Other evidence

Phonotactic theory (EGG 2025, Zagreb)

1 Historical developments

Let us briefly consider the hypothesis that (surface-true) phonotactic constraints can arrest sound change.

1.1 Common Slavic

- In Common Slavic (CS), the so-called *open syllable conspiracy* (Hock 1991:161f.) resulted in the historical loss of codas.
- The following sound changes are implicated in the conspiracy (Crist 2001:150):
  - Deletion of word-final nasals after short vowels
  - Deletion of word-final **t, *d*
  - Internal consonant cluster simplification
  - Loss of final **s, *x*
  - Monophthongization of diphthongs ending in **j, *w*
  - Elimination of nasal codas
  - Elimination of *tl, *dl[1]
  - Elimination of liquid codas
  - Metathesis of *ORC
  - Metathesis or pleophony in *IC*e*RC, *C*o*RC
  - Development of syllabic sonorants in *C*ĭ*RC, *C*ŭ*RC
- As a result, late CS appears to have no codas at all.
- More or less immediately afterwards, *Havlík's law* reintroduced closed syllables, as in CS *dьnь > Russian *день* 'day'.

(1) Havlík's law:

*ĭ, *ŭ $>$ $\emptyset$ / $\_\_$ C_0 V where V $\notin$ {ĭ, *ŭ}

[1]This change did not occur in West Slavic, however.

1.2 KL > TL in Germanic

- Most Germanic languages lack branching onsets consisting of a coronal stop followed by a lateral. Thus /pl, bl, kl, gl/ are present in most Germanic languages, but not /tl, dl/.

(2) $*\#\begin{bmatrix}+\textsc{Coronal}\\-\textsc{Continuant}\end{bmatrix}[+\textsc{Lateral}]$

- Blevins and Grawunder (2009) report that dialects of German spoken in Saxony and points south underwent KL > TL (e.g., /kl/ > /tl/, /gl/ > /dl/), and similar sporadic changes occurred elsewhere in the history of Germanic.

1.3 *V̄ʃ# in English

- Modern English /ʃ/ is largely a reflex of Old English (OE) /sk/.

(3) sk > ʃ

- Words in *sk* are largely borrowings from Dutch (e.g., *skipper*) or Norse (e.g., *sky*).
- OE long vowels—the ancestors of the Modern English tense vowels—are not found before coda clusters.

(4) *V̄CC#

- The sound change (3) and the phonotactic generalization (4) would seem to conspire against tense vowels followed by word-final /ʃ/.

(5) *V̄ʃ#

- Indeed, exceptions to (5) are quite rare in Modern English (Iverson and Salmons 2005, henceforth I&S) and this generalization is statistically robust (Gorman 2014b:85).
- Some exceptions to (5) do exist, but according to I&S they tend to
  - be markedly foreign, (e.g., *cartouche*),
  - be proper names (e.g., *LaRouche*), or
  - convey an "affective, onomatopoeic quality" (e.g., *sheesh*, *woosh*).
- Yet I&S claim (5) has slowly but systematically eroded since c. 1100 CE.
- Furthermore, Hayes and White (2013) find that this constraint has no impact on English speakers' wordlikeness judgments.

1.4 Latin *VsV

- Intervocalic *s* merged with *r* in Old Latin.[2]

  (6) s > r / V __ V

- This change was regular (i.e. *Neogrammarian* in the sense of Labov 1981), and temporarily eliminated all traces of intervocalic *s* in late Old Latin.

  (7) *VsV

- This change also introduced substantial inflectional allomorphy across the lexicon, for instance in 3rd declension nouns.

  (8) Paradigm of *honōs-honōris* 'honor':

	sg.	pl.
nom.	honō**s**	honō**r**ēs
gen.	honō**r**is	honō**r**um
dat.	honō**r**ī	honō**r**ibus
acc.	honō**r**em	honō**r**ēs
abl.	honō**r**e	honō**r**ibus
voc.	honō**s**	honō**r**ēs

- Thus most analysts (e.g., Albright 2005, Foley 1965, Gruber 2006, Heslin 1987, Kenstowicz 1996, Watkins 1970) posit a synchronic analogue of (6) for early Classical Latin.

