The Twenty-Second Manchester Phonology Meeting

ABSTRACTS BOOKLET

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Organised by a collaboration of phonologists at the **University of Edinburgh**, the **University of Manchester**, and elsewhere.

This booklet contains the abstracts for all the papers presented at the **twenty-second Manchester Phonology Meeting**, held at Hulme Hall, Manchester, in May 2014.

The abstracts are arranged in alphabetical order by the surname of the (first named) presenter. If any abstracts are missing from this booklet, it is most likely because the authors did not submit a non-anonymous version of their abstract.

The abstracts for the **oral paper sessions** are presented first, followed by the abstracts for the **poster paper sessions**, and the booklet concludes with abstracts for the **special session**.

The **final programme**, included in your registration pack and available on the conference website, gives the details of which papers are in which room, and at which times.

Oral papers

Geminate Splitting in Chukchansi Yokuts

Niken Adisasmito-Smith[a], Chris Golston[a], and Holly Wyatt[b]
California State University Fresno[a], Picayune Rancheria of the Chukchansi Indians[b]
chrisg@csufresno.edu

We present here new data from Chukchansi, a dialect of Yokuts, a critically endangered Penutian language spoken in Central California with very few fluent speakers. Although the language has been well studied for over a century (Kroeber 1907, 1959, 1963; Newman 1944; Collord 1968; Gamble 1978), there is no extant dictionary or other source for checking lexical information. Our data come from the third author, a fluent native speaker in her 60s.

Like most of Yokuts, Chukchansi has a strict limit on onsets and codas which limits them to a single consonant each. Coda clusters are repaired by epenthetic [i] (underlined),

/bayn/	[bay<u>i</u>n]	‘acorn (nom)’	cf. [bayna]	‘acorn (acc)’
/limk̓/	[lim<u>i</u>k̓]	‘black (nom)’	cf. [limk̓a]	‘black (acc)’
/xat-t/	[xat<u>i</u>t]	‘eat (rec pst)’	cf. [xattaʔ]	‘eat (nar pst)’
/yat-t/	[yat<u>i</u>t]	‘talk (rec pst)’	cf. [yattaʔ]	‘talk (nar pst)’

which harmonizes to [u] following an [u] in the stem:

/ʔugn/	[ʔug<u>u</u>n]	‘drink (nom)’	cf. [ʔugna]	‘drink (acc)’
/yunk̓/	[yun<u>u</u>k̓]	‘warm (nom)’	cf. [yunk̓u]	‘warm (acc)’
/šut-t/	[šut<u>u</u>t]	‘add (rec pst)’	cf. [šuttaʔ]	‘add (nar pst)’
/yut-t/	[yut<u>u</u>t]	‘stretch (rec pst)’	cf. [yuttaʔ]	‘stretch (nar pst)’

Surprisingly, underlying tautomorphemic geminates are broken up as well:

/nass/	[nas<u>i</u>s]	‘rattlesnake (nom)’	cf. [nassa]	‘rattlesnake (acc)’
/bič̓č̓/	[bič̓<u>i</u>č̓]	‘cold (nom)’	cf. [bič̓č̓i]	‘cold (acc)’
/moll-taʔ/	[mol<u>i</u>lta?]	‘fool (nar pst)’	cf. [moll<u>i</u>t]	‘fool (rec pst)’
/wek̓k̓-taʔ/	[wek̓<u>i</u>k̓taʔ]	‘peek out (nar pst)’	cf. [wek̓k̓<u>i</u>t]	‘peek out (rec pst)’

with the same harmony in evidence, too, though our data here is rather meagre for geminates:

/dull/	[dul<u>u</u>l]	‘hill (nom)’	cf. [dulla]	‘hill (acc)’

Restrictive accounts of geminates as long (moraic) consonants or as two slots linked to a single melody preclude splitting true geminates. To account for the present data, we therefore propose that root-final geminates in Chukchansi are the result of a mismatch between their underlying morphology and prosody: they are tautomorphemic, but heterosyllabic with respect to the rest of the root. Building on Fudge (1969) and subsequent similar proposals, we propose that Chukchansi root-final geminates fall outside the prosodic constituents that contain the rest of the root: ($_{\sigma}$mol)l, ($_{\sigma}$nas)s, and are thus not true geminates (long consonants) *sensu stricto*. The analysis extends easily to other epenthesis-inducing root-final material: root-final clusters are also tautomorphemic but heterosyllabic ($_{\sigma}$lim)k̓, ($_{\sigma}$bay)n and remain so throughout the derivation from root to word. We argue that an alignment constraint drives medial rather than final epenthesis in Chukchansi: words must right-align with morphems, so that [lim<u>i</u>k̓] (with its discontinuous root) is a better outcome than [limk̓<u>i</u>] (which ends in meaningless material).

Epenthesis in rising sonority clusters in Lakhota

Adam Albright, MIT (albright@mit.edu)

Analyses of onset clusters often rest on a typological preference for rising over level sonority contours. Less attention has been paid to languages with the opposite pattern, tolerating level contours but banning certain rises. One example is Lakhota, which lacks stop+sonorant clusters on the surface, but has instead a set of stop+ə+sonorant sequences (1d). In this talk, I first defend the claim that the sequences in (1d) are underlyingly clusters. I then propose that this apparent reversal, in which epenthesis specifically targets stop+sonorant clusters, is due to faithfulness constraints that make it costlier to repair the clusters in (1a–c) than in (1d). Thus, this apparent counterexample is consistent with a universal markedness preference for rising sonority clusters.

(1)

a. [xp, [xt, [st, [ʃk (etc.)	c. [xl, [xm, [sn, [ʃn
b. [pt, [tk, [kp, [kt	d. [*bəl*, [*gəl*, [*gəm*, [*gən*

There are several reasons to believe the traditional view (Carter 1974) that the sequences in (1d) are underlyingly clusters. First, [ə] does not otherwise occur in Lakhota, and even in this context, it has short and variable duration. In addition, combinations such as [dəl] and [dən] do not occur, which can be attributed to cross-linguistically common ban on *dl (Kawasaki 1982; Tobin 2002) and *dn clusters. The [ə] is also invisible for stress assignment (Elfner 2009): [kimímila] (regular peninitial stress) vs. [gənugənúʃka] (stress second full vowel). These considerations confirm the cluster status, but call into question whether [ə] is a phonological element at all, or merely a targetless open transition between consonants (Davidson and Stone 2003). If the [ə] is transitional, then its quality should be predictable based on the surrounding consonants and vowels. I present acoustic data showing that contextual factors have only small (n.s.) predictive power for the quality of the [ə]. Although this is admittedly a statistically null result, I take the relatively stable quality of [ə] as evidence that it is phonologically specified. Thus, we are forced to conclude that the sequences in (1d) are clusters that have undergone epenthesis.

Why are stop+sonorant clusters repaired, while rising fricative+sonorant and level stop+stop clusters are tolerated? Building on work by Fleischhacker (2005), Flemming (2008) and Yun (in press), I claim that these asymmetries are due to a perceptual difference: bl∼bəl are perceptually more similar than xl∼xəl or pt∼pət. Epenthesis therefore violates a lower-ranked Dep(ə) constraint in stop+sonorant clusters than elsewhere. The insight is that stop+stop and fric+C clusters are more marked than stop+sonorant, but they may also be costlier to repair, and are thus tolerated. I show how this analysis extends to other apparent markedness reversals, including Mohawk and child English (Barlow 2001), whereas previous analyses of such reversals (Alderete 1995; Davis and Baertsch 2011) cannot explain Lakhota or these other cases.

(2) Epenthesis asymmetries through differential faithfulness

/pl/	Dep/p_t	*pt	*pl	Dep/p_l
a. pl			*!	
☞ b. pəl				*

/pl/	Dep/p_t	*pt	*pl	Dep/p_l
☞ a. pt		*		
b. pət	*!			

The final challenge is to explain why stops voice in these clusters, even though they are not surface-adjacent to the sonorant. One possibility is to view this as an opaque interaction, in which voicing applies 'first': /pəl/→bl→ bəl. This approach is unsatisfying, since regressive voicing assimilation triggered by sonorants is cross-linguistically rare (though see Recasens and Mira 2013). I argue instead that the perceptually-motivated account offers a unified account, in which voicing is motivated by faithfulness to phonetic duration. Acoustic measurements show that singleton voiceless unaspirated stops have long closure duration in Lakhota, whereas voiced stops and stops in clusters are much shorter. Voicing of /pl/ → [bəl] maintains the shorter duration of C1 (as well as of the cluster as a whole), and Ident(duration) favors [bəl] over *[pəl].

Speaking Rate Effects on Medial Stop Cues: A Comparison of German and English

Jill Beckman, University of Iowa

A growing body of research documents asymmetric effects of speaking rate on the phonetic cues that realize word-initial laryngeal contrasts in a variety of languages (Pind 1995, Kessinger & Blumstein 1997, Magloire & Green 1999, *inter alia*). These researchers have found that as the rate decreased, long-lag VOTs on stops increased in English and Icelandic, while prevoicing increased in Spanish and French; there was no change in the short-lag VOTs in any of these languages. Little research has investigated the effects of speaking rate on the cues of medial stops, however. Here, we present data from a rate study of medial and initial stops in German and English, and examine the phonological implications of our findings.

Considering the asymmetric effects of speaking rate described above, Beckman et al. (2011) argue that these make sense if, as many assume, the two-way contrast in languages such as Icelandic and English is one of privative [spread glottis] vs. [ø], whereas the two-way contrast in languages such as Spanish and French is [voice] vs. [ø]. On this assumption, in the cases reported above, the phonetic cue(s) for *only the active/marked feature(s) in a phonological contrast* were selectively increased at slower speaking rates; *cues associated with the unmarked feature were unaffected.* Beckman et al. provide further evidence for this interpretation with a rate study of Swedish, where the stop contrast is "overspecified" with both [voice] vs. [sg] (Helgason & Ringen 2008). They found that Swedish talkers increased prevoicing *and* long-lag VOT in word-initial stops at slower speech rates, as expected—*phonetic cues for both of the phonologically marked categories changed as a function of speaking rate.*

Kulikov (2012) applied the rate paradigm to an investigation of the cues for the [voice]/[ø] contrast in Russian. He tested the effects of speaking rate on intervocalic stops in connected speech, examining both word-initial and, crucially, word-medial stops. Kulikov found that, as predicted, *the phonetic cues associated with medial [voice] stops, but not unspecified stops, were increased in slow speech*.

We examine rate effects on VOT in both initial and medial stops in the speech of native speakers of English and German, two languages that typically realize the word-initial contrast as short-lag (orthographic *b, d, g*) vs. long-lag (orthographic *p, t, k*) VOT in initial position, with some (passive) voicing of short-lag stops in intervocalic position (Jessen 1998). If the phonological contrast in these languages is [sg]/[ø] (Iverson & Salmons 1995, Jessen & Ringen 2002, Honeybone 2005), the prediction is clear: VOTs should increase in medial long-lag stops in slower speech, but VOTs in short-lag stops shouldn't vary as a function of speaking rate. Further, the closure voicing of short-lag stops in medial position, which is argued to be a passive phonetic effect in German (Jessen & Ringen 2002), rather than an active phonological effect, should not vary as a function of speaking rate.

We recorded 7 native speakers of each language producing words with initial or medial stops embedded in a carrier sentence at both normal (slow) and speeded (fast) speaking rates. In medial stops, VOT, closure duration, voicing duration, and voicing ratio (VD/CD) were measured. As expected in the privative [sg] analysis, long-lag VOTs in initial stops in both German and English were significantly longer in slow speech than in fast speech. Also as predicted, German VOTs were significantly longer at the slower rate for the long-lag medial series of stops (M_{slow}=41.3ms, M_{fast}=31.8ms, p=.001), while VOTs for the short-lag initial stops were not significantly different (M_{slow}=13.4ms, M_{fast}=11.2ms, p=.089); furthermore, the closure voicing ratio was not affected by rate. Quite surprisingly, however, preliminary analysis of 4 English talkers shows that VOTs were *not* significantly different in either short-lag (M_{slow}=15.5ms, M_{fast}=14.6ms; p=.535) or long-lag stops (M_{slow}= 32.6ms, M_{fast} = 28.8ms; p=.094). This seems to be inconsistent with a phonological analysis of English in which [sg] is the specified feature of contrast in all positions, suggesting that a more nuanced account may be called for.

Laryngeal conspiracies and the life cycle of phonological processes

Karolina Broś, University of Warsaw
k.bros@uw.edu.pl

An abundant set of cross-linguistic data confirm the observation that a distinction should be made between word and phrase phonology on the one hand, and between the different advancement stages/domains in which phonological processes apply. In a holistic perspective phonology points to an ascending trend from the lowest (broadest) to the highest (narrowest) domains – as rightly captured by the concept of the life cycle of phonological processes (Bermúdez-Otero 2007). Thus, processes involving opacity can be explained in terms of domain narrowing, e.g. the differences between Spanish dialects, from phrase level *s* debuccalisation only, through word-level preconsonantal and opaque prevocalic, to the deletion/debuccalisation conspiracy with complete *s* loss phrase-finally and debuccalisation word-finally in Chilean (Lipski 1996, Broś 2012). Similar cyclic patterns can be observed in the distribution of English linking *r* and dark *l* (Bermúdez-Otero 2011, Turton 2012), as well as Catalan and Quito Spanish (e.g. Colina 2009, Strycharczuk 2012).

In Slavic languages, Polish distinguishes between two dialectal behaviours, one of which involves presonorant assimilation across word boundaries. The Poznań/Kraków dialect presents not only voice assimilation (VA) and final devoicing (FD), but also admits voicing before all sonorants, except word-medially. This is complicated by the specific restrictions on syllabification, with onset maximisation and SSG suspension that result in syllabifying CC and CCN clusters in the onset (*ja.sny* 'bright', *gwie.zdny* 'stellar', *ża.bki* 'frogs', *pro.sty* 'straight'). This makes traditional accounts of VA implausible in terms of determining directionality (saving onset voice at the expense of the coda), as noted by Rubach (2008), cf. Lombardi (1999). A string-based faithfulness account solves the question of agreement in clusters, but fails to account for the unexpected behaviour of word-final obstruents in Kraków. Traditional pre-OT accounts (Gussman 1992, Rubach 1996) rely on autosegmental delinking cum spreading which requires that word-final obstruents be distinguished from word-medial by the prior application of FD (underspecification). This is incompatible with the results of the latest studies in voicing oppositions and the life cycle. As noted by Strycharczuk (2012), Kraków/Poznań voicing data suggest that FD is a phrase-final process: full neutralisation in voicing can only be observed prepausally. In all other cases final obstruents share the voicing specification with the following sound. Thus we have *bra[t]* 'brother', *bra[da]dama* 'Adam's brother', *bra[dm]agdy* 'Magda's brother', *bra[tk]asi* 'Kasia's brother' and *bra[dg]osi* 'Gosia's brother'. Given the lack of resyllabification in Polish, the last segment in *brat* invariably stands in the coda, unlike word-medial presonorant obstruents: *ja.sny* 'bright', *za.zna* 'will experience'.

I will argue that Kraków Polish has no FD in the traditional sense. Laryngeal contrast can be observed word-medially (purportedly due to syllabification restrictions), albeit with obligatory cluster homogeneity: *pstry* 'colourful', *bzdura* 'nonsense', *gwiazda* 'star', *miasto* 'town'. General markedness of laryngeal features in obstruents is the driver of both neutralisation across a word boundary (with full laryngeal agreement before obstruents and sonorants alike) and pre-pausal devoicing interpreted as delaryngealisation. This is presented in a Stratal OT framework where *LAR and AGREE constraints conspire at the phrase level, avoiding unmotivated Duke-of-York effects and stipulative constraint formulations. The resultant underspecification would then be interpreted as the default value (voicelessness) by the phonetics component of the grammar, giving rise to 'emergence of the unmarked' in the post-phonological component. This perfectly captures the phonetics-phonology interface and phonetic feeding into the phonological component (rule stabilisation and domain narrowing as per the life cycle), especially given the latest insight into the passive/active voicing mechanisms in sound production and perception (Jansen 2004, Blevins 2004) whereby FD can be attributed to the lack of a voicing target on the right.

The fact that underlying voiced obstruents are more prone to voicing than their voiceless counterparts (Strycharczuk) provides further support for the assumption that there is no FD at the word level in Kraków, although interspeaker variation and optionality might suggest a move in the direction of domain narrowing. Thus, the contrast between Kraków and Warsaw Polish can be interpreted as a difference in the domain application of FD which ascends to the word-level in Warsaw, superseded only by obstruent cluster agreement.

The effect of a null pronoun on morpho-phonology: demonyms in Modern Hebrew

Noam Faust, Hebrew University

Demonyms (here: names denoting populations) in Modern Hebrew are productively derived by a suffix suffix *-i*. Although the native vocabulary of MH is largely stress-final, and this suffix is native, it is only stressed when attached to native (or nativized) bases; otherwise, stress remains in its lexical position. This affects the form of the feminine affix: stress-final demonyms usually have a feminine form with *-a* (1b). Lexically-stressed demonyms, in contrast, always have a feminine form with *-t* (1a; these usually have loaned bases). As (1) further shows, demonymic (inanimate) adjectives have the same *m.sg* form as nouns, but differ in two ways in their inflection. First, the feminine form always has *-t*, regardless of stress (*sxora yapánit/yevanít/*yevaniyá* 'Japanese/Greek merchandise'). Second, the *m.pl* plural form of such adjectives is always different from that of either noun type: whereas in nouns *-im* replaces the base's suffix *-i* (*yevani+im =>yevan**im**),* in adjectives the two markers are concatenated (*yevani+im => yevan**ii**m*).

(1)	*demonym*	*nominal m.pl.*	*adjectival m.pl.*	*nom.fm.*	*adj.fm.*	
a.	yapán-i	yapán-im	yapán-i-im	yapán-i-t	yapán-i-t	'Japanese'
b.	yevan-i	yevan-im	yevan-i-im	y(e)van-i-a	y(e)van-i-t	'Greek'

In this talk, I ask the following questions:

Q1. Why isn't the nominal feminine suffix *-a* used for lexically-stressed bases and adjectives?

Q2. Why is the same suffix used for lexically-stressed bases and adjectives?

Q3. Why does the plural suffix of adjectives not merge with the base *-i*, as in nouns?

