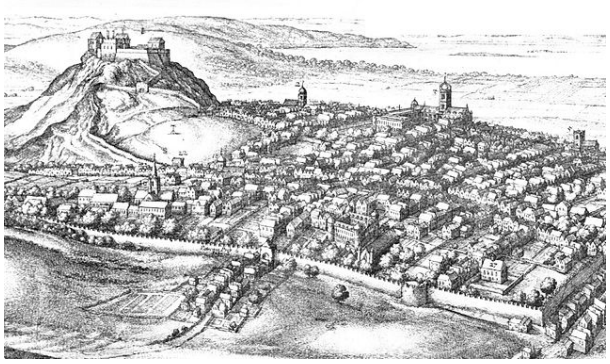
The Second Edinburgh Symposium on Historical Phonology

Featuring the Angus McIntosh Centre for Historical Linguistics plenary speaker



ABSTRACTS BOOKLET

3rd – 4th December 2015

University of Edinburgh

With support from **the Linguistics Association of Great Britain** and the **Angus McIntosh Centre for Historical Linguistics**

TALKS

Tone loss in Sranan Creole: rethinking contact-motivated change

Emily Barth
elb252@cornell.edu

BACKGROUND. In the family of Surinamese creoles, Sranan is a purely stress-accent language, whereas both Ndyuka and Saramaccan exhibit phonological tone in addition to stress. Alleyne (1980) and Devonish (1989;2002) assume that the proto-creole had phonological tone, which Sranan lost in conjunction with late innovation of onset consonant clusters. I contend that, while tone was likely present in the proto-creole, it only acquired distinctive phonological status in Ndyuka and Saramaccan after removal of original liquid clusters through epenthesis in CR-onsets and intervocalic liquid deletion. Syllable restructuring created mismatches in the placement of tone and stress, which encouraged the retention of both prosodic phenomena.

PREVIOUS ACCOUNTS. Alleyne and Devonish both believe that CV structure was canonical in early Suriname creole and Sranan onset clusters were a late development associated with Dutch superstrate influence. Alleyne argues that stress took a primary role Sranan in direct emulation of Dutch prosody, after which unstressed vowels became susceptible to deletion, e.g. 'creek' > *ki ˈríki* > *ki ˈriki* > *ˈkriki*. In Devonish's view it is syllable structure that Sranan modeled after Dutch, and stress accent went from a secondary to primary feature as a by-product, e.g. 'creek' > *ki ˈríki* > *ˈkríki* > *ˈkriki*. Under both analyses, Ndyuka and Saramaccan undergo only a trivial change of liquid deletion, e.g. 'creek' > *ki ˈríki* > *ˈkiíki*, and are otherwise conservative.

However, Aceto (1996) argues for the presence of CR- onsets in the proto-creole, based on the widespread regular appearance of orthographic clusters in our earliest Saramaccan documents, and also on the recording of clusters even when the donor words already conformed to CV structure (e.g. 'believe' > *bribi* and 'aborrecer' > *brusséh* in 18th century Saramaccan). These findings necessitate a re-thinking of the causal relationship between syllable re-structuring and prosodic change. If CR- onsets were indeed an original feature of the proto-creole, the development of consonant clusters could not have been what directly caused Sranan tone loss.

ANALYSIS. I argue Ndyuka and Saramaccan independently innovated heavy syllables through a process of epenthesis and liquid deletion. According to Huttar (1994) and Rountree (1972), these newly created heavy syllables attract stress away from its original position, e.g. in Ndyuka 'fly-mouse' (i.e. 'bat') >**fle ˈmúsu* >**fele ˈmúsu* >*ˈfeemúsu*. This created mismatches between the location of H tone and main stress. Before the creation of heavy syllables via epenthesis and liquid deletion, the assignments of underlying H tone and stress coincided naturally, as they continued to do in Sranan. With fully redundant distributions of H tone and stress, Sranan was susceptible to prioritization of one over the other. Only at this point did Dutch influence come into play, pushing the Sranan prosodic system to level in favor of stress-accent rather than tone. Thus Sranan tone loss is an innovation, but its syllable structure is conservative. Meanwhile innovatory syllable re-structuring in Ndyuka & Saramaccan contributed to conservation of tone and an increased, distinctive role of tone in these languages' phonological systems.

My analysis:	'creek' > *ˈkríki* > *ˈkriki*	(Sranan)
	'creek' > *ˈkríki* > *ki ˈríki* > *ˈkiíki*	(Ndyuka & Saramaccan)

Previous accounts of Sranan tone loss label Ndyuka and Saramaccan as conservative, and Sranan the innovator—with my reevaluation of cause and effect, I have shown that these labels are not applicable, as all three creoles both innovate and conserve, and that innovation in one area can inhibit change in another. Further, these accounts depend on language contact being able to directly induce major phonological innovations, whether introducing new syllable types or new systems of stress and accent. I suggest language contact only triggers systemic phonological change when there is an internally motivated vulnerability pre-existing in the language.

A constant rate effect in Manchester /t/-glottalling:
high-frequency words are ahead of, but change at the same rate as, low-frequency words.

Ricardo Bermúdez-Otero,[1] Maciej Baranowski,[1] George Bailey[1] & Danielle Turton[2]
[1] *University of Manchester,* [2] *University of Newcastle upon Tyne*

The impact of lexical token frequency on phonetic implementation has been argued to support Exemplar Theory in the following way (Bybee 1998, 2002; Pierrehumbert 2001, 2002):

(a) Synchronically, high-frequency lexical items exhibit more coarticulation and reduction than low-frequency items (e.g. Dinkin 2008, Gahl 2008, Myers & Li 2009, among many others).
(b) This is because, in diachronic processes of lenition, frequent words change at a faster rate than infrequent ones.
(c) In turn, this is because high-frequency items suffer greater exposure to phonetic biases in production and perception than low-frequency items, and the effects of this difference are directly registered in phonetically detailed lexical representations.

This argument suffers from several problems. Hypothesis (b) has not been corroborated by actual diachronic observations in real or apparent time. Indeed, (a) does not logically entail (b): as acknowledged by Hay *et al.* (2015), frequent items can be ahead of infrequent ones, and yet change at the same rate. In such a scenario, the impact of frequency gives rise to a **constant rate effect** (CRE) in the sense of Kroch (1989): when modelled as logistic functions, the curves of change for high- and low-frequency items exhibit different intercepts but equal slopes. The existence of CREs in phonology was established by Fruehwald *et al.* (2013). Without drawing an explicit connection with Kroch's concept, Zellou & Tamminga (2014) report an instance of gradient coarticulatory change affecting high- and low-frequency items at the same rate. As regards (c), the empirical predictions of Exemplar Theory remain unclear. Sóskuthy (2014) shows that, in the absence of *ad hoc* stipulations, the inertia of a large exemplar cloud will cancel out the effects of greater exposure to phonetic bias. In addition, Hay *et al.* (2015) propose an exemplar-based account for a sound change apparently led by **low-frequency** words.

In this paper, we challenge (b) with evidence from a CRE in /t/-glottalling in Manchester English. As expected, token frequency has a strong effect on /t/-glottalling, but during the 20th century the proportion of glottal realizations increases at the same rate in high- and low-frequency wordforms. Our data come from a sociolinguistically stratified sample of 49 speakers born between 1926 and 1985, and raised in Manchester from age 3 or younger. 8,255 tokens of /t/ in word-medial and word-final positions were auditorily coded as glottal, i.e. [ʔ], or nonglottal. Each wordform was assigned a frequency score on a Zipf scale based on the SUBTLEX-UK corpus (van Heuven *et al.* 2014). Figure 1 shows that the curves of change in apparent time for high- and low-frequency items are parallel. Figure 2 shows that, when compared to the overall rate of /t/-glottalling, the average glottalling rate of the highest-frequency words fails to increase with time, and that of the lowest-frequency words fails to decrease. A generalized mixed-effects logistic regression model with frequency (as a continuous variable), birthyear, social class, and following segment as fixed effects provides the best fit for the data; speaker and word were included as random effects. Crucially, a birthyear:frequency interaction proves not to be significant, and adding it does not improve on the model without the interaction (by ANOVA comparison). We conclude that the impact of token frequency on the rise of /t/-glottalling in Manchester English produced a CRE, with all wordforms changing at the same rate.

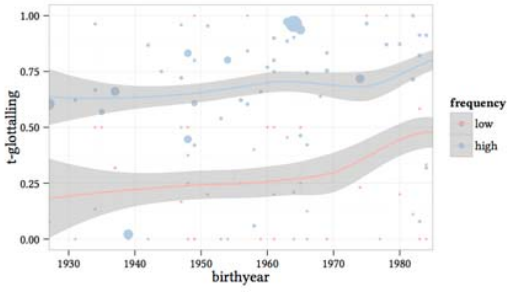


Figure 1

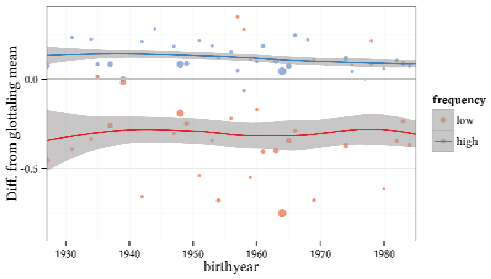


Figure 2

The absence of evidence for (b) suggests that alternatives to (c) should be considered. Frequency-driven CREs are consistent with modified versions of classical modular architectures in which neogrammarian innovation is effected through change in phonetic implementation rules referring to phonological categories in surface representations (Bermúdez-Otero 2015: §2.2), whilst the impact of token frequency is produced by orthogonal mechanisms.

Phonetic (non-)explanation in historical phonology: duration, harmony, and dissimilation

Bert Botma
Leiden University
e.d.botma@hum.leidenuniv.nl

Pavel Iosad
University of Edinburgh
pavel.iosad@ed.ac.uk

Hidetoshi Shiraishi
Sapporo Gakuin University
hide@sgu.ac.jp

In this paper we consider the diverging phonologization paths of a single phonetic phenomenon, namely durational trade-offs between neighbouring vowels. We show that the shortness of a vowel relative to a neighbouring one can give rise to both assimilatory and dissimilatory phonological patterns. While this ambiguity is consistent with the stochastic nature of phonologization posited by evolutionary models of historical phonology (Blevins 2004), we suggest that this latitude weakens these models' predictive power.

As discussed in detail by Barnes (2006), relative shortness promotes unstressed vowel reduction, which endangers cues to some vocalic contrasts, especially height. This leads to ambiguity in weak positions, creating the potential for hypercorrection (Ohala 1981) and thus phonological change whereby the vowel in a weak position is interpreted as identical (or at least similar) to that in a strong position. We present a detailed analysis of stress-dependent height harmony in Nivkh whose origin can be plausibly reconstructed using just such a scenario. In a study of 291 disyllabic roots, we find a strong preference for the vowels to be identical, as well as a strong dispreference for second vowels being non-high unless licensed by a preceding (ideally identical) non-high vowel. We interpret these results as indicating that Nivkh possesses a system of height harmony. Measurement of vowel duration in field materials confirms the relative shortness of unstressed vowels, which is consistent with the scenario proposed by Barnes (2006). A similar role for reduced relative duration in the genesis of harmony systems can be posited for Gallo-Romance (Delucchi 2013) and central North Germanic (Hesselman 1948–1953).

A very similar phonetic precursor, however, has been posited to account for *dissimilation* phenomena involving height. Relevant cases are found, among other languages, in East Slavic dialects (e. g. Crosswhite 2000), Irish (Ó Sé 1984), and Welsh (Awbery 1986). For instance, in Connacht Irish we find reduction of non-high vowels to high before [a(ː)] (Old Irish *occoras* 'hunger', *bratán* 'fish sp.' → Modern (Connacht) Irish [ˈʊ̲kra̲s], [ˈbrʊ̲dɑ̲ːn]) but not before other second-syllable vowels (OIr *cotlud* 'sleep', *deired* 'end' → MIr [ˈkʌ̲lʏ̲ə], [ˈdʲɛ̲rʲə]). In Welsh, long mid vowels are lowered before a high vowel: [ˈe̲ːdɛ̲] 'string' but [ˈtʰɛ̲ːbɪg] 'similar'. These cases can be interpreted as adjusting vowel quality to bring the vowel's inherent length in line with the pattern of the durational trade-off, leading to dissimilation.

Thus, syntagmatic relationships between the durations of different vowels, in particular the relative shortness of some vowels compared to others, can be phonologized as both assimilatory and dissimilatory patterns. This fact appears *prima facie* to be consistent with functionalist approaches that emphasize the stochastic nature of phonologization processes (cf. the CHANCE mechanism of Blevins 2004). We argue, however, that at the same time it weakens the *predictive* power of these functionalist approaches, in that the stochastic nature of the processes is an obstacle to constructing a theory of phonological change based solely on phonetic factors.

This conundrum can, at least in principle, be resolved with better phonetic data: in the present state of our knowledge there is no guarantee that the phonetic precursors to the different changes were sufficiently similar in relevant respects (cf. Pearce 2007 on a potential precursor to dissimilation in Kera). We argue, however, that in the absence of such detailed data functional explanations cannot be assumed to be automatically superior to formal ones in historical phonology. Thus, our conclusion supports the proposition that phonological factors may play a significant role in sound change (potentially even at very early stages; Janda 2003, Baker, Archangeli & Mielke 2011, Fruehwald 2014) and are not entirely obviated by appeals to functional factors.

Tracing the early development of a vowel shift

David Bowie
david.bowie@uaa.alaska.edu

Studies of new dialect formation have, in some cases, traced the development of individual linguistic features from the formation of a community (see, e.g., Gordon et al. 2004; Kerswill & Williams 2005; Bowie 2012), but they have not generally traced the historical development of entire linguistic *systems*. This paper fills that gap by looking at the historical development of one variety of English, and tracing the development of that speech community's participation in a pan-regional vowel shift.

Though "the West" was identified as a single North American dialect region by Labov, Ash, & Boberg (2006), other work has found that Western US varieties might best be thought of as related, but certainly not unitary. That said, they do generally share a number of linguistic features, and one of the features that appears to be widely shared to a greater or lesser extent by Western US varieties is a set of changes in the vowel system variously known as the California Shift (e.g., Aiello 2009), the Canadian Shift (e.g., Clarke, Elms & Youssef 1995), and the Third Dialect Shift (e.g., Durian 2012).

