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ABSTRACTS BOOKLET

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TALKS

PHONEMIC DISPERSION DECREASES OVER TIME BECAUSE OF SOUND CHANGE

Andrea Ceolin (University of Pennsylvania)

Introduction. Languages contain phonemes which are very frequent and phonemes which are uncommon (Tambovtsev and Martindale 2007). This extends to phonemic sequences: some of them are more productive than others in the lexicon. One explanation is that these patterns result from a functional pressure towards ease of production and learnability, but another possibility is that these patterns result from diachronic change (Dautriche et al. 2017). We develop a null model of sound change, to study the emergence of sound patterns in the vocabulary, and we show that regular sound change can indeed reduce phonemic dispersion in the lexicon over time and favor the development of phonemically similar words.

Model. We use an artificial lexicon of 20 CVC words, with an alphabet of 10 possible vowels and 18 possible consonants. We apply four functions to the lexicon: i) mergers, ii) splits, iii) contractions and iv) resolutions. These functions operate on the strings by: i) merging two symbols into one, ii) creating a new symbol in a specific environment from an existing symbol, iii) creating a new symbol from a combination of two symbols, and iv) removing a symbol by substituting it with a combination of two existing symbols. The functions simulate the most common types of sound change. The frequencies through which these functions are applied is estimated through a collection of sound changes from historical families. After a function is run on the lexicon, we compare the starting and the output lexicon through measures of dispersion like number of minimal pairs and average edit distance.

Results. We ran 10 parallel simulations in which the functions are called for 200 times, and in Table 1 we track the change of minimal pairs over time. The number of minimal pairs is always increasing, apart from when homophones are created, and in this case we see a drastic drop. This is surprising, because functions which have the effect of increasing dispersion are well represented in the model. Inspecting the intermediate states of the lexicon, we see that the reason why minimal pairs increase is due to the fact that mergers are *irreversible*. In the example in Table2, once the two nuclei merge and create minimal pairs where the contrast is either in the coda or in the onset, it is impossible by means of a regular sound change to eliminate both of them in a single step. The opposite is not true: for every case of split, it is possible to revert back through a merger. Similarly, while it is possible to create homonymy through a sound change, it is not possible to revert back once the merger goes to completion.

Conclusion. Our model shows that phonemic dispersion decreases over time because of the irreversibility of mergers. This result shows that we do not need to motivate lexical clumpiness in natural language vocabularies with reference to communication efficiency and functional pressures, but it can be derived from a simple model of sound change.



(A)	>	(B)
sad		sad
set		\mathbf{sat}
far		\mathbf{far}
her		har
(A)	~	(B)

Table 2: Mergers are irreversible.

Table 1: Minimal pairs after 200 iterations in 10 runs.

The lowering of high vowels before [r] in Latin

András Cser (Pázmány Péter Catholic University)

Every comprehensive – and many partial – discussions of the historical phonology of Latin mention a change (or a pair of changes) that turn(s) the short high vowels [i] and [u] into [e] and [o], respectively (Sommer 1914: 63, Leumann 1977: 50–51, Parker 1988, Meiser 1998: 68, Baldi 2002: 246, de Vaan 2008: 557, Weiss 2009: 142, Sen 2015: 82 to name a few). Examples usually include forms such as those in (1):

PIE *si-sō > L serō 'sow'
 PIE *bhu- > L forem 'I would be'

The details of the change, however, are highly controversial and no consensus has been reached on several points. The paper critically presents the arguments that have been proposed so far regarding the following questions in the literature above:

- Is the change affecting [i] and [u] parallel?
- Does the change treat original [r] and [r] resulting from [s] through rhotacism differently?
- Is the position of the syllable (initial vs. non-initial) relevant to the change?
- Is syllable structure (open vs. closed) relevant to the change?
- How did the change interact with medial weakening?
- What is the relative chronology of high vowel lowering and other pertinent changes?
- Are principled explanations available for the high number of counterexamples?

It is argued that the data clearly show the change affecting [i] as restricted to non-initial syllables (as indeed suggested by Sommer 1914 and Meiser 1998); and whereas the fate of [u] is practically impossible to disentangle in a principled manner, the absence of [ir] sequences in non-initial syllables developed into a pervasive pattern that has important consequences for the morphophonological system of the language. While it is not necessarily the case that the lowering of [i] before [r] continued as an active phonological rule in Classical Latin, its consequences are present in a very strong pattern-based generalisation. It is possible to demonstrate that the fundamental principles of allomorphy that operate in the verbal system can be reduced to an independently motivated, very simple and general phonotactic regularity if we recognise the pattern whose genesis can be traced back to the lowering rule.

Final devoicing before it happens

Adèle Jatteau, Ioana Vasilescu, Lori Lamel, Martine Adda-Decker & Nicolas Audibert

(University of Lille, LIMSI & Sorbonne Nouvelle)

In order to understand precisely how sound change develops, we need to know where it starts from. The goal of this paper is to investigate the potential phonetic precursors of Final Devoicing (the word-final neutralisation of the [voice] contrast, e.g. Russ. *Youtu*[p]) by studying it in a language which (still) contrasts [voice] word-finally: French. Two research questions are under scrutiny. First, FD is at first sight a transparent sound change, well grounded in articulation and perception [Ohala 1983, Keating et al. 1983, Westbury & Keating 1986, Blevins 2006, Myers 2012]. Nevertheless, the phonetic precursors found in the literature (in column 1 below) do not exactly match the recurrent properties of the phonologised process (in column 2). Are the phonetic predictions in (1) actually implemented in the `pool of variation' [Ohala 1989] from which FD may arise as a sound change?

	(1) Phonetic predictions	(2) Phonologised FD
a.	voicing is difficult to maintain at the end of the <i>utterance</i>	FD is typically <i>word</i> -final
b.	voicing is more difficult to articulate or perceive on fricatives than stops	all obstruents devoice (5 exceptions; no preference for stops or fricatives)
c.	the shorter the vocal tract, the more difficult voicing is to maintain: back obstruents devoice more easily	all places of articulation (POA) undergo devoicing

Second, several studies have shown that in many languages, FD is acoustically incomplete: some phonetic cues to the [voice] contrast, such as preceding vowel duration, remain distinct in word-final position [Dmitrieva et al. 2008, i.a.]. Are the different cues of [voice] already differently affected in the variation?

Methodology. To address these questions, we examine the acoustic properties of word-final obstruents in French. French has 6 voiced obstruents: /b, d, g, v, z, ʒ/, which contrast for [voice] word-finally (ex. *cache* [kaʃ] `hides' vs. *cage* [kaʒ] `cage'). A variable tendency towards FD has been previously reported in a number of regional varieties, especially in contact with German and Flemish, in small-scale elicitation studies [Pooley 1994, Temple 1999]. In order to get an insight into variation in Standard French, we investigate two large corpora: ESTER [Galliano et al. 2005] (radio-TV broadcast news, 90 hours), and NCCFr [Torreira et al. 2010] (spontaneous conversation, 36 hours). These manually transcribed corpora were automatically segmented into words and phones using our lab's speech recognition system [anonymised]. Three acoustic parameters of the [voice] contrast are measured in word-final obstruents: the proportion of voicing in the obstruent (through F0 detection in Praat), the duration of the obstruent, and the duration of the preceding vowel. The results are distributed in 5 categories depending on the following context (cf. 3 below). The effect of speech style, manner (stops vs. fricatives), and POA are reported.

Results. Only the results for F0 are available so far. They confirm the phonetic predictions in (1a, b, c): as shown in (3), there is evidence for pre-pausal devoicing in French. Interestingly, no effect of speech style emerges. We

(3)	Foll. context	example	Result
	voiceless obst.	arri <u>v</u> e <u>t</u> ôt	devoicing: assimilation
	voiced obst.	arri <u>v</u> e <u>b</u> ien	marginal variation
	sonorant	arri <u>v</u> e <u>l</u> oin	marginal variation
	vowel	arri <u>v</u> e <u>a</u> vant	marginal variation
	pause	arri <u>v</u> e ##	devoicing: potential
			FD precursor

expect the upcoming results (on preceding vowel duration and obstruent duration) to shed light on the exact implementation of [voice]: are the different phonetic cues to the [voice] contrast differently affected in final position, as they are in many cases of phonologised FD?

OSL and Apocope Overlapped in German Dialects: Evidence from Tonal Accent

Björn Köhnlein (Ohio State University)

The issue. Understanding interactions of conflicting sound changes is a long-term issue in historical linguistics (e.g. Chen & Hsieh 1971). This presentation discusses the influence of two sound changes (Open Syllable Lengthening (OSL) and apocope)) on a third change, viz. the development of a contrast between two tonal accents in Franconian (Continental West Germanic). The talk has two goals, i. It aims to resolve a long-term debate on the genesis and typology of the tone-accent opposition. ii. In doing so, it also reevaluates the chronology of two 'classic' West Germanic sound changes: I argue that (at least) in Franconian, OSL and apocope must have overlapped. This claim challenges received knowledge, as it is generally assumed that OSL predates apocope (e.g. Paul 1880). The talk thus contributes not only to diachronic prosodic typology, but also to our general understanding of the history of (Germanic) vowel systems. Background. Franconian tonal accent is typically realized as a contour tone for Accent 1 (e.g. [dau^{HL}f¹] 'pigeon') and a level tone for Accent 2 (e.g. [dau^Hf²] 'baptism'). Beginning with Nörrenberg (1884), origin and typology of the opposition have been studied extensively, without reaching consensus. A critical issues concerns variation in the lexical distribution across dialect areas (so-called *Rule A*, *Rule A1*, *Rule A2*). This regards originally long non-high vowels (here: 'â'), long high vowels ('î'), and all lengthened vowels ('V:') before intervocalic voiced consonants ('D', a context that tends to favor Accent 1), and their interaction with apocope. (1) shows that apocopated words (' ϕ ') with D always receive Accent 1; yet there is a decreasing likelihood that non-apocopated ('ə') words with D get Accent 1 (Rule A: â, î, V:; Rule A1: â, î; Rule A2: â). This leads to an apparent paradox: If OSL had predated apocope, lengthened and long vowels should behave alike (roughly $i = \hat{i}$, $a = \hat{a}$); if apocope had predated OSL, vowels in apocopated words should be short, as a closed syllable should not trigger OSL.

(1) Distributional variation in three Franconian dialect areas (Accent 2 grey-shade	haded	grey-sl	(Accent 2	areas	dialect	Franconian	three	riation in) Distributional	(1)
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Rule A		Rule	e Al	Rule A2	
â¹Də	â¹Dø	â¹Də	â¹Dø	â¹Də	â¹Dø
î¹Də	î¹Dø	î¹Də	î¹Dø	î²Də	î¹Dø
V: ¹ Də	V: ¹ Dø	V: ² Də	V: ¹ Dø	V: ² Də	V: ¹ Dø

Analysis. In a Middle High German reference system, Accent 1 corresponds to intrinsically longer vowels, and Accent 2 to shorter vowels (Bach 1921). Based on this observation, Köhnlein (2013, 2015) argues that Accent 1 arose on words that were sufficiently long to fit a contour tone into the accent syllable. Elaborating on these proposals, I claim that the genesis was triggered by apocope (see Schmidt 2002), which provided 'extra duration' in favor of developing Accent 1 (similar to compensatory lengthening). In non-apocopated words, â-vowels, the longest vowel category, always developed Accent 1. î-vowels were shorter than â-vowels, but still long enough in Rule A and Rule A1 to receive Accent 1. If we assume that OSL was indeed incomplete when apocope occurred, V:-vowels would be expected to be the shortest category. This captures the fact that only one area (Rule A) shows Accent 1 for V:-vowels, and thus resolves the paradox. Additional evidence. Independent evidence in favor of my proposal comes from a set of German dialects in the tone-accent area (e.g. Cologne) where OSL-vowels are synchronically short, even though medieval manuscripts indicate them as being merged with their long counterparts (so-called Rückverkürzung 'lit. back-shortening', Wiesinger 1983). As argued in, e.g., Klein (1995), this indicates that lengthening cannot have been completed at the time, and that the available manuscript evidence thus cannot be taken at face value. Furthermore, my approach is in line with recurring claims that in Middle English, OSL first applied to apocopated forms (e.g. Minkova 1982, Bermúdez-Otero 1998, Page 2006).