Because *-a* is usually stressed in native adjectives and nouns, one is tempted to appeal to paradigm uniformity in answering **Q1**: attaching *-a* to loaned bases would attract stress away from those bases. Although I do eventually turn to such configurations, I claim that paradigm uniformity cannot be so central to the account because, among other weaknesses, it cannot answer **Q2**. Instead, I propose a solution based on the combined effects of autosegmental morpho-phonology and the syntactic structures of nouns and adjectives.

I first present the autosegmental representations of the different suffixes. I show that *-it* and *-im* involve additional skeletal material, whereas *-a* does not. As a consequence, its realization alters the linking pattern between the segmental and skeletal tier. As a second move, I propose that the morpho-syntactic structure of adjectives, unlike that of nouns, involves a null pronoun that is co-referenced with the noun. Thus, the nominal structure for 'a Japanese person' is $[[\text{yapan}]_{\text{nP}}\ \text{i}]_{\text{nP}}$, whereas that of the adjective 'Japanese' is $[[[\text{yapan}]_{\text{nP}}\ \text{i}]_{\text{adjP}}\ \text{PRO}\ ]_{\text{nP}}$. The inflection of an adjective is thus not of the adjective itself but of its pronominal head.

The presence of this null element in adjectives results in a barrier between the base and the inflectional marking. In consequence, when the inflectional markers are added to the adjective, they may not alter the linking of the segments of the base to the skeletal tier. Thus, *-a* will never appear on adjectives (because it has no skeleton of its own), and *-im* will not be able to merge with the base's *-i*. With this solution at hand, the only fact left to explain is absence of *-a* from denonyms with loaned based. The notion of paradigm uniformity is returned to, but this time with autosegmental motivation: just like stress is unaltered in such nouns, one prefers not to alter their linking of segments and skeletal slots.

Syntactic theories of morphology such as Distributed Morphology (Halle & Marantz 1993) often raise the objection that syntactic phenomena such as movement and long distance dependencies have no morphological equivalent. The effect of the proposed null pronoun constitutes a case where morpho-phonology does reflect syntactic configurations.

FEATURES CHANGE

JOSEF FRUEHWALD

Labov (1981) set out to provide a new synthesis between the position that "every word has its own history," and the Bloomfieldian dictum that "phonemes change," suggesting a new research program whereby we may "predict with a high degree of certainty the way the phonological system will behave as the system changes," and "illuminate the synchronic nature of the phonological system." This paper follows in that research program, with a two pronged argument. First, I'll argue, following Labov (1981), that rather than trying to identify a unitary locus and mechanism of language change, for any particular language change we should be trying to identify where it is located among all possible loci provided by the grammatical system. Second, I'll argue that one possible locus of change is the phonetic implementation of phonological features, where I define "feature" along the same lines as Mielke (2008), as a label denoting a set of phones which are phonologically active together. This argument is a generalization of the statement "phonemes change" to "features change."

The primary data supporting my argumentation will be the tight correlation of the GOOSE, GOAT and MOUTH vowels in Philadelphia, using approximately 700,000 vowel measurements drawn from 40 years of fieldwork there (Labov et al., 2013). These three vowels share a common diachronic trajectory across a century of apparent time, initially showing a strong fronting trend, then all three ceasing to front at the same time, then all three retracting at the same time. Unsurprisingly, the frontness of these vowels is also highly correlated across speakers.

In addition to being diachronically linked, these vowels are also phonologically active together. GOOSE and GOAT fronting is categorically blocked by a following /l/ from the very onset of the fronting trend. I argue this must be because distinct phonological allophones of these vowels appear pre-/l/, most likely the same phonological process of off-glide deletion that effects MOUTH in the same context (Tucker, 1944; Dinkin, 2011). This process could be formalized as a rule like so: Vw $\rightarrow$ V:/__l, producing a long vowel which is exempted from the fronting process. The result is a fully back realization of GOOSE and GOAT before /l/, and the merger of *Powell* and *pal* for MOUTH.

Given their common phonological activity (targets of off-glide deletion), GOOSE, GOAT and MOUTH belong to a phonological natural class, and it is this natural class, or feature, which is undergoing phonetic change in Philadelphia, resulting in their parallel diachronic trajectory. I also address the substantive counter-proposal from (Watt, 2000) that these vowels may be *socially* correlated rather than *linguistically* linked. The social motivation for the reversal of the fronting trend seems clear. As Labov et al. (2013) argued, it represents Philadelphia moving away from Southern dialectal features. However, even after controlling for social factors (such as gender and level of education), the high correlation of these vowels remains. Moreover, social marking alone would predict that other Southern dialect features, like lax nucleus for FACE pre-vocalically, should also begin to be eliminated, which it is not. I argue that it is necessary to take into account the social marking of features *in combination* with the grammatical representations they become attached to, in this case, the phonological natural class which includes GOOSE, GOAT and MOUTH, but not pre-vocalic FACE.

Intrusive vowels in Tashlhiyt Berber – Driven by the tune?

Martine Grice[1], Timo B. Roettger[1] & Rachid Ridouane[2]

[1]I*f*L Phonetik, University of Cologne;
[2]Laboratoire de Phonétique et Phonologie (UMR 7018) CNRS/Sorbonne Nouvelle
{martine.grice, timo.roettger}@uni-koeln.de; rachid.ridouane@univ-paris3.fr

Schwa in Tashlhiyt Berber has been analysed as a voiced transition - an intrusive vowel - with a distribution that is predictable from the consonantal environment (Ridouane & Fougeron 2011; Ridouane 2008; *pace* Coleman 2001). The present study investigates voiced transitions (schwa) in entirely voiceless target words (e.g. /tfsχt/ 'you cancelled'). Six Tashlhiyt speakers (Agadir, Morocco) produced target words in utterance final position. Results reveal that all speakers frequently produce schwa in these target words (83% of all instances, n=288) (as in Fig (b) and (c)). Interestingly, however, not all of the schwas were interconsonantal (C@C 63%); many were prepausal (CC@ 37%). In no cases were there two schwas in a target word (C@C@).

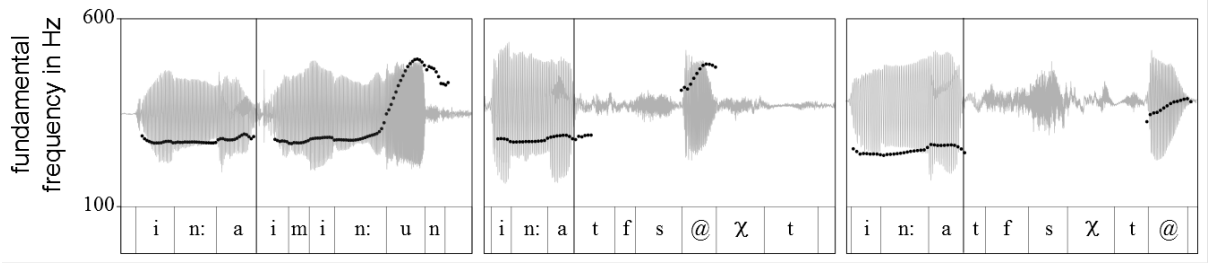


Figure 1: Representative F0-contours and waveforms for /in:a TARGET/ 'he said TARGET?' produced by one speaker. Left: (a) fully voiced control (/imin:un/ 'your mouths'); middle and right: voiceless target (/tfsχt/ 'you cancelled'), which surfaces with a schwa (b) interconsonantally (C@C) or (c) word finally (CC@).

In the model of Articulatory Phonology (AP), an intrusive vowel can result from gestural retiming: A reduction in overlap between the gestures for two adjacent consonants leads to a transition that may be voiced, and thus perceived as a vowel (Browman & Goldstein 1992, Gafos 2002, Hall 2006). We focus on what happens when these consonants are both voiceless. According to AP, a reduction in overlap of the glottal opening-and-closing gestures for the two consonants should lead to voicing, since the glottal narrowing required for voicing is treated as a default laryngeal setting (Browman & Goldstein 1992). Nonetheless, not all transitions between voiceless consonants are voiced in the language (Ridouane & Fougeron 2011, see also e.g. Butler 2014, for voiceless transitions in Khmer), somewhat weakening the argument for the voicing as a default. Looking at the present data: although a reduction in gestural overlap might be able to account for voicing interconsonantally (if we treat voicing as default), it cannot account for voicing prepausally. Since the two locations for schwa appear to be interchangeable in the language, a uniform explanation for their voicing is called for.

Looking at the intonation contours in Fig. 1, we propose the following motivation for the voicing of the transition (and thus the intrusive vowel): Tashlhiyt uses intonation to mark illocutionary force, and in particular to distinguish statements from questions (Roettger et al., 2014). We report on schwa in words that were phrase final, the locus of communicatively relevant intonational tones. Crucially, the tokens analysed had voicing in only one of the positions (either C@C or CC@). Furthermore, unlike in the study by Ridouane and Fougeron (2011), where voiceless transitions were found between the first two consonants in CCVC tokens, there was no other voiced segment in the target word to bear intonational tones. The need to realise these tones, so as to convey the pragmatic message, could thus be seen as the driving force behind the voicing.

Input optimization: phonology and morphology

Michael Hammond, U. of Arizona (hammond@u.arizona.edu)

In this paper, we provide a unified account for the statistical underrepresentation of marked phonological elements, the statistical underrepresentation of phonological repair, and the statistical *overrepresentation* of morphologically conditioned phonology.

It's long well-established that marked phonological elements and configurations are avoided statistically in surface/output representations. For example, [d] is more marked than [t] crosslinguistically and its word-initial distribution in e.g. English reflects this. Similarly, word-initial [dr] and [dw] are more marked than [d]+vowel. Their distribution in English reflects this as well. Both of these facts have been established several times in the literature, e.g. Zamuner (2003, etc.), but we replicate these effects in English using the Brown corpus (Kučera & Francis, 1967).

Marked phonological configurations can be repaired phonologically as well. These repairs are also statistically avoided. For example, Hammond (2013) shows that iambic adjectives in attributive position in English that *can* undergo stress shift to avoid clash (or enhance eurhythmy) are statistically underrepresented, e.g. *àbjéct* in *ábjèct póverty*, just as iambic adjectives that *cannot* undergo stress shift are avoided, e.g. *cŏmpléte* in *cŏmpléte póverty*. The former show that the repair is underrepresented, not just surface clash.

Strikingly, Welsh mutation exhibits the *opposite* distribution. Welsh has three basic mutation patterns (King, 2003). The soft mutation makes the following changes in various syntactic and morphological configurations:

p	→	b	b	→	v	ɬ	→	l
t	→	d	d	→	ð	r̥	→	r
k	→	g	g	→	∅	m	→	v

Other consonants do not change in soft mutation contexts. Using the CEG corpus (Ellis et al., 2001), we find that words that begin with mutatable consonants are *overrepresented* in mutation contexts (producing more violations of faithfulness).

Our hypothesis, in optimality-theoretic terms, is that *constraint violations are avoided statistically in output representations*. (Cf. Golston, 1998.) Winning candidates with many violations occur less often than expected and winning candidates with few violations occur more often. This accounts for the underrepresentation of typologically marked elements and the underrepresentation of marrked configurations in terms of minimizing violation of markedness constraints. This accounts for the underrepresentation of forms like *abject poverty* in terms of avoiding faithfulness violations. The Welsh pattern is subsumed directly if we assume that there is a constraint that militates for the expression of morphological contrasts: REALIZE-MORPHEME (Kurisu, 2001). The overrepresentation of mutable consonants follows from the statsitical avoidance of violations of the REALIZE-MORPHEME constraint in output forms.

Confirmation of this approach comes from the distribution of the English genitive. The genitive exhibits the interesting property that words that end in plural *-s* get no additional suffix (Stemberger, 1981; Zwicky, 1987). Thus:

man	man's	cat	cat's	
men	men's	cats	cats'	*cats'(e)s

What we find in the Brown corpus is that cases like *cats'* are statistically underrepresented. This is precisely what we would expect under the input optimization approach with a constraint like Kurisu's that militates for the expression of morphological contrast.

Fortis is always the marked value: Evidence from CVCV-CL

Ben Hermans (Meertens Institute) & Bert Botma (University of Leiden)

A striking property of CVCV Compensatory Lengthening (CVCV-CL) is that its application is conditioned by the laryngeal specification of C_2. For example, in Čakavian dialects (Bethin 1998, Kavitskaya 2002, Langston 2006) the loss of V_2 triggers lengthening of V_1, unless C_2 is voiceless. This has resulted in length alternations in synchronic paradigms of the kind in (1).

(1) kra:j ‘end, NOM.SG’ kraja ‘end, GEN.SG’
pra:g ‘threshold, NOM.SG’ praga ‘threshold, GEN.SG’
brat ‘brother, NOM.SG’ brata ‘brother, GEN.SG’

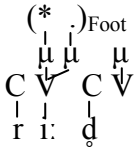
A similar phenomenon is found in Low Saxon dialects of German (Prehn 2012), where loss of V_2 in the suffix triggers lengthening of V_1, unless C_2 is Fortis.

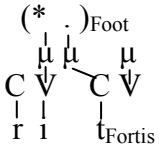
(2) ri:d̥ ‘ride, 1.PRES.SG’ riḍən ‘ride, INF’
ʃi:n ‘shine, 1.PRES.SG’ ʃinən ‘shine, INF’
rit ‘rip, 1.PRES.SG’ ritən ‘rip, INF’

Čakavian and Saxon have different laryngeal systems: in Čakavian, Voice is marked, whereas in Low Saxon, Fortis is marked. This raises an important question: why does the presence of the marked value (Voice) trigger lengthening in one language (Čakavian) but the absence of the marked value in another (Low Saxon)?

To unify both types of lengthening, we follow a recent proposal from Van der Hulst (to appear). Van der Hulst argues, quite spectacularly, that Fortis is *always* the marked value, with differences between languages being the result of different default and enhancement features. For example, English Fortis consonants are enhanced with Aspiration, while Dutch non-Fortis consonants are enhanced with Voice. This offers an elegant account of the ‘partial devoicing’ that has been observed for Dutch: partial devoicing is not the result of incomplete neutralization, but of the variable application of Voice enhancement to the unmarked series. In our talk, we will show that Van der Hulst’s approach also allows a uniform account of the interaction between CVCV-CL and the laryngeal specification of C_2: Fortis consonants block CL, in both Čakavian and Low Saxon.

The next question is *why* this should be the case. Our answer will be that Fortis consonants are moraic, in line with Van Oostendorp’s (2003) account of Frisian. Our analysis runs along the following lines. Final consonants occupy the onset of an empty-headed syllable (see e.g. Harris 1994). Such syllables do not project a position on the stress plane (Halle & Vergnaud 1987), and so cannot be parsed into a foot. In (3a), this creates a long vowel in the preceding syllable, since foot binarity must be satisfied. (Onsets are linked to the σ-node, which, for lack of space, has not been represented.) However, if C_2 is Fortis, as in (3b), it must be linked to a mora. Since this mora is not empty, it can project a position on the stress plane, and therefore contributes to foot binarity. Hence, (3b) has no CL.

(3) a. 

b. 

Treating Fortis as marked thus explains a phenomenon that has not been previously accounted for: the interaction between CVCV-CL and the laryngeal specification of C_2. Our proposal can be extended to account for allophonic vowel length of the type found in English, as well as to certain tonal patterns in Limburgian Dutch. Also, the claim that Fortis consonants are moraic ties in with the observation that there are languages like Pirahã, in which onset Fortis consonants are weight-bearing to the exclusion of other consonants (see e.g. Topintzi 2011).

Explaining phonological variation: a case study of Mandarin tone sandhi

Yujing Huang, Harvard University, yujinghuang@fas.harvard.edu

There are several theoretical frameworks that are proposed to explain phonological variation. This study uses Mandarin Tone 3 Sandhi (henceforth T3S) as a case study to compare three different frameworks: optional-rule application, Stochastic Optimality Theory (StOT) (Boersma 1997, 1998; Boersma & Hayes 2001) and MaxEnt Harmonic Grammar (MaxEnt HG)(Goldwater & Johnson 2003, Hayes & Wilson 2008). It proposes that MaxEnt HG has advantages over the other two in explaining T3S because it allows a probability distribution over candidates in the same evaluation which is precisely the case of T3S.

T3S is the phenomenon that Tone 3 changes to Tone 2 when it precedes another Tone 3 (Tone 3 → Tone 2/___ Tone 3). The sandhi application is cyclic. When there are multiple Tone 3s in a chain, T3S will apply to the innermost morphosyntactic constituent first and then to bigger constituents if applicable. Therefore, in a three syllable Tone 3 chain, when the morphosyntactic structure is a right-branching one, i.e. (σ(σσ)), the sandhi result should be (3(23)). However, a variant (2(23)) is documented to be grammatical in the literature.

Traditionally, this phenomenon is explained by optional rule application (Chen 2000, Duanmu 2007) which hypothesizes that Tone 3 can change to Tone 2 if it precedes a Tone 2 that is underlyingly a Tone 3. However, this analysis is problematic. If T3S happens cyclically, after the first cycle of sandhi application, the environment that triggers sandhi for the first syllable is no long available because of the sandhi application to the second syllable (the output for the first cycle is (3(23)) where numbers specify the tones).

A StOT analysis of T3S runs into problems too. In StOT, constraint ordering can be changed by adding noise to constraint ranking. Different ordering will choose different winners. Nevertheless, in the same ordering, a candidate that violates a constraint twice will be harmonically bounded by a candidate violating the same constraint once. In the analysis of T3S, candidates (2(23)) and (3(23)) have exactly the same violations except that (2(23)) violates the faithfulness constraint for tone one more time (the crucial constraints are OCP-3>> Ident-OO (Tone) >> Ident-IO (tone)). Therefore, StOT mistakenly predicts that (2(23)) is harmonically bounded by (3(23)) and there should be not variation.

Different from StOT, MaxEnt HG defines a probability distribution over candidates and assumes no harmonic bounding. In the case of T3S, with the same set of constraints stated above, MaxEnt HG predicts that (2(23)) is less harmonic than (3(23)) but still has a non-zero probability. This prediction is confirmed by a rated perceptual experiment conducted by the author. In the study, native speakers are asked to rate the forms they hear based on their tones. After controlling for other factors and have tones as the only variable, participants judged (2(23)) lower than (3(23))(t = 12.23, p-value = 1.14e-13). However, they accept (2(23)) as a degraded variation (significantly different from an ungrammatical form, t = 5.66, p-value = 3.70e-07). Therefore, MaxEnt HG has its advantages over optional-rule application and StOT in explaining T3S variation. As every candidate gets an non-zero probability, MaxEnt HG can model the gradient welllformedness of T3S found in the experiment.