Studies of the variety of English spoken along the Wasatch Front of Utah have found a number of features associated with the Third Dialect Shift (Di Paolo 1992; Di Paolo & Faber 1990; Krahnke 1979; Lillie 1998; Reeves 2009, among others). However, none has looked at the historical changes that have led to this system, even though archival recordings exist that allow the development of Utah English linguistic features to be traced from the initial English-speaking settlement of the region in the mid-nineteenth century to the present (cf. Bowie 2003; Bowie 2012), including the period during which Utah was quite isolated geographically from the rest of the English-speaking world. This study, then, looks at the speech of representatives of the first generations of English speakers born in Utah and analyzes their production to trace the history of the development of the Third Dialect Shift there, and compares the trends found to those from other studies of the early development of new varieties (e.g., Gordon et al. 2004; Kerswill & Williams 2005; Calude & James 2011).

Thirty speakers were analyzed, fifteen born during the first half century following permanent English-speaking settlement in what was to become Utah (i.e., 1847 to 1896), and fifteen born during the next half century (i.e., 1897 to 1946). Each individual's speech was obtained from archived recordings of radio (and, in later years, television) broadcasts, sampled in years divisible by five beginning in 1940 (i.e., 1940, 1945, 1950, 1955, and so on); individuals appeared in multiple years across the sampled broadcasts, providing a sizable corpus for most speakers. Acoustic and impressionistic measurements of vowel production were obtained for all of the vowels involved in the Third Dialect Shift, as well as vowels that are not involved in the shift but that can be used to measure the degree of relative shift for those that are.

The earliest-born speakers show a great degree of instability with regard to the vowels of the Third Dialect Shift, which is unsurprising given what we know about new dialect formation (e.g., Kerswill & Williams 2000; Kerswill & Williams 2005). There are, however, signs among that group that the Third Dialect Shift system was developing, and it clearly exists, at least partially, in its initial stages among the younger speakers. These findings are then analyzed in light of the demographic history of Utah, which provides some support for the possibility that its initial stages were brought to the West as the West was first undergoing English-language settlement. Further, the patterns exhibited by the speakers show the importance of looking at the influence of other systems in contact with the system under investigation when attempting to reconstruct the historical development of a linguistic system, and principles for doing so are outlined.

A new case of "rhinoglottophilia:" from nasalization to aspiration

Stefano Coretta
University of York

This talk investigates the diachronic development of (apparently) idiosyncratic phonomorphological correspondences that relate verbs and nouns in Cheke Holo, an Oceanic language of Santa Isabel (Solomon Islands). Such correspondences are distributed in five patterns that seem phonetically unrelated with one another. The only authors dealing with these idiosyncrasies, Tryon & Hackman (1983), surrender without giving a unified account and ascribing different patterns to different sources. I argue that the phenomenon know as "rhinoglottophilia" (Matisoff 1975) can provide the missing link that supports the idea of a common diachronic origin for all the patterns.

The analysis of lexical data from Cheke Holo (White et al. 1988) showed regular segmental patterns between some verbs and their semantically related nouns. These patterns are given with examples in Table 1. Verbs that begin with an unaspirated voiceless stop (/p/, /t/ or /k/) correspond to nouns with an aspirated stop (/p^h/, /t^h/ or /k^h/, Pattern I in Table 1). Verbs that start with the liquids /r, l/ add /g/ to form the noun (Pattern II). The initial fricative /ɣ/ in verbs is a stop /g/ in nouns (Pattern III). Verbs that begin with /h/ have their nominal counterpart beginning with /n̥/ (Pattern IV). Finally, other nouns have /na/ before the corresponding verbal base (Pattern V).

I argue that *all* the correspondences are the outcome of different phonetic changes that operated on the same source, the POc article */na/.

Table 1: Patterns of correspondences in verbs and nouns in Cheke Holo

Pattern	**Verb**	**Noun**	**Examples**
I	p-, t-, k-	p^h-, t^h-, k^h-	/pore/ 'to comb' – /p^hore/ 'comb'
II	r-, l-	gr-, gl-	/lehe/ 'to die' – /glehe/ 'death'
III	ɣ-	g-	/ɣo̥ra/ 'to paddle' – /go̥ra/ 'paddle'
IV	h-	n̥-	/haru/ 'to tie' – /n̥aru/ 'knot'
V	other	na-(other)	/fnera/ 'to wound' – /nafnera/ 'wound'

Similar cases of article concretion are recognized in several languages of Oceania. The form of the article with no changes is reflected in Pattern V. From the one hand, Patterns II and III are explained drawing upon an accreted constriction transition between two continuants (namely the nasal and the fricative/liquids, see emergent stops in Ohala 2005), and Pattern IV follows a general diachronic evolution of the Santa Isabel languages, namely the change of */hR/ and */Rh/ (where R is a sonorant) to /R̥/. On the other hand, Pattern I seeks a different kind of explanation.

The percept similarities of acoustic features produced by the rhinal and the laryngeal resonators, known in the literature under the term "rhinoglottophilia", can explain the aspirate outcome of plosives in Pattern I (Matisoff 1975, Sprigg 1987). In support of this analysis, Blevins & Garrett (1993) report different cases of what they call "nasal aspiration", that is, the change from NC clusters to aspirated stops C^h. Jacques (2011:1521) notes in particular that Old Tibetan NC clusters correspond to aspirated stops in some modern Tibetan varieties. The talk will present the Cheke Holo data supporting the unified account of verb/noun correspondences and it will provide new evidence for the rhinoglottophilia phenomenon.

References

Blevins, Juliette & Andrew Garrett. 1993. The evolution of Ponapeic nasal substitution. *Oceanic linguistics* 199–236.

Jacques, Guillaume. 2011. A panchronic study of aspirated fricatives, with new evidence from Pumi. *Lingua* 121(9). 1518–1538.

Matisoff, James A. 1975. Rhinoglottophilia: the mysterious connection between nasality and glottality. In Charles A. Ferguson, Larry H. Hyman & John J. Ohala (eds.), *Nasálfest: Paper from a symposium on nasals and nasalisation*, 265–288. Stanford: Stanford Universals Project.

Ohala, John J. 2005. The marriage of phonetics and phonology. *Acoustical science and technology* 26(5). 418–422.

Sprigg, R.K. 1987. 'Rhinoglottophilia' revisited: observation on 'the mysterious connection between nasality and glottality'. *Linguistics of the Tibeto-Burman Area* 10(1). 44–62.

Tryon, Darrell T. & Brian D. Hackman. 1983. *Solomon Islands languages: An internal classification*. Department of Linguistics, Research School of Pacific Studies, Australian National University.

White, Geoffrey, Francis Kokhonigita & Hugh Pulomana. 1988. *Cheke Holo (Maringe/Hograno) dictionary*. Pacific Linguistics Australian National University.

Romance Loanwords and Stress Shift in English: A Quantitative Approach

B. Elan Dresher, University of Toronto & Aditi Lahiri, Oxford University
dresher@chass.utoronto.ca aditi.lahiri@ling-phil.ox.ac.uk

A major change in the history of English stress was a shift in directionality (edge orientation) from the Germanic practice of computing stress from the left edge of the word (apart from certain unstressed prefixes) to the right edge (Halle & Keyser 1971). All writers on the topic attribute this shift to the massive influx of Romance loanwords into English, beginning with the Norman Conquest (1066), but there has been no agreement as to when the shift began.

Some writers (Halle & Keyser 1971; Lass 1992) have proposed that the Romance right-edge oriented stress rule gained a foothold in English in the Middle English period exemplified by Chaucer (c1343–1400), though it did not become the main stress rule until some time later. We take the view of those who argue that this wave of loanwords, mostly via French, did not have any lasting impact on English stress (Jordan 1974: 199; Minkova 1997, 2006; Redford 2003). Dresher & Lahiri (2005) argue that the final or penultimate stress of these loanwords contradicted patterns in the native vocabulary. The result was that the loanwords eventually assimilated to the native patterns; examples are *báron* (first cited in 1200), *móment* (1240), *sécond* (1391), *fámous* (1400), *mánacle* (1350), and *gálaxy* (1384).

Danielsson (1948) and Poldauf (1981) associate the change in directionality with the accumulation of words with Latin and French suffixes such as *-able/-ible, -ation, -ator, -ic(al), -ity,* etc. In such words, stress is computed from the right: for example, *medícinal* and *philosóphical* can be assigned stress by a unified rule computing from the right edge (both have stress on the antepenult), but not from the left. Dresher & Lahiri (2005) estimate that the shift in directionality occurred around 1530. In the earlier periods, Latin words had been borrowed as morphologically simplex (Minkova & Stockwell 1996; Lahiri & Fikkert 1999); by 1530, Romance borrowings were so common that English speakers could recognize their morphological composition. At that point they could identify recurring morphemes, such as derivational suffixes. The rightward directionality of stress in words with these suffixes could then become apparent. Moreover, the native English vocabulary did not have words of similar complexity that could systematically contradict these patterns. Most native words could be reanalyzed as having stress from the right, without any change to the location of their stress.

The above account rests on rather impressionistic data, and in this talk we will investigate the above claims by looking at the data from a quantitative point of view. As an approximation to when a word first entered the language, we will use the earliest date for which it is attested in the *Oxford English Dictionary* (*OED*). We will compare the distribution and composition of Romance loanwords in two 25-year periods: 1343–1369 (roughly when Chaucer would have been acquiring his native language), and 1505–1530 (around the time of the directionality shift, according to Dresher & Lahiri 2005).

According to the *OED*, by 1369 English had borrowed around 3,480 words of Romance (mostly French and Latin) origin, about 18.5% of all words. By 1530, the Romance words had tripled and made up 20.8% of the total. But the composition of the Romance vocabulary changed more drastically, as we can see when we look at the Latinate suffixes mentioned above. From 1369 to 1530 the words with *-ity* increased from 30 to 280 (9.3x); adjective-forming *–al* went from 40 to 400 (10x); and *-able/-ible* went from 58 to 707 (12.2x). These numbers lend *prima facie* support to the notion that the relevant data for learners in 1369 was very different from that in 1530. Moreover, we can attempt to test Yang's (2005) theorem that the threshold value at which exceptions become treated as a rule is $N/\ln N$. We will try to fix appropriate values for N (= the number of all words relevant to the stress rules) and for the number of words favouring a directionality shift (which must be greater than $\ln N$).

Generations, Lifespans, and The Zeitgeist Josef Fruehwald, University of Edinburgh, josef.frue@ed.ac.uk

This paper serves both as a methodological recommendation for the study of the time dimensions of language change in large speech corpora, as well as a theoretical and empirical investigation. Large speech corpora, where the data collection was carried out over many years, are being used with increasing frequency in the study of language change in progress (Labov, Rosenfelder & Fruehwald 2013; Hay, Pierrehumbert, Walker & LaShell 2015). These corpora provide a unique opportunity to investigate the relative importance of the time dimensions potentially involved in language change, specifically:

1. Generational time: Defined as the difference in time between one generational cohort and the next.
2. Lifespan time: Defined in terms of individual speakers' aging and maturational process.
3. The Zeitgeist: Defined in terms the era in which speech data was collected.

Determining the relative importance of these three time dimensions are crucial matters for the study of language change in progress. If sound change is best understood as an innovation rapidly diffusing throughout the entire speech community, the era of speech data collection will play a primary role. If there is robust lifespan change, then the Apparent Time construct is unreliable for diagnosing change.

Using data from the Philadelphia Neighborhood Corpus (Labov & Rosenfelder, 2011), I explore these three time dimensions for 4 language changes. Three were previously investigated by Labov, Rosenfelder & Fruehwald (2013): pre-voiceless /ay/ raising, which exhibited a linear progression across the 20^{th} century, and /aw/ and /ow/ fronting, which both reversed course around mid century. Additionally, I investigate a categorical language change, also found in the PNC, where speakers are increasing their frequency of use of the UM pause filler relative to the UH pause filler.

In all four cases, I estimated the outcome variable (vowel quality, UM usage frequency) utilizing a two dimensional tensor product smooth against date of the interview, and speaker's date of birth. This has two key benefits over previous attempts to dis-entangle the relationship between speakers' age and date of birth in this corpus. First, it does not assume a linear relationship between the outcomes and the time dimensions involved (cf. Labov, Rosenfelder & Fruehwald, 2013), and second, it utilizes all of the available data without recourse to subsampling (cf. Zellou & Tamminga, 2014).

All four language changes exhibited very strong generational effects, with extremely limited (non-significant) lifespan effects. Only one language change (/ow/ fronting for men) appeared to be significantly affected by a time dimension other than generational time. In this case, there appears to be a Zeitgeist effect around the 1980s and 1990s, with men, regardless of their generational cohort or age, backing /ow/.

My conclusion is that the Apparent Time construct, the basis for most of what we know about language change in progress, is well supported empirically. My methodological recommendation is to utilize two dimensional smoothing in order to disentagle the relative effects of these three time dimensions.

Sociolinguistic motivations in sound change: loss of low tone breathy voice in Shanghai Chinese

Jiayin GAO <jiayin.gao@gmail.com>

"Tone split" is a sound change process during which a laryngeal contrast was replaced with a contrast between two tone heights (Haudricourt 1961). The ancient voiced consonants lowered fundamental frequency (F0) of the following vowel (Hombert, Ohala & Ewan 1979). They also involved a relaxation of the glottis, as suggested by Haudricourt (1965), leading to a breathy quality, which also had an F0 lowering effect. This breathy quality is phonologized in Mon-Khmer languages (e.g., Shorto 1967), although some of them seem to be evolving into tonal systems (Abramson & Luangthongkum 2009), whereas lowered F0 is phonologized in Vietnamese, late Middle Chinese, etc. In the latter case, it has been proposed that breathy voice occurred before *phonologized* lowered F0 (e.g., Pulleyblank 1978, Mazaudon 2012).

In some languages that have completed tone split, such as Chinese Wu dialects, we still find synchronic association between low tones and breathy voice (Cao & Maddieson 1992, Chen 2011). In this study, we focus on Shanghai Chinese (SHC), the urban Shanghai variety of Wu, characterized by its most rapid evolution among all Wu dialects since the recent past, partly due to its permanent contact with Standard Chinese (SC) as well as with migrant dialects. Suppose that breathy voice, as a redundant cue to low tones, will disappear in Wu, as in most Chinese dialects: we predict that this disappearance will speed up in SHC, due to the interference with SC, in which breathy voice does not play any linguistic role.