Structural factors in the emergence, persistence and regularization of exceptional stress patterns in Turkish

Janne Lorenzen and Barış Kabak, University of Würzburg

Word-level prominence in Turkish is regularly assigned to the final syllable irrespective of its weight, although there is a large number of exceptions resisting this robust pattern. These include place names and loanwords, as well as morphologically complex words with certain suffixes that give rise to non-final stress (NFS; cf. Inkelas 1999; Kabak & Vogel 2001). The pressure from the regular final stress (FS) pattern is evident by the presence of morphemes that seemingly vacillate between FS and NFS. However, factors that foster NFS as well as those that derive variability remain largely unexplored. Here, we examine three distinct cases deriving NFS in Turkish using synchronic corpus data and ask (i) how prosodic exceptions may have arisen in an otherwise regular stress system and ii) which structural factors are decisive for them to either resist or yield to the pressure of regularization.

The first case we analyze is irregular root stress, which stems mostly from loanwords. This is puzzling since edgemost stress systems are known to adapt foreign prosodic properties according to their prevalent pattern (Kang 2010). We hypothesize that there are structural reasons for the non-accommodation of loans leading to a considerable number of words that persistently show NFS. In a database study, we find that in Modern Turkish the majority of FS words end in a heavy syllable (71.79%), whereas the majority of NFS words end in a light syllable (64.72%). We argue that through this salient structural asymmetry at the right edge, loanwords ending in light syllables were largely able to resist adaptation into the regular FS pattern because word-final stress assignment was closely associated with heavy syllables. Closer inspection of the etymological origin of these loans corroborates this argument: If Germanic and Latinate loanwords end in a heavy syllable, they almost categorically receive FS. However, if they end in a light syllable, as the majority of them do, they exhibit NFS with a higher probability.

Second, some disyllabic suffixes exhibit NFS fixed to their first syllable. It is widely acknowledged that this pattern derives from the diachronically compositional nature of these suffixes, which in the case of the progressive marker *-Iyor* is evident in its lack of vowel harmony. Focusing on this marker, we find that, in a spoken Turkish corpus, only less than 2% of *-Iyor* tokens exhibit stress on the first syllable while the majority are regularly stressed. We argue that this is due to the reanalysis of the suffix as morphologically simplex, escorted by structural disintegration, e.g., /r/-dropping in *-Iyor* is frequently observed in our data; some Anatolian varieties additionally do not realize the disharmonic /o/.

Finally, some person markers that attach to tense markers such as the future (-*EcEk*) or the reported past suffix (-*mIş*) are invariably unstressable, hence yielding NFS (e.g., *gel-miş-im*). Exempt from this pattern is the 3^{rd} person plural *-lEr*, which is reported to be regularly stressable, thus conforming to FS (*gel-miş-lér*). However, our corpus analysis shows that *-lEr* exhibits systematic variation, vacillating between stressable and unstressable. Although the majority of our *-lEr* tokens exhibit stress on the marker itself (as previously postulated), stress falls on the syllable preceding *-lEr* in 14% of all cases. Here, the attraction to the NFS pattern, too, is principled since unstressability achieves uniformity with the rest of the paradigm, with the exceptional pattern being upheld by paradigm leveling.

In sum, in an otherwise regular stress system, salient structural cues are necessary for a morpheme to maintain exceptional prominence patterns or to get attracted to them. With the disintegration of such cues, they yield to the pressure of the prevalent pattern, as in the case of *-Iyor*.

Understanding sporadic insertion of word-final /n/ in Maltese

Christopher Lucas (SOAS University of London) and Michael Spagnol (University of Malta)

This paper offers an explanation of the appearance of an etymologically unexpected wordfinal /n/ in a number of Maltese items, thus resolving a problem of Maltese and Arabic historical linguistics, while also shedding light both on how morphological alternations can act as a source of analogical phonological change, as well as the nature of phonological adaptation more generally.

Examples of the phenomenon in question include *xejn* /ʃɛɪn/ 'nothing' (< Arabic šay? 'thing'), *sufan* /sʊ'fɛːn/ 'sofa' (< Italian *sofà*) and *biskwin* /bɪs'kwiːn/ 'fine pottery' (< French *biscuit*). While no explanation has previously been offered for the presence of this final /n/ in loans from European languages, Aquilina (1987: *s.v. xejn*), in his seminal dictionary of Maltese, claims that /n/ in *xejn* is a retention of the indefinite -*Vn* suffix, which is found in Classical Arabic, but no spoken Arabic varieties (except as a clearly distinct "adnominal linker"; cf. Ferrando 2018, Stokes forthcoming).

Aquilina's claim, if correct, would be of huge importance for Arabic dialectology and historical linguistics. However, our investigation of the full set of items with non-etymological or optional /n/ suggests that Aquilina's derivation is likely incorrect. We find that all confirmed cases of non-etymological /n/-insertion occur with items with a final open stressed syllable. We suggest that this is a consequence of the near-absence in the core Arabic-derived Maltese lexicon of items with this phonological profile. A handful of items of this kind do exist, but are mostly function words (e.g. $le /l\epsilon:/, 'no', \dot{g}o /d30:/ 'inside')$, or otherwise high-token-frequency content items (e.g. $\hbar u /\hbar u:/ 'brother', \dot{g}ie /d31:/ 'come')$. Though high in token frequency, the type frequency of such items is tiny relative to the whole lexicon, such that loaned content items with this profile are likely to be judged poor phonological exemplars of Maltese words (cf. Bybee 2001). We suggest, therefore, that /n/-epenthesis in loans such as *sufan* and *biskwin* is a repair strategy which serves to bring these items more closely into line with the inherited lexicon: an instance of phonological adaptation that occurs because of the low type frequency of the loaned forms, despite their fundamental phonological well-formedness.

But why is /n/-insertion the chosen repair strategy? This must have its origins in the pre-existing alternation between word-final /n/ and zero in items with the dual suffix *-ej(n)*. Maltese has in common with other Arabic and Semitic varieties that the dual suffix has two allomorphs: *-ej /* ϵ I/ when the dual noun carries a possesive pronominal suffix, as in *għajnej-k* /er nɛrk/ 'your (sG) eyes', and *-ejn* /ɛrn/ elsewhere, as in *għajnejn* /er nɛrn/ 'eyes'. Less typically of Semitic varieties, Maltese has extended this alternation beyond possessive contexts, such that *-ejn* and *-ej* seem to be simply in free variation in all non-possessed contexts. This (optional) alternation is then extended to a few non-dual forms which happen also to end in /ɛrn/ and which regularly take pronominal suffixes, such as *fej-kom* /ˈfɛrkom/ 'where are you (PL)' < *fejn-kom*. Final /n/ in *xejn* 'nothing' should not, therefore, be understood as a totally unexpected retention of the Classical Arabic *-Vn* suffix, but as an analogical extension of word-final /ɛr/ ~ /ɛrn/ optionality from items such as *fej(n)* and *għajnej(n)*. Insertion of /n/ thus emerges as an obvious means for speakers to convert European loans with final open stressed syllables into more prototypically Maltese forms.

REAL AND FAKE GEMINATES IN THE HISTORY OF ENGLISH

Donka Minkova (University of California, Los Angeles)

Among the many directions of inquiry for this symposium is: What is the precise patterning of particular changes in the history of specific languages? The change addressed in the proposed talk is the phonological restructuring of consonantal length in English. The dichotomy of singleton vs. geminate consonants and the representation of geminates in terms of length and/or weight are issues at the core of any phonological theory (Davis 2011, Ringen & Vago 2011, Ham 2013, Topintzi & Zimmermann 2014, Russo & Ulfsbjorninn 2017, the studies in Kubozono 2017, Dmitrieva 2018, Ryan 2019. While Present-Day English is not considered informative in that debate, the diachronic transition from contrastive consonantal length – degemination – no stem-internal geminates, has not been examined in the light of current linguistic modeling.

Old English, like its West Germanic relatives, is reconstructed as having contrastive consonantal length: OE *bane*, n. 'destroyer, bane' - *bannen*, v. 'to ban'. Geminates never occurred in word-initial position, and their loss in word-final position is consistently reconstructed as a late Old English change. By late Old English, pre-geminate long vowels were subject to shortening (OE *bliss* > ME *blis(se)* 'bliss'), rendering geminates phonotactically restricted to -VC₁C₁V- strings. This is the rationale behind the association between vowel length and orthographic doubling of consonants in the history of English spelling, though inconsistencies persist, compare *gallery* – *celery*. The survival of "real" geminates varies regionally, but after the end of the 14th c. the consonantal system appears to have been fully reanalyzed, though "fake" gemination (Oh and Redford 2012, Kotzor et al. 2016 Ben Hedia & Plag 2017) continues into Present-Day English.

This project will identify, discuss, and attempt to assign weights to the conflicting parameters involved in the course of stem-internal degemination. It starts with a detailed survey of the available empirical data base and an overview of the evidential value of Middle English double consonant spellings. The next step is a reassessment of the phonological testability of the consonantal length contrast in relation to vowel length. The core of the paper deals with factors that might favor or disfavor degemination: the low functional load of minimal pairs (Britton 2012); the relationship between consonantal strength and degemination in the context of lenition as constriction duration, i.e., is there a correlation between the laryngeal feature of voicing and gemination (Hayes et al. 2004: 6-18)? Further factors to be tested and ranked are the interaction between the bias for syllabic well-formedness, which would protect geminates, and the progressive loss of $-VC_1C_1V$ - strings in various word positions and word-types, which would predict an uneven rate of degemination across the nominal and verbal paradigms. The results promise to yield an empirically solid and theoretically grounded reconstruction of the history of consonantal length in English.

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VARIATION AND PRESERVATION OF MAPUDUNGUN DENTAL FRICATIVES

Benjamin Molineaux (University of Edinburgh)

Despite being common amongst the languages of Europe, dental fricatives are relatively rare phonemes, crosslinguistically, with voiced forms showing up in only 5% of the phonemic inventories in the Phoible database (Moran & McCloy 2019), and voiceless ones in just 4% of them. Indeed, most languages of the world tend to have only one coronal place of articulation, most frequently alveolar. The implication is that dental/alveolar contrast is difficult to maintain, a notion that seems to be corroborated by the tendency for European dental fricatives to undergo mergers (cf. English *TH-stopping* and *TH-fronting* as well as Spanish *seseo*).

Enter Mapudungun, a (presumed) linguistic isolate spoken in Chile and Argentina, with a full series of dental/alveolar contrasts including $/\underline{t} \sim t/$, $/\underline{n} \sim n/$, $/\underline{l} \sim l/$ and $/\theta \sim s/$ (Sadowsky, Painequeo, et al. 2013). Not only is this pattern unique on a global scale, but there seems to be little evidence for regional support for dental/alveolar contrasts more generally, and for dental fricatives in particular.

Dental:	[t̪ən]	'head louse'	[mə.n̪a] 'cousin'	[kɨ.l̪a] 'bamboo'	[θakel] 'pact/agreement'
Alveolar:	[tən]	ʻhigh sound'	[mə.na] 'much'	[kɨ.la] 'three'	[saku] 'sack'(<sp.'saco')< td=""></sp.'saco')<>

The core of this paper discusses the historical evidence for dental fricatives in Mapudungun, as gleaned from the *Corpus of Historical Mapudungun* (CHM — Molineaux in prep.) spanning the language's 400-year documentary record. I will show that contrast between dentals and alveolars is not new, and can be traced to the earliest written records in the 17th century. I will also give evidence for the fact that, throughout the record, a definite imbalance existed between the two coronal consonant series, such that minimal pairs were rare, and the lexical incidence for the dental series among stops, nasals and laterals was far smaller than that for their alveolar counterparts. In the case of fricatives, however, I will show that the opposite pattern emerges: with alveolar /s/ (found in 67% of Phoible inventories) being rare (predominantly in Spanish and Quechua borrowings), while dental $/\theta/$ is frequent and widespread throughout the lexicon.

Data will also be presented to show that, over the course of the 20th century, the peripheral dialects of Mapudungun have begun to loose the dental/alveolar contrast. In the southernmost dialect, Huilliche, dental fricatives have mostly merged with the alveolar, as have the other dental segments (Sadowsky, Aninao, et al. 2015). However, in the north and east (Picunche and Pehuenche), the dental/alveolar contrast is maintained among fricatives, despite merger — on the alveolar — for stops, nasals and laterals (Salamanca & Quintrileo 2009). The most vital, central varieties retain the contrast throughout, even if $/\theta \sim s/$ alternation is increasingly frequent.