In sum, this study shows a case where optional rule application and StOT run into problems. Maxent HG, as it assigns a non-zero probability to the non-optimal candidates, can explain the T3S variation. It also provides an intuitive model to explain the graded acceptability.

Accounting for Metathesis in Highland East Cushitic

Coral Hughto (UMass Amherst) coralwilliam@linguist.umass.edu
Stuart Davis (Indiana University) davis@indiana.edu

The phenomenon of metathesis has long posed interesting problems for phonological theory. One example of this is the process of obstruent-nasal metathesis found in at least three Highland East Cushitic (HEC) languages of Ethiopia: Kambaata, Alaaba, and Sidamo. In these languages there are three processes, epenthesis, assimilation, and metathesis, which work together to avoid illicit consonant clusters resulting from verbal inflection. The only consonant clusters allowed are heterosyllabic sequences of two consonants, with preference for geminates and sonorant-obstruent sequences. Each process targets a different type of illicit cluster, with epenthesis applying to avoid complex onsets and codas, assimilation applying to avoid non-geminate sequences of two obstruents or two sonorants, and metathesis applying to avoid obstruent-sonorant sequences. Some representative examples are given below.

(1)	Kambaata	a.	/biːtˀ+neːmmi/	→	[biːn.tˀeːm.mi]	'we broke'
		b.	/kaːs+nunta/	→	[kaːn.sun.ta]	'so that we plant'
	Sidamo	c.	/bitʃˀ+nummo/	→	[bin.tʃˀum.mo]	'to scar' + 1.PL Perf.
		d.	/miʃ+nummo/	→	[min.ʃum.mo]	'to despise' + 1.PL Perf.

There have been some works which have sought to explain the obstruent-nasal metathesis found in the HEC languages through phonetic motivations or diachronic change. Under a phonetics-based account such as described in Hume (2004), obstruent-nasal metathesis is motivated by perceptual optimization; in other words, by a preference for placing segments with less robust phonetic cues, such as obstruents, into positions where their cues would be more salient, such as in onset position. This would account for at least some of the facts in HEC, but would not provide a satisfactory explanation for forms such as those in (1b) and (1d), where the obstruent involved is a strident fricative. As these segments have fairly robust cues of their own, the benefit gained from moving them into onset position is minimal.

Another account (Garrett & Blevins 2009) proposes that obstruent-nasal metathesis, such as in the HEC languages, can only arise through a historical process of "phonological analogy", where the language develops a particular process through analogy with other, pre-existing phonological processes. However, there is little evidence to suggest that the scenario which they propose prompted the development of obstruent-nasal metathesis actually arose in all of the languages considered in our paper.

In our work, we propose an account based in Optimality Theory. The generalization that these languages prefer cross-syllabic consonant sequences which consist either of geminates or falling-sonority sequences provides evidence of adherence to the Syllable Contact Law (Vennemann 1988), which expresses that a syllable contact sequence $\alpha.\beta$ is more preferred the greater the sonority of the offset α and the lower the sonority of the onset β. This preference can be captured by a constraint against cross-syllabic rising-sonority consonant sequences. To account for the processes observed in HEC, we propose a constraint requiring adjacent consonants to agree in all features, triggering assimilation, which is outranked by faithfulness to the feature [±sonorant], preventing assimilation from applying between an obstruent and a sonorant. In order to avoid rising-sonority sequences, which would violate the syllable contact constraint, metathesis applies, violating a lower-ranked LINEARITY constraint instead. We argue that this analysis, viewing metathesis in its place as part of the larger phonological system, provides the most comprehensive explanation of the processes observed in these HEC languages.

Rethinking the category 'reʈroflex' in Indo-Aryan: Acoustic Evidence from Punjabi

Qandeel Hussain[1], Mark Harvey[2], Katherine Demuth[1]
qandeel.hussain@students.mq.edu.au, mark.harvey@newcastle.edu.au, katherine.demuth@mq.edu.au
Macquarie University[1], University of Newcastle[2]

In many Australian languages (e.g., Nyangumarta: Geytenbeek, 2010) retroflex consonants may be preceded by the vowels /i u a/, and contrast with alveolars in all three environments. Indo-Aryan languages also have a contrastive retroflex and dental series (Punjabi: /siʈi/ 'whistle' vs. /sit̪i/ 'sew'). Ohala & Ohala (2001), in a study of Hindi, suggest that retroflexion is signalled by F2-F3 convergence near the vowel offset. However, they do not provide criteria for measuring the presence of convergence, nor any statistical analysis. Furthermore, their F2 and F3 plots for /i/ showed only minimal differentiation throughout, with no clear evidence of statistically significant convergence for this vowel.

The goal of the present study was therefore to provide a quantitative acoustic analysis of retroflexion in the Indo-Aryan language Punjabi. We predicted that F2-F3 convergence would occur for /a/ and /u/, but not for /i/. Ten male Punjabi speakers (22-28 yrs, M=25.2 yrs) participated in an elicited imitation task. They were presented with nine CVːʈ words, preceded by the long vowels /i: u: a:/ (e.g., *kit* /kiːʈ/ 'insects', *gut* /guːʈ/ 'short man', *phat* /pʰaːʈ/ 'torn'), all matched with a picture. The test items were embedded in a pre-recorded Punjabi carrier sentence [kɛː____ədʒ] 'say____today', randomized, and presented in eight blocks (72 items/speaker). All productions were recorded at 44.1 K with a Zoom digital recorder. The vowels of the total 720 test items were then acoustically coded, examining F2 and F3 in the spectrogram. As there were no significant differences in vowel duration, a Praat script selected the mid-point of the vowel, and 3 additional points at 60%, 70%, 90% of the vowel duration. F2 and F3 formant values were then extracted from these points.

The lowering of F3 and raising of F2 near vowel offset, resulting in 'convergence', were chosen as the criteria for determining the presence of retroflexion (Hamann, 2003). Statistical analysis, using GLM repeated-measure ANOVA, revealed that there was a significant *lowering* of F2 with preceding /i/ ($F(1.797,16.177)=25.458$, $p<.001$) but *raising* of F2 with preceding /u/ ($F(1.043,9.388)=29.657$, $p<.001$) and /a/ ($F(1.427,12.840)=56.816$, $p<.001$). The analysis of F3 showed that there was *no significant lowering of F3* for /i/ ($F(1.734,15.604)=1.605$, $p=.232$). However, /u/ and /a/ showed a significant drop in F3, as expected ($F(1.739,15.647)=43.409$, $p<.001$) for /u/, and ($F(1.179,10.614)=29.435$, $p<.001$) for /a/. This is shown in Figures 1-3.

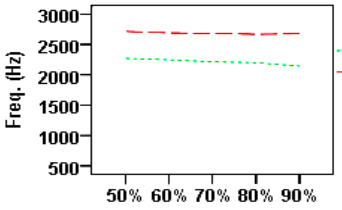


Figure 1. /i/

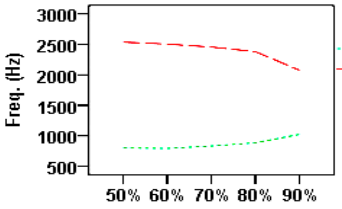


Figure 2. /u/

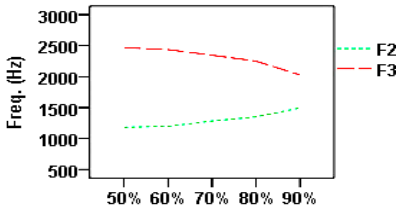


Figure 3. /a/

The results of this acoustic study are consistent with findings from articulatory studies that claim that the tongue gesture of the high front vowel /i/ is difficult to coordinate with retroflexes, pointing to the rarity of retroflexes in this environment (Bhat, 1973). They also suggest that the category 'retroflex' in Indo-Aryan languages may be quite different from that found in the Australian languages where two distinct but closely related categories of coronals (alveolars and retroflexes) preserve place oppositions in the context of /i u a/. In contrast, we suggest that the term 'apical' best describes the Indo-Aryan category, which has both retroflex and non-retroflex realizations. This raises many questions for any general crosslinguistic featural analysis for retroflexion.

Lexical diffusion of vowel length merger in Seoul Korean: a corpus-based study

Yoonjung Kang; Tae-Jin Yoon; Sungwoo Han

University of Toronto Scarborough; Cheongju University; Inha University

yoonjung.kang@utoronto.ca; tyoon@cju.ac.kr; drysoul@inha.ac.kr

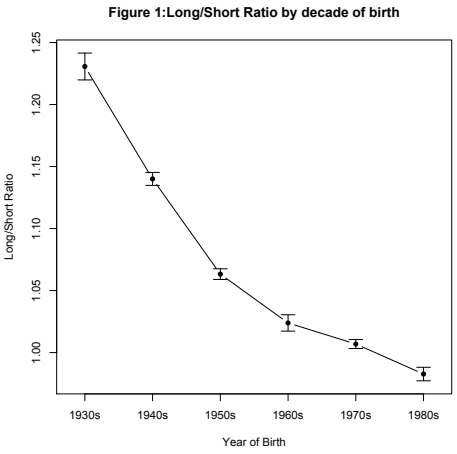
Introduction: In Seoul Korean, long and short vowels contrast in word-initial position (*nun* 'eye' vs. *nu:n* 'snow') but recent studies report loss of length distinction in younger speakers' speech (e.g., Kim 2003, Park 1985, Zhi 1993). The change, however, does not affect all words equally; some words are more resistant to shortening than others. The current study examines the pattern of lexical diffusion, specifically the effect of frequency and phonological contexts on the diffusion of vowel shortening. The results show that while vowels tend to be shorter in high frequency words overall, the sound change proper—i.e., the reduction of contrast over time—is more advanced in low frequency words.

Background: According to Usage-based Phonology (Bybee 2001, Philips 1984, Pierrehumbert 2001), sound changes that involve reduction of articulatory effort tend to affect high-frequency words first while changes that involve (re)analyses affect low frequency words first. While the effect of frequency on lenition in synchronic variation is well documented (Gahl 2008), clear cases of on-going sound change showing the purported frequency effect are sparse and the effect size tends to be minor when compared to that of grammatical conditions (Dinkin 2008, Walker 2012). The present study contributes to this literature by examining the frequency effect in an on-going sound change in Korean.

Data: The data are drawn from *the Reading Style Speech Corpus of Standard Korean* (NIKL 2002). The study examined over 370,000 vowels in word-initial syllable, produced by 118 speakers (59 male and 59 female) stratified for age. The acoustic measurements are aided by the Korean phone aligner developed by the authors. Words are coded for the underlying vowel length (*Great Korean Dictionary*) and the lemma frequency (NIKL frequency list 2007).

Analysis: A mixed-effects model analysis is performed; the dependent variable is the normalized vowel duration (a ratio to the mean short vowel duration of the speaker); the fixed effects include phonological conditions that are known to affect vowel duration (vowel quality, syllable structure, preceding segment, prosodic position, and word length), log lemma frequency (FREQ), underlying vowel length (VL), speaker's gender and year of birth (YOB). To test whether the contrast reduction affects high and low frequency words differently, a three-way interaction of VL*YOB*FREQ is included as fixed effects. Random intercepts of word and speaker are also included.

Results: As **Figure 1** shows, there is a clear trend of contrast reduction between long and short vowels; speakers born in the 1930s exhibit a mean ratio of 1.23 between short and long vowels while the ratio falls below 1 for speakers born in the 1980s. The mixed-effects model shows that all phonological factors show the significant effects in the expected direction (not shown). The main effect of FREQ is significant (β=-0.028,s.e.=0.003, $p<0.0001$); vowels are shorter in high frequency words. The interaction of YOB * VL is significant (β=-0.004,s.e.=0.0003, $p<0.0001$): vowel contrast reduces with younger speakers. The three-way interaction of YOB * VL * FREQ is also significant (β=0.0005,s.e.=0.00005, $p<0.0001$): vowel contrast reduction in younger speakers is expedited for low frequency words and mitigated for high frequency words. In other words, while high frequency words are in general shorter than low frequency words, the contrast reduction over time, i.e., the sound change itself, affects low frequency words first.



Discussion: The emerging picture of the frequency effect is a complex one. While as a synchronic pattern, high frequency words are produced with shorter duration than low frequency words in line with frequency effect predicted for a lenition process (cf. Gahl 2008), the opposite frequency effect emerges in diachronic change; frequent words are more resistant to shortening sound change. This diachronic frequency effect suggests that the mechanism underlying the vowel length contrast neutralization may be analytical not phonetic; the high frequency words have more robust representation and are more stable against reanalysis by analogy to the majority pattern (i.e., short vowel). The current finding is significant in that it demonstrates that synchronic frequency effect in lenition may not necessarily lead to the same frequency effect in diachronic sound changes.

Finnish dialectical epenthesis: two distinct types of vowel insertion

Robin Karlin, Cornell University—*rpk83@cornell.edu*

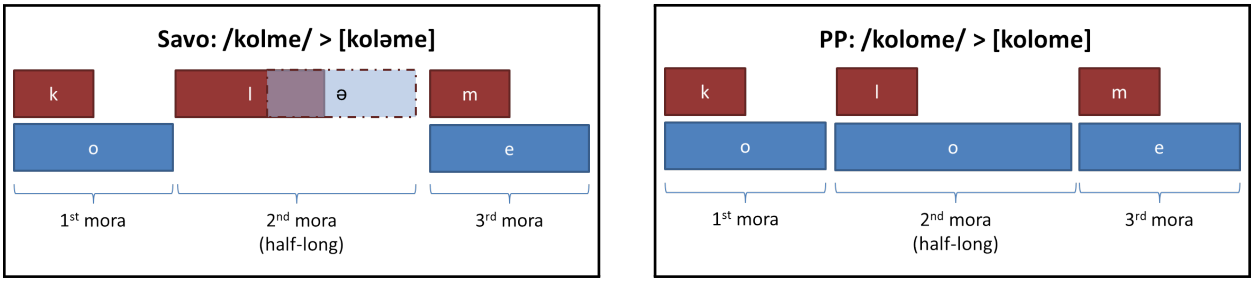
In the Savo and Pohjois-Pohjanmaa (PP) dialects of Finnish, words with shape $C_1VC_2C_3V$ are produced as $C_1VC_2\mathbf{v}C_3V$. In Savo dialects, the quality of **v** is often between that of adjacent vowels (1a), while in PP dialects **v** has the same quality as the preceding vowel (1b) (Harrikari 1999). Vowel insertion is limited to C_2C_3 position; later CC contexts do not trigger insertion (1c).

(1) a. silmä > sil**e**mä 'eye'
b. silmä > sil**i**mä 'eye'
c. kuvitelma > *kuvitel**v**ma 'fantasy'

Although both are traditionally grouped under the label "epenthesis" (Suomi 1990), I argue that Savo and PP vowel insertion are two distinct processes with differing causes. Acoustic duration analyses of the inserted vowels show that Savo **v** is inconsistently produced and is much shorter than other vowels, both hallmarks of excrescent vowels. In contrast, PP **v** is consistently produced, and is actually longer than the first vowel of the word, suggesting that PP **v** is phonological epenthesis. Complementing the acoustic evidence, other properties of the phonologies of these dialects corroborate this interpretation. I argue that both vowel insertion types are connected to another phenomenon exhibited by both dialects, second mora lengthening (SML).

In dialects with SML, speakers lengthen the second mora of a word to 1.5x the length of comparable segments, a so-called "half-long" segment (Suomi and Ylitalo 2004; Spahr 2012). In $C_1VC_2C_3V$ words, SML applies to C_2; however, consonants cannot be sustained like vowels. The result is a short, variable gap between C_2 and C_3 with no consonantal closure. The excrescent nature of Savo **v** suggests that this gap, caused by SML, is the root cause of Savo **v**. Linking vowel insertion and SML also accounts for why only C_2C_3 triggers vowel insertion (1c): no other consonant slot is lengthened; thus, there is no other underlap, and no additional excrescence.

SML also provides evidence for the phonological status of PP epenthesis. As previously described, PP **v** is actually longer than the first vowel, patterning with other underlying second mora vowels. The schematic of the word *kolme* 'three' below illustrates the difference in the degree of phonologization between the two dialects. Savo **v** is phonetic, and the lengths of C_2 and the excrescent vowel are variable; combined, they make up the second mora. However, PP **v** is phonologized and functions alone as the second mora.



This novel approach combines phonetic and phonological analyses to tease apart the distinction between Savo and PP vowel insertion. Such an account unifies gesture-based and representational explanations of epenthesis and provides a more nuanced understanding of the phenomenon of vowel insertion.

The relevance of feminine rhyme for phonological theory

Björn Köhnlein (Leiden University) b.koehnlein@hum.leidenuniv.nl
Marc van Oostendorp (Meertens Instituut, Leiden University)
marc.van.oostendorp@meertens.knaw.nl

Central claim. Phonological research on poetic language has a long tradition, but this has usually concentrated on metrics rather than rhyme. Based on an experiment on the judgment of imperfect feminine rhyme in Dutch, we demonstrate that a systematic study of poetic rhyme has the potential to reveal important insights about phonological constituency.

Background. Phonological knowledge surfaces in many different ways, but never without being influenced by other factors. Although for a long time, a lot of phonological theory was successfully based on grammaticality judgments of scholars and informants, it has always been acknowledged that the intuitions underlying such judgments can surface, and hence be studied, in other ways as well. A classical source of such 'external' knowledge of phonological generalizations can be found in the study of poetry. The reason for this is an idea that has been made explicit by Fabb (1997, 2010): poetic traditions never seem to use sound patterns that are not known in one way or another in 'ordinary' phonologies of human language. It is possible that the poetic tradition uses something that is not present in the language in question; but a parallel will always be found in some other language. While parallels between poetic metrics and linguistic stress are widely recognized, the phenomenon of poetic rhyme is less well studied; yet several authors have pointed out the similarity to reduplication (Kiparsky, 1970, 1973; Holtman, 1996; Yip, 1999; Author, to appear): the rhyming constituents can typically be defined in terms of phonological constituency.