In order to investigate the evolution in SHC, we recorded transversal data from native speakers of two age groups: 12 young (aged 20-30) vs. 10 elderly (aged 60-80) speakers. They read a list of 32 monosyllabic words, each produced in a carrier sentence. We compared the voice quality between high and low tone syllables, using acoustic measures for spectral tilt (H1-H2, H1-A1, H1-A2) and harmonic organisation (Cepstral Peak Prominence), as well as electroglottographic (EGG) measures. Furthermore, we also conducted a survey on these speakers' evaluation of their own linguistic competence and usage in SC and SHC.

The acoustic and EGG measures showed an overall breathier voice on low than high tone syllables, and more interestingly, to a greater extent for elderly than young speakers, suggesting a general trend towards loss of breathy voice, as we expected. Moreover, cross-gender variations were also observed: female speakers were more advanced than male speakers in this evolution. This confirms Labov's (2001, etc.) findings according to which women play a leading role in sound change. Labov's analyses of English varieties showed that women are more willing to adopt overtly prescribed prestigious forms of linguistic variables to replace stigmatized forms. He called this kind of trend "changes from above."

The changes described by Labov concern prestigious vs. stigmatized forms in different varieties of the same language. The Shanghai case is somewhat different since two different languages are at stake: SC and SHC (although SHC is called a "dialect"), the former being more prestigious. Within SHC usage, breathy voice was never seen as a stigmatized form that might drive women to reject it. Here, the sociolinguistic shift, which women seem to initiate, would be the increased adoption of the SC system of linguistic variables as a whole.

The global impact of SC on SHC affects different linguistic levels (e.g., Qian 2003), but also speakers' judgment of their linguistic competence. According to the results of our survey, elderly speakers evaluated their competence in SHC higher than SC, but young speakers were much less confident in their competence in SHC. More specifically, among the young speakers, most women (5/6) judged they were less competent in SHC than SC, and used less frequently SHC than SC, whereas much less men (1/6) made the same judgment. This result suggests a stronger willingness to adopt the prestigious SC linguistic system by Shanghai women than men. Coming back to our phonetic data, women's more advanced loss of breathy voice is probably related to the stronger impact of SC on SHC. More generally, the influential SC is accelerating the loss of breathy voice as a redundant cue to low tones in SHC.

On the genesis of the Limburgian tonal accents

Ben Hermans; Meertens Institute; ben.hermans@meertens.knaw.nl

Limburgian dialects (mainly in the south east of the Netherlands) have two tonal accents. Originally, the two accents had a predictable distribution; long high vowels carried Accent2, whereas long non-high vowels received Accent1. This is illustrated in (1):

(1) long high vowels — long non-high vowels

wi:^{2}t	'far'	bre:^{1}f	'letter'
ti:^{2}ger	'tiger'	e:^{1}der	'every'

When Open Syllable Lengthening (OSL) became active, lengthened non-high vowels received Accent2. After OSL, then, the two accents became contrastive; *originally long* non-high vowels had Accent1, whereas *lengthened* non-high vowels had Accent2 (Boersma 2006).

(2)

re:^{1}t	'reed'	e:^{1}der	'every'	originally long
re:^{2}t	'crevice'	e:^{2}der	'earlier'	lengthened

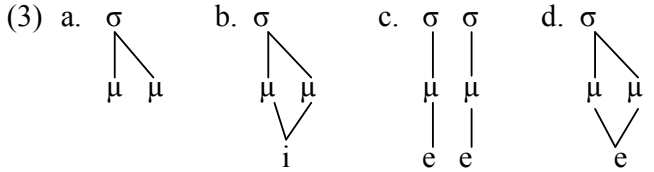
The fact that, before OSL, there was a relation between the tonal accents and vowel height is an exception to a universal; tonal quality is never determined by vowel quality (Hombert 1976). This implies that the relation between tone and vowel quality must be indirect; something intervenes between them. The first important question, then, is: what is this?

The facts presented in (2) seem to indicate that there are two types of long vowels; originally long vowels have a representation that is different from the representation of the lengthened vowels. The second important question, therefore, is; what is this difference?

Our goal in this talk is to present an analysis of the historical stage of Limburgian when OSL became active, trying to give a unified answer to both questions mentioned above. *Our proposal* is that high long vowels, and lengthened vowels, are bimoraic and *monosyllabic*; originally long mid and low vowels, on the other hand, are bimoraic and *bisyllabic*. This difference is explained by a constraint disallowing high sonority from a dependent mora (de Lacy 2006). When OSL became active this constraint was lowered in the hierarchy, explaining that lengthened vowels behaved like originally long high vowels.

Following de Lacy (2006) we propose that in a syllable with two moras the first mora is the head, whereas the second mora is the dependent. This is shown in (3a).

(3)



We also propose that high sonority (mid + low vowels) is not allowed in a dependent position: *-Δ/mid+low. This constraint does not penalize (3b), nor (3c). In (3d) the vowel in the dependent mora is of high sonority; in (3c) there is no dependent mora, because the second mora occupies the head position of the second syllable. The representation in (3d), however, was not tolerated. This was the situation before OSL. At the time when OSL became active the constraint *-Δ/mid+low became low ranked, so that now the representation in (3d) was acceptable. At this stage, then, two types of long vowels existed in the language. We claim that the representation mediating between vowels and tones is the moraic/syllabic level. It is this representation that answers our two questions; it makes direct reference between tones and vowel quality superfluous. The same representation creates a difference between two types of long vowels; after OSL lengthened vowels were monosyllabic, whereas originally long (mid and low) vowels remained bisyllabic. At all stages of the language bisyllabic long vowels got Accent1, whereas monosyllabic long vowels got Accent2. This explains why Accent1 was/is phonetically expressed by a tonal drop *early* in the long vowel, whereas Accent2 is expressed by a tonal drop *after* the long vowel. It follows from the fact that the tones of the intonational melody (HL) are anchored to the syllable nodes.

Opacity over time: Charting the paths of fricative voicing in English plurals

Laurel MacKenzie, University of Manchester, laurel.mackenzie@manchester.ac.uk

This paper investigates the diachronic trajectory of an opaque phonological alternation: the voicing of stem-final fricatives in English plural nouns. We find that this historical rule has fragmented, and propose that Yang's (2005) Tolerance Principle regarding the storage of lexical exceptions may explain its patterning. The results speak to questions of when variation may lead to change and how both connect to the process of language acquisition.

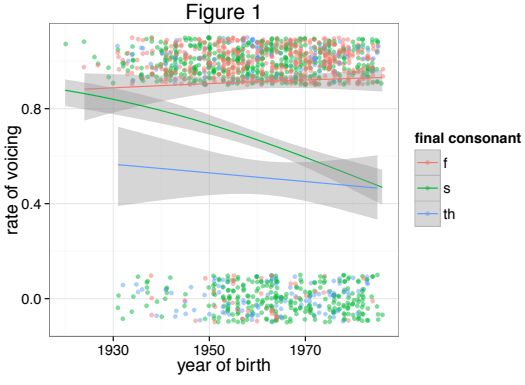
Regressive voicing affects a number of words ending in voiceless fricatives in present-day English (PDE): for instance, the words *wife* [waɪf], *path* [paΘ], and *house* [haʊs] have as their plurals [waɪvz], [paðz], and [haʊzəz]. This alternation can be traced back to Old English (OE), in which plurals were formed by the addition of an [-əs] suffix (e.g. [paΘ], [paðəs]; Ringe & Eska, 2013). Stem-final fricatives in OE were thus intervocalic in their plural form, resulting in a natural and regular process of voicing. However, as Ringe & Eska outline, a number of processes led to this alternation becoming opaque, including the loss of [ə] in the plural suffix (except after sibilants). The upshot is that PDE contains several words that retain the alternation, but many others of the same phonological shape which do not. We investigate whether this opacity has led to change, and whether any attested diachronic developments proceed similarly across the three fricatives (/f/, /Θ/, /s/).

Following a survey of three dictionaries of present-day American English (AmE), we identified 22 /f/-final, 17 /Θ/-final, and 3 /s/-final words—all monosyllables—for which at least one dictionary provided a voiced plural form. We then auditorily coded the voicing of the stem-final segment for all plural tokens of each word in both the Switchboard (Godfrey & Holliman, 1997) and Fisher (Cieri et al., 2004) corpora of AmE, resulting in a database of 1456 tokens. Data were analysed using mixed-effects logistic regression in R.

Confirming what Becker et al. (2012) found in a judgment task, stem-final plural voicing is variable, occurring 70% of the time in our dataset. In fact, the rate of voicing significantly differs across the three consonants, with /f/-final stems voicing significantly more than either /s/-final ($p = 0.001$) or /Θ/-final ($p < 0.001$). Additionally, /s/-final words (of which tokens of *house* constitute the majority) show change in apparent time, with younger speakers voicing less than older ($p = 0.001$), but the other two fricatives show no significant effect of age ($p > 0.1$; Figure 1). The historical voicing rule thus appears to have fragmented.

We propose that the differing diachronic trajectories in Figure 1 may be explained by Yang's (2005) Tolerance Principle, which asserts that language learners can tolerate a productive rule with listed lexical exceptions so long as the number of those exceptions does not exceed N/ln(N), where N is the number of words that meet the structural description of the rule. We observe that, of the 87 monosyllabic /s/-final stems in the English Lexicon Project (Balota et al., 2007), the number which exceptionally voice in the plural (3) is well below the number of tolerable exceptions (19). It thus appears that learners have a productive "form the plural of /s/-final words without regressive voicing" rule with 3 exceptions, which are now being assimilated. In the case of /f/-final and /Θ/-final words, though, there are too many items which voice in the plural to be tolerated as exceptions to a rule, but conversely there are too many items which **don't** voice in the plural for **them** to be tolerated as exceptions to the opposite rule. Under Yang's model, this means that no productive rule can be written either way—forms must be listed—which we take to explain the diachronic stability of each environment. Models of representation can thus shed light on patterns of change.

Figure 1



Pre-R Dentalisation in English and Scots

Warren Maguire

University of Edinburgh

w.maguire@ed.ac.uk

PreRD Dentalisation (PreRD), the realisation of /t/ and /d/ as [t̪] and [d̪] before /r/ and /ər/, is a well known feature of traditional varieties of English across the island of Ireland (Harris 1985, Maguire 2012). Thus we find pronunciations such as *try* [t̪ɾaːe], *dry* [d̪ɾaːe], *after* [ˈɛft̪ɚ] and *consider* [kənˈsəd̪ɚ] in the rural dialect of southwest Tyrone in Northern Ireland. PreRD is typically accompanied by two other related phonological features:

1) An R-Realisation Effect (RRE), whereby /r/ is pronounced differently (usually as a tap [ɾ]) after dentals. In southwest Tyrone English, this results in pronunciations such as *try* [t̪ɾaːe] and *through* [θɾʉː] as opposed to *cry* [kɹaːe].
2) A Morpheme Boundary Constraint (MBC), which limits the application of PreRD such that it does not operate over 'Class 2' morpheme boundaries. Thus we find PreRD in *better* 'more good' [ˈbɛt̪ɚ] and *secondary* [ˈsɛkən̪d̪(ə)ɾɪ] but not in *better* 'one who bets' [ˈbɛtɚ] or *spreader* [ˈspɹɛɾɚ].

What is less well known is that PreRD and the associated RRE and MBC are also found in dialects of English and Scots in Britain (Maguire 2012, forthcoming). This paper examines the evidence for PreRD and the associated features in Scotland and England in traditional dialect sources, in particular the *Survey of English Dialects* (SED; Orton and Dieth 1962-71) and the unpublished data underlying the *Linguistic Atlas of Scotland* (Mather and Speitel 1986). My analysis reveals that PreRD, the RRE and the MBC are present, in a similar form, in locations as diverse as Lancashire, Durham, Wigtonshire, Banffshire and Shetland, and that there is evidence for an even wider distribution of at least PreRD in England in earlier times. The widespread distribution of PreRD, the RRE and the MBC not only helps to explain the presence of these features in varieties of Irish English but also gives us a detailed insight into the phonetic and phonological history of English, suggesting that this unique bundles of features is of considerable antiquity.

Middle English Open Syllable Lengthening, syllabification and foot construction

Donka Minkova
minkova@humnet.ucla.edu

Nikolaus Ritt
nikolaus.ritt@univie.ac.at

Pursuing the possibility that Middle English Open Syllable Lengthening (a) involved phrase level processes adjusting vowel duration and (b) led to fast restructuring of lexical inputs without necessarily being phonologized on the word level, we reconsider two factors normally held responsible for the change. First, we discuss the syllabic status of the postvocalic consonants traditionally regarded as onsets of the second syllable (hence *Open* Syllable Lengthening). Second, we discuss whether lengthening – rather than being triggered primarily in the stressed light penultima of disyllabic words – may not equally well reflect gradient post-lexical processes whose probability and effect correlate inversely with the number of weak syllables following potential input vowels on the phrase level.

Open Syllable Lengthening is assumed to depend on onset-maximal syllabification in (C)VCV strings. While the status of intervocalic consonants and clusters in Present-Day English can be debated, ambisyllabicity is considered the structural trigger of phenomena such as the lack of aspiration of [p] in e.g. *happy* vs. *appear* with [pʰ], or alveolar tapping, both pre-atonic (*a**t**om, le**tt**er, inevi**t**able, anxie**t**y*) and phrasal (*a**t** Ed's*). For Old English, the principles of syllabification are also controversial. Suzuki (1994, 1995) proposed ambisyllabicity for V[C]V in all cases of a short vowel followed by a single consonant, irrespective of the nature of the vowel or the nature of the consonant. Fulk (1997) presented a vigorously 'contrary' view. These positions are discussed in Minkova (2015) who questions the validity of the arguments against ambisyllabicity in OE. An entailment of this inquiry is that arguments against ambisyllabicity during Middle English should also be re-examined.

Our study contributes to the debate on syllabification in the history of English by re-examining the evidence for open-syllable lengthening in Middle English in relation to the nature of the intervocalic consonant. Ritt (1994: 40-41) addresses that aspect of the change with respect to sonority, leading to a puzzling behavior of medial sonorants: out of 76 items of the type *gammon, moral, talent, tenant*, only a single item, *moment* (a1382) has been lengthened. Dealing with the same data, Bermúdez-Otero (1998) isolated the sonority of the second syllable codas in words resisting OSL, such as *copper* (c. 1000), *desert* (c.1225), *metal* (c. 1230), as the 'blocking' trigger. Unlike these earlier studies, we focus both on sonority *and* manner of articulation of the intervocalic consonant. The working hypothesis, suggested by experimental studies of syllabification (Treiman & Danis 1988, Content, Kearns & Frauenfelder 2001, Bishop & Toda 2012), is that obstruents are more likely to appear at onset than at coda position, while sonorants are more likely to appear at coda than at onset position. The results promise to throw light on a central debate in English historical phonology and on the debate on syllable structure in general.