These patterns of variation and loss are related, no doubt, to contact with Spanish, as well as loss of vitality of the key dialects. However, I will claim that the preservation of dental fricatives in the northern and eastern dialects is likely to be an artefact of a longstanding dialectal difference in Mapudungun: the voicing of fricatives. Indeed, despite the fact that Mapudungun does not contrast consonantal voicing — a broader areal feature for the Southern Cone —, the fricatives of central and southern dialects are generally voiceless, while in the north and east they are voiced. The main exception to this clear dialectal pattern is /s/ which surfaces on both sides of the isogloss. The voiceless realisation of /s/ in the fricative-voicing varieties is supported by Spanish, creating an additional dimension of contrast with $/\partial/$, and hence keeping the two sounds distinct in those dialects.

Ultimately, then, the Mapudungun data points to the fact that dental/alveolar contrast can be maintained long-term in contexts of linguistic vitality, even with no significant areal support and substantial imbalance in frequency. In cases of loss of vitality, nonetheless, the contrast is lost fairly quickly, unless additional features can be relied upon for its maintenance.

Armenian and the glottalic theory: a response to Garrett (1998)

Ollie Sayeed (University of Pennsylvania) and Bert Vaux (University of Cambridge)

This paper argues against Garrett's (1998) diachronic analysis of the Armenian stop system in the context of the PIE glottalic theory, and proposes a new relative chronology of the relevant changes with respect to Adjarian's Law.

In a geographically contiguous cluster of Armenian dialects, Adjarian's Law (AL; Adjarian 1901, Vaux 1992, 1998) causes fronting of vowels in initial syllables after consonants descended from the PIE breathy-voiced series. Garrett argues that we can only understand AL if the Proto-Armenian reflex of this series was breathy-voiced; breathiness on the stop causes the following vowel to become [+ATR], and then [+ATR] vowels are fronted. If Proto-Armenian had a breathy-voiced series inherited directly from PIE, this would be evidence against the glottalic theory (Hopper 1973, Gamkrelidze and Ivanov 1973), which would reinterpret the traditional 'breathy-voiced' series as plain voiced.

We point out a number of problems with Garrett's analysis. First, Garrett proposes, following Ohala (1993), that AL coincides in the dialects that have it with the merger of breathy-voiced stops with plain voiced stops; if listeners reinterpret cues for breathiness as cues for vowel frontness, the fronting change should happen at the same time as the loss of the stop contrast. This predicts that AL should never apply in varieties that have breathy-voiced stops, shown to be false of the Erevan dialect by Seyfarth and Garelleck (2018).

Second, Garrett argues against Vaux's (1992) analysis of AL as an effect of stop voicing on the grounds that, if AL were triggered by voiced stops, we should see it on all synchronically voiced stops in varieties that have AL. Even though not all voiced stops in modern Armenian trigger AL, this opacity makes sense if AL applied to the common ancestor of all the varieties that have it, not to their current forms; if AL is a synchronic rule, we propose it must be phonetically arbitrary (or even lexically conditioned) thanks to the telescoping of a series of sound changes, applying to only some voiced stops in the language.

Third, Garrett argues that a Duke of York derivation, where PIE breathy-voiced stops become plain-voiced in Proto-Armenian and then breathy again in some daughter varieties, is uneconomical. There are two problems with this: first, if the glottalic theory is true, the PIE stops were never breathy-voiced to start with. Second, the theory in which breathy-voiced stops have been breathy forever seems to have difficulty accounting for borrowings (Sayeed and Vaux 2017). An early loan like Greek *bēma* 'stage' appears in the classical language as *bēm*, patterning with the historical breathy-voiced series; if Proto-Armenian had breathy-voiced stops, we'd expect *bēma* to be borrowed as PA *bēm*, which would become Classical **pēm*.

In our chronology, the PIE "breathy-voiced" series was a plain voiced series in Proto-Armenian, if not in PIE itself as per the glottalic theory. Implementing voicing involves dorsum fronting (Trigo 1981), causing fronting on the following vowel leading eventually to Adjarian's Law. In the daughter varieties with breathy-voiced stops, we propose that pharyngeal expansion causes breathy voice as a secondary consequence, leading to an innovative breathy-voiced series from the stops that triggered Adjarian's Law.

Tobias Scheer & Philippe Ségéral (University of Nice & Université Paris Diderot)

The goal of this presentation is to run the neogrammarian record against modern phonological theory, to see which pieces of the modern toolbox they held in hands, and what they had not understood. This then raises the question, in turn, what exactly we have gained, if anything, in reformulating insights from 140 years ago in modern vocabulary.

It is shown item by item that the neogrammarians knew about most things that are relevant today: the phoneme, distributional analysis, sonority, syllable structure, onset maximinzation, empty nuclei or voice- vs. spread glottis languages. It is argued that they ignored what they ignored for three reasons: the self-imposed limitation to diachronic data, the lack of ambition to build a general theory of language (no search for universals, no notion of "possible process / language", no idea that some may be outright impossible) and a merely mechanistic understanding of language (the ultimate cause of things is only phonetic).

The neogrammarians are also at the origin of the modern view on language as such, which took form in the well-known Saussurian and Chomskyan dichotomies (Langue-Parole, I-language - E-language etc.). They were lucky enough to live in those felicitous times when empiricism was not a thing in science and the pursuit of knowledge was rationalist in kind. In this environment they were influenced by Darwin's work and applied his ideas of evolution to the history of language. The critical idea coming from that, first aired by the neogrammarians as far as I can see, is that language is not an artefact (man-made) but a natural object (Chomsky's language organ). Therefore it must be studied as such, i.e. independently of humans action, of their culture, of their social relations etc. And since language is a natural object, its evolution is lawful, hence the idea of phonetic *laws* (like in chemistry or biology) and the claim that they are exceptionless (just like chemical and biological laws).

When comparing neogrammarian and modern work, a recurrent observation is that the neogrammarians *did* things, but did not bother naming for formalizing them. Their insights are written in prose, and there is little specific terminology or methodological principles that were made explicit. Take distributional analysis: every undergraduate class today will explain the methodology that is needed in order to approach an unknown dataset and to safely extract relevant linguistic generalizations. The neogrammarians did distributional analysis, but common sense seemed to be enough among understanding people in order to do what needs to be done: reasoning is expressed in prose without methodological quarrels (which are characteristic of later structuralism). Another example in this context is the phoneme: the neogrammarians practiced it, but did not define it, or made explicit a discovery procedure.

Given this firmly rationalist backdrop, the idea that the neogrammarians are early exemplarists and hence represent empiricist thinking is addressed. They were certainly functionalist to a certain extent (Paul 1880: 32 says that change exists in order to augment the "usefulness" (Zweckmässigkeit) of language, just as biological evolution adapts to environmental demands), but this is no contradiction with rationalist thinking. The ultimate explanation of all phenomena by phonetic grounding, however, is a serious empiricist anchor (and also not functional in kind).

In this context an interesting case where the neogrammarians had a good advance on modern thinking are empty nuclei: these have appeared in modern times only by the early 1980s (Anderson 1982) and are still disputed today by most mainstream representatives who continue to go by the empiricist idea that something which has no phonetic existence cannot be real. Sievers (1901 : §534) observes that word-initial #kt, #pt and #s+C are illegal according to what he has independently established regarding syllable structure: syllable-initial clusters must have a rising sonority profile. Committed to rational thinking, he believes in his theory and therefore concludes that the initial consonant of these clusters is part of a secondary syllable (Nebensilbe), which means that it is preceded (#øptV) or followed (#pøtV) by an empty nucleus (since all syllables have a nucleus).

En[dj]uring [tʃ]unes or ma[tj]ure [dʒ]ukes? Palatalization in the Eighteenth-Century English Phonology Database

Ranjan Sen, Joan Beal, Nuria Yáñez-Bouza & Christine Wallis (University of Sheffield) The palatalization of alveolar consonants before 16th-17th-cent. English /ju:/ (Dobson 1957: 701-4; 799-803) – i.e. where a postalveolar fricative /(3) or affricate /t d3/ arose from the sequence /t d s z/ + /j/ + /u! / -is still diffusing and variable in Present-Day English (PDE). The OED gives several pronunciations for mature (e.g. /ma⁺t_jva⁻ ma⁺t_jva⁻), but provides only unpalatalized (/dj tj/) transcriptions for endure, tune, and duke, despite the common occurrence of palatalized (and yod-dropped) variants in many varieties of British English. Extensive variability is not recent in origin (Beal 1996): this paper presents results from data compiled from ten pronouncing dictionaries in the Eighteenth-Century English Phonology database (ECEP, Beal et al. 2015), supplemented with word-frequency information for the period 1700–99 from ARCHER 3.2, in order to determine the internal (stress, phoneme, word-position) and external (prescriptive, geographical, social) motivations for the presence or absence of palatalization in the eighteenth century, which underlies the variation seen today. To facilitate this, we compiled three consonantal lexical sets with further subsets in ECEP: DEUCE (/t d s z/ + /ju:/ with no following /r/), SURE (with original /r/ following), and FEATURE (with original /r/ following, but just schwa in PDE; unstressed syllable); subsets in DEUCE and SURE further categorised words according to the position of the sequence in relation to the stressed syllable: a. in the stressed syllable, b. following, and c. preceding.

We find significantly more palatalization when /r/ originally followed the vowel (*sure*, *feature*) than when it did not (*deuce*), particularly in a post-stress syllable (*closure*, *pleasure*). The more frequent of these palatalized forms (e.g. *nature*) seem to be the words which have become lexicalized in present-day English. Palatalization occurred in /sj/ in particular (*issue*), and this is the only context which palatalizes in a stressed syllable with any regularity (*sure*); otherwise, palatalization was generally resisted in the onset of a stressed syllable, as noted explicitly by Walker (1791), but more common in post-stress syllables. Two other contexts proved to be more conducive to palatalization: word-initial position, thus Sheridan (1780) /tʃ/ in tune, but /tj/ in attune, and before vowel hiatus, thus /tʃ/ in *punctual, sanctuary* in Sheridan (1780), Walker (1791), and Jones (1798), but mainly /tj/ elsewhere.

In terms of geography, there is little palatalization in the Scottish sources, and Spence (1775) from Newcastle. Chronologically, palatalization appears to have become increasingly more common over the course of the eighteenth century: there is little in Kenrick (1773), but Sheridan (1780) is the arch-palatalizer. Palatalization became much less common at the end of the century as such pronunciations came to be stigmatized (Jones, 1798: iv), e.g. less common from Jones' second edition to his third. The mid-century increase may have been due to the earlier restitution of post-consonantal yod in earlier yod-dropped forms (*creature*), as in the London-based 'metropolitan pronunciation' criticized by Kenrick (1773). Two chronologically and phonologically distinct yod-droppings are revealed by the database: this first occurred in the earlier sources after all alveolars in unstressed syllables before /r/; the second occurred in the later sources after any phoneme in a stressed syllable (*dual* in Sheridan 1780 is the earliest).

The abundance of contextual and sociolinguistic evidence available for eighteenthcentury British English combined with the systematic phonological investigation permitted by *ECEP* presents a fascinating, complex picture.

Present-day patterns in North-East English NEAR and CURE vowels reflect historical processes of pre-r breaking and pre-schwa laxing

Danielle Turton & Kate Dovaston (Lancaster University)

Following and during the loss of coda /r/, the centring diphthongs of English went through a process of pre-r breaking and pre-schwa laxing, as outlined in Table 1 (McMahon 2000). These vowels, historically long monophthongs followed by word final /r/, have undergone various stages to results in what we have in most non-rhotic varieties today. Whilst these sound changes were traditionally observed as being independent (Wells 1982), others suggest pre-r breaking and pre-schwa laxing can be seen as an 'integrated complex of changes', naturally following the lenition of /r/ in certain dialects (McMahon, Foulkes and Tollfree 1994:301-2). Present-day varieties which are fairly conservative in their realisation of these vowels may hold clues to the diachronic trajectories of such changes.

word	original	pre-r breaking	pre-schwa laxing	loss of /r/
beer	[biːr]	[biːər]	[bɪər]	[bɪə]
sure	[ʃuːr]	[ʃuːər]	[∫ʊər]	[ʃບə]

 Table 1: Trajectory of processes, adapted from McMahon (2000: 234). Dotted line represents that loss of /r/ could have happened after laxing.

