONKAWA/Isolate of Central Texas (Hojjer 1933: 4)  
/g/ is devoiced finally, but not /b, d/.
- HAISLA/Wakashan (Lincoln & Rath 1986: 11):  
Word-final devoicing/frication of consonants posterior to /d/; but variable devoicing of /d/ (no word-final /b/).

# FINAL VOICING PATHWAYS

- Although word-final devoicing is common, some languages have word-final voicing
- Potential Pathways to Final Voicing:
  - (i) singleton/geminate opposition turns into a voiceless/voiced one (Welsh)
  - (ii) intervocalic obstruent voicing → word-final voicing when final vowel is lost (Proto-Indo European)
- Kiparsky: Against Potential Pathways Because They Can Be Invented/Imagined
- Belvins: Supports Potential Pathways Because She Finds Historical Evidence

# CASES OF FINAL VOICING FOLLOWING THE PATHWAYS

- Welsh: geminate/singleton opposition turns into a voiceless/voiced one
  - Before: geminate (long/fortis) consonants contrasted with singleton (short/lenis) consonants
  - Now: /p/, /t/, /k/ contrast with /b/, /d/, /g/

(12) Predictable distribution of final /b d g/ vs. /p t k/ in Welsh  
(Wells 1979: 347)

Short vowel + fortis

[map] /map/ 'map'  
[brat] /brat/ 'apron; rag'  
[dot] /dot/ 'dot; vertigo'

Long vowel + lenis

[ma:b] /mab/ 'son'  
[bra:d] /brad/ 'treason'  
[do:d] /dod/ 'to come'

# CASES OF FINAL VOICING FOLLOWING THE PATHWAYS

- Proto Indo-European is an ancestor of Proto-Italic.
- From Proto Indo-European the intervocalic /t/ becomes word final /d/ in Proto Italic with loss of word-final vowel.
  1. Proto Indo-European: /VtV#/ → [VdV#]
  2. Proto Italic: /Vt#/ → [Vd#]

# BENEFITS OF EVOLUTIONARY PHONOLOGY

- Blevins (2006) points out three features that distinguish evolutionary phonology from other theories:
  - Predictive Value
  - Testable Nature of Hypothesis
  - Explanatory Nature

# **BENEFITS OF EVOLUTIONARY PHONOLOGY: 1. PREDICTABLE VALUE**

- There are recurrent patterns with how languages change.
- Blevins (2006) claims that evolutionary phonology is comparable to OT with respect to having constraints.
- However, OT does not tell us why some sound patterns are more common than others.
- In contrast, evolutionary phonology works to explain why, where, and when certain sound patterns occur.

# **BENEFITS OF EVOLUTIONARY PHONOLOGY: 2. TESTABLE NATURE OF HYPOTHESIS**

- Laboratory phonology can test the hypothesis developed in the evolutionary phonology framework to explore the why behind articulatory and perceptual trends in human speech.
- Acoustic analyses test physical constraints on speech production and perception that influence how languages evolve.
- Innate aspects of language can be tested as well with new technology.



# BENEFITS OF EVOLUTIONARY PHONOLOGY: 3. EXPLANATORY NATURE

- Evolutionary phonology looks at the sources (a-e) in Table 1 to explain:
  - Sound patterns
  - Trajectories of change
  - Phonological stability
  - Relationships between phonological domains

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# CONCLUSION: KEY TAKEAWAYS

- Evolutionary phonology incorporates synchronic (looking at language at the present) and diachronic (looking at language over time) to better understand how languages evolve.
- Unlike OT and SPE, evolutionary phonology does not rely on "**innateness**" for explanations but rather looks at "**emergence**" to find out why phonological patterns exist.
- human anatomy → phonetics → phonological trends