With regard to foot construction, OSL is typically considered to be restricted to heads of trochees built over words. While feet tend to be isochronous and may thereby affect the duration of the segments in them, however, foot boundaries and word boundaries do not necessarily co-align. Therefore, we investigate the rhythmic contexts in which inputs to vowel lengthening occurred in Middle English utterances. For that purpose, we use LAEME and PPCME data and count the number of weak syllables by which potential inputs to vowel lengthening were separated, on average, from the next rhythmic peak. We do this for vowels in (a) prototypical OSL inputs (such as *make* or *hope*), (b) less prototypical OSL inputs (such as *beaver* or *patient*), and (c) closed monosyllables (e.g. *blade* < *OE blæd* or *whale* < *OE hwæl*). Looking at rhythm on the utterance level, we factor in the possibilities both of optional final schwa deletion and of rhythmic promotion in sequences of three or more weak syllables. We hypothesize that the probability of lengthening will have correlated inversely with the amount of unstressed material in utterance feet.

Allomorphy, Morphophonology and Opacity in the Accentuation of the Vedic Noun

J. Joseph Perry (jjp45@cam.ac.uk)

The pitch accent in Vedic Sanskrit displays a remarkable degree of mobility, and its interaction with morphophonology is extremely complex (see e.g. MacDonnell 1916 for a description). This paper uses the accentuation of the Vedic nominal paradigm to argue for the necessity of morphophonological readjustment rules in addition to listed allomorphs.

Distributed Morphology (Halle and Marantz 1993 et seq.) posits a distinction between suppletive allomorphy, due to competing Vocabulary Items, and morphophonological readjustment rules which follow Vocabulary Insertion. Other realisational approaches, especially within an OT framework (e.g. Mascaró 2007, Wolf 2008) effectively treat all morphosyntactically conditioned alternations as instances of suppletive allomorphy. I show that this makes a decompositional account of Vedic accent impossible, and a conventional DM approach making use of serially ordered readjustment rules has greater explanatory value.

A first approximation to a correct decompositional approach to Vedic accent can be found in Kiparsky's (2010) account of Indo-European accent. A given syllable may or may not be underlyingly accented, and the surface *ictus* is realised (as a pitch peak) according to the Basic Accentual Principle (Kiparsky and Halle 1977), whereby the ictus is located on the leftmost accented syllable in a domain, or on the leftmost syllable of the domain if there are no accented syllables. This accounts for monosyllabic nominal stems with case suffixes.

(1)

foot-NOM.PL	foot-INS.PL	cow-NOM.PL	cow-INS.PL
/pad + as/ [pádas]	/pad + bhís/ [padbhís]	/gáv + as/ [gávas]	/gáv + bhís/ [góbhis]

Following Kiparsky, the treatment of polysyllabic stems involves an additional process, assigning an accent to their final syllable, as well as a process reassigning a syllable's accent when it is left without a nucleus (e.g. due to ablaut triggered by a following accented syllable.)

(2) /pitar/ 'father' / bhrā́tar/ 'brother'

a. Unaccented Suffix /-as/ (NOM.PL) /pitar + as/ [pitár-as] /bhrā́tar + as/ [bhrā́tar-as]
b. C-Initial Accented /-bhís/ (INS.PL) /pitar + bhís/ [pitṝ-bhis] /bhrā́tar + bhís/ [bhrā́tṛ-bhis]
c. V-Initial Accented /-ós/ (GEN.DU) /pitar + ós/ [pitr-ós] /bhrā́tar + ós/ [bhrā́tr-os]

Where followed by a consonant, a stem-final sonorant may be syllabified as a nucleus, blocking accent shift, as in (2b). But, although C-initial and a syllabification trigger, the genitive plural suffix /-nā́m/ shows unexpected accent shift: [pitṝ-ṇā́m] (*[pitṝ́-ṇām]) 'father-GEN.PL'. It turns out that this suffix has an allomorph /-ā́m/ with consonant stems not ending in glides, (e.g. nāmn-ā́m 'name-GEN.PL'). Assuming distinct suppletion and readjustment, this permits an explanation for the odd accentual behaviour of/-nā́m/: it behaves like a V-initial suffix because the form inserted at VI is /-ā́m/. It is only *after* accent shift that a readjustment rule inserts /n/, as (3) shows. This insertion rule cannot simply be phonological epenthesis – it is particular to the genitive plural morpheme (cf. the instrumental singular /-ā́/, with no epenthesis in an identical environment: [pitr-ā́] 'father-INS.SG' (*[pitṛ-ṇā́])).

(3)

pitár-ā́m	→	pitr-ā́m	→	pitṝ-ṇā́m
(VI, Oxytone)		(Ablaut, Accent Shift)		(*n*-insertion, *r*-syllabicisation)

The key point is that accentual processes are interleaved with readjustment processes, such as those triggering ablaut and inserting /n/ before the genitive plural marker. Without distinct readjustment processes, and assuming that morphologically conditioned alternations like *ā́m~nā́m* are suppletive, this interleaving is not formulable – because accentuation processes hold over phonological, not morphosyntactic representations, we would have to state that the accentuation is determined on the basis of one allomorph, and preserved when that allomorph is replaced. No extant theory provides a mechanism for this sort of process, and an allomorph-replacement process which preserves phonological information is in any case not meaningfully distinguishable from a readjustment rule. We can reasonably conclude that some analogue of the division between suppletion and readjustment assumed by DM is necessary to account for the facts of Vedic.

From phonetic enhancement to phonological underspecification: new diachronic perspectives on sibilants in European Portuguese

Michael Ramsammy[1] & Patrycja Strycharczuk[2]
[1]University of Edinburgh & [2]CASL, Queen Margaret University

In this talk, we consider the diachronic development of the Portuguese sibilant system. According to traditional descriptions of Portuguese, the [–voice] sibilants, /s, ʃ/, contrast with [+voice] counterparts, /z, ʒ/, in onset position (1a–d below). Place and voicing contrasts are suspended elsewhere (Herslund 1986; Mateus & d'Andrade 2000): phrase-finally, the outcome of neutralisation is voiceless postalveolar [ʃ] (1e), whereas only voiced alveolar [z] occurs in word-final prevocalic contexts (1f).

	caça 'hunt'	*casa* 'house'	*caixa* 'box'	*queijo* 'cheese'	*rapaz* 'boy'	*rapaz alto* 'tall boy'
(1)	a. [ka.sɐ]	b. [ka.zɐ]	c. [kɐj.ʃɐ]	d. [kɐj.ʒu]	e. [ʁɐ.paʃ]	f. [ʁɐ.pa.zał.tu]
(2)	a. [ka.sɐ]	b. [ka.ʂɐ]	c. [kɐj.ʃɐ]	d. [kɐj.ʃ̬u]	e. [ʁɐ.paʃ]	f. [ʁɐ.pa.ʂał.tu]

However, recent experimental work has thrown these traditional assumptions about the Portuguese sibilant system into question. Acoustic data from European Portuguese (EP) reveal that intervocalic lenis sibilants (2b, d, f) do not display full voicing, but rather show characteristics of gradient passive voicing (Ramsammy & Strycharczuk 2015). On the basis of this result, Ramsammy & Strycharczuk propose a reanalysis of the EP obstruent system in which fortis sibilants are contrastively specified for [spread glottis], whereas lenis sibilants are phonetically underspecified (Keating 1988) for laryngeal features (3).

(3)	**stops**	**sibilants**
fortis	[∅]	[sg]
lenis	[voice]	[∅]

This analysis has implications for our understanding of the diachronic development of the Portuguese sibilant system. In this talk, we examine the emergence of place and laryngeal contrasts in sibilants from Proto-Romance through to present-day Portuguese with a view to gaining insights into the operation of synchronic neutralisation. If (3) is correct as a characterisation of the laryngeal system of the language, then EP exemplifies a system of laryngeal contrasts potentially unattested elsewhere. We therefore also explore the question of whether EP may occupy a transitional stage between a prototypical *true voice* language and a *spread glottis* language. Furthermore, in light of the claim that fortis fricatives are preferably [sg] (Vaux 1998; van Oostendorp 2007), we consider how a system like (3) may emerge diachronically from phonetic pressures to prevent passive voicing on fortis fricatives. According to Iverson & Salmons' (2003) formulation of Vaux's Law, gradient enhancement of voicelessness on fortis fricatives in true voice languages can lead to diachronic activation of [sg] (see 4 below). We suggest that EP may represent an extension of this process in which laryngeal specification on lenis fricatives is suppressed once [sg] has become active in the language.

(4)

Proto-EP 1				>	*Proto-EP 2*				>	*Present-day EP*			
/t/	/d/	/s/	/z/		/t/	/d/	/s/	/z/		/t/	/d/	/s/	/z/
|	|		|			|	|			|	|	
[∅]	[voice]	[∅]	[voice]		[∅]	[voice]	[sg]	[voice]		[∅]	[voice]	[sg]	[∅]

Finally, with reference to the life cycle of phonological processes (Bermúdez-Otero 2007; Ramsammy 2015), we address the question of how the trajectory of change shown in (4) can be incorporated into an analysis of synchronic laryngeal neutralisation which permits only laryngeally underspecified sibilants in non-preconsonantal word-final environments.

Vowel epenthesis in Oscan

Nicholas Zair
naz21@cam.ac.uk

Oscan is a language of Ancient Italy, attested only in inscriptions dating from about the fifth to the first century BC. It belongs to the Sabellic family, which includes languages such as Umbrian and South Picene, and is a sister family to Latin. One of the characteristics that marks Oscan out from related languages is epenthesis of vowels in sequences involving sonorants and obstruents. The best description of the linguistic situation is that of von Planta (1892-1897: 251-71), who distinguishes between two types of epenthesis (in both types the epenthetic vowel is the same as the vowel on the other side of the sonorant):
a) 'anterior' epenthesis in which a sequence RC becomes RVC, e.g. **aragetúd** 'silver' < **argento-*
b) 'posterior' epenthesis in which a sequence CR becomes CVR, e.g. **sakaraklúm** < **sakrāklo-*

Posterior epenthesis does not take place when C is preceded by a long vowel, diphthong or another consonant (e.g. **maatreís** 'mother' /ma:treis/, *contrud* 'against', **lúvfreís** 'free' /loufreis/), nor when the sonorant is /m/ (e.g. *egmo* 'thing'). Assuming Oscan syllabification of the type V.CV and VC.CV, we can explain posterior epenthesis as taking place only when the consecutive consonant and sonorant were separated by a syllable boundary. The environment for anterior epenthesis is more difficult to explain: a possible formulation would be that epenthesis takes place between sonorants and consonants with a different place of articulation (again /m/ is not involved): **aragetúd** but not μαμερτει 'Mars' /mamɛrtɛi/, **anafríss** 'goddesses of rain' < **anβress* but ϝενζηι 'Venus' /wɛnsɛi/, **kulupu** 'thieves' < **kolpo-* but not *moltas* 'fine'.

It is tempting to see the two types of epenthesis as 'mirror images' of each other: consequently, some scholars have argued that they should be seen as part of the same process (Schmid 1955), while others have seen them as taking place at different times in the historical development of Oscan (von Planta loc. cit.). In this talk I will show that synchronic phonology favours a syllable-based explanation for posterior epenthesis and a linear approach for anterior epenthesis, while the diachronic evidence also suggests that the two sound changes happened at different times.

References

Schmid, W. (1955). Anaptyxe, Doppelschreibung und Akzent im Oskischen. *Zeitschrift für vergleichende Sprachforschung auf dem Gebiete der Indogermanischen Sprachen* 72, 30-46

von Planta, Robert (1892-1897). Grammatik der oskisch-umbrischen Dialekte. Strassburg: Verlag von Karl J. Trübner

POSTERS

Graduality and Typological Analysis

Birgit Alber - birgit.alber@univr.it

Historical sound change and its manifestation as dialectal variation in space are often characterized by graduality: subsequent historical stages (or neighboring dialects) differ minimally with respect to each other (Kiparsky 2014 and ref.). Typological Analysis in Optimality Theory (Alber&Prince, in prep., Alber, DelBusso & Prince 2015) can give a measure for this type of minimal grammatical difference, by providing the *typological properties* (TPs) of a system, i.e. the inventory of ranking conditions determining it. TPs come with two values, A and B, one the logical opposite of the other. Each language of the typological system is characterized by a specific set of TP values and minimal difference between languages amounts to a minimal difference in these values.

The relevance of this type of analysis for graduality in sound change is illustrated with the example of s-retraction (SR; e.g. MHG *snelle* > NHG *[ʃ]nell*) in the history of German and Italian dialects. In German dialects, alveolar /s/ is realized as postalveolar [ʃ] in preconsonantal contexts. Graduality is visible both in the types of preconsonantal contexts affected (the process involved progressively larger preconsonantal contexts on the chronological scale k > p, t >r > l > n > m > w) and in the positions involved (the process first applied word-initially, then also word-internally; Schmid 1956, Benware 1996, Schmidt 2007). Similarly to German, Southern Italian dialects exhibit a gradual involvement of increasingly larger preconsonantal contexts, but they do not show graduality in terms of positions in the word: SR usually takes place word-initially as well as word-internally.

In order to determine the minimal difference between languages exhibiting various degrees of SR, a typology of SR has been computed with the help of OT-workplace (Prince, Tesar & Merchant 2007-2014) assuming three markedness constraints in a stringency relation (m.1, m.2, m.3), militating against /s/ in various types of preconsonantal contexts and two faithfulness constraints, protecting /s/ from change in medial position (f.spec) and in general (f.all). The resulting factorial typology contains 10 languages which are determined by 6 TPs. As an example of one of these properties take TP1= f.all <> m.1, m.2, m.3. This property, in its A-value f.all >> m.1& m.2 & m.3, characterizes fully faithful langugages, which do not show any SR. In its B-value m.1 ∨ m.2 ∨ m.3 >> f.all, it is true for languages with some unfaithfulness, i.e. with some degree of SR. The comparison of the 10 languages in terms of TP values reveals which of them differ minimally. We thus obtain a prediction on the possible paths that historical change follows. The two main paths predicted by the SR typology correspond to the one observed for German dialects, where SR first affects word-initial, then word-medial contexts (Fig1), while Italian dialects, changing simultaneously word-initially and word-mediallly instantiate the second path. We thus conclude that, indeed, minimal differences in TP values can give a measure for graduality in historical sound change.