Observation. We observe that the Dutch imperfect feminine rhyme *kosmos – Lesbos* sounds better to native speakers than *kosten – drachmen*. This seems to correspond to the well-known generalization that schwa is the prototypical unstressed vowel in Dutch, while closed syllables with full vowels are commonly regarded to be strong attractors of word stress (open syllables with full vowels are located in between; e.g. Van der Hulst 1984, Kager & Zonneveld 1986, Kager 1989, Trommelen & Zonneveld 1989, Van Oostendorp 1995):

(1) Stress attraction in Dutch (descending order): VC > V > ə(C)

Starting out from this observation, we wondered whether speakers of Dutch take this knowledge into account when they judge the wellformedness of imperfect feminine rhymes, even when the rhyming syllables are unstressed, as in *kósmos – Lésbos*.

Experiment. We tested the influence of syllable structure on imperfect feminine rhyme in a study with native speakers of Dutch. All rhyme pairs were disyllabic, stressed on the first syllable, and presented auditorily and orthographically. We differentiated four syllable types in the unstressed second syllables, deriving from two binary oppositions in the linguistic rime: one between full vowels (V) and schwa (ə) in the nucleus, and one depending on whether or not syllables were closed by a consonant (C). The results indicate that syllable weight (heavy syllables >> light syllables) and vowel quality in unstressed syllables (full vowels >> schwa) determine the wellformedness of imperfect rhymes. We discuss how these results support and extend previous analyses of Dutch stress. From a broader perspective, we argue that the listener to a poem tries to assign a plausible sound structure to the words in the poem, making it fit with the template that the poem assigns to the word. The easier it is to modify the linguistic structure in order to fit the template, the better the rhyme is considered to be.

Implications. The results of our experiment strongly argue in favour of a view on poetic rhyme in which prosodic constituency is crucial. The outcomes are particularly remarkable as they provide independent evidence for a hierarchy that, to this point, seemed not to be amenable to empirical testing. This suggests that the study of poetic rhyme can be a fascinating testing ground for phonological theory. We believe that future research in this so far largely neglected area will introduce exciting new types of data into the field. These data will not only serve to support or contradict existing approaches to the analysis of certain phenomena (such as linguistic stress) but may certainly also lead to the emergence of novel theoretical insights.

Coda Markedness and Coerced Weight

Martin Krämer
University of Tromsø

Draga Zec
Cornell University

We present a typological survey of coda consonant inventories to test the hypothesis that restrictions on the set of consonants allowed in coda position are the same as or at least overlapping with those that govern which consonants can be moraic by position.

Zec (1988, 1995) showed that there is an implicational hierarchy favouring moraicity of sonorants over obstruents. Morén (2001) proposed a set of Optimality Theoretic constraints to account for this observation. At first blush, languages with restrictions on codas seem to prefer sonorant codas, i.e., those that are attested as contributing moraic weight to syllables more often) and some languages display sonorants and geminates (the most likely contrastively moraic consonants) in their coda inventory (e.g., Japanese or Italian; Itô 1987). Following Zec and Morén's conclusions, weight effects are restricted in Optimality Theory by universal constraints. If these interact with the Faithfulness constraints Max-IO and Ident(±F), one expects to observe languages with coda conditions that conform to the same implicational hierarchies as found for differential weight. However, this is not the case as shown for Lardil and Kiowa already by Zec (1995). Is it sufficient then to combine the weight constraints with de Lacy's (2003) stringent constraints on place of articulation and Zec's *[+continuant] and *Laryngeal?

Among the languages which ban certain segments from the coda the most frequently discussed pattern bans labial and dorsal place, and stops, unless they are geminates (Itô 1988, de Lacy 2003). A look at more languages reveals a more complex picture. In this paper I compare conditions on coda inventories in over 50 genetically diverse languages to shed more light on the above questions. Portuguese allows only approximants and [ʃ], banning nasals and obstruents (Mateus & d'Andrade 2000). Diola Fogny bans all obstruents, while all sonorants are present (Sapir 1965, Piggott 1999) in word-internal codas. Chipewyan displays fricatives and sonorants in the coda, no stops (Cook 2004). Central Alaskan Yupik spirantizes stops in preconsonantal position (Miyaoka 1996). Korean (Kim & Jongman 1996) and Saigon Vietnamese (Thompson 1959) among others, allow only stops and nasals (excluding fricatives, and the more sonorous liquids), even though they don't have geminates. Hayu (Michailovsky 2003) displays plain stops, sonorants and /x/. Kashaya (Oswalt 1961) bans labial stops from the coda. Lhasa Tibetan allows only /p/ and [ʔ], though /m/, /ŋ/, /r/, /l/, and /k/ are sporadically produced (de Lancey 2003). Definitely banned are coronal obstruents. North Sami and Lardil on the other hand, allow only coronals. Tibetan also shows an interesting differentiation in the fate of historical final consonants. Nasals cause vowel lengthening and nasalization, liquids cause vowel lengthening, and stops are realized as [ʔ] only at the end of the word and elsewhere deleted without compensatory lengthening. This indicates that the obstruents didn't contribute weight to begin with.

While some of these patterns are apparently determined by the moraicity constraints (i.e., Portuguese, Diola Fogny, Chipewyan), the markedness reversals between fricatives and stops in Korean and Vietnamese, between labials and dorsals, as well as the non-incremental exclusion of higher sonority segment classes cannot be accounted for in terms of sonority-driven markedness of consonant moraicity and stringent PoA constraints alone. Discussing the crucial cases in more detail I propose a licensing account to coda conditions that is complementary to the constraints on consonant moraicity proposed in the literature and takes into consideration the specifics of the segment inventories of individual languages.

Grapes *are* sour

Nancy C. Kula, nckula@essex.ac.uk, University of Essex
Nasir Abbas Syed, nasirabbassla@gmail.com, Lasbela University

Kimper (2010), McCarthy (2011) and Wilson (2006) among others, argue that nasal spreading is myopic with no anticipatory 'look-ahead' ability and therefore that it involves gradient spreading. According to McCarthy (2009, 2011), since nasalization is universally myopic, spreading from segment to segment until it meets a blocker, it cannot be explained by Classical OT constraints like AGREE or ALIGN, which suffer from a "sour grapes" effect; unable to account for partial spreading and instead predict an all or nothing harmony pattern (McCarthy 2011: 4).

This paper provides counter-evidence to non-myopic nasal spread from Saraiki (Indo-Aryan) where nasal spreading can be non-myopic. The triggers of nasalization in Saraiki are nasal consonants and vowels with oral vowels and glides as targets, while liquids and obstruents are opaque and stress blocks nasal spread beyond its onset. Nasal spreading in Saraiki exhibits the cross-linguistically rare (Walker 1998) pattern of bidirectional harmony with both regressive and progressive nasalization. Regressive spreading is gradient and myopic, spreading leftwards until it is stopped by a blocker (column A). By contrast progressive nasalization has anticipatory power. It only activates if there is no blocker between the origin of nasality and the right edge of the word (column B). If a blocker intervenes between the trigger and the right edge of the word, it does not even activate (column C). It is in this sense an all or nothing type of categorical non-myopic spreading counter McCarthy (2011), among others.

	A: Myopic Regressive		B: Progressive		C: Non-myopic Progressive	
(1)	*zɛ̃ən*	(male name)	*zɛ̃ən-ĩ*	'Zan' (vocative)	*zɛ̃ən-ʌb*	(female name)
(2)	rʌ̃n	'lady/wife'	rʌ̃n-nũ:	'wife's slave'	rə-nu:-haɽ	'groups of women'
(3)	*ɦarãm*	'illegitimate'	*ɦarãm-ĩ*	'bastard'(m)	*ɦarãm-il*	'bastard' (f)

(4) Stress as blocker

a.	si-ʊ̃ã-ʊ̃ʌ̃ɲ	'get sewn'	
b.	rəh̃ãʊ̃ʌ̃ɳ	'cause to live'	
c.	ʊi-jã-ʊ̃ʌ̃ɲ	'to give birth'	

Non-myopic spread

d.	ni-ʊa-ʊe	'may he bow'	(no rightward spread)
e.	mi-lã-ʊ̃ʌ̃ɲ	'meeting'	(no rightward spread)
f.	nĩ-ʊ̃ã-ʊ̃ʌ̃ɲ	'bow'	(rightward spread)

The word-final morpheme in column B is inherently oral but undergoes progressive nasalization when preceded by a nasal. However, if a morpheme that contains a blocker is added (in column C), nasalization is not activated. Contrary to this regressive spreading in column A is gradient and myopic as seen in 3A where it spreads once when further spread is blocked by the liquid /r/. Bidirectional harmony within a word is subject to the same constraints in (4) where stress (underlined) blocks further leftward spread (4a-c) and rightward spread only applies if all segments will be nasalized (4f) contra (4d-e). (4f), achieved by bidirectional spreading illustrates that what is crucial is an all nasal output after progressive spread rather than the nasality source.

In order to account for these facts we propose an analysis that reverts back to ANCHOR constraints in Classical OT arguing that Harmonic Serialism would in this case make incorrect predictions since it forces myopic spreading. In the spirit of Walker (2010) we propose a locality constraint restricting nasal spread to adjacent syllables, dominating an ANCHORRT$_{\omega}$ (NAS) constraint which itself dominates SPREAD (NAS). A *SKIP (stress) constraint between Locality and Anchor will capture the blocking effect of stress. These constraints are sandwiched between *NAS constraints that distinguish blockers from undergoers (Walker 1998) thereby simultaneously yielding myopic regressive nasal spread and non-mypoic progressive nasal spread. The pathologies raised in McCarthy (2009, 2011) are avoided by formalizing ANCHORRt as satisfied by rightward spread that is sensitive to prosodic word domains.

How phonological is French liaison?

Marie-Josée L'Espérance :: ml978@cornell.edu - Cornell University

French liaison is a type of external sandhi, whereby a consonantal segment is realized between two words when the second word is vowel initial. The relationship between the liaison consonant (LC) and the words surrounding it is still a matter of debate. This paper presents the results of an experimental investigation of liaison in adjective+noun pairings in Québec French and discusses how its results inform the phonological status of LCs. The results show a clear divergence between the behavior of stable onsets and LCs, as well as a significant difference between LCs and codas. I argue that these results highlight the need for a model of liaison that takes into account its highly lexical nature.

LCs historically arose from the loss of word-final consonants in pre-consonantal contexts. Synchronically, this situation yields a contrast between underlying codas and LCs, where LCs' realization is dependent on the phonological context as seen in the examples below:

LC [z]	(1) deux ours	[døzʊʁs]	'two bears'
	(2) deux tigre	[døtˢɪg]	'two tigers'
Underlying coda [z]	(3) douze ours	[dʊzʊʁs]	'twelve bears'
	(4) douze tigre	[dʊztˢɪg]	'twelve tigers'

The realization of LC also depends on syntactic factors, as shown in examples (5) and (6):

(5) savants anglais	[savãzãglɛ]	'learned Englishmen'
(6) savants anglais	[savã.ãglɛ]	'English scholars'

Earlier studies have analyzed liaison as a coda consonant (Schane 1968, Encrevé 1988) and a few studies have suggested that LC syllabify as onsets of Word2 (Ternes 1977). However, data from perceptual experiments and acoustic analyses (Nguyen et al. 2007) suggest that LCs pattern neither like canonical onsets nor codas.

The present experiment involved measuring certain acoustic features and articulatory targets for native speakers of Québec French while they uttered sequences of adjective+nouns in a carrier sentence. The results failed to show an affiliation of LC to either Word1 or Word2. The duration measures of LCs were shorter than onsets, and shorter than or equal to codas. LCs also failed to induce vowel laxing on the preceding vowel, a robust phenomenon associated with codas in Québec French. The analysis of the articulatory data showed that the movement ranges and durations associated with LC differed significantly from onsets across all conditions, and from codas in most conditions.

The results presented herein confirm the hypothesis of a syllabification that is neither like canonical onsets nor codas. The present study provides new phonetic data from a less-studied dialect, adding to a growing body of experimental evidence that supports an examplar-based approach, whereby LCs are part of a lexicalized construction larger than the word and are affiliated with neither Word1 nor Word2 (Bybee 2001, 2005). These constructions are treated as storage and processing units just as words and fixed phrases are. Such an analysis shifts the focus away from the problem of how LCs are syllabified to other issues governing the distribution of LCs, such as frequency and syntactic effects. Ultimately, conceptualizing liaison within the constructionist framework will inform our understanding of the role of memory and the lexicon in our theory of phonology and the implications for the phonology-syntax interface.

ON THE PRINCE-TESAR-HAYES' APPROACH TO RESTRICTIVENESS IN OT

Giorgio Magri | CNRS, UiL-OTS | magrigrg@gmail.com

The problem of restrictiveness in OT phonology is as follows: given a set of surface forms, find a ranking which is *consistent* (i.e., the given set of forms belongs to the set of forms licit according to that ranking) and is furthermore *restrictive* (i.e., no other consistent ranking generates a subset of licit forms). From a computational perspective, this problem formulates the classical *Subset problem* (Fodor & Sakas 2005) within OT phonology. From a modeling perspective, it formalizes the task faced by a child acquiring phonotactics at an early developmental stage (Hayes 2004). As this problem has been shown to be intractable (Magri 2013), we need to develop *heuristic* algorithms and to explore their modeling implications. Prince & Tesar (2004) and Hayes (2004) propose the *PTH heuristic algorithm* in the box below. The idea is to reduce the difficult problem of finding a restrictive ranking of the entire constraint set to the possibly simpler problem of finding a restrictive ranking of just a constraint subset, namely the subset of the faithfulness ($\mathcal{F}$) constraints.

STEP 1: guess a restrictive ranking $F_1 \gg F_2 \gg \dots$ of the $\mathcal{F}$ constraints. STEP 2: intersperse the markedness ($\mathcal{M}$) constraints as high as possible (compatibly with consistency).

This talk contributes to a foundation of the PTH approach by addressing the four questions it raises.

Q1: under which conditions is the PTH approach correct? The relative ranking of two $\mathcal{M}$ constraints interspersed between the same two faithfulness constraints ($F_1 \gg M_1 \gg M_2 \gg F_2$ vs $F_1 \gg M_2 \gg M_1 \gg F_2$) can in principle matter for restrictiveness, deceiving PTH. Yet, assume that there is no distinction between surface and underlying forms (Tesar 2013). And that the candidacy relation is *symmetric*: [ta] is a candidate of /da/ iff [da] is vice versa a candidate of /ta/. Some $\mathcal{F}$ constraints are *symmetric*, i.e. unaffected by switching the underlying form with the candidate. For instance, featural identity constraints are symmetric: IDENT[VOICE](/da/, [ta]) = IDENT[VOICE](/ta/, [da]). Other $\mathcal{F}$ constraints such as MAX and DEP (both segmental and featural) are not symmetric: MAX(/CCV/, [CV]) $\neq$ MAX(/CV/, [CCV]). I show that, if the faithfulness constraints are all symmetric, the PTH strategy is correct: the relative ranking of the $\mathcal{M}$ constraints doesn't contribute to restrictiveness and thus the PTH approach always returns a restrictive ranking. This result has implications for the choice between IDENT(F) and DEP(F) types of $\mathcal{F}$ constraints.

Q2: how can step 2 be implemented? Given a restrictive relative ranking $F_1 \gg F_2 \gg \dots$ of the $\mathcal{F}$ constraints, step 2 intersperses the $\mathcal{M}$ constraints as high as possible. PTH successfully implement this step 2 in the *batch* regime by adding to Tesar & Smolensky's (1998) batch RCD the provision that an $\mathcal{M}$ constraint be chosen if possible at any iteration. They note that EDCD couldn't be used instead. I note that EDCD is unsuitable not because *error-driven* but because not gradual. Indeed, step 2 of the PTH approach can just as easily be implemented with a gradual error-driven variant of EDCD (Boersma 1997, Magri 2012) which demotes by a small amount the undominated loser-preferring constraints.

Q3: why not switch the role of $\mathcal{F}$ and $\mathcal{M}$ constraints? Namely, why not guess a restrictive ranking $M_1 \gg M_2 \gg \dots$ of the $\mathcal{M}$ constraints and then intersperse the $\mathcal{F}$ constraints as *low* as possible? This alternative is easily shown to be correct without additional assumptions (e.g., symmetry of $\mathcal{F}$ constraints). Yet, we do not know how to implement its second step: since demotion is the natural operation in OT (Prince & Tesar 1998), it is difficult to intersperse constraints as low as possible.

Q4: how can step 1 be implemented? The crux of the PTH approach is the proper implementation of step 1: how to guess a restrictive ranking $F_1 \gg F_2 \gg \dots$ of the $\mathcal{F}$ constraints? PTH implement this step within the batch RCD algorithm through two heuristic provisions: prefer $\mathcal{F}$ constraints that are more *autonomous* or that *free-up* more $\mathcal{M}$ constraints. As noted above, error-driven learning is as efficient as batch learning in the implementation of step 2. I show that it is furthermore more efficient than batch learning in the implementation of step 1, contrary to what conjectured by PTH. Indeed, I show that both PTH's batch heuristics fail on a number of languages in the two test cases they consider, namely PT's *Azba* typology and Hayes' Voicing$\times$Aspiration typology. On the contrary, an error-driven algorithm which performs a small amount of promotion besides demotion (Magri 2012) succeeds at learning the relative ranking of the $\mathcal{F}$ constraints (and thus succeeds at restrictiveness) on *every* single language in the two test cases (under uniform sampling of the data).

A unified approach to syllabic constituents and phonological primes: no nuclei but features

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

In theories of phonological representation which employ elements as melodic primes and licensing/government as a device for controlling dependency relations between phonological units (Kaye, Lowenstamm & Vergnaud 1990; Kaye 1990, 1995; Harris 1994, 1997; Charette 1991; Scheer 1995, 2004, 2012; Botma 2004; Kula 2009; and others), not only features (or elements) but also the syllable nucleus is phonetically interpretable. A nucleus may be phonetically realized even it is melodically empty – that is, if it has no features. An empty nucleus is silent when the appropriate conditions are met (e.g. when it is prosodically licensed as a result of being properly governed: Kaye 1990, Harris 1994), but otherwise it must be phonetically realized. A nucleus without any melodic material is typically pronounced as a central vowel of some kind, the precise quality of which is determined on a language-specific basis (Harris 1994: 109). In English, for example, this vowel is a mid central vowel *ə* (schwa), in Yoruba and Cilungu *ɨ* and in Japanese *ɯ*. According to this approach, these vowels are seen as providing an acoustic baseline onto which melodic primes are superimposed. Cross-linguistically, this baseline tends to have a central quality such as *ə*, *ɨ*, or *ɯ*.