# CASES OF FINAL VOICING FOLLOWING THE PATHWAYS

- Tundra Nenets: /p/ and /b/ alternation
  - Word final voicing /b/: historically postvocalic “weakening”
  - No synchronic evidence: no intervocalic voicing
  - Fortis/lenis

i.	initial devoicing	
	<b>p</b> angkor, <b>p</b> akor ‘gaff’	< bagór [29, 127]
	<b>p</b> ayəná ‘sauna’	< báina [30]
	<b>p</b> orə ‘wooded country’	< bor [31]
	<b>p</b> akəlasəkâ ‘flask’	< baklázhka [5]
ii.	syllable-final voicing	
	xorə <b>b</b> ko ‘box’	< koró[ <b>p</b> ]ka
	təru: <b>b</b> kâ ‘cigarette, pipe’	< trú[ <b>p</b> ]ka ‘pipe’ [M 499; Oks 499]
	yubkâ ‘skirt’	< yú[ <b>p</b> ]ka [p. 14]
	xəbtocyəkâ ‘jacket, blouse’	< kóftochka [p. 13]
ii.	final/medial epenthesis	
	popə ‘priest’	< pop [86]
v.	no change (VpV showing that ii. is <i>not</i> post-vocalic voicing)	
	lapâ ‘paw’	< lápa [135]
	xâpu:sətâ ‘cabbage’	< kapústa [p. 13]
	xapitanə ‘ship captain’	< kapitán [p. 13]
	turubâ ‘chimney’	< trubá [53]
	pulyəkâ ‘bullet’	< púl’ka

# CASES OF FINAL VOICING FOLLOWING THE PATHWAYS

- Somali: path (ii) intervocalic voicing + loss of final vowel
- Although really aspiration vs. no aspiration
- But in slow careful speech, voiced with schwa
- Still analyzed as phonologically voiced

SOMALI word-final voicing (Saeed 1999: 24, 27)

/arak-/ 'to see'	arkay '(I) saw'	árag 'see!'
/gunut-/ 'to knot'	guntay '(I) knotted'	gúnud 'knot it!'
/ilik-/ 'tooth'	ilkó 'teeth'	ílig 'tooth'
/adak-/ 'hard'	adkaa 'hard-PST'	adág 'hard'
<i>compare:</i>		
/edeg-/ 'lamb pen'	edgó 'lamb pens'	édeg 'lamb pen'
gor 'vulture'	gorgor 'vultures'	
dir 'send'	dirdir 'send rep.'	
ayáan 'good luck'	ayaandarró 'bad luck'	
	aayadó 'miracles'	aayád 'miracle'

# CASES OF FINAL VOICING FOLLOWING THE PATHWAYS

- Lezgian: synchronic final voicing
  - Kiparsky: word-initial devoicing, “onset degemination and onset fortification”
  - Problem:
    - Word-initial onset strong
    - Positing voiced geminates but not voiceless ones
    - Unnatural context of pre-approximant coda: tse**g**w ‘ant’ tsek**w**-re ‘ant.erg’

		$\_V$	$V\_ ]_{w_d}$
a.	/D/	D	D
b.	/T'/	T'	T'
c.	/T <sup>h</sup> /	T <sup>h</sup>	T <sup>h</sup>
d.	/T/	T	D:
e.	/T' <sub>2</sub> /	T'	D:
f.	/T' <sub>3</sub> /	T' (GÜNE)	T <sup>h</sup>

# PHONOLOGICAL STABILITY

- Contributing factors vs. innate constraint
  - Only factors, can make one phenomenon (e.g. final devoicing) more common, but other factors may lead to different direction (final voicing)
  - Has to do with the nature of the phenomenon (final voicing is universally marked)
- Phonetic adjustments mitigate the original contributing factors
  - Correlation between final voicing and medial long (geminate) voiced obstruents
  - May be the same phonetic adjustments
- Language internal factors that enhance the stability of a sound pattern?
  - Paradigmatic contrast
  - Independent phonetic contrast (singleton/geminate)
  - Cannot really be studied in synchronic terms > mis-generalization and misanalysis