Fig 1: Graduality path 1 - exemplified for German

		#__			#__, medially		
	no SR	__ C_1	__ C_1, C_2	__ C_1, C_2, C_3	__ C_1	_ C_1, C_2	__ C_1, C_2, C_3
	lg.1	lg.2	lg.3	lg.4	lg.7	lg.9	lg.10
TP1	A	A	A	B	B	B	B
TP2	A	A	B	B	B	B	B
TP3	A	B	B	B	B	B	B
TP4	A	A	A	A	A	A	B
TP5	A	A	A	A	A	B	B
TP6	A	A	A	A	B	B	B
	OHG/ Niederdeutsch	documented	documented	MSG		Bavarian/ Tyrolean	Mòcheno

The tonal phonologies of Raja Ampat languages: Towards a historical account

Laura Arnold
l.m.arnold@sms.ed.ac.uk

In this presentation, I will use published and unpublished data to explore the historical development of the tonal systems of three languages spoken on the Raja Ampat archipelago, east Indonesia. Several languages belonging to the South Halmahera-West New Guinea subbranch of Austronesian are spoken across the Raja Ampat archipelago. Three of these languages have been analysed as having lexical tone: Maʹya (van der Leeden 1993; Remijsen 2001), Matbat (Remijsen 2001), and Ambel (Arnold 2015). Very little is known about the origin of these tonal systems. In this talk, I will compare the synchronic tonal phonologies of these three languages, in order to shed some light on how they have developed.

The suprasegmental phonologies of Maʹya, Matbat, and Ambel are synchronically quite different. Maʹya is analysed as having three tonemes and contrastive lexical stress; Matbat is analysed as having six tonemes; and Ambel is analysed as having one toneme, which contrasts with syllables unspecified for tone. However, a comparison of monosyllabic cognates in Maʹya, Matbat, and Ambel reveals that suprasegmental correspondences can be tentatively identified. For example, monosyllabic words which in Ambel are unspecified for tone correspond to monosyllables specified for High tone in Maʹya ($ˈσ^3$) and monosyllables specified for High Level tone in Matbat ($σ^3$). This is exemplified in (1):

(1) Potential suprasegmental correspondences in Maʹya, Matbat, and Ambel (cognacy judgements from Kamholz 2014):

	Ambel	**Maʹya (Salawati)**	**Matbat**
‘five’	lim	ˈli^{3}m	li^{3}m
‘two’	low	ˈlu^3	lu^3
‘breast’	su	ˈsu^{3}s	su^3
‘louse’	ut	ˈu^{3}t	wu^{3}t

If suprasegmental correspondences can be established between Maʹya, Matbat, and Ambel, there are implications for the genetic subgrouping of the languages spoken in the Raja Ampat archipelago. Kamholz (2014), in a subgrouping of the South Halmahera-West New Guinea languages, proposes that that the most recent common ancestor to Maʹya, Matbat and Ambel is Proto-Raja Ampat-South Halmahera (Proto-RASH). Following this proposal, all of the languages spoken on the Raja Ampat archipelago, as well as the Austronesian languages spoken on the nearby island of Halmahera, have descended from Proto-RASH. None of the other languages which have developed from Proto-RASH have (thus far) been analysed as having lexical tone. I will therefore argue that an examination of the tonal phonologies of Maʹya, Matbat, and Ambel from a historical perspective suggests we can establish a more recent common ancestor from which (at least) these three languages have developed.

References

Arnold, Laura (2015). Lexical tone in Ambel. Presentation given at the P-workshop, the University of Edinburgh. **Kamholz, David** (2014). *Austronesians in Papua: Diversification and change in South Halmahera-West New Guinea*, PhD thesis, University of California, Berkeley. **van der Leeden, A. C.** (1993). *Maʹya: A language study*, Jakarta: Lipi-Rul. **Remijsen, Bert** (2001). *Word-prosodic systems of Raja Ampat languages*, Utrecht: LOT.

The origins of Japanese *h* from an element-based perspective

Phillip Backley and Kuniya Nasukawa
(Tohoku Gakuin University) (Tohoku Gakuin University)
backley@mail.tohoku-gakuin.ac.jp nasukawa@mail.tohoku-gakuin.ac.jp

This paper outlines the structural changes involved in the historical development of Japanese [h] from its origin as **p* via the intermediate realisations [ɸ] and [ɯ̞] (w). The analysis adopts an Element Theory approach to segmental structure which (i) expresses consonant lenition as a loss of melodic structure, (ii) assumes that labial place is structurally more complex than other places of articulation (Backley & Nasukawa 2009), and (iii) uses the same element to represent labials and velars. All three points turn out to be crucial in providing an explanatory account of the relevant changes.

Modern Japanese shows an idiosyncratic alternation between *h* and *p(p)* which has led scholars to assume that these sounds are historically related. The consensus is that [h] derives from **p* (Hashimoto 1928; Martin 1987), on the basis that [h] reveals its historical roots in certain contexts. For example, in the formation of Sino-Japanese compounds an obstruent is realised as its corresponding geminate, as in (a), but exceptionally [h] geminates to [pp] rather than to [hh], as in (b).

(a)	ichi + kai > [ikkai]	'one time'	(b)	ichi + hai > [ippai]	'one cupful'
	ichi + sai > [issai]	'one year old'		ichi + ho > [ippo]	'one footstep'
	ichi + tou > [itto:]	'one (large) animal'		ichi + hiki > [ippiki]	'one (small) animal'
	ichi + shin > [iʃʃiɴ]	'first trial'			
	ichi + chou > [itʃʃo:]	'one block'			

No synchronic explanation for the *h~pp* alternation presents itself, as the sounds involved have no shared properties, and furthermore, there is no parallel among other fricatives or stops in the system. On the other hand, the forms in (b) provide positive support for the idea that Japanese *h* has labiality in its genes. But if so, how is the loss of labiality to be analysed in words containing [h]? Since the eighth century **p* has followed one of two lenition paths:

- intervocalic: *p → ɸ → ɯ̞ (→ zero)
- word-initial: *p → ɸ → h(~ç~ɸ)

In terms of consonant manner, these changes take a typical route along the 'opening' trajectory, each being represented by the loss of one element:

[p] → [ɸ] (= loss of occlusion/|ʔ|)
[ɸ] → [w] (= loss of noise/|H|)
[ɸ] → [h] (= loss of resonance/|U̲|)

As for consonant place, this paper argues that in the history of Japanese, [ɸ] lost its labial characteristics to become realised as placeless [h] word-initially (or [ç]/[ɸ] as a result of vowel colouring) and as *un*rounded *w* (i.e. a glide approximating to velar [ɯ̞]) between vowels. The motivation for this loss of labiality stems from its representation: in the version of Element Theory used here, labial place has a complex structure (headed |U̲|) while other place categories have simplex structures, e.g. velar has non-headed |U|, coronal has non-headed |I|. In this respect labial place has a relatively marked status and is thus a target for lenition, especially in the context of Japanese where the |U| element is known to be phonologically weak, e.g. the *u* vowel is an *un*rounded [ɯ] (which functions as a default vowel) and the *w* glide is phonetically close to an unrounded [ɯ̞]. Indeed, it has been suggested (cf. Yoshida 1999) that the weakness of Japanese *u*/*w* derives from its representation as non-headed |U| (cf. most other languages, in which labiality in consonants and vowels is represented by headed |U̲|).

Assuming **p* and intermediate [ɸ] are both 'truly' labial and represented as headed |U̲|, there are only two ways in which this place property can undergo lenition: following path (1) |U̲| can weaken to its non-headed counterpart |U| and become realised as velar [ɯ̞], or following path (2) |U̲| can be lost altogether to leave a placeless consonant. Both possibilities are seen to have taken place in the phonological development of Japanese.

References

Backley, Phillip and Kuniya Nasukawa (2009). Representing labials and velars: a single 'dark' element. *Phonological Studies* 12, 3–10.

Hashimoto, Shinkichi (1928). Ha-gyô shin no hensen ni tuite [About the change of the h-sound], reprinted in Hashimoto (1950) *Kokugo on'in no kenkyuu* [*Research in the phonology of Japanese*], Tokyo: Iwanami Shoten, 29–45.

Martin, Samuel (1987). *The Japanese Language through Time*. New Haven and London: Yale University Press.

Yoshida, Yuko (1999). *On Pitch Accent Phenomena in Standard Japanese*. The Hague: Thesus.

Open syllable diphthongization in Italian and irregular sound change

Stefano Canalis – stefano.canalis@unipd.it

One of the fundamental questions in historical phonology is the motivation for the (ir)regularity of sound change. Analogy, lexical borrowing and other non-phonological causes may obscure the regularity of a sound change, but – according to the Neogrammarian hypothesis – once they are factored out, no exceptions should remain. However, some sound changes seem to defy this assumption; what is the status of 'exceptions' to sound change which cannot be ascribed to non-phonological forces? How and when does irregularity arise during sound change? Do irregular changes obey to fundamentally different mechanisms, or do they share them with regular changes? The examination of non-systematic sound changes may thus help understand the nature of sound change in general. This paper will discuss one such change, namely stressed vowel diphthongization in Old Italian, and argue that its irregularity does not motivate a radical departure from the Neogrammarian hypothesis.

Many Romance languages display (some form of) stressed vowel diphthongization. In Italian it was restricted to open syllables (unlike other Romance languages, cf. e.g. Italian *porta* and Spanish *puerta* 'door' < PŎRTA(M)); it targeted the mid-low vowels /ɛ, ɔ/, which became rising diphthongs probably no later than the 7th century (Castellani 1961) (e.g. PĔDE(M) > *piede* [ˈpjɛːde] 'foot', FŎCU(M) > *fuoco* [ˈfwɔːko] 'fire'). What is relevant here is the non-complete regularity of this diachronic process; although most occurrences of /ɛ, ɔ/ underwent diphthongization, a fair quantity of words with non-diphthongized vowels do exist. Furthermore, not only diphthongization failed to apply in some lexical units, but several other words display both forms in medieval texts (e.g. *miele* and *mele* 'honey', *piede* and *pede* 'foot', *luogo/luoco* and *logo/loco* 'place'). Some of the 'exceptions' have been accounted for as the result of analogy, but these explanations are not always convincing. Moreover, one of the apparent factors is indisputably phonological: it has long been noticed that there are more 'exceptions' to diphthongization in proparoxytones than in paroxytones. Examining the earliest Italian texts in the online corpus *OVI* (*Opera del Vocabolario Italiano*) I discovered that other phonological factors may be less strong but still relevant (at a statistically significant level), as the presence of a complex onset before the stressed vowel, or voicing of the preceding consonant; furthermore, lexical frequency – sometimes invoked as a motivation for different rates of sound change – was found not to be relevant.

The exact origin of and motivation for Romance diphthongization(s) is a major matter of debate in Romance linguistics, but many authors accept that is somehow related to vowel lengthening in stressed syllables (supposedly because the longer the vowel, the more it is difficult for speakers to maintain equal sonority and/or position along its overall duration, see e.g. Sánchez Miret 1998). Indeed, in contemporary Italian vowels in stressed open syllables are still allophonically lengthened: cf. /a/ in /sali/ [ˈsaːli] 'you climb' vs. /salivi/ [saˈliːvi] 'you climbed', and /salgo/ [ˈsalgo] 'I climb'. Interestingly, the same parameters that seem to have influenced diphthongization are active in modern Italian vowel lengthening: stressed vowels have been reported to be slightly shorter in proparoxytones than in paroxytones (a.o. Marotta 1985, D'Imperio & Rosethall 1999), as well next to complex onsets than next to simple onsets (Fava & Magno Caldognetto 1976, McCrary 2004). Vowel lengthening is a regular allophonic process in modern Italian; there is no reason to suppose that it was not so in Old Italian either. It thus seems that irregularity in the diphthongization process apparently lied in the re-categorization phase (from a (lengthened) vowel to a glide-vowel sequence), rather than in the phonetic emergence of vowel breaking. This finding suggests a two-stage model of sound change (similar to these proposed by Durie 1996, Hualde et al. 2011) in which at least the first stage is wholly regular, but changes in lexical representation may be non-completely systematic.

The development of the placeless nasal in Latin

András Cser
cser.andras@btk.ppke.hu

The loss of nasals in pre-fricative and word-final positions is a well-known sound change in the prehistory of Latin (e.g. Leumann 1977:223–8, Weiss 2009:61–2, cf. Sen 2015:68–9). In this paper it is argued that the process was not simply one of loss with compensatory lengthening and nasalisation on the preceding vowel. What was structurally lost was only the place specification of the nasal in the relevant environments; and the coalescence with preceding vowels remained a low-level implementation process even in Classical Latin. This assumption, based on a parsimonious model of the internal structure of phonological segments, explains the morphological behaviour of the two suffixes consisting of the placeless nasal segment (AccSing for nominals and 1Sing for verbs) as well as the contrast between two types of original [m] + coronal stop sequences (*eundem* 'him, the same' vs. *emptum* 'taken'). It also explains the phonologically odd behaviour of the prefix *con-*, whose nasal consonant assimilates to all stops and nasals except [n] (cf. *cō-nubium* 'marriage') and is deleted before vowels (*co-actus* 'forced', cf. Cser 2011).

The analytical goal of the paper is to demonstrate that the above mentioned nasal-related phenomena can be given a strict and simple formal explanation that has both diachronic and synchronic relevance. The conceptual goal is thus to move towards rehabilitating explanatory models based on underspecification and infrasegmental structure, which complement functionally based models.

Outcome of longterm language contact: towards a definition of an Egyptian Greek variant

Sonja Dahlgren
sonja.dahlgren@helsinki.fi

Greek in Egypt shows many signs of language contact in the form of nonstandard spellings and morphosyntactic variation. Variation is evident from the beginning of the Ptolemaic period onward, first including nonstandard morphosyntax (see Vierros (2012) for Egyptian-influenced patterns in relative clause constructions), and growing stronger and more phonological in nature in the Roman period with reinforcing bilingualism and the emergence of Coptic Egyptian, which used the Greek alphabet with its vowel graphemes (see Gignac (1976) for nonstandard orthographic variants in Roman and Byzantine periods).

