Phonological Evidence

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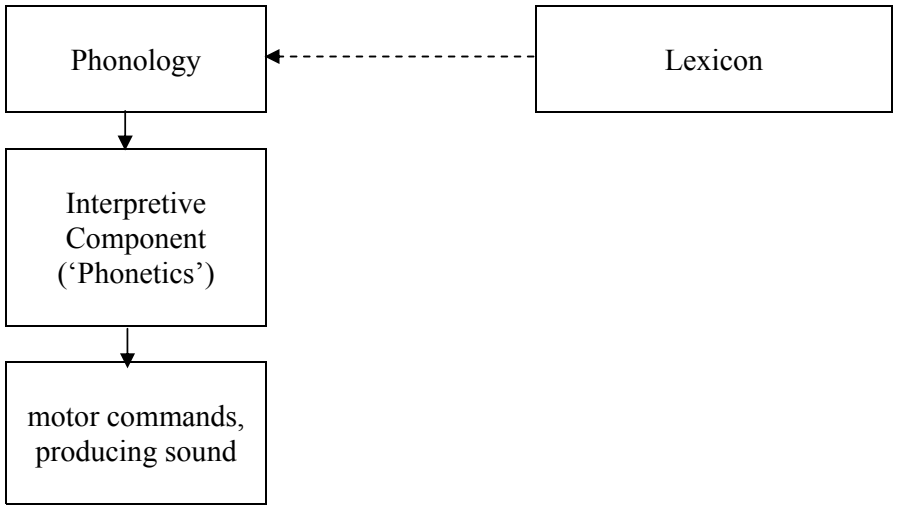
1. Aims

(1) *Why worry?*
(a) There is currently a Functionalist-Formalist split in phonology.
- The different approaches assume that different types of evidence are relevant.
- There is cross-contamination of assumptions about evidence.

(2) *What is 'evidence' for phonology?*
(a) Data that will allow the determination of phonological mechanisms.
(b) Defined by one's theory.

(3) *Theoretical assumptions: Standard Formalist conception of phonology*
(a) Competence-Performance distinction
- Principles governing language use are distinct from those governing form.
- Implicitly/explicitly rejected in a lot of recent work (e.g. Blevins 2004, Flemming 1995, etc.)

(a) *The Standard Model*



(4) *'Levels' of evidence*
(a) *Level 0: Ideal*
(i) Direct access to phonological inputs and outputs.
(ii) Currently not accessible due to technology limitations and limits on our understanding of the brain.
(b) *Level 1 (Best available)*
(i) Access to phonetic outputs.
(ii) No interference from other cognitive modules.
(iii) No language-external influences.
(c) *Level 2 (Cognitive interference)*
(i) Access to phonetic outputs.
(ii) Interference from other cognitive modules.
(iii) No language-external influences.
(d) *Level 3 (External/Performance Influence*)
(i) Access to phonetic outputs.
(ii) Language-external influences.

(5) *Aims for this talk*
(a) To identify the different levels of evidence.

(6) *Controversy?*
Many of the conclusions here disagree with standard practice in phonology.

2. Level 1 Evidence: Synchrony

(7) *Minimum influence on the Phonological output*
(a) Speech sound outputs of an individual speaker.
– i.e. only 'Two steps' away from the phonological output.
(b) If we assume that speech sounds are recoverable from the phonetic output, then we can assume that we are 'one step' away.

(8) *Subtypes*
(a) Alternations
(b) Phonotactics

2.1 Synchronic Alternations

(9) *Alternations*
(a) Morphologically related word forms whose corresponding segments differ in some way.
(b) e.g. German [taːk] 'day-nom.' ~ [taː.gə] 'day-gen.'

(10) *Uncontroversial*
(a) There is no controversy over whether synchronic alternations give insight into inputs, outputs, and the mechanisms that relate them.
(b) Why not?

(11) *Why are synchronic alternations valid?*
(a) Alternations allow an input→output mapping to be determined.
(b) No other component is responsible for the input→output mapping.
- no other component, for example, would alter an input /k/ and turn it into a [ʔ].