The current study seeks to investigate the phonetic quality of NEAR and CURE in present-day Tyneside and County Durham. Although these areas have undergone pre-r breaking, it is not necessarily the case that the nucleus has undergone laxing. If different varieties of present-day English are shown to have remained at staggered stages of the diachronic path, this could give us an insight into the order of these changes historically.

Data is taken from 16 speakers of North-East English, stratified by region (Newcastle, County Durham), age (18-25, 40-60) and sex (female, male) reading phrases in the format 'say CURE again' and 'say CURE'. Data was force-aligned using DARLA (Reddy & Stanford 2015) and formant measurements from F1 and F2 were extracted from five points across the trajectory using FAVE-extract (Rosenfelder et al. 2014), and spot-checked by the authors. Significances are calculated from a series of mixed-effects linear regressions (lme4 package in R) on the nucleus of the vowel (35% mark). Median data points are used for visualisation.

The nuclei of the NEAR and CURE vowels are tenser in Tyneside when compared County Durham (Figure 1), and tenser in older speakers. We argue that this is reflective of a change in progress, with younger speakers still in the process of laxing this vowel. County Durham speakers are ahead and have laxer vowels. /r/ remains in linking position, so we may expect to see a difference

between say near and say near again contexts. However, we do significant not see any differences between these environments, suggesting that not only is there no evidence for a move to the monophthongal system found in some accents such as Manchester and Southern Standard British English, there is not a trace of this in the very position we would expect to find it : phrase-The findings finally. are interpreted with reference to the later loss of r/ in the North-East. the SQUARE vowel, and the connection to FLEECE and GOOSE.



Figure 1: NEAR and CURE median values across 16 speakers from Newcastle (dotted line) and County Durham (solid line).

Indo-European "secondary mobility" and its implications for accentedness

Anthony D. Yates, University of California, Los Angeles (adyates@ucla.edu)

The empirical focus of this paper is a prosodic alternation that is standardly reconstructed for Proto-Indo-European (PIE) and that can be observed in Hittite (Anatolian) and Vedic Sanskrit (Indic). Like PIE, these languages have a lexical contrast between stress-preferring (ACCENTED) and neutral (UNACCENTED) morphemes and a phonological preference for the single stress-bearing syllable to coincide with the word's left edge (Kiparsky and Halle 1977; Kiparsky 2010; Yates 2016, 2017). The alternation involves words with stem-final accent: stress surfaces on the accented stem-final syllable before unaccented inflectional suffixes, but accented inflectional suffixes induce deletion of the stem-final vowel and attract stress — e.g., (1) vs. (2) (accent/stress marked "`"; Ved. forms in IAST, Hitt. in transcription/IPA):

(1) a. Hitt. /pisén-os/
$$\rightarrow pišenuš$$
 [pisé:n-os] b. Ved. /ukṣán-as/ $\rightarrow ukṣánas$
(man-ANIM.ACC.PL) (OX-ANIM.NOM.PL)
(2) a. Hitt. /pisén-ás/ $\rightarrow [p]išnāš$ [pisn-áːs] b. Ved. /ukṣán-ás/ $\rightarrow ukṣṇás$
(man-ANIM.GEN.SG) (OX-ANIM.GEN.SG)

I demonstrate that stress shift onto the inflectional suffix in (2) — referred to by Kiparsky (2010) as "secondary mobility" - depends crucially on the elimination of the accented stemfinal syllable nucleus via syncope. Synchronically, this dependence is shown by words with stem-final accent whose vowel cannot undergo syncope for phonotactic reasons - e.g., Ved. /brah-mán-ás/ \rightarrow brahmánas (priest-GEN.SG) (*[.mn]) — and which thus show fixed stemfinal stress. Diachronically, it is shown by the emergence of stem-final stress in words that previously showed the stress shift in (2) after syncope ceased to apply in the (pre)histories of the IE languages (e.g., Hitt. /link-áj-ás/ ~ linkiyaš [liŋk-j-á:s] >> lingayaš [liŋk-á:j-as] (oath-GEN.SG)). To capture this dependence, I propose that Vedic and Hittite are trochaic languages in which accented morphemes contain the left edge of a foot in their lexical representation and in which high-ranking faithfulness (ANCHOR-L: "The left edge of a foot in the input corresponds to the left edge of a foot in the output. Assign a violation (*) if a vowel intervenes.") ensures that this foot edge is preserved in the output (cf. Inkelas 1999, Özçelik 2014, Yawney 2018). Under this view, deletion of the stem-final vowel allows a single foot in the output to correspond to two distinct feet in the input; thus in (3) (= (2b) above) the winner (3d) with deletion satisfies ANCHOR-L, which is violated by (3b) and (3c) in which the foot associated with the stem or inflectional suffix fails to correspond with an output foot.

1	Э	١
J	0	J

	uk	(ṣan-(as	CULMINATIVITY	ANCHOR-L	All-Ft-L	MAX-V
a.		uk.(ṣá).(nás)	*!		* * *	
b.		uk.(ṣá.nas)		*!	*	
c.		uk.ṣa.(nás)		*!	* *	
d.	B	uk.(ṣṇás)			*	*
e.		(úk).ṣṇas		*!*		*

I argue that this analysis improves upon (i) traditional templatic analyses of IE word prosody, such as the "Erlangen Model" (Schindler 1975a,b; Rix 1992); and (ii) generative analyses which assume that a lexical accent is an abstract prominence autosegmentally linked to an input vowel (Revithiadou 1999, 2007, Alderete 2001, *i.a.*) rather than prespecified metrical structure. I show that (i) cannot explain why stress mobility of the type in (2) depends on syncope; and that (ii) makes incorrect predictions, either preferring loser (3b) to winner (3d) if the stem-final accent is assumed to be deleted along with its host, or preferring loser (3e) with initial stress if deletion permits a lexical accent to reassociate with another syllable.

POSTERS

"Markedness" is an epiphenomenon of phonetically grounded sound change Andrea Ceolin & Ollie Sayeed (University of Pennsylvania)

Introduction. Phonological theory has often found it useful to describe some segments as more 'marked' than others, referring to a cluster of language-internal and -external properties (Jakobson 1941, Haspelmath 2006): i) Marked segments have low frequency within a language; ii) Marked segments have low frequency across languages; iii) Marked segments have a more restricted distribution within a language. Starting with Trubetzkoy (1939), there has been a tradition in phonological theory of encoding "markedness" in the grammar. A recently popular alternative philosophy, Evolutionary Phonology (EP, Blevins 2004), has argued that the concept of representational markedness is unnecessary (Blevins 2004, Hale and Reiss 2008, Samuels 2017). We argue, using a simple mathematical model of sound change, that markedness is an epiphenomenon of random, phonetically grounded sound change; this follows the EP tradition of giving diachronic explanations for synchronic facts.

Model: random splits and mergers. We propose an abstract model of sound change as a discrete-time stochastic process of random splitting and merging of phonemic categories. Following EP, 'marked' segments are those that have a low probability of being created by sound change and/or a high probability of being lost through sound change. We define 'mergerwise marked' segments as those with a high probability of being lost by a merger. We simulate a model that randomly applies a split or a merger to an artificial phoneme inventory at each time step, with a diachronic bias against mergerwise marked segments. Phoneme type and token frequencies in natural languages (Martin 2007) follow a Yule-Simon distribution (Simon 1955, Tambovtsev and Martindale 2007), and our model aims to give this fact a diachronic explanation. Predictions: within-language and across-language frequency. We ran a simulation of the split-merger process for 100 iterations with 20 segments labelled /a/-/z/. At each iteration, two phonemes are selected at random. Mergers are biased towards /a/ (which never disappears after being selected for merger) and against /b/ (which always disappears after being selected for merger). Both phonemes are unbiased with respect to splits. Fig. 1 shows a typical run, where $\frac{1}{a}$ has become high frequency and /b/ has fallen out of the language. Fig. 2 shows the average frequencies of /a/ and /b/ across 1000 parallel runs given equal starting frequencies of 0.05; /a/ has median frequency of 0.1, while /b/ disappears in most runs. As expected, frequency within languages correlates with frequency across languages, with no role for formal markedness.

Conclusion. Both the power-law frequency distribution of phonemes in a language and the cluster of properties associated with 'markedness' can be thought of as epiphenomena of phonetically grounded sound change. A model of sound change as a sequence of random splits and mergers predicts the attested language-internal and typological correlations, showing that formal diachronic models have an important role to play in explaining synchrony.



Egyptian Greek: An example of conquest-related contact phonology

Sonja Dahlgren (University of Helsinki)

Graeco-Roman Egypt was multilingual, with the language contact between Greek and Egyptian a strong part of society. This was partly because Alexander the Great established Greek as the official language of the government but also because even after the Roman conquest, Greek also remained the language of the army. People from multiple linguistic backgrounds wrote Greek in Egypt, with a network of scribes and army personnel spreading a contact variety among the L2 Greek users. Similar phenomena are found in papyri from Fayyum oasis scribes (O.Narm.) to Eastern Desert garrisons (O.Claud. 2).¹ Until now, the Greek-Egyptian contact has mainly been studied regarding bi/multilingualism (Papaconstantinou 2010). It does, however, display typical tendencies of a contact variety especially on the phonological level. For instance, (Coptic) Egyptian phoneme distribution and stress patterns were transferred onto Greek in e.g. the reduction of word-final vowels to schwa (1, 2); word-final *-n* was often deleted and Coptic marked schwa with <e>.

(1) O.Narm. 115 kerase(n) from the standard keraso(n)
(2) O.Claud. 2 pempse(n) from pempso(n)

Furthermore, especially front vowels were susceptible to consonant-to-vowel coarticulation (3), another feature of Coptic (Peust 1999: 229-230).

(3) O.Narm. 110 *metropoli* from *metropoli* (bilabial; retraction)

The situation resembles system convergence (Matras 2009: 223-226): speakers use one phonemic inventory and distribution for both languages, similarly to other contact varieties such as Indian English or Irish/Scottish English. All these contact situations were associated with conqueror languages with remaining strong cultural attachments to own culture, and employment opportunities (cf. Thomason 2001: 15-26). In Egyptian Greek as in Indian and Celtic Englishes, transfer from L1 mostly concerns phonology. For instance, Indian English has replaced Standard British English dental stops /t, d/ with retroflex ones. Similarly, Irish English realises English dental fricatives / θ , δ / as dental stops [t, d] (three - tree) and IrE and ScE add an epenthetic schwa after liquids (*fil*³*m*). The phonological level creates the distinctive character for these varieties even if transfer of L1 vocabulary is scarce.

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¹Examples can be found with these references in *papyri.info*, an online depository for Greek papyrological texts.

Pull chain or Push Chain or Something Else Altogether? A Fresh Look at the Great Vowel Shift

Martina Häcker

The Great Vowel Shift is one of the most controversial issues in the history of English phonology. One of the controversies is whether it is a pull chain or a push chain. In a pull chain the starting point of the shift is the diphthongisation of close vowels, which then "pull" more open vowels into closer positions. In a push chain the chain is started by open vowels that "push" closer ones into a closer position. What both views have in common is a belief that the Great Vowel Shift starts with one vowel shifting position, which then triggers the shifting of the complete set of front and back long vowels, respectively, in a chain reaction. The rationale behind the concept is that phonological systems dislike gaps and mergers and that therefore a position that is evacuated by one vowel is filled by another (pull chain), or that if one vowel moves into the space of another the latter moves as well to avoid a merger (push chain). The most substantial challenge to the interpretation of the Great Vowel Shift as a chain was voiced by Stockwell and Minkova in 1988, who claim that the changes were separate and unconnected rather than a chain, while aspects of it were challenged by Johnston (1992) and Smith (1993), who argue for two chains rather than one on the basis of regional data.

This paper contributes to the debate by taking a closer look at Middle English and Early Modern English spelling variation in words with Early Middle English long o [o:]. The OED documents, for example, the following spellings for MOON (OE mona) for the periods labelled ME and pre-17th century: moune, movne, mowne, movn and movne. Similar variation is found for FOOL (EME fol) with ME foul(e), fowle and foyl, and BOOT (OE bot) with ME bout(e), boyte and buyt/buit. How are these insertions of $\langle w \rangle / \langle v \rangle$ and $\langle y \rangle / \langle i \rangle$ to be interpreted? While $\langle ou \rangle$ has sometimes been interpreted as /uː/, which would correspond to a raised vowel, such an interpretation is impossible for <oy>. I would argue that all of these combinations represent diphthongal realisations in which the second part was perceived sometimes as more [u]-like, for which <u>/<v>/<w>-spellings were used, and sometimes more [i]-like, in which case <y>/<i>spellings were used. This claim assumes that the respective scribes used phonetic spelling and that the insertion was triggered by the audibility of a transitional sound, which is in line with the conventional interpretation of <u>- and <i>- insertion before velar and palatal fricatives, respectively. For the change from ME [o:] to [u:] this would suggest that we are dealing with a sequence of diphthongisation followed by a later monophthongisation, that is [o:] > [ou] > [u:]rather than simply raising. Factors that triggered the change would not be the movement of another vowel in a pull or push chain but changes in the speed of utterance and the degree of muscle tension.