The impact of Egyptian phonology on nonstandard Greek orthography is easily detected in e.g. the fluctuation between voiced and voiceless stops, Roman period Egyptian lacking this distinction. Vowel variation is more opaque due to the process of Greek vowel raising. One clear indicator of Egyptian phonology affecting also nonstandard vowel orthography, however, is the marking of Greek unstressed word-final vowels in accordance with later Coptic conventions for depicting schwa, i.e. usually with <e> (Peust 1999: 253; Horrocks 2010: 112), as in <kerasen> for the standard *kérason* 'mix.IMP' (OGN I: 115). Egyptian was a stress-timed language with a strong tendency to reduce unstressed syllables to schwa, whereas Ancient Greek was a mora-timed language and relied on word-final vowel quality for certain grammatical distinctions. This manifestation of Egyptian phonological transfer on Greek inadvertently caused confusion of e.g. case and mood (Dahlgren and Leiwo in prep.) so its presence in other than texts written by L1 Egyptians seems unlikely. However, Egyptian transfer elements such as the reduction of the unstressed vowel also occur in documents by non-Egyptian writers, e.g. the form *pémpson* 'send.IMP' being written as <pempson>, <pempsen> and <pempse>, all variants representing the phonetic form [ˈpempsə] (Leiwo forthc.).

This indicates a wider substrate effect on Greek spoken in Egypt. Egyptian phonological transfer is also visible in the many instances of the diphthong /ai/, due to Greek vowel raising pronounced [e] at this time, being depicted with both <e> and <a> in Egyptian texts. This suggests a lower variant for the phoneme in Egypt, perhaps [æ] (Horrocks 2010: 112). Among other indicators is also underdifferentiation of Greek /y/ as /u/ (Dahlgren forthc.).

For the present study, Egyptian phonological transfer on Greek in Egypt is studied through the Narmouthis Greek collection (OGN I), combined with a qualitative-quantitative comparative analysis of the nonstandard features in Greek usage in Egypt as a whole. Egyptian phonological impact on Greek will be verified by L1 phonologically-based misspellings of Greek loanwords in Coptic. Loanword adaptations are partly phonologically and partly phonetically grounded, and represented in the limitations set by the target language's phonological system and orthographic conventions (see e.g. Dohlus (2005) on the mechanisms of loanword adaptation). Supporting evidence for features belonging to the Coptic phonological system will be gathered by comparing Greek loanword treatment in Coptic to the similar treatment of Arabic loanwords in the later periods of Coptic. This will serve as reinforcing evidence in separating Coptic phonological integration for loanwords both Arabic and Greek from the language-specific features of these languages. Both Greek and Arabic brought foreign phonemes into the Coptic phonological system, attempted to be repeated as far as was possible within the L1 phonemic reality. Analysing the representation of these can be used to narrow down which elements of nonstandard Greek vowel usage stem from Egyptian influence and which are Greek internal. This combined study will help in defining an Egyptian Greek variant.

REFERENCES

Dahlgren, Sonja (forthcoming). “Egyptian transfer elements in the Greek of Narmouthis ostraka” in *The Proceedings of the 27th International Congress of Papyrology, Warsaw 2013*. The Journal of Juristic papyrology, Suppl.

Dahlgren, Sonja and Leiwo, Martti (in preparation). ”Confusion of tense and modality? Impact of L1 phonological transfer on verb semantics.”

Dohlus, Katrin. 2005. "Phonetics or phonology: Asymmetries in loanword adaptations–French and German mid front rounded vowels in Japanese." *ZAS Papers in Linguistics* 42 (2005): 117-135.

Gignac, Francis T. 1976. *A Grammar of the Greek Papyri of the Roman and Byzantine Periods*. *Volume I: Phonology*. Milano: La Goliardica.

Horrocks, Geoffrey C. 2010. *Greek: A History of the Language and its Speakers*. Oxford: Wiley-Blackwell.

Janse, Mark & Bentein, Klaas (eds.) (forthcoming). *Linguistic Variation and Change: Tense, Aspect and Modality in Ancient Greek*. Amsterdam Studies in Classical Philology. Brill 2015.

Leiwo, Martti (forthcoming). “Confusion of Mood and Tense in Greek private letters of Roman Egypt” in Janse, Mark & Bentein, Klaas (eds.).

Peust, Carsten. 1999. *Egyptian Phonology*. *An Introduction to the Phonology of a Dead Language*. Göttingen: Peust und Gutschmidt.

Vierros, Marja. 2012. *Bilingual notaries in Hellenistic Egypt*. *A study of Greek as a second language*. Collectanea Hellenistica 5. Brussel.

The evolution of the different distributions of contrastive vowel nasalization in Basque

Ander Egurtzegi (Complutense University of Madrid)
aegurtze@ucm.es

Contrastive vowel nasalization is usually a consequence of the reinterpretation of the phonetic nasalization of a vowel due to coarticulation with an adjacent nasal consonant as originating in the vowel itself (cf. Ohala 1993: 247-248; Hajek 1993; Beddor 2009). Basque developed contrastive vowel nasalization after the loss of the nasalized laryngeal /h̃/ (Egurtzegi 2014: 148-149). This segment systematically developed from older intervocalic **n* in Common Basque, the stage of the language preceding the current dialectal division, which Michelena (1981 [2011]: 540-541) placed around the 5th-6th centuries. The loss of the nasalized laryngeal did not occur under the same circumstances in all dialects, and thus yielded different distributions of contrastive nasalization. This paper discusses the development of two different patterns of contrastive vowel nasalization in different Basque dialects.

The analysis is based on the differences observed in the emergence of contrastive vowel nasalization in the contiguous eastern Basque dialects Zuberoan and Roncalese, which yielded different distributions of this feature in these dialects. While modern Zuberoan shows contrastive vowel nasalization only in the stressed last syllable of the word (as in *hügu̍̃* 'repugnance', *hazku̍̃* 'badger', *bedezi̍̃* 'physician' or *orga̍̃* 'cart'), the now extinct Roncalese dialect had phonologically nasalized vowels in any stressed syllable of the word (cf. *ga̍̃zta* 'cheese', *õl* 'board', *arda̍̃ũ* 'wine' or *i̍̃ze* 'hunt'). In addition, these two dialects possessed different nasalized vowel inventories, with Zuberoan lacking phonologically nasalized mid vowels as well as phonologically nasalized diphthongs (compare Zuberoan *ardu̍̃* to Roncalese *arda̍̃ũ* 'wine'). Other Basque dialects with attested contrastive vowel nasalization will be briefly discussed, such as the western Archaic Bizkaian from the 16th century, which shows a distribution of the contrastive nasalization resembling that of Roncalese.

In short, this paper discusses the emergence of two very different patterns of contrastive vowel nasalization in two neighboring dialects of Basque from a common stage of the language with no contrastive vowel nasalization.

Are there impossible changes? θ > f but f ⊁ θ

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

One question that historical phonology should reasonably seek to answer is: *are there impossible changes*? That is: are there imaginable changes that we could reasonably expect to occur in the diachrony of languages' phonologies, but which nonetheless do not ever occur. If we can answer this question with a 'yes', we can go on to ask *why* they are impossible – this is in principle a separate question, but asking it opens the door to the development of a theory of possible changes. In this paper I seek to spell out what it really *means* to consider whether there are impossible changes (in the segmental realm) and what we need to do in order to answer the question for any specific case. I argue that the best evidence indicates that there *are* indeed impossible changes (which I symbolise using 'x ⊁ y' to imply that 'x cannot change into y'), and that f ⊁ θ *is* one.

The question is not new: Bredsdorff (1821) and von Raumer (1837) were already discussing expected pathways of change (eg, d > ð, thus also implying 'unexpected changes'), and Weinreich, Labov & Herzog (1968) see it as part of the 'constraints problem'; it is part of 'diachronic typology' (Kümmel 2015). But what do we need to consider in order to answer it?

(i) we should consider only **endogenously** innovated changes – there may well also be constraints on how contact can affect systems, but the constraints need not be the same – changes can be innovated due to exogeny that seem unlikely through endogeny (eg, Ø > h in varieties of English that used to have '*h*-dropping')

(ii) we should consider only 'neogrammarian, natural' changes ('**N-changes**'), not changes which are due to analogy or major (re)analysis ('A-changes'); A-changes can lead to diachronic correspondences that do not occur in N-changes (eg, r > z / V__V in *coren* > *chosen*), or involve massive leaps (eg, n > Ø / #__ in *næddre* > *adder*)

(iii) we should only consider '**plausible'** changes – it is not interesting that t͡ʃ ⊁ œ because this would involve so many alterations in features at once that this fact by itself precludes such a change (so t͡ʃ ⊁ œ is not theoretically interesting)

(iv) we thus need to constrain ourselves to considering changes that involve only one **quantum** (Lass 1997) – to minimal changes, and not to diachronic correspondences that represent the telescoping of a chain of changes

(v) we can constrain the set of changes to only those that are plausible by considering the **directionality** of possible segmental diachronic correspondences – thus, if x > y is well attested in the history of languages, is also y > x?; if x > y is possible, we can reasonably imagine that y > x should also be possible, unless there is something that prevents it

- the question is thus *really*: **are there any impossible plausible endogenously-innovatable one-quantum N-changes**? All of these conditions involve complex and controversial categories, but we must aim to consider them in order to answer the basic question (because we should not compare apples and oranges).

On this basis, I argue that, while θ > f is attested in the history of languages (eg, in English, Arabic, Italic), and thus f > θ is in principle plausible, this is in fact a directional change, so f ⊁ θ. Blevins (2015) writes that "[t]he existence of f > θ sound change is disputed (e.g. Garrett and Johnson 2012); however, there appears to be at least one clear case...". I consider how we might find counterexamples to proposed 'impossible changes' and I show that candidate examples of f > θ do not fit the bill. This involves a consideration of the only known potential cases – in (i) New Castile Spanish and (ii) Pulo Annian, where, in (i) there are correspondences "of the type *celipe* 'Felipe', *cinca* 'finca'" (where <c> = [θ], see Moreno Fernández 1996), and in (ii) "Proto-Micronesian *f became /ð/ (orthographic <d>)" (Parkvall and Odango 2010). I show that (i) is not the result of an N-change, and that (ii) is not a straightforward change: it involves a merger with /t/, the only evidence that we have (Oda 1977) implies a lenis result, which is described as alveolar and paired synchronically with /z/, and patterns lexically as if it is /d/.

There are thus no clear cases of f > θ, despite considerable effort to find them, so f ⊁ θ.

Apparent time changes in the phonological forms and pragmatic use of *because* in Bolton, Lancashire English

Daniel Huber
Université de Toulouse

The present contribution intends to analyse patterns of full and reduced forms of *because* in Lancashire (Bolton) English, as observed in its ca. 300 occurrences in the semi-guided and free conversations in the corpus of spoken Lancashire English of the PAC project (Carr, Durand & Pukli 2004, Durand & Pukli 2004). This component of the PAC project, collected on the networking principle used by Labov and the Milroys in various studies and recorded in late 2002, comprises recordings from 10 speakers (1 male and 9 females) between 23 and 83 years of age, with the interviews running to a total of 5 hours. While the data can be regarded as relatively small, they are varied enough to make sense of the observable patterns in terms of apparent-time changes, both as far as the phonological variants of *because* and its pragmatic uses are concerned.

It will be demonstrated that the distribution of the phonological variants shows changes in apparent time. Firstly, the oldest speaker did not use monosyllabic forms at all while the two next oldest speakers still did not have the same range of variants as middle-aged and youngest speakers in the corpus did. Secondly, even the occurrence and distribution of monosyllabic forms confirms an apparent-time change in the corpus. The LPD (Wells 2008) lists variants across standard varieties that can differ according to 4 factors: the identity of the stressed vowel: /ɒ ɔ: ʌ ɑ:/ (even /ə/!); the voicing of the final sibilant: /s/ *vs*. /z/; the amount of reduction in the unstressed vowel: /ə i/; and mono- or disyllabicity. Corpus data from Bolton reveal, beyond the variants just mentioned, further reduced variants. A variant [bʊ'kɒz], with a labial, or at least labial-coloured, unstressed vowel, occurs a few times in one speaker in the more formal semi-guided interview. In the same type of dialogue, a curious variant [**t**ə'kɒz] occurs in another speaker a number of times. Finally, the data clearly show that the distribution of mono- and disyllabic forms does not depend either on speech rate or on the informality of the context: in other words, this variation is not a fast speech reduction process.

From a pragmatic point of view, *because* occurs in various discourse functions, not all of which are found equally across different ages. This also points towards changes in apparent time. For example, the discourse progression structure *A*–because *B*–so *A′* (described by Passot 2007 based on another spoken corpus of RP) is virtually absent in the data from older speakers in Bolton. Corpus data further reveal occurrences of a modified template for this structure, apparently not discussed in the literature so far, where *A′* is supplied by the conversation partner. Finally, younger speakers frequently use *because* to elicit further information on the topic under discussion (absent from middle-aged and younger speakers) and use 'style disjuncts' (Quirk et al. 1985:615) much more readily to "[define] in some way under what conditions [they are] speaking as the 'authority' of the utterance".

References

Carr, Philip, Jacques Durand & Monika Pukli. 2004. PAC project: Principles and Methods. In *La Tribune Internationale des Langues Vivantes* (TILV), Vol. 36: 24-35.
Durand, J. & M. Pukli. 2004. How to construct a phonological corpus: PRAAT and the PAC project. *Tribune Internationale des Langues Vivantes* (TILV), Vol. 36: 36-46.
Passot, Frederique. 2007. A because B so A'. Circularity and discourse progression in conversational English. In: Agnes Celle & Ruth Huart (eds.) *Connectives as Discourse Landmarks*. John Benjamins Amsterdam/Philadelphia. pp.117-134.
Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech, Jan Svartvik. 1985. *A Comprehensive Grammar of the English Language*. Longman, London and New York.

The phonetic precursors of aspiration dissimilation: evidence from Aberystwyth English

Adèle Jatteau
U. Paris 8 – a.jatteau@gmail.com

Michaela Hejná
Newcastle University – misprdlina@gmail.com

Overview. This paper investigates the phonetic precursors of aspiration dissimilation with regard to Ohala's coarticulation hypercorrection theory. Data from Aberystwyth English shows that speakers *reduce* coarticulation in the context most likely to trigger dissimilation. This behaviour, previously documented in Mongolian, may then be seen as another path to dissimilation (Garrett 2015) or as a strategy to preserve unambiguity in the speech signal.