Vowel epenthesis in the nativization of loanwords also tells us which vowel is the phonetic manifestation of an empty nucleus. In English, for example, *ə* is again inserted before word-initial NC sequences (which are impossible in English) when they appear word-initially in the source language (e.g., Mpumalanga ***əm***ˌ*puːmə*ˈ*læŋgə*; mbeki ***əm***ˈ*beki*; Ndola ***ən***ˈ*dəʊlə*; nguni ***əŋ***ˈ*guːni*).

The epenthetic vowel used to break up impossible sequences also differs from language to language: in Cilungu it is *ɨ* (Bickmore 2007) and in Japanese *ɯ*. (e.g., some examples from Japanese: ***pɯ***ɾiiz***ɯ*** for 'please'; ***sɯ***ɾim***ɯ*** for 'slim'; ***kɯ***ɾiiɴ for 'clean'). But interestingly, this type of vowel epenthesis also regularly involves one of the central vowels *ə*, *ɨ*, or *ɯ* (*e*, *o* and other vowels are marginally possible, which will be discussed in a different context).

In the literature on Element Theory (ET: Harris & Lindsey 1995, 2000; Harris 1994, 2005; Backley 2011) and Government Phonology (GP: Kaye, Lowenstamm & Vergnaud 1990; Charette 1991; Harris 1994; Harris & Gussmann 1998) it is assumed that the quality of the central vowel for any given language is made simply on the basis of parametric choice. Thus, no explicit explanation is given for why these vowels in particular are associated with the featureless nucleus.

This paper attempts to account for this parametric choice in a non-arbitrary way by proposing that the nucleus itself is one of the three vowel elements |A|, |I| and |U|. These elements belong to a small set of monovalent, independently interpretable primes which function as the building blocks of melodic structure. It is proposed that, for a given language, one of these vowel elements determines the quality of the 'featureless' nucleus: in its acoustically weak form, |A| is phonetically realized as *ə* in English, |I| as *ɨ* in Cilungu and |U| as *ɯ* in Japanese. Accordingly, I claim that |A|, |I| and |U| are the head of a nuclear expression in English, Cilungu and Japanese, respectively. This helps to explain why the central vowel is always one of only three possibilities, rather than five or six.

In addition, this paper shows that elements can be freely concatenated to create melodic compounds. Take, for example, an expression which combines |I| and |A|. If it is labeled as one belonging to the |I| set then it is phonetically interpreted as the mid front vowel *e*, whereas if it belongs to the |A| set it has the interpretation *ɛ*. Furthermore, these sets can be dominated by another set of the same kind: the set in which |I|(|I||A|) is dominated by |I|(|I||A|) is interpreted as a long vowel *ee*. The phonetic value of an element compound (phrase) is thus determined by the specific elements it contains and also the head-dependency relations (labeling) between those elements.

The influence of emergent features on the shape of phonological grammars

Aleksei Nazarov

It has often been assumed that the building blocks of phonological computation are universal or innate - see, for instance, Jakobson, Fant & Halle (1952), Chomsky & Halle (1968). However, an alternative hypothesis is gaining traction in the literature: phonological abstract units are induced by language learners on the basis of the signal (e.g. Mielke 2004, Archangeli et al. 2013). Much work under this latter hypothesis (see, e.g., Lin & Mielke 2007) has focused on the induction of phonological features from acoustics. Here, I will investigate a model in which phonological features are learned from structural distributions (inspired by aspects of Mielke's 2004 Emergent Feature Theory). Specifically, I will investigate this model's implications for the representation of grammatical patterns: a previously unexplored consequence of inductive (bottom-up) approaches to phonological units.

This will be done by computational implementation of a data-driven model of phonological unit induction. In this model, the drive to induce phonological units is the drive to have maximally general constraints in the grammar (cf. the Evaluation Metric in Chomsky & Halle 1968). To achieve maximally general constraints, constraints over fine-grained representations are found, and constraints judged to represent the same process are clustered together. Higher-level representational units are induced from the result of this clustering.

The implementation of this model builds on Hayes & Wilson (2008) and Wilson's (2010) phonotactic grammar learner. This learner uses a Maximum Entropy model (Della Pietra et al. 1997) to induce n-gram phonotactic constraints and give them an appropriate weight, creating a Harmonic Grammar-like end product (Pater 2009, Potts et al. 2010). However, differently from Hayes & Wilson's learner, the current learner did not have features available to it at the outset - the learner started with segmental representations only, and features were induced from phonological behavior.

Given a space of constraints which shared the same phonological context and an unfinished grammar, the algorithm found clusters of constraints that have high information gain with respect to that current grammar. These clusters were assigned feature labels. For instance, if the constraints *#m, *#n and *#ŋ form a cluster of high information gain among constraints of the shape *#_, then the set {m,n,ŋ} was mapped onto a feature label (say, "[nasal]"). This feature label then became available as material for new constraints, so that a constraint *#[nasal] could be induced at a later stage.

This algorithm was applied to a toy language with exactly three phonotactic restrictions: a ban on word-initial nasals, a ban on labial consonants between high vowels, and a ban on word-final [m] (the only labial nasal in the language). The ban on word-final [m] may be described in terms of phonological features ("no word-final labial nasals"), but need not be (since "no word-final *m*" is already a maximally concise statement of the pattern). This toy language is modeled on real cases of combinations of patterns in English (Jensen 1993, Mielke 2007) and Yoruba (Pulleyblank 1988).

The crucial aspect of the toy language is that it has both a one-segment restriction (no [m] word-finally) and multi-segment restrictions. An innate feature approach would require that the one-segment restriction be represented in terms of features ("no word-final labial nasals" or *[lab,nas]#).

The results of the current simulation, however, show that, under a data-driven approach, the one-segment restriction behaves differently from the multi-segment restrictions. Out of 32 runs, only 2 runs resulted in grammars which represented the "no final [m]" pattern using features - the other 30 runs only had the constraint *m#. For the other two patterns (no initial nasals, no labials between high vowels), all 32 runs resulted in some form of featural formulation of the pattern.

Almost all grammars learned by this procedure (31 out of 32) referred to the same sound on different levels of abstraction depending on the constraint: the sound [m] is referred to as "m" by some active constraints, and as "labial nasal" by other active constraints. This result is in agreement with recent findings in speech perception and production (McQueen et al. 2006, Jesse et al. 2007, Nielsen 2013): one and the same sound may be processed processed at different levels of abstraction by the same speaker, which suggests that this unexpected prediction for grammars may be on the right track.

Moraic Onsets and Cross-Anchoring in Arrernte
Andrew Nevins and Nina Topintzi

Rabbit Talk (RT) is a transposition language game in Arrernte , which in the VC-syllable-based-analysis of Breen & Pensalfini (1999) involves the transposition of the first VC syllable of the word at its end (1a-g). Following Nevins (2009), we adopt the hypothesis that Arrernte has CV syllabification, but moraic onsets (showing weight-by-position), along the lines of Topintzi (2009). The RT data, minus the fleeting initial schwa of this language (Tabain 2009) are:

(1) *RT data without spurious initial-ə*

	Arrernte	Rabbit Talk	
a.	mən̪	n̪əm	'plant food'
b.	n̪t̪əm	mən̪t̪	'giving'
c.	kʷən̪ət'ək	n̪ət'əkəkʷ	'to put in'
d.	itirəm	irəmit	'thinking'
e.	araŋkʷ	aŋkʷar	'no'
f.	ulkət̪	t̪ulk	'perentie'
g.	alpət'ək	t'əkalp	'to go back'

We suggest that RT-formation is simply expressed through the statement in (8):

(2) *RT informally stated*: Shift to the end of the word all the material up to and including the first moraic onset

(3) *[ə

(4) *NUC >> DEP-ə

Crucially, and rather uncontroversially (e.g. Itô et al. 1996; Vogt 2009; Borowsky 2010), RT applies on fully-fledged surface words whose moraification and syllabification has already applied. Onset moraicity, indicated with underlining and highlighting, is critical in determining how much material will be transposed.

(5) *Generation of RT forms schematically*

a. *m*$_{\mu}$*ən* → **ənm* [due to (3)], hence *nəm*$_{\mu}$
b. *nt*$_{\mu}$*əm* → **əmənt* [due to (3)], hence *mənt*$_{\mu}$
c. *k*$^{w}_{\mu}$*ənət'ak* → **ənət'akkʷ* [due to (3)-(4)]; hence *n̪ət'akək*$^{w}_{\mu}$
d. *it*$_{\mu}$*irəm* → *irəmit*$_{\mu}$
e. *ul.k*$_{\mu}$*ət̪* → **ət̪ulk* [due to (3)]; hence *t̪ulk*$_{\mu}$

For ease of exposition, only the moraicity of initial onsets is presented. The string transposed, as necessitated by (2), is highlighted. In (5a), shift of [m] creates *[ənm], which is avoided since it contains an initial-schwa (3). A medial one is inserted though, as enforced by (4). (5b) works roughly the same way, however [nt] is treated as a complex C under the onset node. The form *[əmənt] cannot survive due to (9). We are thus left with [mənt]. Shift of the onset in (5c) produces a sequence that violates phonotactics, therefore a schwa has to be inserted to provide a nucleus. As usual, the initial schwa is also deleted. (5d-e) demonstrate that longer material besides a single onset also gets to be transposed in V-initial forms.

As seen in (2), in RT *strings* at the left edge of the base word are transposed at the right. To capture this effect, we propose to employ the CROSS-ANCHOR constraint that Itô et al. (1996) use for a Japanese Argot game.

In conclusion, the proposed combination of moraic onsets and cross-anchoring, independently motivated for other languages, enables a response to Hyman's (2011) criticism that Rabbit Talk provides the strongest argument for VC syllabification in Arrernte, and neutralizes Evans & Levinson's (2009) that universals are a 'myth'.

A Minimalist Phonology? On Feature Insertion and Phonological Architecture

J. Joseph Perry, University of Cambridge
jjp45@cam.ac.uk

Background It has generally been assumed (with Chomsky and Halle 1968) that the phonological features introduced in the derivation to phonological surface representation are identical to the features contained in the lexicon, which is the form which interfaces with the syntax. This corresponds to early versions of transformational syntax (Katz and Postal 1964, Chomsky 1965) which suppose that the features contained in the Deep Structure of a sentence both interface with the semantic component and serve as a starting point for the derivation of Surface Structure. In phonology, this approach has not often been challenged – despite the innovations of theories such as Lexical Phonology (Kiparsky 1982) or Distributed Morphology (Halle and Marantz 1993), the features contained in the lexicon (or the vocabulary) have always been assumed to directly feed the derivation to the surface representation. This view may require revision.

Motivation Nevins' (2010) theory of harmony supposes that assimilation is enforced by a phonological operation which is identical in most respects to the syntactic operation AGREE (Chomsky 1995 et. seq.), where a segment requiring a feature value probes for an appropriate goal with which to agree. Nevins' approach is applicable to a wide range of harmony processes, and he shows that harmony shows locality phenomena directly comparable to those of syntax. This being the case, we would expect phonological AGREE to be motivated along similar lines to syntactic AGREE. The former applies to mark for deletion features which are introduced into the syntactic derivation, but not present in the logical form of a sentence ('uninterpretable features'). Phonological AGREE, then, marks features for deletion if they are present in the phonological derivation but not at the interface with (morpho)syntax. But if the lexical form is both the form which interfaces with syntax and the point at which features are introduced into the phonological derivation, then there is simply no possibility of such mismatch, and no viable motivation for AGREE.

Hypothesis If such an operation is responsible for harmony, then, the traditional view of phonological architecture requires modification. To this end I explore a phonological architecture akin to the Y-model of minimalist syntax (see e.g. Chomsky 1995) – bundles of features (drawn from a segmental inventory) are inserted into the derivation independently of lexical representations. These bundles are combined by some structure-building operation, and eventually undergo TRANSFER to the interfaces with the phonetic realisation mechanisms and with the morphosyntax (and thereby indirectly with the lexical representation). AGREE applies to resolve mismatches between the features initially inserted into the phonological derivation and the phonological representation output by the morphosyntax.

Predictions The proposed architecture has immediate empirical consequences. Specifically, it predicts that processes which *remove* information present in the morphosyntactic form (i.e. deletion or most neutralisations) should follow TRANSFER, in the course of the derivation to the phonetic realisation. The AGREE operation, however, precedes TRANSFER. On first sight this is problematic – there are many examples of deletion apparently feeding (or bleeding) agreement. I consider a number of these processes, including original data from Newar (where deletion seems to bleed assimilation between a vowel and a glide - *kwok*^{h}*-ə̃:* 'crow-ERG' vs. *kwə:* 'crow.ABS'), as well as classic examples from the literature such as Chukchi, where deletion of a schwa vowel seems to feed nasal assimilation (*rətən* 'tooth' vs. *rənn-ət* 'teeth' - Odden 1994) and Karok, where apparent deletion of an initial vowel may feed or bleed palatalisation (*iʃpuka* 'money' vs. *mu-spuka* 'his-money' - Bright 1957, Kenstowicz and Kisseberth 1977). I show that these examples do not, in fact, display phonological deletion at all, but blocking of epenthesis (in Newar and Chukchi), or allomorphy (in Karok). Our model predicts that *all* instances of deletion apparently preceding agreement will be of this type, and these results do indeed suggest that the proposed architecture may be on the right track, meriting further investigation.

The *free-ride* procedure to morphophonemic learning is correct. Some evidence from Catalan vowel epenthesis

Clàudia Pons-Moll & Maria-Rosa Lloret (Universitat de Barcelona)

1. The free-ride approach to morphophonemic learning (FRML). According to the FRML, «when alternation data tell the learner that some surface [B]s are derived from underlying /A/s, the learner will under certain conditions generalize by deriving *all* [B]s, *even nonalternating ones*, from /A/s», that is, «an adequate learning theory must […] incorporate a procedure that allows nonalternating [B]s to take a "free ride" on the /A/ → [B] unfaithful map.» (McCarthy 2005: 19). **2. Our argument.** Data related to vowel (V) epenthesis in Catalan (Cat) and its interaction with some specific cases of underapplication of V reduction (UVR) in Majorcan Catalan (MajCat) provide noteworthy support for this approach. In Cat, V epenthesis has often been invoked to explain the presence of a V (<e> [ə]) in those situations where its absence would entail a structure defying some kind of syllabic constraint. Epenthesis, though, is not fully legitimate by truly productive MPhonA in all positions (Wheeler 2005: § 8.1-8.2). **2.1.** *Epenthesis and lack of (fully productive) MPhonA*. Epenthesis, for instance, has been adduced in word-initial position in cases like *escriure* 'to write', *esperar* 'to wait', *estructura* 'structure', *esport* 'sport' and *estona* 'while', as a strategy to avoid word-initial *sC-* clusters. But the ∅~[ə] alternation that justifies the epenthetic nature of this V is only evident in the alternations found in pairs like *escriure* 'to write' ~ *in*[∅]*scriure* 'to register' or *esperar* 'to wait' ~ *pro*[∅]*sperar* 'to prosper', which in fact are dubiously productive, because recent prefixed forms maintain the <e> preceding the stem: *reescriure* 'to rewrite'; *desesperar* 'to despair'. Words like *estructura* or *estona*, or loans like *esport*, lack such alternations, but <e> systematically appears in the corresponding prefixed forms (cf. *superestructura* 'superstructure', *Interesport* 'commercial name'). *Rebus sic stantibus*, the learner has inexistent (or, in any case, very poor) empirical evidence to project the mapping /∅/ → [ə]. **2.2.** *Epenthesis and fully productive MPhonA*. Contrariwise, word-medial epenthesis in certain verbal forms (*temeré* '(I) will be afraid', *creixeria* '(I) would grow up') is claimed to be uncontroversial, because there are fully transparent MPhonA, both within the paradigm of the same verbs (*tem*[∅]*o* '(I) am afraid', *creix*[∅]*ia* '(I) grew up') and within the paradigm of verbs of the same class whose URs do not give rise to potential syllabic problems (*perd*[∅]*ré* 'I will lose', *beu*[∅]*ria* '(I) would drink'); the mapping /∅/ → [ə] is, therefore, fully legitimate in these cases. The *key* question that we address here is whether the learner makes use of these alternations to project the unfaithful mapping /∅/ → [ə] for the cases where there are not transparent MPhonA, like the ones described in § 2.1. **2.3.** And the answer is *yes*. The evidence comes from the interaction between «V epenthesis?» and UVR to schwa in MajCat. As argued in Pons (2011, 2013), ***a)*** the initial V in word-initial *VsC-* clusters is invisible to the O-O positional F constraints (which demand featural F between the V placed in the initial syllable of the stem), posited to account for UVR in productive derivation (cf. *festa* [é] 'party' / *festassa* [e] 'augm.' *vs*. *castell* [é] 'castle' / *castellet* [ə] '*dim.*') and verbal inflection (cf. *pega* [é] '(s/he) hits' / *pegam* [e] '(we) hit' *vs*. *contesta* [é] '(s/he) responds' / *contestam* [ə] '(we) respond'): [ə]*st*[é]*ve* 'Steve' / [ə]*st*[e]*vet*, *[ə]*st*[ə]*vet* 'dim.'; [ə]*sp*[é]*ra* '(s/he) waits' / [ə]*sp*[e]*rau*, *[ə]*sp*[ə]*rau* '(we) wait'; likewise, ***b)*** the initial V in word-initial *VsC-* clusters is unaffected by the contextual M constraint against a schwa in the initial syllable of the stem that is alleged to account for UVR in learned words and loans, without MPhonA (cf. *fetitxisme*, *vedet* [e]): [ə]*sp*[e]*cial*, *[ə]-[ə] 'especial'; [ə]*st*[e]*roide*, *[ə]-[ə] 'asteroid'. And this can be taken as positive evidence for the fact that the initial V, realized as a schwa, is actually an «epenthetic V!». Hence, the learner has generalized the unfaithful map /∅/ → [ə], derived from the cases with MPhonA (§ 2.2), to the cases without MPhonA (§ 2.1). **2.4.** Note, additionally, that, since the O-O F constraints and the contextual M constraints posited in our analysis are sensitive to morphological edges, our proposal gives further support to a «containment» approach to F within OT.