(12) *Standard Malay*
(a) /k/~[ʔ] in syllable codas

baiʔ 'good'	baiʔ.-lah 'all right'	kə-bai.k-an 'good+result'
du.dʊʔ 'sit'	du.duʔ.-kan 'to seat'	du.du.k-i 'sit+result'

(b) /p/→[p], /t/→[t]

[i.kat]	'to tie'	[a.tap]	'roof'
[sa.kat]	'parasitic plant'	[lə.tup]	'to explode'
[su.ŋut]	'grumble'		

(13) *Assumptions about Phonology*
(a) There are inputs (or at least morphological relatedness)
(b) Generative (i.e. not all allomorphs are lexically listed (suppletive)).
(c) Non-trivial phonology.

(14) *Uses of evidence*
(a) To determine output form.
(b) To determine input/lexical form.
(c) The relation between input/lexical form and output form.

(15) *Use of Malay*
(a) *Output restrictions*
Phonological mechanisms must be such that they permit outputs with coda [ʔ] and with onset [k].
(b) *Input/Lexical Form*
Assuming that [dudʊʔ] and [duduk-i] are related via an input, the input must have a single form from which both can derive.

(16) *Summary*
- Synchronic alternations provide evidence for admissible inputs, admissible outputs, and the mechanisms needed to map inputs to outputs.

2.2 Phonotactics

(17) *Phonotactics*
Properties that exist in the output but for which there is no morphologically related form that shows variation.

(18) *Example: Lhasa Tibetan codas (Denwood 1999)*
- The only nasal Lhasa Tibetan allows in codas is [m] (e.g. [p^{h}alam] 'diamond')
- No other nasals (e.g. [ŋ], [n]) appears in this position.

(19) *What do phonotactics tell us?*
(a) Output: phonology allows [m] in codas; doesn't allow [n] and [ŋ].
(b) Input: Assuming there are no chain-shifts: /m/→[m] in codas.

(20) *Absence of a structure in OT*
(a) Do phonotactics tell us anything about other input relations?
(b) Depends on the theory.
(c) Optimality Theory's principle of Richness of the Base requires asking what would happen to /n/ when it would end up in a coda (e.g. underling /an/).
(b) The lack of surface coda [n] only tells us that /n/ → *not* [n] in codas.
It does not provide any more specific information (cf. Rice 2004).
(c) There are a multitude of options:

n]$_\sigma$ → [d] (fortition, change of manner of articulation)
[˜] (nasalization of the preceding vowel)
[m] (change of PoA)
∅ (deletion)
[n̲i] (epenthesis)

(d) Some can be ruled out by other theoretical proposals (e.g. /n/→[m] is impossible in many theories of markedness – de Lacy 2002, 2006).
(e) Other options can be made more plausible by inspecting rankings for other input→output mappings.
For example, there are alternations that show that coda /ŋ/ becomes vowel nasalization: e.g. /l^{h}a-k^{h}aŋ/ → [l^{h}ak^{h}ã:] 'temple' (cf. [k^{h}aŋ-ba] 'house'). Therefore, it is possible that the same process applies to /n/ when it would surface in codas.

(21) *Summary*
(a) In all theories, phonotactics provides evidence about phonological restrictions on the output.
(b) In some theories, it does not provide direct evidence for input→output mappings.

(22) *Common violations of* (21b)
(a) Tagalog doesn't allow vowel-initial words.
(b) There are no alternations showing what happens to vowel-initial words.
(c) It is commonly assumed that in such cases, /#V…/ → [ʔ̲V] – i.e. there is epenthesis of [ʔ].
(d) At least in OT (but also in many other theories) such a claim is unwarranted. All we know is that /#V…/ → *not* [#V…]

- #V could delete, split into a glide+vowel, or some other consonant could be epenthesized.

(e) There may be other theory-internal reasons for choosing one option over another, of course.

2.3 Interpretation and Environmental Effects

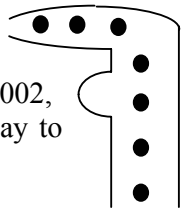
(23) *Phonetic Interpretation*
(a) Assume a non-straightforward phonetic component.
(b) The component converts phonological symbols into phonetic ones (e.g. a gradient representation of some sort).
(c) This rejects ideas that phonological symbols are the same as phonetic ones.

(24) *Two types of evidence for a phonological symbol/structure*
(a) The phonetic realization of a phonological symbol
(b) A phonological symbol's effect on other symbols.
• The point: (b) is crucial in many instances.