1. Ohala's coarticulation hypercorrection theory (e.g. Ohala 1981, 1993) is a widely accepted theory of dissimilation (Bye 2011). In this view, dissimilation arises when coarticulation in the speech signal is misinterpreted by the listener through hypercorrection. For example, in the well-known regressive aspiration dissimilation known as Grassmann's Law in Ancient Greek, Proto-Greek /tʰrikʰos/ 'hair' GEN. sg. would be produced [tʰr̤i̤kʰo̤s]; the aspiration/breathiness pervading the word may then be misinterpreted by the listener as a coarticulation effect, originating in the /kʰ/; the perceived [tʰr̤i̤kʰo̤s] is then reconstructed by the listener as /trikʰos/. This hypothesis implies that post-aspirated stops are able to affect the preceding vowel in a perceptible way, so that breathiness of [i̤] is likely to be interpreted as triggered by the following [kʰ] (Ohala 1992).

2. Voicing preservation in Mongolian was recently interpreted by Garrett (2015) as another possible path to dissimilation. Mongolian has a series of pre-aspirated stops, which are post-aspirated in utterance-initial position: ##[CʰVʰC], and contrast with *lenis* stops (Svantesson *et al.* 2005, Svantesson & Karlsson 2012). Proto-Mongolian *CʰVCʰ sequences underwent regressive aspiration dissimilation in the majority of dialects (e.g. Chahar), progressive dissimilation in Eastern Mongolian (e.g. Monguor), and no dissimilation in Ulaanbaatar Halh.

Proto-Mongolian	Chahar	Monguor	Halh	
**tʰatʰa*	*tatʰ-*	*tʰita-*	*tʰatʰ-*	'to pull'

Remarkably, although the Halh dialect did not undergo dissimilation, aspiration in this dialect still presents a related pattern: post-aspiration in the initial spread glottis stop is significantly shorter before pre-aspirated stops than before other consonants. For example, the [tʰ] of [tʰaɮ] 'steppe' has an average VOT of 72 ms, while the [tʰ] of [tʰaʰtəx] 'to pull' has an average VOT of 50 ms. In contrast to Ohala's prediction, coarticulation is reduced precisely in the context where it is most likely to create ambiguity in the signal. Garrett (2015) interprets this effect as another possible precursor to dissimilation, opposed to coarticulation: reduction of the first aspiration gesture would arise from gestural organization or motor planning (Garrett & Johnson 2012), and might eventually result in complete loss of the first aspiration.

3. Aberystwyth English. Aberystwyth English (AbeE) is another language behaving like Halh Mongolian, and phonetic details about aspiration reduction in AbeE allows for a better understanding of the phenomenon. *Fortis* stops in AbeE are both pre- and post-aspirated, as in *weapon* ['wɛ̤ʰpʰə̤n] (Hejná 2015); the same has been found for Manchester English (Hejná & Scanlon 2015) and Welsh (Morris & Hejná 2014; Iosad, pc). The source of aspiration in a word like *patter* may then be ambiguous. Interestingly, however, phonetic measurements based on 12 English speakers from Aberystwyth (550-620 tokens per speaker) show that the degree of pre-aspiration of C_2 in C_1VC_2- sequences depends on the quality of C_1: the intervening vowel is significantly less breathy, and a smaller portion is pre-aspirated, when C_1 is a *fortis* stop (/p, t, k/) or /h/ than when it is a *lenis* stop (/b, d, g/). As in Halh, a portion of voicing is preserved when the vowel is most likely to undergo complete coarticulation with the neighboring aspirated stops. In light of these results, we discuss Garrett's theoretical interpretations: whether such an effect can be caused by motor planning, and whether voicing preservation could be another path to dissimilation.

Nonesuch contrasts via loanwords

Holly J. Kennard & Aditi Lahiri
(holly.kennard@ling-phil.ox.ac.uk; aditi.lahiri@ling-phil.ox.ac.uk)

To what extent can new phonemes, particularly those that clearly fall within the category of 'nonesuches', be introduced into a language purely on the basis of loans? Furthermore, to what extent can 'nonesuch' as well as 'marked' phonemes be reinforced in the language by loans? In our view a new phoneme entails a non-contrastive feature becoming contrastive in the language. We claim that the phonological grammar does not allow any new contrast to be realised merely on the basis of loans. However, this is quite a contentious statement, since there are a number of accounts in the literature of the borrowing of phonemes from one language into another as a result of intense contact between languages; for example clicks were borrowed into Bantu where it has been claimed that they were borrowed due to special sociological circumstances (Herbert 1990). We will closely examine three (unusual) instances where loans have been claimed to have introduced as well as reinforced nonesuch categories. These include English /θ/, Bengali /ʈ/ and German /p/. A brief sketch of the essential facts follows.

Modern English is one of relatively few languages to have phonemic dental fricatives. These were inherited from Indo-European via Grimm's Law when all voiceless stops became voiceless fricatives. However, most of the surviving Germanic languages have lost them since they are relatively marked sounds: around 18 of 451 UPSID languages have a voiceless dental fricatives. English, on the other hand, has seen an increase in the number of words with /θ/. In a corpus search, using the Celex database, we found that a large proportion (around 60%) of Modern English words with /θ/ are borrowed, particularly in medial position. The rate of borrowing increased in the 16th century, and we argue that many of these came from Greek, being highly specialised vocabulary in the fields of medicine, philosphy and theology.

German /p/ is unusual not because the phoneme is a nonesuch (e.g. 377 languages in UPSID have /p/), but because in the transition from West Germanic to Old High German, initial voiceless /p/ became /pf/. Consequently, Modern German /p/ is only found in loanwords. Words with initial /p/ come either from other Germanic languages (including Low German) or from loans from various sources. Indeed, Swiss German has borrowed /p/ as a word initial geminate since it does not maintain a voicing contrast (cf. Lahiri & Kraehenmann 2004).

Retroflex consonants are clearly thought to belong to the nonesuch category. It is assumed that they have been borrowed into Indo-Aryan languages from Dravidian (Emeneau 1956). However, Bengali not only has /ʈ/ in all word positions, but also uses it very productively in morphological processes. For example, the language has reduplication of full words for plurality where the initial consonant of the reduplicated word is /ʈ/: [ʃari] ~ [ʃari-ʈari] 'sari and such'. Furthermore, the very frequently used classifier is a /ʈ/: [ʃari-ʈa] 'that sari'.

In all three instances, we argue that, rather than the phonemes being borrowed 'wholesale', the internal phonological grammar of the native speaker has facilitated the onset of 'nonesuch' new phonemes, and the reinforcement of existing contrasts.

FROM LATIN TO ROMANCE: COMPUTATIONAL MODELING OF SYNCRETISM

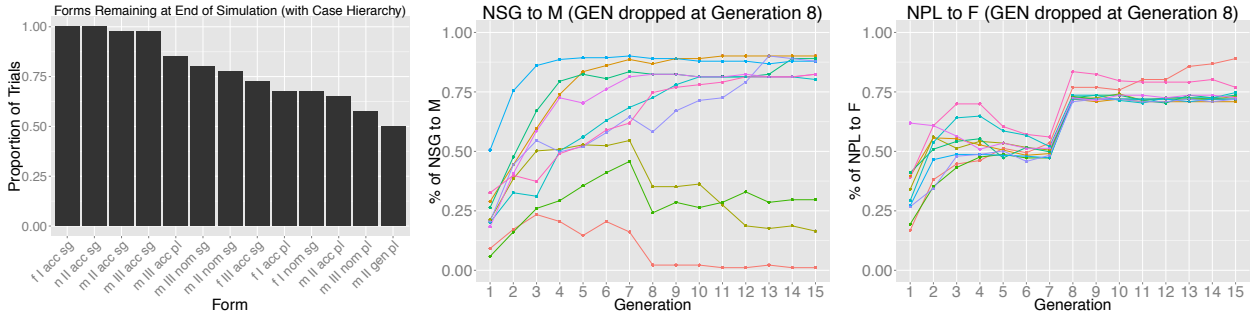
Tyler Lau, Maria Polinsky, & Jake Seaton
tylerlau@berkeley.edu

Introduction: We employ a connectionist simulation to model the simplification of Latin nominal morphology in the transition to the modern Romance languages. The results address the effects of phonology, analogy, and learnability on language change and the question of how much information a model requires to make correct predictions about change and directionality of change.

Background: While the Latin nominal system consisted of five declensions and six cases, rampant syncretism is believed to have been the main factor for simplification. In the daughter Romance languages, declensions IV and V disappear, while Latin N(euter) S(in)g(ular) merges with M and N.PL(ural) with F, due to phonological similarity with the singular forms, respectively. By the time of late Latin, the oblique forms (including GEN(itive)) were soon replaced by periphrastic phrases of the form *preposition + ACC(usative)* (Meyer-Lübke 1904). The merging of SG NOM(inative) and ACC has been attributed to the loss of final *-m*, while the plural in modern western Romance is characterized by an *-s* ending, while eastern Romance shows *-i* for M.PLs and *-e* for F.PLs. It has been argued both that the eastern Romance endings derive from the Latin ACC.PLs *-Vs* like their western Romance counterparts (D'hulst 2005) and also that they derive from the NOM.PL *-i/-ae/-ē* (Rosetti 1986). We explore whether simulation can account for the changes with just phonology and frequency alone.

Model: A neural net was built which takes as its input a feature representation each noun's phonemes and animacy (n=454). For training, each token is introduced several times depending on its frequency in Vulgar Latin and its case/number. The model then predicts gender, declension, case, and number via phonemic/semantic cues. The imperfect output is fed into the next generation, compounding "errors" over time and thus simulating language change, over 15 generations. Two features were toggled: 1) Whether the three cases (NOM, ACC, GEN) were equidistant or whether ACC lay in between NOM and GEN (encoding semantic relationships between the cases). 2) Whether the genitive was dropped at generation 8 (ca. 200AD, assuming 25 years a generation).

Results: We demonstrate first that semantic encoding of the relationship between the cases is necessary to the loss of the genitive. The left figure shows the forms that remain at generation 15 in 50% or more of the trials. As can be seen, declensions IV and V disappear completely, as expected. Among the cases, ACC is highly robust, according with history. NOM survives where it is identical to ACC (Declension III) or where it would be identical once ACC.SG historically lost final *-m*. GEN.SG disappears completely while GEN.PL survives in Declension II in about half of the trials due to a common *-rum* ending across the trials. Second, genitive drop is crucial to the reanalysis of N.PLs as Fs and for the merging of N.SGs with Ms (in the trials in which N.SGs do *not* migrate to M, it is the M.SGs that migrate to N), suggesting that increased use of the *prepositional+ACC* construction was a large factor in the loss of the genitive. The results show that while phonology and frequency can account for morphological class mergers, morphosemantic features must also be accounted for to predict directionality. These simulations also provide a model in which synchronic states may be used to predict diachronic effects.



COUNTING SYLLABLES IS DOWN FOR THE COUNT
THE CASE OF CLASSICAL ARMENIAN AORIST SUBJUNCTIVE DISSIMILATION OF AFFRICATES

MARTIN MACAK
UNIVERSITY OF GEORGIA
macak@uga.edu

The present analysis is part of a larger study involving four additional morpho-phonological phenomena in the synchrony and diachrony of Armenian currently described with reference to syllable count. It is argued that generalizations based on syllable count are epiphenomenal.

As a case in point, the productive alternation observable in the formation of Classical Armenian aorist subjunctive (roughly, future perfective), exemplified by the data in (1), is traditionally described with reference to syllable count: the dissimilation of affricates only occurs if the aorist stem (underlined) is polysyllabic, as in (1b); monosyllabic aorist stems, (1a), do not undergo this dissimilation (Meillet 1913: 95; Jensen 1959: 98; Godel 1975: 15).

(1) a. *lac^{c}c^{c}es* (traditionally pronounced [lɑ<u>ts^{h}</u>.ts^{h}és]) 'thou shalt weep'
b. *stasc^{c}is* (traditionally pronounced [<u>əs.tɑs</u>.ts^{h}ís]) 'thou shalt obtain'

The proposed analysis first argues that the generalization based on counting syllables is based on a philologically questionable input: the traditional pronunciation which is several centuries removed from the original orthography (ca. 400 CE). At this point (ca. 1100+ CE), Classical Armenian was a fully-fledged artificial literary language (Weitenberg 1993), and its orthography was phonetically filtered through a later phonological system.

The original written forms such as *lac^{c}c^{c}es* are compatible with a phonetic interpretation in which the affricates are not in contact, i.e., *[lɑ.ts^{h}ə.ts^{h}és]. The intervening schwa represents a pretonically reduced high vowel underlyingly present on the subjuctive suffix, cf. *lac^{c}ic^{c}* [lɑ.ts^{h}íts^{h}] 'I shall weep' derived from */lɑ-ts^{h}-its^{h}-Ø/ √-AOR-SUBJ-1SG.

Moreover, the dissimilation of obstruents across syllable boundaries was a productive process at a relatively recent prehistoric stage, cf. *kskic* [kəs.kíts] 'itching' from an earlier reduplicated *[kits.kíts]. Thus, the assumption that the originally recorded alternation was *stasc^{c}is*[əs.tɑs.ts^{h}ís] vs. *lac^{c}c^{c}es* *[lɑ.ts^{h}ə.ts^{h}és] and that the dissimilation was phonologically fully predictable when the two obstruents were in contact becomes a possibility. What remains to be explained is the complete reduction of the underlying high vowel in the descriptively polysyllablic aorist stems vis-a-vis the partial reduction in the monosyllables.

To account for the latter alternation, a constraint-base analysis in the framework of Optimality Theory (Prince & Smolensky 1993) is proposed which shows that the descriptive generalization based on counting syllables falls out from the interaction of high ranking principles on prosodic domination (Nespor & Vogel 1986; Selkirk 2004) and specifically ranked morpho-phonological alignment requirements (McCarthy 2002).

