Phonological Knowledge Under Contact: Rethinking the “Spread” of Tone

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1 – Lexical tone
1.1 – Lexical tone

• Lexical tone is the presence of tone values in lexical entries, which serves to contrast them
• About half of languages have lexical tone, maybe more (WALS)
• Atonal languages gain lexical tone through tonogenesis
• Tonogenesis happens when some other contrastive phonological feature is reanalyzed as a contrast in tone
  • Possible initial phonological features include obstruent laryngeal features (voicing in Chamic; Thurgood 1996, 1999; aspiration in the North Huon Gulf Chain; Rivierre 1996; breathy voice in Punjabi, Gill & Gleason 1969), laryngeal coda consonants or phonation on the vowel (Chamic; ibid.), and prosodic structure (Franconian German, Gussenhoven 2004).
1.2 – Notation of tone

• Ex. Mandarin (notation IPA, not Pinyin)

<table>
<thead>
<tr>
<th>IPA</th>
<th>Tone</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[tá]</td>
<td>H</td>
<td>“ride”</td>
</tr>
<tr>
<td>[tà]</td>
<td>L</td>
<td>“hit”</td>
</tr>
<tr>
<td>[tǎ]</td>
<td>LH</td>
<td>“answer”</td>
</tr>
<tr>
<td>[tâ]</td>
<td>HL</td>
<td>“big”</td>
</tr>
</tbody>
</table>

• Acute accent for H (high), grave for L (low), combined for contours: circumflex for HL/falling and hacek for LH/rising.
2 – Areal phonological features
2.1 – Areal features

• Some linguistic features can spread to neighboring languages under contact, as opposed to direct inheritance, these are *areal features*.

• Ex. Hindi’s breathy voiced consonant series is directly inherited from the parent language (and posited as far back as Proto-Indo-European), while its retroflex consonant series developed under contact with Dravidian languages.

• Syntactic features are also shared by linguistic areas without direct inheritance (e.g. the Balkan *Sprachbund*), however any link between the spread of phonological and syntactic features is outside the scope of this presentation.

• Some features seem to spread while others don’t. Ex.: retroflexion and preglottalized stops spread while clicks and (possibly) pharyngeals don’t (Blevins; to appear).
2.2 – Tone as an areal feature

• Tone is notorious as a “spreading” areal feature.
• While tonogenesis is a phonetically-motivated sound change, tonal languages are found disproportionately near other tonal languages (see WALS map on next slide).
• Furthermore, languages in contact with tonal languages are likely to develop tones, while related languages are not.
• Ex. Chamic languages underwent gradient amounts of registro- and tonogenesis depending on the amount of contact with Mon-Khmer, Hlai and other tonal languages of South-East Asia (Thurgood 1999).
2.2 – Tone as an areal feature

- red – large tonal inventory
- pink – small tonal inventory
- white – atonal

Chapter 13: Tone (Ian Maddieson)
2.2 – Tone as an areal feature

Chamic Languages

1. Utsat
   five-way tonal contrast

2. Phan Rang Cham
   two-way tonal contrast

3. Western Cham
   breathy vs. modal register

4. Acehnese
   no suprasegmental features

2.2 – Tone as an areal feature

Questions raised by areal features:

• Why should features spread?
• If the development of a certain feature is otherwise phonetically-motivated sound change, why should contact situations affect whether a language develops this feature?
• What separates areal features from features that are unable to spread?
2.2 – Tone as an areal feature

Tone presents an additional confound:

• All spoken languages use sonorants and thus have fundamental frequency values in the speech signal.
• Additionally, languages without lexical tone make use of specific tones for prosody.
• The presence or absence of tone values in lexical items (lexical tone) is primarily phonological knowledge, not phonetic.
• Other areal features such as retroflexion can be present or absent in the speech stream: whatever process underlies the spread of retroflexion under contact will happen when retroflexion is present in the contact language’s speech stream and will not happen when it is absent from that speech stream.
• Since frequency, the acoustic correlate of tone, is present in the speech stream for both tonal and atonal languages, how can tonal and atonal languages act differently under contact?
2.3 – The Perceptual Magnet Effect


- Subjects reported smaller perceptual differences between vowel tokens that were closer to the *prototype*, i.e. the “best instance” within a category, than between pairs of stimuli farther from the prototype.

- The prototype’s, or *perceptual magnet’s* effect was found in human children and adults, but not monkeys.