(25) *Interpretive Interference: How can phonological structure be obscured?*
(a) *Phonetic Neutralization:* Two different phonological symbols are phonetically realized in the same way (see below). (e.g. voiced and voiceless epiglottal plosives both realized as voiceless – Ladefoged & Maddieson 1996).
(b) *Phonetic non-realization:* A phonological symbol has no phonetic realization.
(c) *Phonetic epenthesis:* Part of the phonetic output has no phonological counterpart (e.g. interpolation in intonation, 'intrusive' segments).
(d) *Phonetic deletion:* A phonological symbol's phonetic realization is 'overwritten' by other segments (e.g. overlap).
(e) *Phonetic allophony:* A phonological symbol has different phonetic realizations, either in different languages, or in different environments in the same language (e.g. English [voice]; Kingston & Diehl 1994).
(f) *Phonetic transference*: A symbol is not realized where it is specified in the phonological string (for good phonetic reasons). (e.g. /ʔ/ in Pendau is realized as creaky voice on a preceding vowel; [voice] in English coda stops is realized as lengthening of the preceding vowel; tone is often realized after its phonological position).
(g) *Phonetic assimilation:* i.e. anticipatory/perseverative coarticulation.
→ Implication: Environmental evidence is often crucial.

(26) *No realization: Secondary stress in Cairene Arabic*
(a) Assuming that there is foot structure in Cairene is <u>crucial</u> in determining the placement of main stress.
(b) It is impossible to say that main stress falls on the antepenult or penult:
e.g. [ʔad.wi.ja.tú.hu] 'his grugs (nom.)', [ka.ta.bí.tu] 'she wrote it'
cf. [ká.ta.ba] 'he wrote', [ʔin.ká.sa.ra] 'it got broken'
(c) Main stress follows if we assume quantity-sensitive trochees from left to right: [(ʔàd).(wì.ja).(tú.hu)] 'his grugs (nom.)', [(kà.ta).(bí.tu)] 'she wrote it'
cf. [(ká.ta).ba] 'he wrote', [(ʔìn).(ká.sa).ra] 'it got broken'
(d) There is no phonetic evidence for the non-head feet: i.e. the heads of the non-head feet are not realized with higher F_0, amplitude, duration, etc.

(27) *Phonetic Neutralization: Glottal nasal stops (also see Walker & Pullum 1999)*
(a) Phonologically velar nasal stops and *glottal* nasal stops are realized in much the same way, for coincidental reasons.
(b) A velar nasal stop [ŋ] is realized with obstruction at the hard palate.
(c) In a glottal nasal stop [N], the [glottal] feature is interpreted as requiring an absence of consonantal constriction downstream from the sound source (de Lacy 2002, 2006§2.2.1.1; adapting Ohala & Lorentz 1977). The best way to implement this is to make an obstruction at the hard palate.



(d) So, glottal and velar nasals are 'phonetically neutralized': they are both produced in the same way.

(28) *Evidence for glottal nasals (and not velar nasals)*
(a) *Assimilation*
(i) In Yamphu, oral stops become [ʔ] before another glottal
(e.g. /mo-dok-ha/ → [modoʔha], /læːt-he-ma/ → [læːʔhema]);
Nasal stops become 'ŋ' before glottals: /pen-ʔi/ → [pe'ŋ'ʔi]. (Rutgers 1998)
(b) *Triggering*
(i) Gutturals (glottals, pharyngeals, uvulars) can force adjacent vowels to become RTR. In Miogliola, vowels must be RTR when followed by a tautosyllabic moraic glottal nasal 'ŋ' (Ghini 2001:ch.4). Velars don't affect adjacent vowels.
(c) *Parallelism in neutralization*
(i) Kagoshima Japanese neutralizes nasals to 'ŋ' in codas, but everything else to [ʔ] (Shigeto Kawahara, p.c.)
(ii) Yamphu neutralizes /t/ to [ʔ] in codas and /n/ to 'ŋ' (Rutgers 1998)
(iii) No language neutralizes nasals to 'ŋ' and oral stops to [k] (de Lacy 2002, 2006).
(d) *Distribution*
(i) No language bans coronals, labials, and dorsals from onsets but allows them in codas.
(ii) Many languages ban glottals in onsets, but allow them in codas (e.g. Chamicuro, Macushi Carib – Parker 1994).
(iii) Many languages ban 'ŋ' in onsets, but allows it in codas (e.g. Buriat – Poppe 1960).