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Does fortition exist? Reasons to be doubtful.

Patrick Honeybone, University of Edinburgh, patrick.honeybone@ed.ac.uk

While the concept 'lenition/weakening' has a firm place in historical phonology, its counterpart 'fortition/strengthening' is more questionable. For example, Blevins (2015, 490) writes that "[i]t is striking how often the prevalence of leniting sound changes leads to models where fortition is simply ruled out." I argue that ruling fortition out from a theory of what is possible in segmental change is likely the right thing to do. Blevins disagrees: "while regular sound changes involving strengthening are, overall, less common than weakening ... they ... require a place in any sound change typology." I give two arguments to the contrary: (i) with a rational definition of 'fortition', changes typically adduced as examples of it do not fit with what is predicted to exist; (ii) cases of changes which *do* seem to fit in with such a definition in fact turn out, on careful analysis, not to be fortitions after all.

What counts as 'fortition'? Bybee (2015, 479) is succinct: "fortition – the **opposite of lenition**". Cser (2015, 201) similarly writes: "[t]he presumed **mirror-image of lenition** ..., fortition involves a change of consonants towards less vowel-like qualities". This gives a rational definition: fortition is the 'opposite of lenition'. Lenition involve sonorisations, spirantisations or debuccalisations (Lass 1984), and thus is typically assumed, for example, to introduce (through some kind of 'rule addition') realisations of a fricative-type (such as $[\beta \sim v, \delta, \gamma]$) in segments which were previously purely stops (of the type /b, d, g/ \rightarrow [b, d, g]) or realisations of a nonbuccal-type (such as [h]) in segments which were previously purely buccal (of the type /f, s or x/ \rightarrow [f, s or x]). Lenitions are *weakly unconditioned*: they are not caused by their environment, but may be inhibited in environments which are 'strong' (a notion which is "relative, not absolute" (Ségéral & Scheer 2008, 140), which means that lenitions can only occur in strong environments, such as initial position, if they also occur in weak environments, such as medial and/or final position).

If fortition is the 'opposite of lenition', then the question is really: can a language innovate changes which are the opposite of lenitions? If the changes in (1) are lenitions, then those in (2) would be fortitions; and if changes of the type given in (2) occur (endogenously and monoquantally), then fortition does indeed exist.

(1) {/b, d, g/ \rightarrow [b, d, g]} > {/b, d, g/ \rightarrow [$\beta \sim v, \delta, \gamma$]}

(2) $\{/\beta \sim v, \eth, v/ \rightarrow [\beta \sim v, \eth, v]\} > \{/\beta \sim v, \eth, v]\} / \rightarrow [b, d, g]\}$

 $b, d, g] \qquad \qquad \{/h/ \rightarrow [h]\} > \{/h/ \rightarrow [s]\}$

 $\{/s/ \rightarrow [s]\} > \{/s/ \rightarrow [h]\}$

To state argument (i): cases of changes that are typically adduced as fortitions are *not* like those in (2). For example, when describing *Weakening and strengthening in Romance*, Recasens (2002, 336) writes that **"[j] may yield a palatal stop, fricative or affricate** word initially and after a nasal stop", and to consider Germanic, the phrase **"[f]ortition of** the cross-linguistically rare **interdental fricatives [θ] and [ð] to** the almost universal corresponding **stops [t] and [d] is relatively common**" gets 8 hits on Google. What such changes actually have in common is that they are ways of *removing glides*¹ or (the marked segment-type) *dental fricatives* from a language: this may or may not involve the addition of stricture, but I argue that this is not the motivation of the change, as we would expect for a fortition. So: what *would* count as a case of fortition? A change involving v > b and/or y > g, or h > s clearly would count, but that is not the case with the Romance and Germanic changes of the type discussed here.

To state argument (ii): Hualde (2013, 248) writes that, in Spanish "phrase-initially (and after certain consonants) OSp **v** has become [b]", and Moulton (1954, 1) assumes that "/bh dh gh/... gave the spirants [$\beta \delta \gamma$] at some stage in Germanic; and that **these spirants later became stops in certain environments**". Both of these changes seem to count as authentic fortitions (and have been described as such). However, in fact, neither change actually involved the addition of a rule of the type /fricative/ \rightarrow [stop]. The Spanish case involved the merger of / β / with /b/ (which was unsurprising because both were realised as [β] in several environments), which led to the loss of / β /. After this, / β / \rightarrow [β] / #__ no longer occurred because / β / no longer existed – forms which previous underwent it now, naturally, had /b/ \rightarrow [b] / #__, instead. The Germanic case, in fact, never actually occurred. As Luick (1914-20), Vennemann (1984) and Noske (2012), for example, argue, there are compelling reasons to believe that, rather than the IE Mediae Aspiratae (MAs) developing fricative reflexes, and then losing them again (through fortition because they turned back into stops), the MAs remained stops in Germanic, and have been subject to some lenition (in the form of spirantisation) in certain environments in some of the Germanic languages.

If arguments (i) and (ii) hold beyond the data considered here (which I think they do), there is no reason to believe that fortition occurs in historical phonology.

¹ Since this abstract was written, Bybee & Easterday (2019) has appeared, also making this point (with a large empirical base).

Dialect Variation as Evidence for Subgrouping in Khmer

Nielson Hul (Cornell University)

Jenner (1974), in his "Observations on the Surin Dialect of Khmer," states that the lower Mun valley was likely to be the earliest identifiable seat of Khmer power in the region. After the fall of Angkor, these speakers were isolated from the greater body of the Khmer diaspora and there has been much debate upon the effect that this has had on the Khmer Surin dialect also known as, Northern Khmer. Many scholars believe that this is likely a more historically conservative dialect of Khmer.

In support of this view, my work analyzes synchronic patterns of phonological variation to offer linguistic evidence that the Northern Khmer dialect is likely to be more conservative than dialects in the south. In other words, the Khmer Surin in this "arid and economically depressed" (Jenner, 1974) region of the Khorat Plateau are speakers of an older dialect of Khmer.

This leads us, more generally, to the question of subgrouping. Among the three major dialects of Khmer, namely Central Khmer, Southern Khmer, and Northern Khmer there is limited mutual intelligibility. A speaker of Northern Khmer may not fully understand a speaker of Southern Khmer; Central Khmer speakers may have difficulty communicating with Southern Khmer, and so on. This limited intelligibility indicates a need for further subgrouping in Khmer. By identifying specific innovations in speech, I propose that the southern dialects sub-group together based on a pattern of phonological reduction they share that excludes Northern Khmer.



Using corpus data from Minh (1996), who collected data from Central Khmer and Southern Khmer as a guide, I collected data from speakers of Northern Khmer, specifically from the Surin province of Thailand. I looked at 60 comparable lexical forms from the three dialects, with specifically targeted word structures in which there was a tendency toward reduction. One example is in the pronunciation of the word 'Khmer' $i \ {\ a} \ {\ a}$ across the three dialects (see above). The most salient difference is the presence of rhoticity in Northern Khmer, which has been lost in the southern dialects. Based on the presence of the character 'i' representing /r/ in the historical spelling of the word $i \ {\ a} \ {\ a}$, we may deduce that the Northern Khmer dialect is likely to be the older form. Between Central and Southern Khmer there is a flattening of the diphthongal nucleus $[aj] \rightarrow [e:]$. So, an incrementally stronger pattern of reduction in the Central and Southern dialects together have been more innovative than Northern Khmer, with further differentiation between Central and Southern Khmer taking place.

Drift revisited: Phonological convergence in north-western Europe Pavel losad (University of Edinburgh)

In this talk I offer a framework for understanding convergent diachronic developments in the phonological systems of unrelated languages, informed by the life cycle of phonological processes. I focus on preaspiration of |fortis| stops (the traditional /p t k/ series) in several languages of north-western Europe that are either unrelated, or not related closely enough for preaspiration to be inherited: they include the North Germanic languages, varieties of English, the Gaelic languages, Welsh, and the Sámi languages.

Preaspiration is commonly claimed to be typologically rare and diachronically unstable (Silverman 2003; Blevins 2017); hence, its appearance in unrelated languages with a history of contact between speakers is often ascribed to that contact (Marstrander 1932; Posti 1954; Wagner 1964; Borgstrøm 1974; Salmons 1992; Gunnar Ólafur Hansson 2001; Pétur Helgason 2002; Rießler 2008; McKenna 2013). However, this scenario has recently been challenged. First, more or less convincing non-contact scenarios for the development of preaspiration in individual cases have been proposed (Steblin-Kamenskij 1974; Ó Baoill 1980; Ó Murchú 1985; Ní Chasaide 1986). Second, it has been argued (Pétur Helgason 2002; Clayton 2010) that variable, 'weak' forms of preaspiration, which authors such as Silverman (2003) have argued to be diachronically unstable, can persist over significant time periods. Third, preaspiration appears to be more widespread than traditionally assumed, cf. Ní Chasaide (1986) on Irish; Morris & Hejná (2019) on Welsh; Docherty & Foulkes (1999); Gordeeva & Scobbie (2010); Hejná (2015); Kettig (2015); Fiasson (2016) on English; Pétur Helgason (2002); Schaeffler (2005); Tengesdal (2015); Iosad (forthcoming) on North Germanic vernaculars. Fourth, historical and sociolinguistic evidence does not always support the possibility of contact-induced transfer (Iosad submitted).

Taken together, these arguments undermine the case for contact as the primary vector of the spread of preaspiration in north-western Europe. I suggest, however, that the convergent development of preaspiration in North Germanic, the Gaelic languages and the Sámi languages should not be entirely written off as coincidental. Instead, I propose to view this development as an instance of *drift* along the lines of Sapir (1921). Specifically, I suggest that the similarities arise because the development of preaspiration follows the life cycle of phonological processes (Bermúdez-Otero 2007; 2015). Under this account, preaspiration arises as a variable by-product of the realization of laryngeal contrast. It can remain a variable phonetic rule (as in Ulster Irish, Welsh, English, and some Norwegian varieties), but it can also (as in Icelandic and some Scottish Gaelic varieties) enter the phonological grammar, with a concomitant narrowing in the range of variation. Compatible accounts of the diachrony of preaspiration are offered by Gunnar Ólafur Hansson (2001); Pétur Helgason (2002); Iosad (forthcoming) for North Germanic and Ó Maolalaigh (2010); Clayton (2010); Iosad (submitted) for the Gaelic languages.

The suggestion that drift can arise as a consequence of initially variable phonetic patterns proceeding along the life cycle, which makes them progressively more entangled in the categorical grammar, is consistent with the proposal by Joseph (2013) that the historical source of 'drift' in related languages is the narrowing of the range of variation found in the proto-language. In the cases considered here, however, the original variation is not inherited, even though the mechanism of drift is the same. I further suggest that the convergent developments have been facilitated by the fact that the languages share significant commonalities in their phonological grammar, particularly with respect to the rôle of moraic quantity (these may or not may be contact-induced at a greater time depth; cf. Salmons [1992]). These similarities may 'prime' (in the sense of Kiparsky [1995]) the co-option of similar phonetic cues such as preaspiration to signal quantitative patterns, further contributing to the convergence. I also suggest that a similar mechanism may have led to the rise of at least two other areal phenomena in the region: tonal accents and sonorant pre-stopping.

Imitation before innovation - A principle of language change

Sverre Stausland Johnsen (University of Oslo)

Introduction. Language change is the result of innovation. Once an innovation has been accepted by the local speech community, it might spread to other speech communities. When we observe a novel feature in a speech community, we know that the new feature must have been innovated by someone at one point. We cannot, however, know off-hand whether this novel feature was innovated in the speech community we observe it in, or if it has spread to this community by sociolinguistic diffusion mechanisms.