On the Behavior of sC clusters: French Acquisition and Aphasia Data

Typhanie Prince, Lling, University of Nantes
Typhanie.prince@univ-nantes.fr

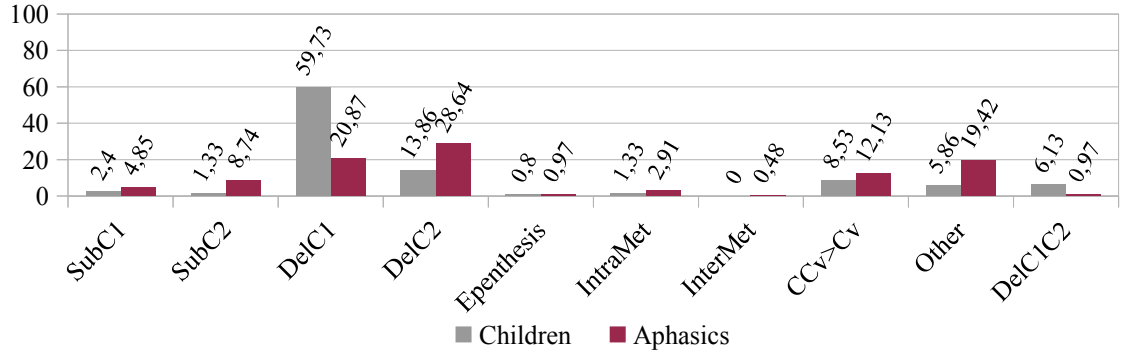
Introduction. The starting point of this study is Jakobson's proposal (1968) that a parallel can be drawn between the phonological system in acquisition and aphasia. Both in acquisition and in phonology, one of the main issues has been the representation of sC clusters (Freitas: 1997, Barlow: 2001, Goad: 2012), since sC violates one of the syllabification rules - the *Sonority Sequencing Principle.* The analyses of sC are far from being uniform and vary depending on the observed languages (coda+onset, extra_X...). The question we are addressing in this paper is: does sC really have a different behavior from other clusters? We compared the production of sC and ʁC clusters in French-speaking aphasics and children. Our results show that sC behaves like ʁC in French, i.e. coda+onset sequences – C_1C_2 – as proposed by Goad (2012) for English and Kaye (1992). These transformations can be explained in the framework of government phonology (Kaye: 1992, Scheer: 2004 and Goad: 2011), as we shall see.

Experiment and participants. A naming task and a repetition task were used to test the production of sC and ʁC sequences in initial, medial and final position, with the total of 40 items. Twenty aphasic participants (7 Broca, 6 Wernicke, 4 Conduction and 3 Transcortical) were recruited at the stroke unit in *Centre Hospitalier Universitaire* (France) and twenty standardly developed children (age 2;1-3;8) at a kindergarden in France. For this presentation, we have extracted all the cases for sC in French. Some examples are given in (1).

(1)

a. 'snail'	escargot	/ɛskaʁgo/	→	[ɛʃkaʁgo], [ɛksago], [ɛkago]
b. 'mosquito'	moustique	/mustik/	→	[muʃtik], [muti]
c. 'spatula'	spatule	/spatyl/	→	[pastyl], [patyl]
d. 'cap'	casquette	/kaskɛt/	→	[kakɛk]
e. 'pen'	stylo	/stilo/	→	[skilo], [tilo]

Results. The main generalizations that can be formulated on the basis of our results are: (i) the most important transformation observed in both groups is the deletion of C_1 or/and C_2 (Barlow: 2001) (ii) children delete more /s/ than C_2 (iii) another important transformations observed are *coalescence* – CCv>Cv (Kirk & Demuth: 2005) and *other*. This in return will lead to a discussion on the structural representation of sC. See the following table for percentages of the different transformations for sC.



Discussion. The purpose of this presentation is to explore and give an explanation for the different strategies applied for sC, by comparing the data in acquisition and aphasia. The remaining question is: what is the status of sC clusters? Given the position of sC/ʁC, our comparison of the transformations applied to ʁC and sC sequences seems to suggest that sC behaves like ʁC, ie. as coda+onset sequence. Furthermore, we will show how does the nature of C_2 plays a role (particularly in aphasia). We will explain that the complexity result from the interaction between segmental and syllabic dimensions. The understanding of this kind of data in acquisition and pathology is important to improve the current theoretical models in government phonology.

Derived glides and turbid stress

Anthi Revithiadou, Giorgos Markopoulos & Polina Messinioti / AUTh
revith@lit.auth.gr; gmarkop@lit.auth.gr; mesiniot@lit.auth.gr

There is little consensus regarding the underlying representation of Greek glides (e.g., Kazazis 1968; Setatos 1974; Nyman 1981; Topintzi & Baltazani 2011, a.o.). In this paper, we shed light on this controversial issue by investigating the formation of *derived* glides in a group of Greek dialects. Such glides arise as a recuperation strategy to hiatus triggered by intervocalic deletion of voiced fricatives (Dodecanese) or of the rhotic /r/ (Samothraki):

(1)	a.	/kre**v**át-i/	krjáti (Rhodes)	‘bed’	(Ts(opanakis) 1940: 58)
	b.	/aɣó**r**a-s-a/	aɣwásа (Samothraki)	‘buy-1SG.PAST’	(Méndez Dosuna 2002: 105)

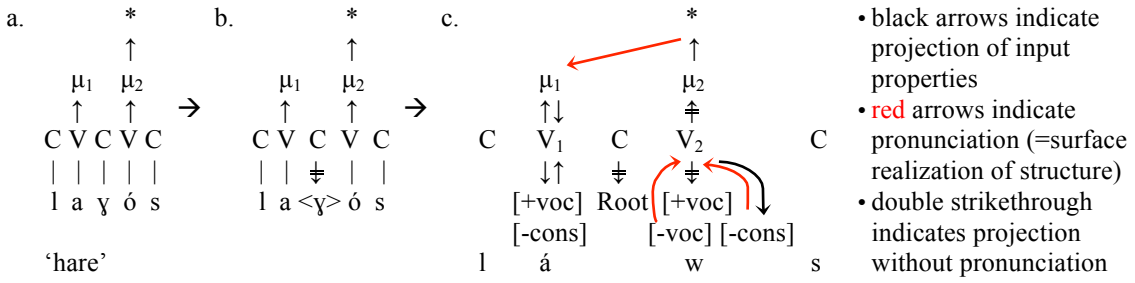
Derived glides, just like vowels, are [-cons] but, since they are forced to occupy syllable margins, they become automatically [-voc]. Following Halle (1995, 2005) & Halle et al. (2000), we claim that derived glides are specified for two *Designated Articulators* (**w** [LAB], [DOR]; **j**[COR], [DOR]), one of which is deleted when a preceding fricative spreads [+cons] to the glide turning it into a consonant (Kaisse 1992; Nevins & Chitoran 2008). As a result, in the Dodecanese a glide may surface as a labial, a coronal or a dorsal consonant:

(2)	a.	/súða/	s**f**á (Apolakkia) (< swá)	‘drink’	(Ts 1940: 52)
	b.	/karavi-a/	karáv**ʒ**a (Vati) (< karávja)	‘ship-PL’	(Ts 1940: 69-71)
	c.	/aliθi-a/	alíθ**c**a (Trianta, Salakos) (< alíθja)	‘truth’	(Ts 1940: 70-72)

More importantly, the non-nucleic position that the newly formed glide occupies has severe repercussions for the position of stress, as shown in (3). To account for the stress behavior of derived glides, we propose a representation along the lines of *Turbidity Theory* (Goldrick 1998, 2000; van Oostendorp 2006, 2008), according to which stress is treated as a property of a moraic slot (moras are independently necessitated by the existence of geminates in these dialects), which is forced to be pronounced on a neighboring vowel when the sponsoring mora is silenced (due to glide formation). An instructive example is given in (4).

(3)	a.	/akr**íð**-a/	akrj**á**	‘grasshopper’	(Rhodes, Ts 1940: 63-64)
	b.	/prot**óɣ**al-i/	protw**á**li	‘mother’s milk’	(Rhodes, Ts 1940: 55)
	c.	/a**ɣé**l-i/	**á**jli	‘herd’	(Rhodes, Ts 1940: 57)
	d.	/efaɣ**ó**θisan/	ef**á**wθisan	‘be eaten-3PL’	(Rhodes, Ts 1940: 52)

(4)



We provide further evidence for the dissociation between stress and its sponsoring mora from data (e.g., Archangelos Rhodian) which exhibit a peculiar pattern of metathesis. Examples such as /liɣarj-á/ *lajrjá* ‘wicker’, /próvata/ *práwta* ‘sheep-PL’ (Ts 1940: 55, 78) show that the vocalic content of the first two moras is reversed so that a falling diphthong can be formed (see Williams 1962 for Portuguese). Interestingly, examples such as /roðákin-o/ ***raó**kino*/ ****ráw**kino*, indicate that, although there is a reversal of vocalic quality between the first two moras ($o_{\mu1}$-$a_{\mu2}$ → $a_{\mu1}$-$o_{\mu2}$), stress remains faithfully on the sponsoring mora thus blocking glide formation and sustaining hiatus. The paper concludes with a cross-dialectal typology of glide formation and its effects on the location of stress.

Prosodic targets in Tashlhiyt Berber morphology and metrics

Tomas Riad, Stockholm University, tomas.riad@su.se

Tashlhiyt Berber has a relatively rich prosodic morphology, showing up in imperfectives and several noun/adjective formations (Jebbour 1999, Dell & Elmedlaoui 1992), cf. (1). I propose an analysis in similar terms of two secret languages, Tagnawt and Taqjmit (Douchaïna 1998, Lahrouchi & Ségéral 2010), where the target for the prosodic morpheme is partly disguised, cf. (2). 'L' = light syllable, 'H' = heavy syllable. Moras are underscored, and epenthetic segments are italicized.

(1) Prosodic morphemes in regular word formation

construction	root	prosodic target	prosodic morpheme	output	gloss
Tifrdi	frd	LL	fr.di	ti-fr.di	'graze/grazing'
Tirrugza	rgaz	L.H.L	r.rug.za	ti-r.rug.za	'manhood'
Azddayru	tlf	L.H.L	*n*t.tal.fu	a-*n*t.tal.fu	'be lost soul'
Abnakli	skr	L.H.L	s.ka*j*.ri	a-s.ka*j*.ri	'doer/drunkard'
Ukris	krs	H.H	uk.ris	uk.ris	'trousseau'

(2) Prosodic morphemes in secret languages

secret language	root	prosodic target	prosodic morpheme	disguised output	gloss
Tagnawt	/ksudˁ/	L.LL.L	k.ka.sdˁ sdˁ	aj-kkasdˁ-wa-sdˁ	'be afraid'
	/sala/	L.H.L	ss.al ll	aj-ssal-wa-ll*i*	'busy oneself with'
Taqjmit	/ksudˁ/	L.LL.L	k.ka.sdˁ sdˁ	ti-kkasdˁ-ju-sdˁ	'be afraid'
	/gn/	L.H.L	g.g.an n*i*	ti-ggan-ju-n*i*	'avoid'

The prosodic morphemes exhibit unmarked properties regarding foot size (always binary: [´μμ] or [´μμ][´μμ]), but also marked properties (e.g. the misaligned foot in L.H.L, L.LL.L). I argue that the marked properties are due to distinctive violation (Golston 1996) of the familiar rhythmic constraints NoClash and NoLapse.

These patterns are connected to the verse metrics of Tashlhiyt Berber (Jouad 1995, Dell & Elmedlaoui 2008), where verse feet belong to one of two classes: {LL.H} or {L.H.L, L.LL.L}. The similarity warrants the argument for identity between units of prosodic morphology and units of meter (Golston & Riad 2000). I show that the rhythmic constraints are operative in the meter, such that clash is fully avoided while lapse is both partly avoided and employed to define marked properties of verse feet (thus: NoClash ≫ NoLapse). The upshot is a demonstration of how rhythmic constraints are operative to, on the one hand, optimize rhythm in meter (regular grammatical evaluation), on the other hand, structure meter by required arrhythmy in verse feet (definition of prosodic shape).

Superheavy Syllables in Mukallawi Arabic

Sam Rosenthall
Oakland University
srosenth@oakland.edu

Hamed Altairi
University of Aukland
halt239@aucklanduni.ac.nz

The distribution of superheavy syllables (CV:C and CVCC) syllables in Mukallawi Arabic (a previously undescribed dialect spoken in Yemen) presents a variation of the distribution patterns observed in other dialects. This paper proposes to account for the distribution of CVCC syllables, specifically, in Mukallawi Arabic and other dialects by reranking a small set of universal constraints, as defined by Optimality Theory.

CVCC syllable in Mukallawi Arabic can occur word-medially, but word-final CVCC syllables undergo epenthesis. This is contrasted with the distribution in Lebanese Arabic where medial and final superheavy syllables are possible provided sonority is falling (Haddad 1984). Makkan Arabic, on the other hand, has final CVCC syllables (provided sonority is falling) but does not have medial CVCC syllables.

	Mukallawi	*Lebanese*	*Makkan*
/kalb/	kalib	kalb	kalb
/ʃakl/	ʃakil	ʃikil	ʃakil
/kalb-na/	kalbna	kalbna	kalbana
/ʃakl-na/	ʃakəlna	ʃikilna	ʃaklana

Following previous analyses of superheavy syllables in Arabic (Sherer 1994, Kiparsky 2003, Mahfoudhi 2005), these syllables require licensing of an extrasyllabic consonant. This licensing is achieved here by a (possible universally fixed) ranking of constraints that ensures extrasyllabic consonants are appended to the periphery of the highest possible prosodic category:

*APPEND-TO-σ » *APPEND-TO-FT » *APPEND-TO-PRWD.

The ranking of the *APPEND constraints ensures that an extrasyllabic consonant is harmonically parsed as peripherally as possible.

The distribution of CVCC syllables in all dialects (not just those mentioned above) will follow from the ranking of faithfulness, specifically DEP, and an ALIGN constraint with respect to the *APPEND ranking. The ranking compels two different representations for CVCC syllables. Medially, the extrasyllabic consonant is appended to the syllable (the foot is not available due to higher ranking constraints), but word-finally it is appended to the prosodic word.

Medial: [[[kalb]$_{\sigma}$na] Final: [kal]$_{\sigma}$b]$_{Prwd}$

Ranking DEP above the *APPEND constraints leads to CVCC syllables, as in Lebanese. Ranking DEP between the *APPEND constraints allows for final CVCC syllables, but not medially, as in Makkan. Mukallawi and Lebanese differ in the ranking of an ALIGN constraint, which forces the right edge of the word to coincide with the right edge of a syllable. The appropriate ranking of ALIGN and *APPEND is best-satisfied by epenthesis in Mukallawi Arabic, but not in Lebanese. The sensitivity to sonority is accounted for by interaction of these constraints and constraints on the sonority profile of the syllable.

The proposal here has advantages not available in previous analyses of superheavy syllables, namely, the different representations of medial and final CVCC syllables provide the crucially different contexts in which epenthesis occurs. The paper will also discuss the distribution of CVVC syllables as well, which will support Watson's (2007) shared mora representation.

French Liaison: the Double-Floating Representation in First Grade

Samantha Ruvoletto – University of Paris 8, UMR 7023
samantha.ruvoletto@gmail.com

INTRODUCTION. In French, the boundaries within articles and nouns are subject to a specific phonological process called 'liaison'. It consists in the surfacing of a latent segment, called liaison consonant (LC), that is resyllabified in the following noun if it starts with a vowel (e.g. *les* [le], en. *the* + *ours* [uʁs], en. *bears* → *les[z]ours* [le.zuʁs], en. *the bears*). To represent this particular phenomena, the phonological-autosegmental model uses a LC which is a floating segment, with respect of both the segmental and syllabic tiers (Fig. 1, Encrevé, 1988; Encrevé et al. 2005).

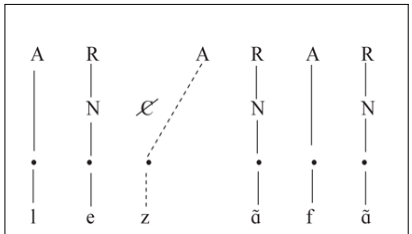


Fig. 1. Autosegmental representation of French liaison in *les enfants* [le.zɑ̃.fɑ̃], en. *the children* (Encrevé, 1988; Encrevé et al. 2005)

Nonetheless liaison causes many infant difficulties in French speech segmentation that seem vanished at 6 years of age, when children acquire this double-floating nature of the LC autosegment (Wauquier, 2009).

In this study, we're going to find evidences of French first graders' representation of LC as a double- floating segment.

METHOD. 43 French children (average age 6; 3) are tested individually through a picture naming task. We propose 18 couples of cards depicting the same animal or object but differing in number (one vs. many). The interviewer names the first card producing an elision (e.g. *l'ours* [luʁs], en. *the bear*) then asks to the child to name the second card in order to produce the plural and so the liaison (e.g. *les[z]ours* [le.zuʁs], en. *the bears*) and vice-versa (interviewer's input: liaison *les[z]oreillers,* [le.zɔ.ʁɛj], en. *the pillows* → child's production: elision *l'oreiller* [lɔ.ʁɛj], en. *the pillow*). A long training precedes the performing of the task and the tests items are alternated at random with fillers that don't require productions of liaison or elision (e.g. interviewer's input: *les gateaux* [le gɑ.to], en. *the cakes* → child's production: *le gateau* [lə gɑ.to], en. *the cake*).

RESULTS. The results of the task show that when it's asked to produce an elision [lɔ.ʁɛj] (en. *the pillow*) from a liaison [le.zɔ.ʁɛj] (en. *the pillows*), children product the same percentages of (1) good answers as [lɔ.ʁɛj] (32%), of (2) 'hiatus' as [lə ɔ.ʁɛj] (35%) and of (3) sequences that preserve the LC at the beginning of the noun as [lə zɔ.ʁɛj] (33%). We analyze children's productions through the software PRAAT and we discover:

- in (2), a glottal stop is systematically produced between the two words *le(s) [ʔ]oreillers* [lə ʔɔ.ʁɛj].
- in (3), the LC [z] doesn't make difference in length from the LC in the correct production of liaison as *les ours* [le.zuʁs], en. *the bears*.
- the vowel [ə] is in average longer (198 ms and 178ms) in (2) and (3) than [ə] produced in non-liaison sequences as *le gateau,* [lə gɑ.to], en. *the cake* (150 ms).