(29) *The implication*
(a) Evidence for a phonological symbol must often be gleaned from its effects on its environment.
(b) Sole reliance on phonetic realization is not adequate.

3. Level 2 Evidence: Perceptual Interference

(30) *Are the following valid evidence for phonology?*
(a) Loanword adaptation: Māori [hipi] from English [ʃiːp]
(b) Diachronic change: Hawaiian [k] from Pre-Hawaiian [t]
(c) (Order of/Adaptations in) Language Acquisition: [bɪl] from adult [spɪl]
(d) L2 errors

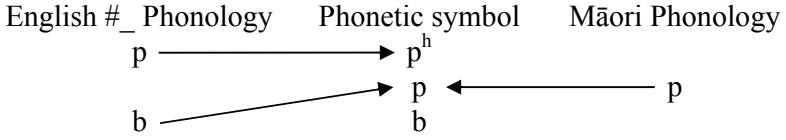
(31) Q: What do we have to assume to make them evidence?
A: 'Perfect' perception. Almost certainly telepathy.

(32) *Perceptual solution*
(a) The first step in word recognition is correct mapping to *phonetic* categories.

Sound
⇓ (a)
Phonetic decoding
⇓ (b)
Phonological decoding

(a) Segmentation; mapping of acoustic properties to phonetic symbols.
(b) Mapping of phonetic symbols to phonological ones.

(33) *Realization of [+voice]*



(34) Māori [pɪɾipɪɾi] 'sp. of plant' → English [bɪɾibɪɾi], *[pʰɪɾipʰɪɾi]

(35) Adult English [spɪl] → Gitanjali [bɪl] (Gnanadesikan 1995).
• [p] is voiceless unaspirated after [s]!

(36) *Sound→Phonetic decoding*
• Peperkamp & Dupoux (2003), Broselow (2005); also Yip (2002) and many others.
(a) Dupoux et al. (1999): Japanese speakers perceive a vowel between consonants even when there is none.
(b) A person's sound→phonetic decoding mechanism will insert/delete/alter segments depending on the language's phonetic restrictions.

3.1 Phonological loanword adaptation

(37) *The Bilingual Issue*
(a) Hypothesis: If a bilingual adapts a word from one of their languages into another, surely perception doesn't have anything to do with it.
(b) Problem with this assumption: This assumes that the same perceptual system (i.e. phonetics) is used for two different phonologies. This is demonstrably false: there are different perceptual systems for different languages within the same person.

(38) *Māori passive allomorphy (de Lacy 2003, refs cited therein)*

UR	alone	passive	gloss
/hopuk/	hopu	hopuk-ia	catch
/arum/	aru	arum-ia	follow
/mauɾ/	mau	mauɾ-ia	carry
/kohaɾak/	kohaɾa	kohaɾak-ia	split open
/tapuhi/	tapuhi	tapuhi-tia	split open
/koːɾeɾo/	koːɾeɾo	koːɾeɾo-tia	talk

(39) *Māori loanwords 1*
(a) English C# → Māori CV#
Eng. [saɪn] Māori [haina]
Eng. [siːl] Māori [hiːɾi]
Eng. [ʃɪp] Māori [hipi]
• Perceptual: Māori perceive a vowel at the end of the word.
• Phonological: Process of phonological epenthesis motivated by NOCODA.
(b) Prediction:
(i) Phonological: the final vowel should disappear:
i.e. /saɪn-ia/ → [hainia], *[haina-tia].
(ii) Perceptual: the final vowel should stay: i.e. /saɪna-ia/ →[haina-t̲ia]
(c) The Perceptual prediction is right.

(40) *Māori loans 2*
Eng C_1C_2# ~ Māori C_1# (specifically {nasal,obstr}stop)
Eng. [ˈiːdʒɪpt] ~ Māori [ˈiːhipa]
Eng. [ˈsɜːvənt] ~ Māori [ˈhaːwini]
Eng. [ˈtæks] ~ Māori [ˈtaːke]
• Perceptual account: Māori are 'perceptually deleting' the final C.
• Phonological account: Māori /C_1C_2#/ → [C_1V#].
(i) Phonological: *tax* is UR /tæks/, so passive: = *[taːkehia]
(ii) Perceptual: *tax* is UR /taːke/, so passive: = [taːketia]
[Ko to utu teːnaː i aːhei kia t̲aːket̲ia i muɾi iho i ŋa taŋohaŋa katoa"
"That is your taxable income after all deductions have been made.
(Ngata 1993)