  (9) Rhotacism: [+Coronal] → {−Strident} / [+Vocalic] __ [+Vocalic]

- However, subsequent changes suggest that Rhotacism was not "projected" to (7).

- In the 1st c. BCE, degemination of *ss* after diphthongs and long monophthongs reintroduced intervocalic *s* (e.g., *caussa* > *causa* 'cause').

- This subsequent change led in part to the morphologization (e.g., Roberts 2012) or restructuring (e.g., Gorman 2014a, 2020) of (9).

- At roughly the same time as the actuation of degemination, Classical Latin borrowed a number of Greek words with intervocalic *s*.[3]

  (10) ambrosia 'food of the gods', *asōtus 'libertine' (acc.sg. asōtum), basis 'pedestal', basilica 'public hall', casia 'cinnamon' (cf. cassia), cerasus 'cherry', gausapa 'woolen cloth', lasanum 'cooking utensil', nausea 'id.', pausa 'pause', philosophus 'philosopher', poēsis 'poetry', sarīsa 'lance', seselis 'seseli'

- Intervocalic *s* are also found in Germanic and Celtic loanwords (Gorman 2014a:282).

- In summary, (7) failed to prevent degemination or to impose itself on later loanwords.

[2] The *terminus post quem*—the latest possible date—for the actuation is the 4th c. BCE; see Gorman 2020.

[3] Many Greek borrowings into Latin exhibit Greek-like inflectional endings, but with the possible exception of the very early borrowing *tūs-tūris* 'incense' (Thiselton-Dyer 1911), even Greek borrowings that adapt Latin inflectional affixes preserve intervocalic *s*.

1.5 Estonian

- Caplan and Kodner (2018) consider how children might determine whether a language has vowel harmony, and propose a surface-oriented algorithm.
- Evaluating their model on a number of languages, they find that it incorrectly predicts that Estonian has vowel harmony.

(11) Estonian and Finnish declension:

	Estonian			Finnish		
	nom.	ess.		nom.	ess.	
a.	vesi	vee-n**a**	‘water’	vesi	vete-n**ä**	‘water’
	nimi	nime-n**a**	‘name’	nimi	nime-n**ä**	‘name’
b.	töö	töö-n**a**	‘work’	työ	työ-n**ä**	‘work’
	külg	külg-en**a**	‘side’	kylki	kylke-n**ä**	‘side’
c.	kool	kool-in**a**	‘school’	koulu	koulu-n**a**	‘school’
	talu	talu-n**a**	‘farm’	talo	talo-n**a**	‘house’

- Estonian stems tend to conform to the inherited Finnic vowel harmony pattern, but it lost vowel harmony alternations some time in the distant past.

2 Loanword adaptation

- Loanwords are often made to conform to phonotactic generalizations of the recipient language. For instance, in Desano a process of nasal harmony (Kaye 1971) ensures that every word—whether native or foreign—is either totally oral or totally nasal.

(12) Desano loanwords (Kaye 1971):

a. [barateru] ‘hammer’ (< Port. *martelo*)
b. [nãnãnã] ‘orange’ (< Span. *naranja*)

- Kaye argues that this reflects a productive process of nasal harmony.
- However, there are other cases where the adaptations do not seem to derive from any phonological process in recipient language.
- For example, Wikchamni Yokuts lacks complex onsets and has no way to derive one. Yet, it adapts Spanish loanwords either via anaptyxis or deletion of the first consonant.[4]

(13) Wikchamni Yokuts adaptations (Gamble 1989):

a. cruz > [kh**u**luʃ] ‘cross’
   frijoles > [p**i**lhoːliʃ] ‘beans’
b. **p**lato > [laːto] ‘plate’
   clavo > [laːwu] ‘nail’

[4]To be fair, Gamble observes there is no reason to believe that the adaptations actually occurred within Yokuts given the limited contact between the Yokuts peoples and the Spanish colonists.