From Kuhl 1991. Hollow circles surround the prototype (P) while black dots surround a non-prototype point in the vowel space (NP).
2.3 – The Perceptual Magnet Effect

- Prototypes are language-specific: an American English prototype for /i/ may not be the same as for another language (Kuhl 1991)

- Prototypes develop based on language experience

From Kuhl & Iverson 1995. A shows stimuli arranged in the vowel space, and B shows the magnetic effect of the prototype.
2.4 – The PME in contact

• Non-native language experience may also affect prototypes in L1

• Sanskrit borrowed words from Dravidian languages with retroflex consonants; subsequently, phonetic environments in native Sanskrit words closest to retroflexes perceptually became retroflex consonants (Emeneau 1956). Ex: *lt > *ﻠّt > /ʈ/ etc. (Fortunatov’s Law)
2.4 – The PME in contact

• Blevins (to appear) bridges external influence on L1 prototypes to sound change under contact:

  "Areal sound patterns can be viewed as the long-term consequences of a special case of the [PME]. ... an external phonetic proto-type is internalized by a speaker on the basis of data external to the language being acquired."

• Under this approach, prototypes are affected by external language experience under contact.

• Ex: the prototype for /t/ may drift towards [t] under contact with a language with [t] in the speech stream. L1 phonetic environments that were already close to the external [t] prototype are reanalyzed as /t/. 
2.4 – The PME in contact

• This way, contact situations are able to “provoke” sound change that is otherwise natural (like tonogenesis).

• Ex. Punjabi tonogenesis occurred outside of a contact situation. The triggering environment (breathy voice) had a strong lowering effect on $f_0$ (Laver 1994), thus reanalysis as a tonal contrast was phonetically-motivated.

• If tonogenesis can be provoked by some PME phenomenon, then it can be both phonetically natural in some environment and exhibit “spreading” areally.
2.4 – The PME in contact

• Blevins (to appear) uses the nature of the PME to model candidacy of areal features. Establishment of a phonetic prototype requires:

  1. Phonetic saliency: a feature that is more salient in the speech stream is more likely to spread areally.

  2. Significant exposure: intensity and duration of language contact affect a feature’s ability to spread. Features require several generations to fully diffuse.

  3. Phonetic motivation of resulting sound change: the PME draws phonetically similar tokens to the prototype. Because of this phonetic similarity, the resulting sound change “will appear to be natural and phonetically motivated, and indistinguishable from internal developments.”
3 – The spread of tone
3.1 – Tone and PME candidacy

• While other features can be present/absent in the speech stream, the acoustic correlate of tone (frequency) has values in the speech of all spoken languages.

• With Autosegmental Phonology (Goldsmith 1976), only tone heights (H,L...) considered phonological primitives. Many tonal languages (such as Mandarin) are analyzed entirely through H and L, which are utilized by the prosodies of atonal languages.

• If the tone heights such as H and L are the phonetic prototypes that affect pre-tonogenesis languages, why would anything but these primitives in the prosody be affected?

• What is imparted through contact is not a specific tone height but *phonological knowledge*, the presence of these entities in lexical items. But then what prototypes are used by the PME in contact with tonal languages?
3.1 – Tone and PME candidacy

Two possibilities for PME candidates in tonogenesis:

- Some peculiarity in the tonal contour, that when imported to L1 through contact predisposes language to tonogenesis

- Some feature that can be present/absent in the speech stream spreads and leaves languages more vulnerable to tonogenesis
3.2 – Features of the tone contour

- Naïve speakers often perceive some quality in languages with large tonal inventories, for example referring to Chinese languages as “sing-songy”

- While primitives such as H and L are shared by tonal lexical items and atonal prosodies, they may have differing distributions.

- Ex. Cantonese has a tone on every lexical item, Mandarin on every content word, Japanese on every noun, prosodies perhaps only on boundaries or in positions of stress
3.2 – Features of the tone contour

I’ve forgotten to buy some oranges.

(Cantonese phrase from CantoDict, cantonese.sheik.co.uk)
3.2 – Features of the tone contour

Problems with tone contour features as PME prototypes

• Tonal languages by definition allow for the full array of phonological tones on otherwise identical syllable types

• This is fine for a voicing contrast for example; [tà] will be phonetically closer to L1 /da/ and serve as its prototype until reanalysis as /tà/. (as with [tá] and L1 /ta/ > /tá/).

• But then why do sonorants act uniformly? If contact language has [má] and [mà], why should either be closer to L1 /ma/? Sonorants generally band together with the unvoiced group in these cases (Vietnamese, Chinese, Chamic; Thurgood 1999, 2008, Norman 1988).

• Voicing acts more as a *privitive* feature, which after some process is reanalyzed as an L tone, and the H tone is assigned by default.
3.2 – Features of the tone contour

• But can PME prototypes based on the tonal contour really privilege one tone over another?
  • Experimental evidence from Yoruba children/adults shows that \( H \) is the most prominent tone perceptually (Harrison 2000, Yip 2002).
  • If \( H \) is the “default” tone assigned to whatever did not get reanalyzed as \( L \), wouldn’t this suggest that \( L \) is more prominent perceptually?

• Languages with small tonal inventories also provoke tonogenesis under contact. Do these languages differ significantly in their tonal contours from atonal languages that use as much tonal information for prosody but do not have the same effect?
  • Ex.: spreading of pitch accent (*LH or *L vs. no phonological tone) in varieties of German, Dutch and Scandinavian (Gussenhoven 2004)
3.3 – Non-tonal prototypes

• The other possibility is an intermediate stage in tonogenesis where some non-tonal feature is spread, leaving languages more vulnerable to tonogenesis.