Typological shift from a word language to a syllable language and vice versa

Roland Noske roland.noske@univ-lille3.fr

The distinction between 'syllable-timed' languages and 'stress-timed' languages (introduced by Pike & Pike 1945 and Abercrombie 1967) has been shown to be inadequate on several occasions (e.g. by Roach 1982). Dauer (1983, 1985) has shown that the intuitions of linguists on which the distinction was based, is in fact a perceptual effect of differences in syllable complexity, in contrast between stressed and unstressed syllables, as well as in the relative importance of the role of word accent. Taking into account Dauer's findings and building upon Nespor & Vogel's (1986) Prosodic Phonology, a new distinction between two ideal types of language was developed: that between languages in which the syllable is the central prosodic category ('syllable languages') and those where the prosodic word is the central category (Auer 1993, 1994, 2001; Caro Reina & Szczepaniak 2014).

In contrast to word languages, syllable languages have, among other things, the following characteristics: (i) a simple syllable structure, (ii) clear syllable boundaries, (iii) no violation of sonority hierarchy, (iv) possibility of geminates, (v) little influence of stress on syllable structure, (vi) no morphologically influences syllabification, (vii) possibility of tone on unstressed syllables, (viii) no positionally determined allophones, (ix) no vowel reduction, (x) no diphthongization of stressed syllables, (xi) epenthesis for the sake of syllable optimization, not for morphological reasons, (xii) liaison across morphological boundaries.

Using several of these criteria, Szczepaniak (2007) (in a monograph on the typological development of German) shows that in the course of twelve centuries, High German has developed from a clear syllable language to a word language. For instance, in Old High German many phonological processes, such as vowel epenthesis and loss of *r* before a consonant have the role of optimizing syllable structure. However, in Early New High German there are processes which strengthen the role of the phonological word, often to the detriment of optimal syllable structure, like consonant epenthesis (including glottal stops) at phonological word boundaries, as well as a significant reduction of external sandhi phenomena.

The evolution can also go into the opposite direction: although, as in High German, the typological shift was mostly that from a syllable language to a word language in Germanic languages, there have been movements in Scandinavian back to a syllable language (Braunmüller 2014, who uses the term "typological cycle").

In addition, Cunha (2010) shows that varieties of one language may develop in typologically opposite ways, as in this case of European Portuguese (a relative word language) and Brazilian Portuguese (a relative syllable language).

Using the above sketched typology, I will firstly show in this poster that French has developed in the opposite direction from what German did, i.e. from a word language to a (in many respects) syllable language. While, e.g., in Old French vowel reduction (a property of a word language) was pervasive, this process has stopped to be productive in Early Middle French. Instead, a process of schwa-deletion came into being, based on principles of syllable optimization (a feature of a syllable language). Also, word stress has disappeared around the 15th century, thus enhancing further the syllable language character of French.

Secondly, I will show that Dutch, like Portuguese, has undergone a typological split. While in Northern Dutch (spoken in the Netherlands) there are processes of apocope, productive vowel reduction and continuing diphthongization, these processes, typical of word languages, are absent in Southern (Belgian) Dutch. In this latter variety, by contrast, we witness, among other things, liaison phenomena over morphological boundaries, typical of syllable languages.

The role of complexity in possible sound changes

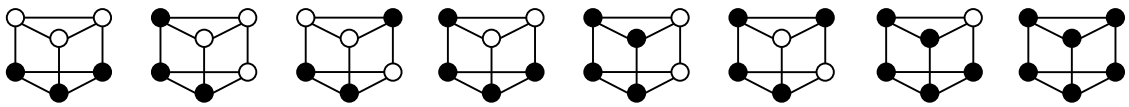
Klaas Seinhorst (University of Amsterdam) – seinhorst@uva.nl

One of the topics that this symposium addresses is the question which sound changes are possible, and which are not. Obviously, many factors play a role here, and I would like to single out one of them: complexity.

It has been argued that linguistic typology is constrained by acquisition biases, which are present in every generation of human learners (e.g. Christiansen & Chater 2008), and that the iterated effect of such biases is a reduction of complexity in various linguistic subsystems (e.g. Kirby, Tamariz, Cornish & Smith 2015). I will present empirical evidence that such a reduction indeed occurs in the acquisition of data sets whose internal structure is based on cross-linguistically frequent plosive inventories.

In this study, human subjects ($n = 96$) learned stimuli that could be described as combinations of one binary feature (in plosive inventories: voicing, e.g. voiced vs. voiceless) and one ternary feature (in plosive inventories: place of articulation, e.g. labial vs. coronal vs. dorsal). Since very young infants are already sensitive to these features (e.g. Eimas et al. 1971), and because the experimental task would be too complex for prelinguistic infants, I used adult participants who learned a sign language instead of speech. This way, the task still concerned *de novo* acquisition. Learners were exposed to photos of the signs in their data set, and then carried out a classification task.

Assuming that a spoken language uses at least three of the possible six categories, any inventory can be reduced to one of the following category structures, or 'types' (similar to Shepard et al.'s (1961) types, used by Moreton et al. (2013) in phonology). A black dot indicates that a feature combination is present, a white dot indicates an absent category. A language with /p t k/ would be of Type I; a language with /b t k/ would be of Type III.



The experimental results show an effect of type on proportion of correct classifications ($p < .001$); most errors favour regular systems, i.e. types without gaps, which have less complex internal structures (cf. Feldman (2000) for a quantification of complexity). Learners do not seem to make errors that increase complexity.

We can regard any incorrect classification as a change, because the learner's interpretation is different from his input. In that light, these results make predictions about possible sound changes: learners like to reduce complexity in the phonological system, so any change that does the opposite is not expected to occur.

However, my learning experiment aimed to investigate learning preferences only. It minimised the role of other relevant factors in sound change, such as perceptual saliency, ease of articulation, influences of other levels of linguistic analysis, etc. Attested and unattested sound changes can shed light on the role of exactly these factors, and on the way they interact with inductive biases. Interestingly, sound changes exist that are unexpected from the perspective of complexity: for instance, the loss of phonemic /g/ in Dutch created a gap in the Dutch plosive inventory. I will explore attested sound changes and investigate how they relate to complexity, and how the two constrain each other.

Computational phylogenetics for linguistic reconstruction: quantitative tools for a qualitative problem?

Kevin Stadler

Language Evolution and Computation Research Unit
School of Philosophy, Psychology and Language Sciences, The University of Edinburgh
3 Charles Street, Edinburgh EH8 9AD, Scotland
kevin.stadler@ed.ac.uk

The past decade has seen a rise in applications of computational tools originally developed for phylogenetic reconstruction in biology to linguistic data, leading to enthusiastic exclamations by the methods' proponents, scepticism from traditional linguists, and little to no consensus between the two. Constructive interactions appear to be hindered by mutual accusations of misunderstanding each other's fields – biologists not understanding (or trivialising) the nature of linguistic data, and linguists not understanding (or questioning the applicability of) the computational methods involved.

This work is an attempt to understand and reconcile the two positions where possible, first and foremost by paying close attention to how different types of linguistic data are obtained, and how these match (or don't match) the kind of input data that the methods are devised for. I will highlight how the purely symbolic encoding used in computational studies does not differentiate between cognacy judgements and descriptive or typological traits, two types of data which are of a qualitatively very different nature. After arguing that the use of the former is in fact tautological I discuss how reconstructions based on the latter fall prey to Galton's problem, i.e. they cannot determine whether similarity between languages is due to common descent, horizontal transfer (borrowing), or parallel evolutionary developments.

While anthropologists working with cross-cultural data are well aware of Galton's problem it is interesting to note that it is largely unheard of in linguistics. I will show how linguistic reconstructions can escape Galton's problem thanks only to the duality of patterning of human languages, and how the Comparative Method has been leveraging this little noted fact since its very inception. Finally, I will also look at some of the most recent endeavours in computational reconstruction that take into account the internal structure of words, showing how they successfully address some, but not all, of the issues raised.

Dimensions of ɦ-metathesis and phonetic adjustment

Nasir Abbas Syed (nasirabbassla@gmail.com)

The current study presents examples of adjacent and long distance metathesis in Saraiki, an Indo-Aryan language. It shows how phonetic adjustment is done using metathesis as a repair strategy to satisfy a constraint which allows voiced fricative [ɦ] only word-initially. [ɦ] is most frequent target of metathesis in Saraiki. Transposition of [ɦ] from syllable-final or word-medial position triggers if a suitable landing context is available within the word boundary. Voiced phonemes are targets of landing for [ɦ]. The preferred direction of movement is rightward although leftward displacement of [ɦ] also occurs in Saraiki. Considering LINEARITY a gradient constraint, Hume (2001) claims that maximum two violations of LINEARITY are possible in one case. Therefore, Hume and Mielke (2001) delineate that metathesis normally occurs in adjacent phonemes only. But in Saraiki [ɦ] sometimes skips over three phonemes. Hume claims that since metathesis is segmental, it may not be treated as other phonological processes like assimilation which involve features. Buckley (2011) also considers that phoneme metathesis provides evidence in favour of innateness of *segments* in language. The current study provides examples of feature metathesis which is rare in synchronic phonology. There are examples of feature metathesis in Saraiki in which only two features swap positions. In these cases, when feature [breathy voice] lands at implosives, feature [constricted glottis] moves to the voiced stops. According to Hume (2004), only those structures which are independently attested in the language, emerge as output of metathesis. The same occurs in Saraiki. There are no aspirated fricatives and breathy voiced implosives and fricatives in Saraiki. Therefore, fricatives and implosives are never targeted in ɦ-metathesis. Breathy voiced sonorants are limited to word medial or final position; therefore, [ɦ] targets sonorants on word-medial and -final position only. Voiceless aspirated stops exist in Saraiki but [ɦ] does not target them in synchronic metathesis. However, in historical development, there are examples of metathesis as a result of which voiceless unaspirated stops became aspirated. Sanskrit 'st' clusters changed into 'tʰ' in Saraiki. The direction of change is 'st'→'ht'→th→'tʰ' (Masica, 1991). In cases where [ɦ] displacement is not possible, phonetic adjustment is made by vowel metathesis (appendix-F). When 'ã' (plural marker) is added to the words ending on [i], the [i] palatalizes the preceding consonant e.g. 'pətti+ã'→'pətʲã' *pəttiã. But if the consonant before [i] is [ɦ], then instead of palatalization of [ɦ], vowel displacement occurs, e.g. 'kə.ɦi+ã'→'kəi.hã', *'kəɦʲã'.

References

Buckley, E. (2011). Metathesis. In M. v. Oostendorp, C. J. Ewen, E. Hume & K. Rice (Eds.), *Blackwell Companion to Phonology* (Vol. III, pp. 1380-1407). Sussex: Wiley-Blackwell.

Hume, E. (2001). Metathesis: Formal and Functional Considerations. In E. Hume, N. Smith & J. v. d. Weijer (Eds.), *Surface Syllable Structure and Segment Sequencing* (pp. 1-24). Leiden: HIL Occasional Papers.

Hume, E. (2004). The indeterminancy/attestation model of metathesis. *Language, 80*(2), 203-237.

Hume, E., & Mielke, J. (2001). Consequences of word recognitition for metathesis. In E. Hume, N. Smith & J. v. d. Weijer (Eds.), *Surface syllable structure and segment sequencing* (pp. 135-158). Leiden: HIL.

Masica, C. P. (1991). *The Indo-Aryan Languages*: Cambridge University Press.

Matras, Y. (2004). Romacilikanes -- The Romani Dialect of Parakalamos. *Romani Studies, 14*(1), 50-109.

Matras, Y. (2011). Romani. In B. Kortmann & J. v. d. Auwera (Eds.), *The languages and linguistics of Europe. A comprehensive guide* (pp. 257-268). Berlin: De Gruyter Mouton.

Secondary Stress in Old English, Optionality and Uncertainty:
Manuscript Spacing and Clues to Metre

Monique Tangelder
M.Tangelder@let.ru.nl

I will show that the use of spaces in the *Beowulf* manuscript contains important clues about the placement of both primary and secondary stress in Old English (OE) alliterative verse. Most, if not all, scholarly work on scansions of OE alliterative verse agrees on the placement of primary stress, but the exact nature of secondary stress remains a subject of debate. Bliss' (1962) scansion of *Beowulf* has become the de facto reference scansion, but the views on secondary stress tend to differ greatly depending on the phonological (cf. Dresher and Lahiri, 1991) or morphological (cf. Minkova, 2006) principles that form the basis of these analyses.

Interestingly enough, in the original manuscripts we *can* find supporting evidence for the placement of primary and secondary stress. Spacing and word-division in OE manuscripts are usually regarded as inconsistent and erratic and resulting from less formal rules on word-division and particular scribes' individual habits. However, on closer inspection the apparent irregular use of spaces between morphemes is likely to have been governed by phonological considerations rather than strict rules on word formation.

The scribes' habits of writing clusters of monosyllabic unstressed words and spaces between N-N compounds, in the *Beowulf* manuscript for instance, show a high degree of regularity when we look at stress placement. The use of space appears prompted by a scribe's language intuitions, rather than a full understanding of the rules on word formation. And it is this aspect that provides invaluable clues on secondary stress placement in OE poetry.
For example, in *Beowulf* we find instances of the element *-wine* 'friend' as the second element of a N-N compound, but not always preceded by a space:

	Scansion (Bliss 1962)	**Manuscript transcription** (Kiernan 2004)	
l. 1319a	/ / x x		
	Frean Ing-**wine**	Frean <space>ingwine	(f.162r.)
l. 2438a	x / \ x		
	His frea-**wine**	His <space> frea <space> **wine**	(f.187v.)

Most notably, the instance of *–wine* in l. 2438a carries secondary stress and is preceded by a space in the manuscript, whereas the same element in l. 1319a which is unstressed follows the first element of the compound without a space. The proper noun *Hroðgār,* an obscured N-N compound, usually appears without space between the two elements, but *Hroð gāres* is found with a clear space between the elements, an indication of secondary stress carried by *–gār.* This relation between stressed syllables and superfluous spacing manifests itself throughout the manuscript and is strongly statistically significant. Manuscript spacing can thus offer valuable systematic indications of the appearance of both primary and secondary stress.

References:

Bliss, A. J. (1962). *The Metre of Beowulf*. Oxford: Blackwell Publishing.
Dresher, E. B., & Lahiri, A. (1991). The Germanic Foot: Metrical Coherence in Old English. *Linguistic Inquiry, 22*(2), 251-286.
Kiernan, Kevin. (2004) "Electronic Beowulf 2.0." London: British Museum. CD-ROM.
Minkova, Donka. (2006). "Old and Middle English Prosody". In van Kemenade & Los (Eds.). *The Blackwell Handbook on the History of English*. Oxford: Blackwell Publishing, 96-124.