- Peperkamp (2005) highlights several other cases where native phonological alternations are distinct from those used in loanword adaptation.
- For example, Korean /s/ is realized as [t] in codas, as in [nat]–[nasɨl] 'sickle (nom.–acc.)'. In loanwords, however, final [s] becomes an onset via epenthesis, as in *boss* > [posɨ].
- Peperkamp thus claims loanword adaptation is driven by non-veridical speech perception, not by the phonology–phonotactics of the recipient language.
- Daland et al. (2019) conduct a series of speech perception experiments with Korean speakers suggesting that, *pace* Peperkamp, illicit word-final consonants in Korean do not necessarily give rise to the perceptual illusion of a final epenthetic vowel.

References

Albright, Adam. 2005. The morphological basis of paradigm leveling. In *Paradigms in Phonological Theory*, ed. Laura J. Downing, Tracy A. Hall, and Renate Raffelsiefen, 17–43. Oxford University Press.

Blevins, Juliette, and Sven Grawunder. 2009. *KL > TL sound change in Germanic and elsewhere: Descriptions, explanations, and implications. *Linguistic Typology* 13:267–303.

Caplan, Spencer, and Jordan Kodner. 2018. The acquisition of vowel harmony from simple statistics. In *Proceedings of the Annual Meeting of the Cognitive Science Society*, 1440–1445.

Crist, Sean Jacob. 2001. Conspiracy in historical phonology. Doctoral dissertation, University of Pennsylvania.

Daland, Robert, Mira Oh, and Lisa Davidson. 2019. On the relation between speech perception and loanword adaptation: Cross-linguistic perception of Korean-illicit word-median clusters. *Natural Language & Linguistic Theory* 37:825–868.

Foley, James. 1965. Prothesis in the Latin verb *sum*. *Language* 41:59–64.

Gamble, Geoffrey. 1989. Spanish loans in Wikchamni. In *General and Amerindian ethnolinguistics: In remembrance of Stanley Newman*, ed. Mary R. Key and Henry M. Hoenigswald, 123–128. Mouton de Gruyter.

Gorman, Kyle. 2014a. Exceptions to rhotacism. In *Proceedings of the 48th annual meeting of the Chicago Linguistic Society*, 279–293.

Gorman, Kyle. 2014b. A program for phonotactic theory. In *Proceedings of the 47th annual meeting of the Chicago Linguistic Society: the Main Session*, 79–93.

Gorman, Kyle. 2020. Anatomy of an analogy. Talk presented at Stony Brook University.

Gruber, James F. 2006. The prosodic domain of roots: Output oriented faithfulness in Classical Latin. *Georgetown University Working Papers in Theoretical Linguistics* 6:127–165.

Hayes, Bruce, and James White. 2013. Phonological naturalness and phonotactic learning. *Linguistic Inquiry* 44:45–75.

Heslin, Thomas P., Jr. 1987. Prefixation in Latin. *Lingua* 72:133–154.

Hock, Hans Heinrich. 1991. *Principles of Historical Linguistics*. Mouton de Gruyter.

Iverson, Gregory K., and Joseph C. Salmons. 2005. Filling the gap: English tense vowel plus final /š/. *Journal of English Linguistics* 33:1–15.

Kaye, Jonathan. 1971. Nasal harmony in Desano. *Linguistic Inquiry* 2:37–56.

Kenstowicz, Michael. 1996. Base identity and uniform exponence: Alternatives to cyclicity. In *Current Trends in Phonology: Models and Methods*, ed. Jacques Durand and Bernard Laks, 355–385. European Studies Research Institute.

Labov, William. 1981. Resolving the Neogrammarian controversy. *Language* 57:267–308.

Peperkamp, Sharon. 2005. A psycholinguistic theory of loanword adaptation. In *Proceedings of the 30th Meeting of the Berkeley Linguistics Society*, 341–352.

Roberts, Philip J. 2012. Latin rhotacism: A case study in the life cycle of phonological processes. *Transactions of the Philological Society* 110:80–93.

Thiselton-Dyer, William T. 1911. Origin of incense. *Nature* 85:507–507.

Watkins, Calvert. 1970. A case of non-chronological rule insertion. *Linguistic Inquiry* 1:525–527.