DISCUSSION. The wrong elision productions reflect a possible phonological representation of liaison phenomena after 6 years of age where LC is a floating segment. The skeletal position and the segmental content of LC are preserved otherwise the skeletal position is filled with a glottal stop [ʔ]. LC or [ʔ] are floating from the segmental and the syllabic tiers:

- in the segmental tier their presence causes the lenghthening of the previous vowel, as it happens for the vowel in liaison (Nguyen et al. 2007) and don't happen between separated words where the consonant is only lexical and related to the onset of the noun (e.g. *le gateau* [lə gɑ.to], en. *the cake*);
- in the syllabic tier they fill the onsetless syllable and avoid hiatus, prevent the elision process.

Anything goes: Czech initial clusters in a dichotic experiment

Tobias Scheer, Laurent Dumercy, Frédéric Lavigne (all: Université Nice Sophia Antipolis, CNRS 7320) & Markéta Ziková (Masaryk University Brno) ; correspondence: scheer@unice.fr

Some languages restrict word-initial clusters to TR (T = obstruent, R = sonorant), while others also allow for RT, TT and RR. The former, TR-only languages, instantiate words with *all* logically possible muta cum liquida clusters. By contrast, the latter, anything-goes languages, may (e.g. Moroccan Arabic) or may not implement all logically possible #RT, #TT and #RR clusters (e.g. in Czech only 28 out of 108 possible #RT clusters occur).
The question raised is thus whether the missing non-#TRs in Greek, Czech etc. are accidental or systematic gaps. The zero hypothesis is that for each language, the set of occurring and non-occurring clusters shares some property. In Slavic languages neither set forms a natural class in any sense (e.g. Cyran & Gussmann 1999 for Polish). This as well as the diachronic situation in Slavic (#CCs are created by the loss of yers) speaks in favour of the accidental gap analysis. On the theoretical side, the accidental gap analysis matches the claim that there are only two types of grammars (regarding initial clusters): one imposes a restriction on #CCs, the other does not. The former produces TR-only-, the latter anything-goes languages. The prediction of a binary typology follows from the idea that the beginning of the word has a true phonological identity: syllabic space (Lowenstamm 1999, Scheer 2012).
In this talk we experimentally test the prediction that really anything goes in anything-goes languages. In dichotic experiments, subjects are exposed to two distinct stimuli through two distinct perceptive channels. They then perceive neither: the brain has fused them into something that is not present in any perceptive input; the best known case is the McGurk effect (McGurk & MacDonald 1976). Dichotic effects may also be achieved with two distinct audio channels, perceived through the left (L) and right ear (R). Cutting (1975) has shown that English natives perceive *play* when inputted with *pay* (L) and *lay* (R). Interestingly, the perception *play* is still achieved when *lay* has a 50 ms lead on *pay*, i.e. when in the physical input the #l precedes the #p. That English natives will not perceive *lpay* is understandable since (1) there is no such lexical item and (2) their TR-only grammar prohibits #lp.
If the accidental gap hypothesis is correct, the grammar of Czech for example does not prohibit any #RT, independently of whether it does or does not occur in some lexical item ((2) above). Like English natives, however, the perception of Czechs may be guided by the existence of a lexical item that instantiates a given #RT ((1) above). We have run an experiment with 24 Czech natives along the audio-audio dichotic protocol mentioned (54 word pairs distributed over all types of #CCs). We report that there is a strong lexical bias favouring the perception of existing lexical items, as compared to non-existing ones; e.g. on an input {*dousit* (R), *rousit* (L)} speakers will report that they perceive *rdousit* "to throttle" (while *drousit* is not a word in Czech). This behaviour extends to all types of #CCs, and is pervasive even if the non-existing target is favoured by a 50 ms lead ({*dousit* (R), *rousi*t (L, 50 ms later)}. Combined with this lexical bias there is also (against the prediction) an existing-cluster-effect: when target word 1 exists (e.g. *lpě*t and *prak*) but target word 2 does not (**plět* and **rpak*), the perception of the latter is significantly more frequent when the non-existing word begins with an existing #CC (#pl of **plět*), as compared to when it bears a non-existing #CC (#rp of **rpak*). The trouble is that both biases (lexical and existing-cluster) are interleaved. In order to tease them apart, i.e. to make sure that the stimulus is only assessed by the grammar (rather than by a simple lexical access), we need to get the lexical bias out of the way. We therefore probed only pairs made of target words that do not exist, e.g. {*touk* (R), *rouk* (L)}, neither **trouk* or **rtouk* exists. This time the result conforms to the prediction: the existing-cluster-effect disappears. That is, there is no statistically detectable effect induced by cluster existence: as predicted, the perception of speakers stubbornly follows lead time, independently of the result (existing or non-existing cluster). We conclude that once the lexical bias is eliminated, the prediction that literally anything goes is supported.

Metaphonetic Diphthongization and 'Rafforzamento Fonosintattico': phenomena of phonology-syntax interface

Giuseppina Silvestri - University of Cambridge/University of Trieste

Status quaestionis. Diphthongization driven by metaphony (MD) and phono-syntactic doubling (aka 'Rafforzamento Fonosintattico', RF) exhibit extremely complex patterns in Italo-Romance varieties (Fanciullo 1994 on MD, Loporcaro 1997 on RF, a.o.). In particular, in a handful of dialects of the border zone between Calabria and Lucania the two phenomena are both active and function as morphological mark (MD) or as a strategy to define the sentence word order (RF). Pioneering studies (D'Alessandro-Ledgeway 2006, Biberauer-D'Alessandro 2006) showed that such phenomena can be most comprehensively understandable as an outcome of the interplay between prosodic, lexical, and syntactic conditions.

Data and interpretation. In the dialect of Verbicaro (North-Western Calabria) the 3rd sing. person of verbs may display two endings: a 'short' ending -[a] which triggers RF of the following word's initial consonant, *iff* intrinsically doublable; a 'long' ending -[əðə] which does not produce RF (the fact was first noticed in Lausberg 1939). The alternation of the two possibilities is not arbitrary for the speakers. In 1, (a) and (b) are not equivalent. Namely, the two utterances differ in their informational structure:

1. (a) [ˈmanʤa ppaˈpajə] ~ (b) [ˈmanʤəðə paˈpajə]
   eats dad = 'DAD is eating' eats dad = 'dad is eating'

In (1,a) 'dad' represents the NEW of the utterance (which answers to the question *Who is eating?*) and is marked by RF. In (1,b) the 'new' predication is the verb itself, since 'dad' was already known in the discourse universe (1,b answers to the question *What is dad doing?*).
In the same dialects, MD of etymological mid-low vowels (Ĕ,Ŏ) is also a mark of grammatical features, such as gender and number, in adjectives and past participles.

2.

	adjectives		participles	
	masculine	feminine	masculine	feminine
singular	ˈspiərtə / ˈspjertə 'smart'	ˈspɛrta	ˈkuəttə / ˈkwottə 'cooked'	ˈkɔtta
plural		ˈspɛrtə		ˈkɔttə

The alternation between falling and raising MD is constrained, first of all, by the position of the word whitin the utterance: if the word is in prepausal position, speakers always articulate a falling MD (3,a). Otherwise, the MD undergoes optionality (3,b-c).

3. (a) [að addəˈmwat ʊ ˈfuəkə] 's/he lit the fire' (question: *what did s/he do?*)
   (b) [ʊ ˈfuək að addəˈmwatə] 'THE FIRE, s/he lit' (question: *what did s/he light?*)
   (c) [ʊ ˈfwok að addəˈmwatə] 'the fire lit' (q: *what happened? did the fire light?*)

The falling MD is selected when the word is placed in a marked position. Namely, in (3,b) the fronting of the direct object is a topicalization strategy, occurring along with the selection of the falling MD. On the opposite, in (3,c), that displays the same linear order as (3,b), 'fire' is articulated with a raising MD and plays the role of undergoer of 'light' in its unaccusative acceptation .

Proposal. I will argue that RF and MD patterns in the dialect of Verbicaro serve the expression of the informational structure of the utterance, ultimately responding to requirements of the syntactic architecture and relations between phrases, constituents, and overall sentence.

Emergent noun faithfulness in novel English blends

J. Smith (jlsmith), E. Moreton (moreton), K. Pertsova (pertsova), R. Broad (broadr)
University of North Carolina at Chapel Hill (@email.unc.edu)

There is *typological* evidence for **noun faithfulness**: in languages where nouns (N) and verbs (V) have different phonology, N typically show stronger faithfulness effects (Smith 2011). But is noun faithfulness part of the **universal constraint set**? We present *experimental* evidence that it is. English speakers **preserve N segments** in preference to V segments in novel blends, and this is an **emergent** effect—the general phonology of English does not provide overt evidence for noun-specific MAX constraints. Intriguingly, we find weaker effects for N stress preservation, which contrasts with typological findings that category-specific phonology is typically **prosodic**, *not* segmental. We discuss implications for the syntax-phonology interface.

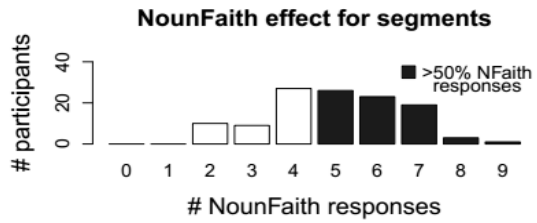
• ***Methodology:*** Many factors influence the formation of blends (*motor*+*hotel* → *motel*; Bat-El 2006). If noun faithfulness is one such factor, then **properties of a N source word** should be **better preserved** in a blend than those of a V source word. We tested for this effect using an extension of the blend experiment paradigm in Shaw (2013), in which participants match two definitions to two different blends made from the same source-word pair. For example, *plot* + *litigate* can be interpreted as N+V or V+V (1). Noun faithfulness predicts that participants will match the N+V interpretation with the blend that preserves more N segments: (1a), not (1b).

(1)

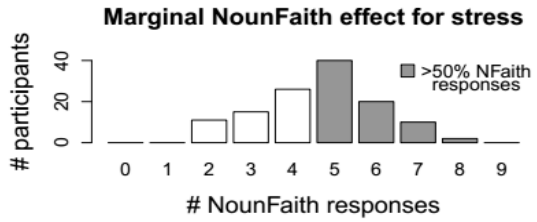
	Definitions		Choice	MAXSEG(N)
►(a)	to sue a plagiarist over the plot of a novel	(***plot*N**)+V	**plɑtɨgeɪt**	√ **N faithful**
	to sue a conspirator when they plot against you	(*plot*V)+V	plɪtɨgeɪt	√ (no N here)
(b)	to sue a plagiarist over the plot of a novel	(***plot*N**)+V	**plɪtɨgeɪt**	* **N deletion**
	to sue a conspirator when they plot against you	(*plot*V)+V	plɑtɨgeɪt	√ (no N here)

• ***Results:*** In Experiment 1, blends differed in how many **segments** they preserved from each source word, as in *plotigate* / *plitigate*. Here, 72/118 participants (61%) had a majority of noun-faithful responses—significantly above chance, which is 50% (exact binomial test, p=0.020). Thus, blends are ***more likely*** **to preserve the segments from a N source word** than from a V (2a). In Experiment 2, blends differed in which source-word **stress** they preserved, as in *prúne*+*enjóy* → *prúnejoy* / *prunejóy*. This time, 72/124 participants (58%) had a majority of noun-faith-conforming responses, numerically above but only marginally significantly different from 50% (p=0.088). This suggests that blends ***may*** **be more likely to preserve stress** from a N source word than from a V (2b), but the effect is weaker than for segments.

(2) (a)



(b)



• ***Implications:*** First, **noun faithfulness** is **universally available**. English speakers show noun faithfulness effects in blends even without overt evidence to acquire them from (indeed, English lexical statistics indicate that N stress patterns are *more* restricted than V; Kelly & Bock 1988). Second, typological evidence shows that phonology is **sensitive to lexical category** much more often for **prosodic** patterns than for segmental ones. Our results suggest that this pattern is *not* due to an *absence from the grammar* of segmental noun faithfulness, but must arise through **extragrammatical** factors. Finally, the sensitivity of faithfulness to both N vs. V and prosody vs. segmental phonology is strong evidence (contra Kenstowicz 1996, Cable 2005) that **the phonological grammar must refer to lexical categories**.

Stress windows and Base Faithfulness in English suffixal derivatives

Juliet Stanton and Donca Steriade (MIT) — {juliets, steriade}@mit.edu

We present a comprehensive, unified account of stress in A.English suffixal derivatives, based on Marchand 1969's suffix list, derivative lists obtained from Lehnert (1973), and OED's reports on their stress patterns. Our survey reveals more extensive base-faithfulness effects among suffixes classified as Level 1 ('stress-shifting') than previously reported. These effects emerge when we distinguish two regions within the derived word: (a) a right-edge window (Kager 2012) whose stress may be strongly constrained, frequently in suffix-specific ways, and (b) the rest of the derived word. The region in (b) displays faithfulness effects to the stress of the base even when stress must shift in the (a) region, to satisfy the window constraints. One example is the suffix *–al*: it causes stress shifts in (a) to keep main stress within a final 3 syllable window (e.g. *ùnivérsal, òrnaméntal*), but it also tolerates long lapses in (b), to avoid light clashes and remain faithful to its base (*bìbliomaníacal* 2000100, from *bìbliomániac*). A second finding is that many classes of suffixal derivatives stand in correspondence with not just the exponents of their syntactic subconstituents (their local bases), but with their extended lexical families. All English derivatives prefer to correspond with their local bases, but this preference can be overridden when a related form better satisfies high-ranked accentual phonotactics. Our study extends in this way more limited earlier findings in Raffelsiefen 2004 and Steriade 1999.

The suffixes we studied can be classified according to two parameters: (1) whether they display window effects, and (2) whether they allow derivatives to access the stress pattern of non-local bases. An analysis of all these patterns uses Benua's (1997) Base-Derivative (BD) correspondence as modified in Steriade 2013: bases need not be contained in their derivatives.

Stress windows. Some suffixes, like *-a/ency* and *-able*, do not require stress to fall at a fixed distance from the right word edge. Others impose a stress window (Kager 2012): e.g. a 2σ window for *-ic*, (*syllábic*, *syntáctic*), and a 3σ window for *-al*. Window requirements can force the stress pattern of a derivative to deviate from that of its base. Beyond the window constraints and their immediate consequences for clash resolution, we show that all suffixes seek to maintain stress identity with their bases, typically at the expense of *LAPSE (cf. Burzio 1994: 169-198).

Non-local bases. Raffelsiefen (2004) and Steriade (1999) argue that the suffixes *-able* and *-ize* allow their derivatives to access the stress patterns of non-local bases, to satisfy varieties of *LAPSE or *CLASH. We show that the phenomenon is much more widespread: e.g. *apòstolícity* matches *apóstle*, not *àpostólic*, to avoid light clash; *prèsentée* resembles *prèsentátion*, not its local base *presént*, etc. There are also suffixes, like *-a/ency*, that prohibit their derivatives from accessing the stress of non-local bases. Thus we have *éxcellency* from *éxcellence*, although corresponding with the stress of *excél* would alleviate a long lapse (**excéllency*).

Summary. The two parameters above predict four suffix types. Examples follow:

	Faithful only to local base	Faithful to lexical family
Window	*-al, -ary, -dom, -ese, -ette, -ian, -ic*	*-ate$_1$, -ee, -esque, -ician, -ity, -ize, -ory, –ify, –(at)ive*
No window	*-age, -a/ency, -a/ent, -cy, -en, -ery, -ess*	*-able, -acy, -ate$_2$,*

The overall picture is one in which English suffixal derivatives prefer to correspond with their local bases, but this generalization can be obscured if (a) a suffix-specific stress window forces the base stress to shift; and/or (b) the suffix permits correspondence to non-local bases, allowing the derivative's stress pattern to satisfy high-ranked accentual phonotactics. The implications of these findings for the classical two-level-plus-postcycle model of English stress (Kiparsky 1982) and its recent modifications (e.g. Bermúdez-Otero 2007 and Collie 2008) will be discussed.

Learning bias in stress windows: frequency and attestation

Robert Staubs rstaubs@linguist.umass.edu University of Massachusetts Amherst

In this work I show that biases of a computational model of stress learning mirror tendencies in the frequencies of stress window systems. The model is Maximum Entropy (Goldwater and Johnson, 2003) Stochastic Gradient Ascent (Jäger, 2007; Boersma and Pater, 2014) with Robust Interpretive Parsing (Tesar and Smolensky, 2000). This learner is inherently biased to learn some patterns better than others. Bias comes "for free" from the combined use of a learning algorithm and a theory of representation. In iterated learning, these biases explain the frequency of stress window systems, including gaps.

Stress windows tend to be small, with a maximum of three syllables. Systems like Malayalam's final two-syllable window (Asher and Kumari, 1997) are more common than Comanche's final three-syllable one (Smalley, 1953), and similarly on the left edge. In the learning setting presented (as many others), this tendency follows from two facts. First, short words are generally more frequent. This biases learners away from patterns which require very long words, as large windows do. Second, and more importantly, the data in small short windows is more consistent for the learner. If a window is short, most words show one of a very few stress patterns. With longer words, learners must incorporate greater and greater variability. This inconsistency slows down learning. In iterated learning, this bias predicts that short windows should be more common.

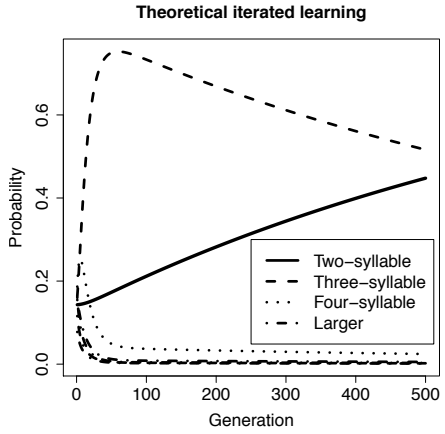


Fig. 1

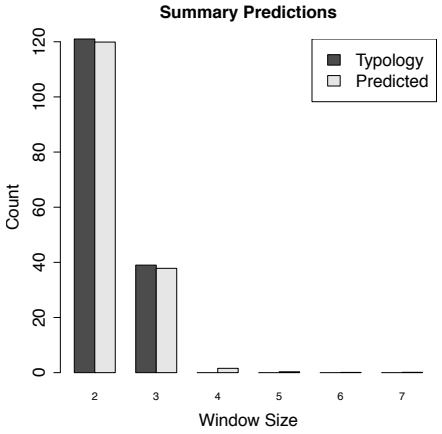


Fig. 2

Figure 1 shows predictions for typological frequency as iterated learning continues. Learning bias in favor of short windows results in large windows collapsing first to three syllables and ultimately to two. Figure 2 shows the typological predictions' best fit to summary counts from Kager (2012, ex. 22) (at generation 1,664). Simulations used a learning rate of 0.1 and exponentially decreasing frequency by word length. The constraint set used was adapted from Alber (2005) and Kager (2005).