The problem. If the goal of the linguist is to explain why the observed language change took place, then their first task must be to determine whether the change was innovated locally, or if it diffused to the local community from elsewhere. More often than not, however, the linguist will simply assume that they are dealing with a local innovation, and start to look for an explanation rooted in the grammar of the local speech variety. If, however, the linguist were to address the question of where the innovation originated, there are no guiding principles to aid them.

The principle. The proposal is the following principle: For any observed language change, it is more likely to have arisen by imitation than by innovation. The principle is rooted in a more general principle of social-psychological behavior, stating that people first and foremost aim to mimic and copy the behavior of their peers. If imitation is more likely than innovation, it follows that an observed novel feature in a speech community has most likely diffused to the local community from elsewhere.

Basis. (1) It is practically self-evident that imitation must be more likely than innovation. If this were not the case, and it were the other way around, then individuals would innovate new features more often than they mimicked the features of their interlocutors. The end result would be that all individuals spoke significantly different languages. We know, however, that individuals interacting with each other tend to assimilate their speech patterns to each other. (2) When a language change has occurred, the new feature is often found in many local speech communities within a language. By the principle of parsimony, it is more likely that the feature arose once and then spread to other communities (imitation) than the feature having been innovated independently in all of these communities (innovation).

Conclusion. Linguists have a bias in usually assuming that any linguistic change they observe is due to an innovation in the local language, and they will typically start looking for a grammatically motivated explanation. Following the principle stated above, most language changes are not motivated by grammar at all, but by social factors (i.e. social-psychological motivations for mimicking your interlocutor). If the linguist wants to investigate the possible grammatical conditions behind the innovation, then they need to determine where the innovation originally occurred, and then analyze the speech variety of that community. This will require some sociolinguistic analyses, and this demonstrates the importance of (historical) sociolinguistics in the study of language change.

Linguistic change can be messy and so can its explanation. Ken Lodge (University of East Anglia)

This is an attempt to explain an observable change in present-day English in terms of quite disparate influences. Since the change is not yet complete, it is a messy conspiracy of these influences. By studying life-time changes of this sort we may gain insights into how well understood historical changes worked. The change I want to examine is most noticeable in the written form, but its trigger has been the phonetic realizations of the forms to be considered. The forms are exemplified by alternations in NPs such as *box(ed)sets, skim(med) milk, arch(ed) corbel table*.

The NPs with *-ed* have a structure: Adj_{pp} N, whereas the forms without it are compound nouns. Some of the Adj_{pp} forms found in such noun phrases are actually pseudo past participles, that is they are not formed from a verb, but take the *-ed* ending, e.g. *four-wheeled, gate-legged*.

I will consider how native speakers learn such forms: from the spoken or written language. This is relevant because the realization of members of both sets may be the same. The realizations are subject to an optional rule that gives the forms in (1), whether a participial adjective is involved or not.

(1) last time [las taim] postman [pəusmən] boxed set [bbks set]

The environment is as follows: the second consonant of a sequence can be suppressed, iff it has the same phonation as the preceding one and there is a morpheme boundary between the second and third consonants.

I will also consider the stress patterns of the new compounds, the orthography as a reflection of the structural change, the 'Germanic' tendency towards compounding and the way in which changes may start in a specifiable context and then spread by analogy to other environments. The resultant picture is a messy one and the change has certainly not yet been completed, but we can see a conspiracy of disparate areas of the linguistic system putting pressure on certain key points.

We should note that "English" is not a consistent linguistic system. We have to be clear about which variety we are discussing. And remember that English 'belongs' to many different groups of people, including non-native speakers as a lingua franca, so it is subject to many more influences today than parochial versions of even just a hundred years ago.

Sociolinguistic variation in Scottish English: the case of /r/ and /l/ lenition

Anna Lukaszewicz University of Warsaw

This paper traces patterns of development of two processes appearing in the varieties of Scottish English: variable rhoticity in Standard Scottish English and /l/ vocalisation in Scots. The decrease in using postvocalic /r/ has been reported to occur among middle class Scottish speakers at the turn of the 20th century, with the subsequent increase in rhoticity from the 1970s onwards (Lawson et al. 2014). /l/ vocalisation was a historical change that took place in Scots between the 15th and the 18th centuries that affected /l/ in certain phonological contexts (e.g. syllable final /l/ after /a/, /o/ and /u/ in words like *gold, full*; McClure 1994, Jones 2006).

The comparison of seemingly distant phenomena follows the observations made in previous studies that report on similar routes of development of lenition processes affecting /r/ and /l/ (Gick 2002). We explore the connection between the degree of rhoticity and /l/ vocalisation in Scottish English not only by looking at sociolinguistic factors governing the two processes, such as the phonological contexts for occurrence, but also by addressing methodological challenges which stem from lack or scarcity of historical sources. In this respect, we incorporate Labov's hypotheses on analysing historical data from the perspective of current changes and through a convergence of methods available nowadays (Labov 1994).

The paper investigates the fate of rhoticity among middle class Scottish speakers from Glasgow and Edinburgh, as well as the fate of historical /l/ vocalisation in Scots. We analysed changes in rhoticity on the basis of sociolinguistic interviews with 12 middle class speakers (7 speakers born before 1950s, 5 speakers born in the 1980s and 1990s) from the BBC Voices database and SCOTS (Scottish Corpus of Text & Speech). For the purpose of this study, from the total of 200 min of recordings 2545 potential r sites were extracted. The data were auditorily coded into one of the three categories, from the most to the least rhotic: 1. Tap or trill, 2. Approximant, 3. Zero. An additional category, 4. Unidentified, was used when the tokens could not be assigned to any of the three categories above. The analysis focused on the age of the speakers, as well as on the context for occurrence: potential r sites before fricatives, before consonants other than fricatives, before vowels, and before a pause. As regards /l/ vocalisation, we analysed a corpus consisting of data we extracted from 4 historical dictionaries of Scots, e.g. Jamieson's An Etymological Dictionary of the Scottish Language (1808). Phonological contexts for the occurrence of the process were verified along with the attitudes towards /l/ vocalisation in specific words denoted by contemporary dictionary writers.

We found that in the case of rhoticity young middle class speakers use predominantly approximants (62%), in contrast to older middle class speakers who use mostly taps and trills (60%) and occasionally the zero variant (19%). For /l/ vocalisation, phonological contexts reported in the literature were confirmed.

While the previous studies on routes of /r/ and /l/ lenition dealt mainly with the issue of the loss of these segments, and their subsequent resurfacing as linking or epenthetic consonants (Gick 2002), this study shows that social factors may play a crucial role in determining the direction of the analysed sound shifts. For middle class SSE speakers the loss of rhoticity was blocked, however /r/ was not restored to the traditional pronunciation, i.e. taps and trills. This contrasts with the linguistic situation observed in the literature for working-class adolescents, who seem to lean towards using derhoticised variants of /r/ (e.g. Stuart-Smith et al. 2007). As regards /l/ vocalisation, while this phenomenon was attested in literary Scots, the process is reported to be no longer productive nowadays, with middle class speakers using it only occasionally in high-frequency words, e.g. *all*.

Sybies and Tatties: Problems Concerning the Form and Development of Diminutives in Scots and Scottish Standard English

Alan Murray (University of Leeds)

It is well known that one of the salient characteristics of the Scots language (Sc) is its many diminutive forms, expressed either through adjectives (e.g. *wee*, *peerie*) or suffixes (e.g. *-ie/-y*), some of which are confined to certain dialects (Ayrshire *-ock*, North-Eastern *-ikie*). The ending *-ie/-y* occurs as a diminutive in most varieties of English (especially in personal names), but its use in both Scots and Scottish Standard English (SSE) is much more frequent, with the suffix occurring in a high number of lexicalized items (e.g. *lintie* "linnet", *lassie* "girl"), as well as continuing to be productive in spontaneous speech. Recent scholarship has pointed to many such forms as overt Scotticisms in both everyday speech and literary output, e.g. *tattie* "potato" and *sybie* "salad onion" (e.g. Dossena 1998, Dossena 2012).

This paper investigates the form and development of words with the suffix *-ie* in Scots. In many cases, e.g. *wifie* (woman), *laddie* (boy) or *cattie* (cat), the diminutive implies smallness, endearment or familiarity. However, in a significant number of cases the occurrence of an *-ie* ending can be explained through phonological changes. Thus French *ciboule* (scallion, salad onion, spring onion) was originally borrowed into Scots as *syboe* (with vocalization of final /l/), but is now universally pronounced as *sybie*. This seems to be an example of words borrowed relatively late which retained an original *-o* in Standard English but became *-ae/-ie* in Scots, as in the case of Eng. *potato* > older Sc. *pitawtie* "potato" with the modern reduced form *tattie*. Other examples include Sc. *tomatie* (tomato), *stuckae* (stucco), *tabbacae* (tobacco).

It is likely that this development was influenced by a wider change in the early modern period; here an unstressed vowel in final position was realized in Southern English spelling variously as <-o(w)> or <-er> (e.g. *fellow, feller*), but this became <-ie> or <-ae> in most dialects of Scots (e.g. *tattie, fellae, windae*). A similar change can be observed in the cases of placenames whose modern popular pronunciation diverges from the official spelling, which may be based on older variants or an Anglified orthography, e.g. Kelso (Roxburghshire), but Scots *Kelsae*; Yarrow (Selkirkshire) but Scots *Yarrae*; Chatto (Berwickshire) but Scots *Chattae*; Portobello (Midlothian), but Scots *Portaebellae*. We can conclude that many of the words in Scots and SSE ending in *-ie/-ae* suffix are not true diminutives, but are the result of a regular phonological change to unstressed endings.

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The History of /pf/ in New Braunfels German: Another Case of Rule Inversion?

Marc Pierce (University of Texas at Austin)

The status of rule inversion, i.e. "reversal of the input and output of a rule and complementation of the environment" (McCarthy 1991: 194), as a mechanism of language change remains controversial. While scholars like Vennemann (1972) have argued that it is a relatively common process, others, like McCarthy (1991), have contended that rule inversion is at best very rare. Additional examples of rule inversion would help resolve this controversy. This paper therefore addresses another potential example of rule inversion, involving the history of the affricate /pf/ in New Braunfels German, a critically endangered New World variety of German, spoken in New Braunfels, Texas (about 30 miles northeast of San Antonio).

According to Eikel (1954), which is based on data collected in the 1930s and 1940s, /pf/ did not appear word-initially in New Braunfels German, meaning that words beginning with [pf] in Standard German, e.g. Pferd 'horse', Pfeffer 'pepper', and Pfirsich 'peach', began with [f] in New Braunfels German. It did, however, appear word-medially and word-finally, e.g. in Topf 'pot'. In light of the numerous similarities between Standard German phonology and New Braunfels German phonology discussed by Eikel, this situation indicates that a sound change from /pf/ to /f/ (deaffrication) had taken place, at some point between the formation of New Braunfels German in the late 19th-early 20th century and Eikel's data collection. The situation soon changed: Gilbert (1972: Map 103), which is based on data collected in the 1960s, notes that his informants pronounced words like *Pferd* with an initial [pf] (e.g. 100% of his informants produced an initial [pf] in *Pferd*). In other positions within the word, Gilbert's informants used both [pf] and [f]. This indicates that /f/ had been affricated in word-initial position to [pf], at some point between the 1940s and the 1960s. In the data collected by members of the New Braunfels German Dialect Project (TGDP; www.tgdp.org) since 2001, the situation has changed again. According to Boas (2009), only 8% of his informants pronounced words like Pferd with an initial [pf]. This shows that pf/ has been deaffricated to f/ at some point between the 1960s and 2001.

I argue that the best account of the New Braunfels German facts is a relatively straightforward sequence of sound changes, /pf/ > /f/ > /pf. This account outperforms other possible analyses of the New Braunfels German data, like the model of new dialect formation proposed by Trudgill (2004), which can account for the differences between the Eikel data and the Gilbert data, but not for the differences between the Gilbert data and the TGDP data (Boas 2009). These changes admittedly do not correspond precisely to the classical definition of rule inversion, since they take place in the same environment, and thus do not involve the "complementation of the environment," as true rule inversion does, but they do involve the "reversal of the input and output of a rule." While this particular development may therefore not be a clear-cut example of rule inversion, the reasoning here could be extended to cover other phonological phenomena in New Braunfels German (e.g. the unexpected occurrence of front rounded vowels in some contexts), which may yet reveal such examples of rule inversion in New Braunfels German.