• One candidate is phonation, i.e. breathy, tense or creaky voice on the vowel or during a sonorant consonant.

• Ex. Tense/creaky in varieties of Athabaskan (Kingston 2005), breathy/tense in Utsat (Chamic; Thurgood 1999, Macaulay 2014).

• Because these types of phonation can be present or absent in the speech stream (the latter “modal voice”), they are suitable candidates for PME prototypes. Additionally, they are privative.

• The evolution from consonant to vowel phonation is also phonetically-motivated: for example, phonological glottal stops are more likely to surface as creaky/tense phonation on the vowel than full stops (Garellek 2013).
3.3 – Non-tonal prototypes

• When to posit intermediate steps?
• Not always evidence available for individual steps of tonogenesis. This is the nature of historical linguistics.
• Sometimes related languages ‘branch off’ with intermediate structure
• Thurgood 2008 argues for a creaky register in Proto-Vietnamese with evidence from Mon-Khmer
• Thurgood 1996, 1999 describe the Chamic languages which underwent varying degrees of registro-/tonogenesis and syllable restructuring under differing amounts of contact
3.3 – Non-tonal prototypes

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3.3 – Non-tonal prototypes

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• Intermediate steps in Chamic survive as paradigms in related languages

• Contact languages (Mon-Khmer in this case) had contrastive phonation

• This phonation was close enough to L1 categories to shift prototypes: breathy voiced [t̜a] phonetically similar to Proto-Chamic /da/, etc.

• Phonation-based PME prototype possible

• Acquired phonation has predictable effect on frequency; reanalysis as tonal contrast is phonetically motivated, indistinguishable from internal developments.
4 – Other areal phonological knowledge
4.1 – Phonetic realization of phonological structure

- Imported phonetics can “latch on” to identical structure
- Scottish Gaelic (SG) has prominence (*) in underlying representation
- Contact with Nordic (Borgstrøm 1976, Iosad, to appear)
- Outer Hebrides SG surfaces * as linked *LH as Swedish/Norwegian pitch accent (Ladefoged et al. 1998)
- Argyllshire SG surfaces * as glottal element, like Danish *stød (Holmer 1938)
4.1 – Phonetic realization of phonological structure

Scottish Gaelic

Outer Hebrides
[pòó]

“underwater rock”
/po/

Argyllshire
[ˈpoʔo]

Scandinavian

Swedish
[bùúɖ]

“table”
bord

Danish
[ˈboʔə]

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synchronic phonology

correspondences in surface phonetics (potential contact?)
4.2 – Type of phonological rule

• (Pending more formal survey) types of phonological rules may be more common in geographic areas

• Moreton 2009 surveys languages that either have synchronic **consonant-tone interaction** (depressor consonants, phonotactics) or **tone-tone interaction** (sandhi, neutralization).

• May be the case that consonant-tone interactions are more common in Africa. (Tang 2008 for more comprehensive survey.) Tone-tone interaction widespread in Asia and fairly common in Africa.

• Unrelated but approximate languages also have similar rules: Wuming Zhuang (Tai-Kadai; Snyder & Tianqiao 1997) has a constraint against *LL, like Mandarin “third-tone sandhi” (*LL).
4.2 – Type of phonological rule

- Can ‘type of phonological rule’ diffuse?
- PME prototypes for features such as VOT may predispose languages to developing certain kinds of rules.
- Ex: true obstruent voicing more susceptible to act as “depressor consonant” with associated L tone
- Languages such as Sinitic languages that lost voiced consonants during tonogenesis would thus not be prone to develop depressor consonants
- Evolution of larger tonal inventories may encourage development of more sandhi rules; prototypes such as coda laryngeal features may provoke these larger inventories
5 - Conclusion
5.1 – Conclusion

• Tonogenesis occurs disproportionately under contact with tonal languages

• As lexical tone is primarily phonological knowledge, tonogenesis is difficult to account for under phonetically-based models of change under contact

• Differing distributions of tones in tonal vs. atonal languages lead to PME prototypes? Raises issues.

• Intermediate steps such as phonation are more suitable candidates for PME prototypes, but less easy to evidence historically.

• Generally, features that occur with greater than random chance in a geographic area may not necessarily spread directly, but could be the natural evolution of another areal feature.
5.2 – Further Research

• Syntactic features also occur in geographic areas with greater than random chance, e.g. morphology in the Balkan Sprachbund, or phi-features in South Asian languages (Macaulay, to appear).

• For this to be spreading, speakers must have actual knowledge of contact languages.

• While bilingualism is often hypothesized under contact (Blevins, to appear, Thurgood 1999), significant exposure without actual L2 acquisition should still trigger PME.

• Are phonological linguistic areas a superset of syntactic linguistic areas?
References


References


Thank you!