(41) All loanwords add *–tia* in the passive (Hale 1968, Blevins 1994:41)

(42) *A phonological response*
- Suppose loan phonology is different from native phonology.
- Faithfulness to the base form beats faithfulness to the input:
  || OO-MAX, OO-DEP » IO-MAX, IO-DEP ||

(43) *The implication*
- Given current limited understanding of the influences of phonetic decoding and phonetic→phonological decoding, any claim about a loanword adaptation being phonological must be supported by alternations.

3.2 Diachronic Change and language acquisition

(44) *The issue*
(a) Is diachronic actuation phonological?
(b) In the Proto-Eastern Polynesian (PEP) change of *t to Hawaiian [k], was there ever a speaker in which /t/→[k]?
(c) *Assumptions*:
  (i) Perfect perception.
  (ii) The sound→phonetic or phonetic→phonological decoding is never altered. The only thing that can be altered is the phonological system.

(45) *Suppose that all diachronic actuation is phonological*
(a) Then children must *perceive* perfectly.
(b) Then it is inexplicable why there are some diachronic changes with no synchronic counterpart:
  (i) *t→k is found in Hawaiian, Luangiua, Fort Chipewyan Chipewyan, and several Oceanic languages (Lynch et al. 2002:ch.4). Also in codas in the change from Middle Chinese to Classical Fuzhou (Chen 1973).
  (ii) There is *no* synchronic neutralization process whereby /t/ surfaces as [k]; no language has alternations like [ak] and [ak.-mi] vs [a.t-i].

(46) *Perceptual issues*
(a) If diachronic actuation can be an alteration in phonetic decoding, then diachronic *t → k makes sense.
(b) [k] and [t] are acoustically confusable (see Blevins 2004 and references cited therein for discussion).

(47) *Summary*

(a) The hearer can alter speech sound 'pre-phonology' by perceptual mechanisms that map sound to phonetics to phonology.

(b) Therefore, any speech sound phenomena where perception plays an essential role cannot be assumed to be due to phonological mechanisms.

(c) Until there is a fully developed theory of the role of perception mechanisms in these phenomena, it is necessary to err on the side of caution.

- The gold standard is clearly synchronic alternations.
- At the very least, if a loan adaptation, diachronic change, or child language property has no synchronic counterpart, the possibility for a phonology-external motivation must be shown to be incorrect before appealing to phonological mechanisms.

(e) Claims based on loanwords, diachronic change, and language acquisition alone is therefore extremely suspect.

(48) *Other cognitive influences*

(a) Other cognitive modules could affect the phonological and phonetic output.

(b) Paralinguistic module: alterations to the phonetic output to signal things such as emotion (anger, joy, boredom, etc.). (e.g. change in pitch range – see Ladd 1996§1.4 for discussion).

(c) (Perhaps) an advanced symbol manipulation module: to account for the kind of effects seen in language games (with no counterparts in standard morphology) – e.g. reversing the segments in a word.

4. Level 3 evidence: Frequencies

(49) *The worst sort of evidence*

Sound-related phenomena that are affected by external considerations.

(50) *Inventory frequency*

- The number of languages in which a certain structure is permitted.

(a) Almost all languages have a [t] (but not the ones noted above where *t→k)

(b) If a language has a voiced stop, it is least likely to be [g].

(51) *Competence-Performance distinction*

(a) Frequency generalizations are about how people use language.

(b) Specifically, does [g]-avoidance tell us anything about phonological constraints?

(52) *Voiced stop inventories*

g	b	d	*Languages*
✓	✓	✓	Nhanda (Blevins 2001), Catalan (Wheeler 2005a)
✓	✓		Tigak (Beaumont 1979)
✓		✓	Wapishana (Tracy 1972), Ayutla Mixtec (Pankratz & Pike 1967)
	✓	✓	Sioux Valley (Santee) (Shaw 1980:17), Xavanté Macro-Je (Rodrigues 1999a)
✓			Makurap (Rodrigues 1999b:112ff)
	✓		Koasati (Kimball 1991)
		✓	Diyari (Austin 1981), Nambiquara (Kroeker 1972)

- Every voiced stop inventory exists.
- Therefore, there must be states of phonology which can produce each outcome. (i.e. synchronic phonotactic evidence).