You only get out what you put in: Acoustic analysis in support of the comparative method

Rebekka Puderbaugh University of Edinburgh

The present paper uses acoustic analysis to describe, compare, and contrast the phonetic profiles of cognate pairs in Upper Necaxa Totonac and Huehuetla Tepehua, especially with respect to non-modal phonation in vowels. Potential methods for increasing transparency and reproducibility in transcription are illustrated as a first step toward establishing a standard of best practice in phonemic analysis of under-described languages. This preliminary analysis using modern computational and analytical tools demonstrates that the incorporation of explicit, transparent annotation criteria and the subsequent reproducible transcriptions will further strengthen traditional analyses from well-established methodologies such as the comparative method.

The Totonac-Tepehua languages are morphosyntactically complex, polysynthetic languages with nominative-accusative alignment, and flexible verb-initial constituent order (Levy & Beck, 2012). Their sound systems largely resemble the most common inventories in the UPSID (Maddieson & Precoda, 1990), but they do include some less common sound patterns such phonation contrasts in vowels, referred to within the family as *laryngealization*. In fact, the family is divided into two major branches, Totonac and Tepehua, in part on the basis of the temporal alignment of laryngealization within the syllable. Totonac languages laryngealize syllable nuclei, resulting in contrastive vowel phonation, while Tepehua languages laryngealize syllable onsets, resulting in a contrast between pulmonic and glottalic stops (Beck, 2014, Brown, et al, 2011). The correspondences between Totonac CV syllables and Tepehua C'V syllables is well-established (Beck, 2014, MacKay & Trechsel, 2018) and factors into ongoing work in reconstruction of Proto-Totonac-Tepehua through use of the comparative method.

The comparative method in historical linguistics is considered to be one of the most successful and irrefutable tools of linguistic inquiry (see, for example, Ohala, 2017). Though originally based on historical written texts, the work of Bloomfield and others has established the applicability of the comparative method to unwritten languages as well (Campbell, 1996). Nevertheless, the reliability of the reconstructed forms and phylogenetic relationships among languages within a family would seem to depend on the accuracy of the language data that feeds into the analysis. While the comparative method may be applied to transcriptions representing any level of detail from close phonetic transcriptions to abstract phonemic representations, the selection of which level of representation to use as input is largely unaddressed in the literature (Rankin, 2003). In the case of Totonac-Tepehua, phonetic descriptions of laryngealized vowels and glottalic stops are highly variable and sparsely available. This variation and sparse data makes it difficult to determine which forms constitute the best input for comparative reconstruction. Resorting to a broader surface phonemic representation, as recommended by Harrison (2003), may not resolve the issue, as the phonemic analysis itself may require further investigation. For example, acoustic analysis of data from Upper Necaxa Totonac suggests that phonetic vowel laryngealization may be conditioned by the presence of following glottal stops, where present (Puderbaugh, 2019).

Although preliminary, this paper suggests that detailed acoustic analysis can improve the accuracy of phonetic transcription, which can in turn improve phonemic analyses. Improving the accuracy and precision of both phonetic and phonemic representations of language data, can contribute to explicit specifications for the input to the comparative method, further refining and strengthening an already robust methodology.

Stress and weight from Latin to Old French

Thomas Rainsford

Institut für Linguistik/Romanistik, Universität Stuttgart

In this paper we outline the changing relationship between syllable weight and stress from Latin to medieval French and examine in particular the sound changes which broke all links between the two phenomena. In so doing, we intend to gain insight into the initial stages of the loss of lexical stress in French and its replacement by a system of group stress, a development argued to have taken place in the medieval period and well in evidence in 16th-century accounts of French prosody (cf. Pope 1939, Marchello-Nizia 1995, Rainsford 2011).

Our approach to this problem is based both on the reconstruction of sound changes between Latin and Old French and on a detailed analysis of the syllable structure of all forms attested in two 12th-century manuscripts. Firstly, using evidence from sound change, we argue that the relationship between syllable weight and stress passes through four distinct phases: 1. quantity-sensitive stress rule (Classical Latin); 2. bimoraicity of the stressed syllable due to syncope in proparoxytones and the (allophonic) lengthening of all stressed vowels in open syllables (Late Latin, cf. Loporcaro 2011, 2015); 3. dissociation of quantity and stress following degemination and depalatalization of consonants (in evidence in the earliest French texts); 4. emergence of new phonemic long vowels independently of stress due to coda loss and compensatory lengthening (Late Old and Middle French, cf. Morin 2006)

We will focus in particular on the third phase of development in which the association between stress and quantity begins to break down. We argue that degemination ultimately causes the re-emergence of light stressed syllables, which come to form minimal pairs with heavy stressed syllables containing diphthongs derived from formerly allophonically lengthened vowels, e.g. Early Old French (EOF) 'peinə < PĒNA \neq 'penə < PĬNNA. Moreover, the depalatalization of palatalized consonants creates new diphthongs in pretonic syllables, increasing the frequency of unstressed CVV syllables. (e.g. EOF plaj'dzir < proto-French *pla'dz^je:re < PLACĒRE)

To complement the diachronic perspective, we provide a synchronic snapshot of possible syllable structures in early 12^{th} -century Old French through a quantitative analysis of over 5 000 forms in two Anglo-Norman manuscripts (the Oxford *Chanson de Roland* and the *Life of saint Alexis* from the St. Albans Psalter).

A morphophonological account of Mass / Count distinction from Latin to Romance

Michela Russo University of Lyon and UMR 7023 SFL CNRS-Univ. Paris 8

Most central and southern Italo-Romance languages developed a semantic and morpho-syntactic category of neuter nouns derived from the Latin neuter. The reanalysis of the Latin gender led to Italo-Romance nominals marked by a linguistic Mass distinction (Fanciullo 1994; Maiden 1997; Russo 2002; 2009). These nouns include entities expression of product or substance (e.g. *iron* as metal), abstract (*evil, good*), nominal adjectives, past participles, infinite nouns, as well as other non-countable concepts. The Mass /Count distinction follows clear phonological and morpho-syntactic criteria. In the languages under scrutiny, the Det category triggers *Syntactic Doubling* in the onset only when the Noun is Mass (as opposed to the MSG):

(1) Mass Num		e.g. Neapolitan 17 th c., but also	e.g. Neapolitan 17 th c., but also modern		
(a) Latin	Neuter Gender > Mass Num				
lo ll atte	'milk'	Lat. LAC (Acc)	(Neuter)		
DSG N-MassS	G				
lo cc aso	'cheese'	Lat. CASEUM	(Neuter)		
DSG N-MassS	G				

The opposition between the two Latin genders, masculine and neutral, undergoes a phonological and morphological rearrangement: the new class of neutrals includes not only Latin neutrals, but also masculine nouns that relate to mass concepts:

The identification of the neutral noun depends on precise grammatical strategies such as the application of *Syntactic Doubling* which gives a geminate (\emptyset c- C). The *Syntactic Doubling* is triggered by the D° proclitics placed to the left of a lexical category [+Mass], analysed as syntactic heads (see 2), due to a cliticization effect:

(2) Syntactic Doubling – Geminates are syntactically licenced by an upper syntactic head specified [+Mass]
 Geminate: (Ø_l-1) n



Rule (2) applies to certain roots and not to others, and results in nominal (and verbal) onset gemination, for reasons that do not appear to be only phonological in nature.

In addition, Mass nouns are preceded by an extended bi-syllabic article (D°) derived by the Lat. ILLUD, realized as a lateral geminate (that undergoes different harderings and rhoticisation). This geminate /ll/ marks in many dialects the Mass distinction in the prenominal articles. This lateral geminate /ll/ specified [+Mass] in the D° category is opposed to a singleton lateral /l/ marking the masculine D° (3) (see Procida near Naples):

(3) Hardering + Rho	oticisation of the bisyllabic Art	/ll/ + N Mass	$= D^{\circ} = [ra]$
$\left[\frac{DP}{ll}\right]_{[+Mass]}$	[rə kˈkesə]	'D° +chee	ese'
$v + \frac{1}{\sqrt{1}}o$ [+RS]	$D^{\circ} = /ll/$	Lat. ILLUD (Neut	ter Mass)
$CV_1 + C_1 C_2 V_2 / \emptyset cv /$	= / de + llo/	(as in Medieval N	eapolitan)

In (2) and (3) phonological rules refer to morphemes and to a morphological feature (e.g. $[\pm Mass]$) associated to phonological rules.

These pieces of phono-morphological information interact in complex ways and require a 'full decomposition' (Embick 2015). The Mass distinction appears split and distributed over nominal root onsets, inflexional morphemes and D categories.

Do these alternations result from the storage in memory of distinct allomorphs (see Embick & Kobey 2017)? It seems that on the one hand, the morphophonological alternations can be handled by phonological and syntactic rules as (2); on the other hand, they are stored and employed in the appropriate contexts. However, the Vocabulary Items always gives phonological content to morphemes that have the feature [\pm Mass].

Vowel harmony decay in Old Norwegian Jade J. Sandstedt Nord University

Vowel harmony involves the systematic correspondence between vowels in some domain for some phonological feature. Though harmony represents one of the most natural and diachronically robust phonological phenomena that occur in human language, how harmony systems emerge and decay over time remains unclear. In particular, the pathways by which harmony languages lose harmony and what motivates harmony decay is poorly understood since no consistent historical record in any single language has yet been identified which displays the full progression of this rare sound change (McCollum 2015, Kavitskaya 2013, Bobaljik 2018). In this paper, I present a diachronic corpus study of recently digitised Old Norwegian manuscripts, which display distinct pre-, transitional, and post-decay stages, providing the first coherent record of harmony decay in progress.

As shown in (1), Old Norwegian (*c* 1100–1300) displays height harmony, resulting in systematic alternations between high and non-high vowels in agreement with root-initial (stressed) syllables. Unstressed high vowels co-occur with high vowels / diphthongs while non-high vowels follow mid / low vowels.

(I) Height harmony in Old Norwegian

Нідн	'h <u>u:</u> s-i	<hufi></hufi>	'h <u>u:</u> s-um	<hufu<i>m></hufu<i>	'house'-dat.sg./pl.
	'sk <u>i</u> p-i	<ſkipi>	'sk <u>i</u> p-um	<fkipum></fkipum>	'ship'-dat.sg./pl.
Non-high	'lj <u>o:</u> s-e	<liofe></liofe>	'lj <u>o:</u> s-om	<liofom></liofom>	ʻlight'-DAT.SG./PL.
	's <u>e</u> gl-e	<fegle></fegle>	's <u>e</u> gl-om	<feglo<i>m></feglo<i>	ʻsail'-DAT.SG./PL.

Old Norwegian has a continuous written record during the decay of its vowel harmony system in the 13th– 14th centuries. As a part of the Medieval Nordic Text Archive, a large portion of this period's manuscripts has been digitised in recent years in a form suitable for large-scale corpus linguistic research. Using this material, I illustrate novel corpus methods for tracking, visualising, and analysing harmony decay in historical corpora.

Fig. 1 provides a preliminary look at Old Norwegian harmony decay based on a sample of around 200,000 vowel sequences from six 13th-century scribes. Fig. 1 displays the mean height harmony rate triggered by high, low, mid, and diphthongal vowels for each scribe in historically harmonising V_1-V_2 sequences. Here we see that an overall lower harmony mean (the reference line) is correlated with increasing dispersion in harmony rates across vowel classes, demonstrating that harmony decay is present in the corpus. The manuscripts on the left (H6/DG8) illustrate robust harmony systems, where height correspondence is under tight control (high harmony and low variance). The two DG4_7 hands display transitional systems (lower harmony but still low variance), and the manuscripts on the right display more or less completed harmony decay (low harmony and high variance).

Old Norwegian harmony decay displays a number of characteristics associated with decaying or decayed harmony systems, including changes to the



Figure 1: Mean harmony levels by manuscript V_1 -height class in pairwise vowel sequences

vowel inventory (mergers/splits), a high rate of disharmonic morphemes, and gradient harmony patterns which peter out at increasing distances from the harmony trigger (Harrison, Dras & Kapicioglu 2006; Kavitskaya 2013; McCollum 2015, 2018; Bobaljik 2018). Using this corpus, which displays the full progression of harmony decay, I provide the first clear diagnostics of productive vs. decaying harmony systems and a detailed survey of the potential causes and pathways of harmony loss in Old Norwegian.

San Diu – Is it a variety of Cantonese or is it something else?