(53) *What could account for avoidance of [g]?*

(a) Diachronic change and perceptual confusability of [g] (cf. [b]), production difficulty (Ferguson 1975, Ohala 1983).
(b) External factors. War. Pestilence. Plague. Migration.

(54) *Vowel systems*

(a) It is now common to appeal to phonological principles to account for the high frequency of 'dispersed' vowel systems like [i a u].
(b) cf. Alabama [e o a], Wosera [a ə ɨ].

(55) *<u>Could</u> phonology have anything to do with it?*

(a) To put the issue another way, what would it mean for phonology to explain why [g] is infrequent?

(b) A suggestion set within OT (e.g. Coetzee 2002)
If *n*% of ranking permutations permit structure S on the surface, then we should expect to see S in *n%* of languages.

(56) *Questioning assumptions*

(a) This proposal makes highly questionable assumptions.
  (i) Each ranking is equally functionally plausible.
  (ii) There are enough languages to give all rankings/an even spread of rankings.
  (iii) Learning imposes no bias towards certain rankings.
  (iv) Diachronic change is random.

(b) (aii) is implausible. All theories of phonology predict at least tens of thousands of possible phonological systems. There are only ~6000 (?) currently on Earth. Therefore, we have a tiny sample of all possible rankings, and they're not necessarily evenly spread.
(c) (ai) is certainly wrong. No language has just one consonant and one vowel, no doubt because this is highly unstable, for purely functional reasons. No language has all possible contrasts for the same reason. No language makes use of all possible syllable weight distinctions (i.e. using structure, sonority, and tone distinctions) – probably because such a system is intolerably complex to learn (requires too much data).

(d) (aiii) is wrong given current assumptions. If M » F (as in Tesar & Smolensky 1996), then there is a bias towards maintaining an M » F ranking. F » M rankings require positive evidence.
(e) (aiv) is certainly wrong. Diachronic change is inherently limited by intelligibility: no change can render the children's language unintelligible from the parent's. Consequently, language change is conservative, and therefore restricted.

(57) *Expectations: frequency-Competence mismatches*
• If frequency is to be explained by factors *other* than phonology, if those factors apply different pressures than phonological ones, we would expect to see mismatches between what frequency favours and what phonology favours.
(a) [p] is more frequent than [ʔ] (375 vs. 216 languages in $UPSID_{451}$).
(i) However, while there are synchronic alternations where /p/→[ʔ], there are none in which /ʔ/→[p].
(b) There are very few or even no languages that demand onsets for all syllables (usually the word- or Prosodic Word-initial syllable is allowed to be onsetless) (Blevins 1995, 2004).
→ However, there are many rankings which would produce such a situation (i.e. all rankings in which ONSET outranks some faithfulness constraint). (i.e. phonology is not responsible for frequency).
→ There is *no* synchronic alternation which makes initial syllables onsetless.
→ There *are* synchronic alternations which force initial syllables to have onsets.
→ Phonology favours having onsets over not having them in *all positions*. However, languages that ban initial onsetless syllables are rare.

(58) *Summary*
(a) Typological frequency is *not* something that phonology must necessarily explain.
(b) It is possible that phonology has *no* effect on frequency.
(c) Frequency is something for a theory of performance to account for.
(d) The same comments apply to lexical frequency, text frequency, etc.

(59) *0% and 100% frequency*
(a) Suppose we found that every language with a [g] without also having a [d].
(b) Then we may have good reason for positing a phonological universal
(e.g. *g »» *d and FAITH[d] »» FAITH[g]).

(60) *Functional desirability, formal avoidance*

But how do we tell real phonological conditions from ones that are caused by external factors?

(a) There are many diachronic changes of *t→k, but no synchronic neutralizations of /t/→[k]. The lack of /t/→[k] cannot be explained by appealing to its functional undesirability.

(b) *Lack of k-epenthesis*

(i) Proto-Eastern Polynesian had an epenthetic [t].

(ii) PEP [t] became modern Hawaiian [k].

(iii) Therefore, it is possible that the Hawaiian epenthetic should be [k].

(iv) However, the modern Hawaiian epenthetic consonant is [ʔ].