Matthew Sung, University of Edinburgh

San Diu, a language spoken in Northern Vietnam which is mostly found in Tuyen Quang, Thai Ngyuen, Vinh Phuc, Bac Giang and Quang Ninh provinces is understudied. The genetic relationship between San Diu and other languages is still not clear. There have been claims that San Siu is a form of Chinese language (Pham & Nguyen 2014: 89). Edmondson and Gregerson (2007: 744) stated that it is a form of archaic Cantonese, possibly related to Pinghua which is spoken in modern day Guangxi, China. Haudricourt (1960) compared 5 languages in the region of Moncay with Cantonese and Hakka and he classified San Diu under Hakka. In Ngyuen's (2013) study, she compared San Diu vocabularies with three Chinese dialects: Yue (Guangzhou), Hakka (Meixian) and Southern Min (Teochew). She found that around 2/3 of the San Diu vocabularies are similar to Hakka (lexically and for some, phonetically).

To explore the genetic classification of San Diu further, I will be using shared innovations as a criterion for classification in this paper. This is another way to falsify previous claims and the observation made by surface synchronic comparison between Chinese dialects and San Diu. Innovations that are prototypical and unique to three Chinese dialect groups were chosen and compared with San Diu. Over 400 syllables were analysed overall. The result shows that, firstly, a huge amount of words are not from a Sinitic origin. Secondly, San Diu shares innovations with Yue and Hakka. I argue that the Sinitic words in San Diu largely came from Yue, since more innovations are shared with Yue than Hakka. This, however, does not dispute the possibility that Hakka words did not make their way to San Diu. Further studies are needed for a deeper understanding to the origin of this language.

REVERSAL OF A LINGUISTIC PROCESS UNDER THE INFLUENCE OF DOMINANT LANGUAGES: A CHALLENGE FOR THE LIFE CYCLE MODEL (LCM) OF SOUND CHANGE

Nasir Abbas Rizvi Syed (LUAWMS)

Saraiki is an Indo-Aryan language of Pakistan (Bashir, Conners & Hefright, 2019). Voiced fricative [fi] undergoes or triggers different phonological processes like deletion, insertion, assimilation, dissimilation, displacement/metathesis, etc. in Saraiki. Among these fi-deletion is very significant. Moreover, like other Indo-Aryan languages, Saraiki has a very flexible word order. In this paper, we argue that the same behavior of [fi] along with the flexibility in word order had caused emergence of pronominal suffixation with verbs in Saraiki. Following the movement approach (Anderson, 2005; Chomsky, 2008), we assume that historically, pronominal suffixation emerged in Saraiki as a result of movement of the subject followed by fi-deletion, e.g.

mei $ak^{hi}a$ fie $\rightarrow ak^{hj}a$ fie mei $\rightarrow ak^{hj}a$ fiim (fie # mei > fiim) $\rightarrow ak^{hj}em$ (fi-deletion) 1SG said COP ('I have said').

The life cycle of this process already completed in the past. Interestingly, now-a-days, a reversal of the same process in modern Saraiki (detachment of pronominal suffixes from principal and copular verbs) has started taking place due to language contact situation. This mirror image direction change is contrary to claims of the life cycle model (LCM) of historical linguistics (Bermudez-Otero, 2013; Bermudez--Otero, & Trousdale, 2012; Ramsammy, 2015; Sen, 2016).

Whereas pronominal suffixation is a prominent feature of Saraiki (Shackle, 1976), Urdu, the national language of Pakistan and Punjabi the dominant regional language in Saraiki speaking areas, lack this phenomenon though Urdu and Punjabi also have flexible word-order like Saraiki. Under the strong influence of Urdu and Punjabi on modern Saraiki, a process of detachment of pronominal suffixes from the principal and copular verbs has started. For example, the idea 'I *have hit*' could be translated in the old Saraiki in a single word 'mar^jem'. But, in modern Saraiki, the same can be expressed in the four possible ways listed in column 2 of the table below. All these expressions are acceptable in Saraiki today. The variation in the structure of these sentences is a function of the influence of Urdu and Punjabi on Saraiki. The more a Saraiki speaker is under the influence of Punjabi and/or Urdu, the more detached pronominal morphemes are from the verbs in his/her verb phrases. This change is at different stages in various social strata of Saraiki speakers providing a solid example of rule scattering. However, the variation is at sociolectal instead of dialectal level. This sociolectal continua indicate reversal of a diachronic process which had already completed its life cycle. We argue that in historical development of pronominal suffixation in Saraiki, the language structure underwent the following stages from 1 through 4 whereas in the modern Saraiki, the direction of change is from 4 through 1. These and similar other examples pose a challenge to the LCM which claims that after completion of life cycle of a linguistic process, its reversal is not possible. In this paper we shall present data to point out some other dynamics of change in languages.

Direction of development	Sociolectal variants/stages	Processes
Diachronic↓	1. mei (I) mar ^j a (hit) fie (have)	SV COPULA
	2. mar ^j a ĥe meĩ	Movement of Subject
Synchronic ↑	3. mar ^j a fiim (fie # mei \rightarrow fiim)	Pronominal suffixation
	4. mar ^j em (mar ^j a # fiim→ mar ^j em)	h-deletion

Lat. -ĒTIS > Am.Spanish voseo varieties {-éis, -és, -ís}: A complex story you can only tell with rankable constraints.

Miguel Vázquez-Larruscaín (University of South-East Norway)

- 1. INTRO: The story of the Latin 2nd person plural ending takes incredible proportions in Spanish, such as to push every possible diachronic model to its limits. There are at least three parts of it: (i) from Latin to Old Castilian, (ii) changes in Spanish Golden Age (Lapesa 1970), and (iii) from 2nd plural to 2nd singular informal address in Spanish *voseo* varieties (Fontanella de Weinberg 1978). Our focus is on the third part.
- 2. MEDIEVAL SPANISH: Medieval Spanish turns the voiceless -t- of the ending into the regular voiced and continuant -d-, so that Lat. CANTĀTIS becomes O.Sp. *cantades*. The conjugation vowel, etymologically long and therefore stressed when penultimate, lost not only length but also stress in all preterite tenses, so that Lat. CANTABĀTIS ended up with antepenult stress in O.Sp. *cantábades*. Thus, unlike in the present tenses, which retained stress in *cantamos* or *cantáis*, a columnar nonetymological stress developed in all past tenses, requiring among other things, endingspecific syllable extrametricality if it was to be regularly derived by any metrical algorithm. Besides, 2nd person plural, as in current French, was also a 2nd singular form of formal address - already attested in the major epic *Cantar del Mio Cid*.
- 3. GOLDEN AGE SPANISH. 2nd plural –DES underwent a number of changes between early SXVI and SXVIII. On the phonological front, -des became –is or simply –s, depending on variety. –Is became the standard form, even in non-etymological *cantasteis*, while –s survived in substandard forms like *vos cantás*, particularly vigorously in the American continent. In addition, a major break between European and American Spanish took place. European Spanish abandoned *vos cantá(i)s* as 2nd singular formal address, but retained *vosotros cantáis* as plural, for informal address. American Spanish took other directions. All Am.Sp. varieties eliminated *vosotros cantá(i)s* for 2nd sg., but only for informal address. A new paradigm developed by fusing old *vos* and *tú*, or *voseo americano*, widely spread and highly variable.
- 4. CONTEMPORARY AMERICAN SPANISH VOSEO: *Voseo* varieties have four sets of endings: (i) –áis, éis, -ís, (ii) –ás, -és, ís, (iii) –áis, -ís and (iv) –ás, -ís. Theoretical models face problems with this complex story. None of the endings follows the path of a blind neo-grammarian process nor analogical reasoning has been able to answer how –edes became -ís, particularly in subjunctive *vos cantís*. Rule reordering and restructuring, to a certain extent, appear arbitrary. A parameter-based approach is the only model that could explain why two possible sets of endings are nowhere to be found, that is, (v) –ás, -éis, -ís, or (vi) –áis, -és, -ís. However, -ís in 3rd class verbs like *vivís* is always monophthongal, regardless of how a hypothetic parameter [±diphthong] could be set up. In my mind, only a constraint-based approach is capable of providing a consistent account of this ending's complex evolution in American Spanish, based on the limits of a dynamically variable space defined by the following constraints, which combine both phonological and morphological output conditions:

(1) Constraints: ***-íis, *DIPHTHONG, (II=III)** indicative, Isubjunctive=II indicative. Of these, only *DIPHTHONG and (II=III) indicative are variably violated in varieties of Spanish. The other two, ***-**íis and I_{subjunctive}=II_{indicative}, are always, however, surface-true in any variety of Spanish anywhere.

Models of relative chronology: reconstruction and representation

One of the key issues of diachronic phonology concerns the patterning of particular changes in the history of a languages (see also the announcement of the symposium). The order according to which certain innovations took place may not only reveal interconnections between them but give insights into the mechanisms and factors which determine phonological change. For example, the concentration of changes sharing a specific feature may allow to identify language contact as a source of change. However, the reliability of any such conclusion rests crucially on our knowledge on the sequence according to which the changes occurred. The reconstruction of the chronology of sound changes is thus one of the major tasks of historical phonology. The present paper addresses matters concerning the reconstruction and representation of models of relative chronology.

Although the methods by which such models can be elaborated are known since the earliest days of historical linguistics, they are hardly ever applied exhaustively. Even in such well-studied language families as Slavic it is usually only the most obvious relationships between individual changes which are taken into account in historical grammars (cf., for example, such monumental works as Shevelov 1964). An exception to this is constituted by Georg Holzer's (2007) historical grammar of Croatian. In this monograph the author presents a model of the relative chronology of the post-Proto-Slavic Croatian sound changes that is based on all relationships which he is able to detect between individual changes. His study shows, that much more changes than it is usually suggested in historical grammars can be dated relatively to each other.

Following Holzer's example I have elaborated a model of the relative chronology of the post-Proto-Slavic Russian sound changes. The first half of my talk will be dedicated to the reconstruction of this model. 71 changes were identified as falling into the relevant period, whereby both segmental and suprasegmental innovations were considered. Following this, all logical relationships (Feeding, Bleeding, Counterfeeding, Counterbleeding) detectable between these changes as well as data from loanwords and, if available, written sources were analyzed. As a result, changes could be dated relatively to each other in nearly 200 cases, whereby it is important to note that these datings are not based on theoretical premises on the nature of sound change which may be vary within different conceptions but follow solely from the analysis of the data.

Since models such as the one just described are quite complex, the question of how to present them accurately arises. A proper representation should not only make it possible to access all the included data but also to compare different competing reconstructions on both a large and a small scale. In book format this is only possible to a very limited extend. In the second half of my talk I will therefore present a way of how models of relative chronology can be represented digitally.

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Phonological units for phonological change

Dmitrii Zelenskii (Lomonosov Moscow State University)

The question of what types of units and domains are needed in order to capture phonological change is often believed to make sense. To answer such a question, a phonological change is first to be properly defined. The definition obviously depends on the phonological framework.

For Optimality Theory, for instance, phonological change (as opposed to lexicon shape change for specific lexical items) is a change of constraint hierarchy (whereas both constraints themselves and features are believed to be universal (Kager, 2004)).

For Moscow Phonology School (Avanesov, et al., 1945) phonological change can be either change of rules for choosing a phoneme's allophone or change of phoneme set – for example, Russian palatalized and non-palatalized velars, having been allophones by the time of the paper, can be considered to have become phonemes now, as minimal pairs such as *kuri* 'smoke (imperative singular)' – *k'uri* 'curie (measure unit)' show.

For standard Generative Phonology and its direct successors there are actually (at least) two possible types of change (referred to, e.g., by Kiparsky (1982)): change of rules (be it their order or their formulae) and change of feature set - e.g., vowels which were previously distinguished by ATR feature (with redundant phonetic back feature added lately) become distinguished by back feature (with phonetic ATR feature). Note that Steriade (2000), having accepted OT, argues against the distinction of phonetic and phonological features; for the purposes of this abstract I choose to ignore her arguments, having acknowledged their existence.

However, in each case the same condition holds: change can only be described in the same units (and, presumably, domains) as synchronic description is. That leads to the following conclusion: set of units for phonological change is a subset of the set of units for synchronic description. However, it is also unlikely that some units needed for synchronic description can be fully ignored for all descriptions of synchronic changes, which leads us to believe that set of units for phonological change is also a superset of the same set. Therefore, the sets are equal: phonological units are the units for phonological change sought for, and the question above is meaningless.

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