- Moreover, there are two other Polynesian languages in which *t→k. In *both* those languages the epenthetic segment is [ʔ], not [k].
- i.e. epenthetic [k] is both possible and sensible from a diachronic point of view, but never occurs. This indicates that there should be phonological mechanisms that ban epenthetic [k].

5. Conclusions

(61) *Non-innatist, functionalist*

(a) Suppose phonological mechanisms/symbols directly reflect functional pressures (e.g. perceptibility, ease of articulation).

(b) These same pressures are relevant in loanword adaptation, diachronic change, language acquisition, typological/text/lexical frequency, etc. etc.

(c) Therefore, loanword adaptation, diachronic change, etc. should act in the same way as phonological mechanisms.

[(d) Assumes that all functional pressures seen in loanword adaptation etc. can influence the structure of the phonological component.]

(62) *Why be innatist & formalist?*

(a) Functional grounding is at the species-level, and allows for arbitrariness. (e.g. Chomsky & Lasnik 1977)

(b) Consequence: allows *mismatches* between Performance-governed and Competence-governed phenomena.

e.g. diachronic *t→k, but no synchronic /t/→[k].

[t] is more common than [ʔ], but synchronic /t/ often becomes [ʔ].

(63) *Evidence*

- Synchronic alternations:

  evidence for outputs, inputs, and the mechanisms that relate the two.
- Synchronic phonotactics:

  evidence for restrictions on outputs.

→ Dangers: Phonetic Interpretive interference

(64) *Potential evidence, but shouldn't be assumed to be evidence*
- Loanword adaptation
- Diachronic change
- Language acquisition

→ may be due to phonological restrictions, but the effects of phonetic and phonological decoding must be eliminated

(65) *Highly unlikely to be evidence*
- Inventory/text/lexical/environmental frequency effects.

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Appendix: Case Studies

(66) ***Some of*** *Hume's (2003) diagnostics for labial unmarkedness*

(a) Labials are acoustically less salient than other PoAs in English

(b) Labials are almost as typologically frequent as coronals

(c) The labial [m] is more frequent in Sri Lankan Portuguese Creole words than [n]

(d) The labial [m] can appear in more environments in SLP Creole than [n]
Labial stops are acquired before other segments in language acquisition

(e) Labials can be the sole segment in a language's coda

(67) *Validity*

(a) assumes a functionalist theory in which acoustic salience directly shapes phonological form.

(b) is about typological frequency

(c) is about text frequency

(d) is also about frequency

(e) is about language acquisition: about production capabilities.

(f) is about synchronic phonotactics. It tells us that in codas /n/→not [n] and /ŋ/→not [ŋ], but nothing else.

(68) Excerpt from Blevins (2004:9-10)

i. SEGMENT INVENTORIES

a. If a language has only three vowels, it will usually have /i, u, a/

b. All languages have voiced sonorants and voiceless obstruents in their segment inventories.

c. In the series of voiced stops /b d ɡ/, /g/ is most likely to be missing.

d. No language contrasts voiceless laryngealized obstruents with their voiceless ejective counterparts.

…

ii. PHONOTACTICS

h. In nearly all languages, each consonant in a syllable-internal obstruent cluster must agree in laryngeal features.

i. In many languages, each consonant in an obstruent cluster must agree in laryngeal features.

j. In many languages, there is no possible laryngeal contrast for obstruents in pre-obstruent position.

k. In languages where there is no possible laryngeal contrast for obstruents in pre-obstruent position, laryngeal contrasts are neutralized in this position in derived environments.

(69) (a) i-a, i-c, ii-h, ii-i, ii-j are about frequency.

(b) i-b, i-d, i-k are universals (i.e. 100% generalization). They potentially requires phonological explanation.

- Is list (68) what phonology is interested in?
  - → A Competence theory = no.
  - → A functionalist non-innatist theory = yes.

(70) *Relevant phenomena for a Competence theory*

(a) No language has epenthetic dorsals or labials (excepting [w]).

(b) No language neutralizes Place of Articulation to labial or dorsal.

(c) If coronals trigger PoA assimilation, so do labials and dorsals.

(d) If foot heads are attracted to a vowel V_1, then they are equally or more attracted to V_2, where V_2 is more sonorous than V_1.

(e) If a language does not have a [t], it has a [ʔ]; if a language does not have a [ʔ], it has a [t].

- See de Lacy (2002, 2006) and references cited therein.