These results are encouraging: two- and three-syllable window predictions are in close accord with observation. Five-syllable windows (and larger) are predicted to be essentially zero, again as observed. What of four syllables? The model predicts 1.6 such languages (one, as count data) in a sample of this size. This is not true overprediction; the model assigns a 20.60% probability to a gap for such languages. Thus predictions about relative frequency grounded in learning can offer insight into attestation: accidental gaps are represented in the model as quantitatively different from 'true' gaps as low, non-zero probabilities. These results ignore asymmetries between right and left edges. I further discuss how these distinctions can be modeled in this framework as arising from perceptual asymmetries between the beginnings and ends of words.

Opaque vowel merger - metaphony interactions

Francesc Torres-Tamarit & Kathrin Linke
VU University Amsterdam & Meertens Institute
francescjosep.torres@gmail.com, kathrin.linke@meertens.knaw.nl

This paper presents a unified account of opaque interactions between vowel merger and metaphony in languages of Italy that supports feature privativity and Turbidity Theory.

Framework. In TT root node-feature linking is replaced by two distinct types of relations: lexical/projection relations ('↑') and surface/pronunciation relations ('↓'). Reciprocity constraints ($\mathcal{R}^r_F$, $\mathcal{R}^F_r$) regulate projection-pronunciation relations locally (van Oostendorp 2008). To allow for non-local licensing we propose an additional type of constraints:

(1) LICENSE↑{F} ($\mathcal{L}$↑{F}): assign a violation mark for every projection relation ↑ of a feature *F* that does not correspond to some pronunciation relation ↓ of *F*.

(2) LICENSE↓{F} ($\mathcal{L}$↓{F}): assign a violation mark for every pronunciation relation ↓ of a feature *F* that does not correspond to some projection relation ↑ of *F*.

Non-pronunciation is triggered by the satisfaction of high-ranked feature co-occurrence constraints *{F}, *{F,G}, which are violated whenever a (set of) feature(s) is pronounced irrespective of projection relations. In contrast high-ranked implicational constraints like r⊃{F} induce the local pronunciation of (non-projected) features.

Problem & data. Metaphony is an assimilatory process in which an unstressed high vowel inflectional suffix causes raising of a preceding stressed mid stem vowel (Calabrese 1985, 1998, 2011, Cole 1998, Dyck 1995, Nibert 1998, Sluyters 1988, Walker 2005). In some languages of Italy, however, a diachronic process of vowel merger affecting inflectional suffixes took place, thus obscuring the structural context that gave rise to metaphony. For example, in the dialect of Arpino (Lazio) non-low suffix vowels reduced to schwa although metaphonic alternations are maintained (['mesə] 'month' *cf.* ['misə] 'months'). A parallel case is found in the dialect of Napoli (Campania), with vowel merger in favor of high mid vowels (['notʃe] 'nut' *cf.* ['nutʃe] 'nuts'). Here vowel merger counterbled metaphony. A counterfeeding relation can be found in Northern Salentino (Salento), where all mid vowel suffixes raised to high but do not trigger metaphony (['tori] 'tower' *cf.* ['turi] 'towers').

Analysis. Our representational account rests upon monovalency & feature economy. If feature *F* is active, an input $/^{\mathbf{r}}_{\uparrow}{}_{\mathbf{F}}/$ must map to $\begin{bmatrix}\mathbf{r}\\ \updownarrow\\ \mathbf{F}\end{bmatrix}$ ($\mathcal{R}^r_F$ or $\mathcal{L}$↑{F} ≫ *{F}). Faithful $\begin{bmatrix}\mathbf{r}\\ \uparrow\\ \mathbf{F}\end{bmatrix}$, meaning that feature *F* is inactive, follows from ranking *{F} above $\mathcal{R}^r{}_F$ and $\mathcal{L}$↑{F}.

The basic idea of the analysis is that counterbleeding metaphony due to diachronic vowel merger has been reinterpreted synchronically as a non-local effect of feature licensing. Consider the alternating forms ['mesə] and ['misə] (Arpinate). Despite neutralization, the UR of those suffixes must differ. For ['misə] we propose that the vowel suffix projects {high}. However, this feature is pronounced by the stem vowel. This mapping is obtained by ranking *{high}$_{\text{NON-PHEAD}}$, which prohibits pronunciation of {high} in a non-prosodic head position, and $\mathcal{L}$↑{high}, which requires pronunciation of projected {high} either locally or non-locally, above $\mathcal{R}^V{}_{high}$, which demands pronunciation of {high} by the root node *V* that projects {high}. Now consider the alternating forms ['misi] and ['mɛsi] (Northern Salentino). The form ['misi], with transparent metaphony, is optimal because a metaphony-favoring constraint dominates $\mathcal{R}^{high}{}_V$, penalizing pronunciation of {high} by a root node other than the one that projects {high}. For counterfeeding ['mɛsi] we propose that this vowel suffix does not project {high} but just pronounces it (V⊃{high}$_{\text{NON-PHEAD}}$ ≫ $\mathcal{R}^{high}{}_V$). However in this language the metaphony-favoring constraint is active and we should ask why assimilation of the feature {high} is blocked in this particular case. The answer is that double pronunciation of a feature that is not projected by any root node violates $\mathcal{L}$↓{high} twice, which dominates the metaphony-favoring constraint. The winning candidate with insertion and pronunciation of {high} but no metaphony also violates $\mathcal{L}$↓{high}, but only minimally to satisfy high-ranked V⊃{high}$_{\text{NON-PHEAD}}$.

Implications. In line with other studies challenging a 1-to-1 mapping between features and their phonetic implementation (Odden 2006, Blaho 2008, Hamann 2014), we aim at contributing to the discussion on whether phonology operates with substance-free units.

Templatic Shape and Exceptionality in German Noun Plurals

Jochen Trommer, University of Leipzig – jtrommer@uni-leipzig.de

Problem: Wiese (2009) shows that the native stratum of German noun plurals instantiates a consistent prosodic template of the form $\ldots(\sigma_s.\sigma_w)_{Ft}$, a final bisyllabic trochee with a reduced weak syllable that corresponds to the maximally unmarked foot in German (e.g. *Pelz* (SG) ~ *Pel.z*[ə] (PL) 'pelt(s)', *Kind* (SG) ~ *Kin.d*[ɐ] (PL) 'child(ren)'), and derives this Emergence-of-the-Unmarked effect (McCarthy and Prince 1994, 1995) by prosodic constraints. However, since singular forms do not obey this template, Wiese must assume construction-specific phonological constraints on plurals. Moreover, plural formation also involves affixation (c.f. *Boot* (SG) ~ *Boot*[ə] (PL) 'boat(s)' *Bote* (SG) ~ *Bote-n* (PL) 'envoy(s)'), which is partially unpredictable/lexeme-specific, leading to an analytic dilemma: If affixes such as -ə and -ɐ are morphologically selected, the affix shapes themselves conspire to establish the form of the template and make it redundant to derive it via phonological constraints. **Proposal:** I argue that German has only a single plural suffix – a featurally underspecified segmental root node, which is fully specified by default phonology or by combination with floating material associated to gender or specific lexical items, resulting in different allomorphs. This provides a solution to both of Wiese's problems: there is no need for morpheme-specific plural phonology, but plural morphology provides phonological material, not available in other morphological contexts, that allows to satisfy general prosodic constraints. Since there is only a single underspecified plural marker it leads to the same Emergence-of–the-Unmarked effects across different nouns. **Assumptions:** I assume Generalized Nonlinear Affixation (Bermúdez-Otero 2012) in the form of Autosegmental Colored Containment Theory (Trommer 2011; Zimmermann and Trommer 2014), where phonological material cannot be fully deleted in the output of optimality-theoretic computation, and the only morphological information visible to phonology is morphological 'color', i.e. whether two phonological objects belong to the same or different morphemes. In addition, I assume that two autosegmental nodes of the same type may undergo a fusion operation which marks them as identical for phonetic interpretation. **Analysis:** The only plural affix of German is the suffix -•, (a fully underspecified segmental root node). For C-final nouns with final stress, • is realized as [ə] (resulting in maximally unmarked syllable and foot structure), for nouns already ending in schwa, • is realized as [n], the unmarked coda consonant in reduced syllables, and for nouns ending in a reduced consonant-final syllable (e.g. *Anker* 'anchor' (SG/PL)), • undergoes fusion with the final syllable nucleus, to avoid violation of the high-ranked constraint $*\sigma_w\sigma_w$ penalizing adjacent reduced syllables. The prediction that ə-final nouns form their plural with *-n* is correct without exceptions, however there are consonant-final nouns that take the plural allomorphs -[ɐ] or *-n* instead of [ə] (e.g. *Kind* (SG) ~ *Kinder* (PL) 'child(ren)', *Held* (SG) ~ *Hel.d*[n̩] (PL) 'hero(es)'). Truly exceptional items bear floating features: Held floating [nasal], and *Kind* floating [+low] that results in *-n* and -[ɐ] by combination with plural-•. Crucially, these floating features don't show up in singular forms, due to highranked IDENT constraints, i.e. because they would have to overwrite the features of fully specified segments. Many instances of plural-*n* are in fact not idiosyncratic, but morphologically predictable. Most feminine nouns take *-n* even if they don't end in [ə] (e.g. *Angel* (SG) , *Angeln* (PL) 'fishing rod(s)', *Welt* (SG) *Welt-en* (PL) 'world(s)'). I capture this by a feminine gender marker which is phonologically a floating [CORONAL] feature that results in *-n* by association with • and is protected by undominated MAX [COR], suppressing the effect of $*\sigma_w\sigma_w$ for nouns such as *Angel*. Floating [COR] also accounts for the only systematic class of exceptions to feminine nouns taking *-n*, feminina that form their plural by umlaut and [ə] (e.g. *Hand* (SG) *H*[ɛ]*nd*[ə] (PL) 'hand(s)' Wunderlich 1999). If stem vowels are partially underspecified for vocalic place, [COR] can associate to it and results in fronting.

The role of acoustic disjuncture in loan epenthesis: Experimental evidence

Suyeon Yun (MIT; suyeon@mit.edu)

In loan adaptation, vowel epenthesis frequently occurs as a repair, when a cluster of a source language is phonotactically illegal in the borrowing language. A notable earlier finding has been that the position of epenthetic vowels differs depending on the sonority profile of cluster; clusters with rising sonority, e.g., stop-sonorant, are more likely to be split by an epenthetic vowel than clusters with falling sonority, e.g., sibilant-stop (Broselow 1992, Fleischhacker 2001, 2005, Gouskova 2003, Steriade 2006), e.g., 'plastic'→[b**i**lastik] vs. 'study'→[**i**stadi] (Egyptian Arabic). Based on typological and experimental evidence, this paper argues that it is not the sonority profile but acoustic properties of the cluster that determine the epenthesis site. A cross-linguistic survey of 51 languages was conducted. One result is that clusters with level sonority do not behave uniformly, suggesting that other factors than the sonority profile of the cluster determine the position of epenthesis; stop-stop clusters always undergo internal epenthesis (e.g., tkan' (Russian)→[t**i**kan] 'fabric' (Ewen; Choi 2010)), whereas nasal-nasal clusters may undergo prothesis (e.g., mnemonicheskij (Russian)→[**y**mnemonicheskij] 'mnemonic' (Kirghiz; Gouskova 2003) vs. mnemosine (Greek)→[m**i**nemosine] 'mnemosyne' (Korean). Second, depending on the acoustic properties of the clusters in the source language, the pattern of epenthesis differs. Korean, for example, borrows English word-final stop-stop clusters, where the first stop is optionally released, with single external epenthesis (e.g., 'compact'→[k^həmp^hekt^h**ɨ**]), but it borrows Russian stop-stop clusters, where both of the stops are obligatorily released, with double epenthesis (e.g., relikt→[lellik^h**ɨ**t^h**ɨ**]). The generalization from my survey is that an epenthetic vowel goes after a stop, or a nasal preceding a nasal or liquid (e.g., #tk→tək, #mn→mən (Korean), #ml→məl), and before a nasal preceding an obstruent or nasal, or a liquid (e.g., #mb→əmb, #mn→əmn (Kirghiz), #lb→əlb). Fricative-initial clusters are incorporated into the full analysis but not discussed here.

The clusters where epenthesis is attested involve some acoustic discontinuity, but the clusters where prothesis is attested do not. So I argue that the presence or absence of acoustic disjuncture (AD) plays a key role in determining the site of epenthesis. AD is perceptually salient acoustic discontinuity between the two consonants, one that involves abrupt spectral change accompanied by a rise of intensity. ADs are triggered by the release of stops and nasals. If the input cluster contains an AD, epenthesis occurs at the AD site, e.g., after the released stop or nasal. If there is no AD, prothesis occurs, e.g., before the unreleased nasal or liquid, or no epenthesis occurs, e.g., after the unreleased stop. I hypothesize that this is because the epenthetic vowel replacing the AD is a perceptually less salient change from the original cluster than epenthesis in a non-AD site.

To test the hypothesis, one production and two perception experiments were conducted. First, nonce words including 31 consonant clusters and their counterparts with epenthetic vowels were recorded from 6 Russian speakers. The recording notably showed inter- and intra-stimulus variation in the nasal-initial clusters; nasal-obstruent clusters rarely had audible release, i.e., no AD, while nasal-liquid clusters always involved audible vocalic release, i.e., AD. For nasal-nasal clusters, some were audibly released, i.e., AD, while others were not, i.e., no AD. There was little variation in other clusters. The stimuli for the perception experiments were chosen from these recordings, including released and unreleased stops and nasals in the cluster. 16 English speaker subjects participated in the ABX discrimination task, in which each target item containing a cluster was paired with a corresponding item with an epenthetic vowel (e.g., [kmat]-[kəmat]). With the same stimuli, a transcription task was also run, in which 13 English speakers heard the stimuli and transcribed them using English orthography. Results show that the discrimination was significantly ($p<.001$) worse in the AD trials ($d'=2.7$) than in the non-AD trials ($d'=3.4$), confirming the hypothesis. The results from the transcription task also show patterns similar to the typology. Errors included epenthesis 98% after a stop, 0% before a stop; 84% before a liquid [l], 8% after a liquid [l]; 96% after a released nasal, 0% before a released nasal; 38% after an unreleased nasal, and 47% before an unreleased nasal.

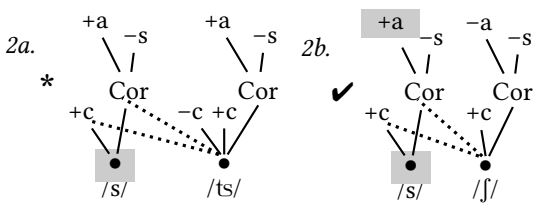
Deletion required, but not allowed: Piro consonant clusters, revisited

Eva Zimmermann (Leipzig University), Eva.Zimmermann@uni-leipzig.de

I propose an account of the consonant co-occurrence restrictions in Piro (Maipurean) that is based on standard assumption about feature geometry and OCP constraints inside parallel OT. Such an analysis avoids the problems identified by Lin (2005) for a parallel OT account of Piro and sheds light on the question of how to represent affricates in this language. **The problem:** Some sequences of adjacent obstruents are illicit in Piro (Matteson, 1965) and avoided through deletion of the first consonant (cf. (1): '+'=attested, '–'=impossible). This distribution of (un)attested obstruent clusters is interesting and challenging since it involves several apparent paradoxes arising from the question of how to represent affricates (Lin, 1993; Kenstowicz, 1994; Lin, 1997, 2005, 2011). For example, the distribution */t/+Affr vs. Affr+/t/ is an apparently clear edge-effect where affricates behave like ordered [–cont][+cont] sequences. If this hypothesis is adopted, however, the $OCP_{[cont]}$ constraint that rules out *F+F should also rule out attested /tx̌/+F. Apparently, 'one single affricate representation coupled with only one level of constraint evaluation seems impossible' (Lin, 2011, 385) and an analysis inside Lexical Phonology is presented in Lin (2005). The stop hypothesis for affricates (Rubach, 1985; Kim, 1997; Clements, 1999) is adopted and the affricates in Piro are represented as strident stops at the lexical level that become contour segments in the post-lexical phonology. Since the relevant OCP constraints are ranked differently in the lexical and post-lexical phonology, the apparent ambivalent nature of the affricates follows. For example, the constraint against adjacent fricatives $OCP_{[+cont]}$ is taken to be active at the lexical level but low-ranked at the post-lexical level. Since affricates are not specified for [+cont] until the post-lexical level, they are not subject to the constraint. **Analysis:** In contrast, I present an analysis for the (un)attested obstruent clusters that is implemented in standard parallel OT. I argue that the Piro affricates are complex segments with the ordered feature specification [–cont] and [+cont] (Sagey, 1986) and that the inconsistency problem Lin (2005) observes for affricates can nevertheless be avoided as soon as the perspective is reversed: all clusters of adjacent obstruents are penalized by high-ranked $OCP_{[-son]}$ and that by far not all of these clusters are repaired through deletion follows from high-ranked faithfulness constraints for features (e.g. $Max_{[pl]}$). Deletion of a segment is thus only possible if certain of its features can reassociate to a new phonetically visible host – a reassociation that is only possible if it does not result in an illicit feature specification (multiple redundant specifications, however, are tolerated). This, for example, rules out deletion of a segment followed by a segment with a different place specification: high-ranked $Max_{[pl]}$ and the impossibility of segments with different place features in Piro exclude this repair. Similarly, deletion of /s/ before /ʦ/ is impossible since [+cont] cannot reassociate without creating an illicit *[+cont,–cont] contour on the resulting segment (2a.). Deletion of /s/ before /ʃ/, on the other hand, is possible since preservation of [±ant] is only required by low ranked constraints and [Cor] and [+cont] can reassociate without creating an illicit feature specification (2b.). Rather than trying to capture the classes of segments where deletion is *required* in a certain context, the analysis poses restrictions on which segments are *allowed* to undergo deletion in which contexts. And reference to these contexts, I argue, is possible with standard faithfulness constraints on features.

1. Piro obstruent clusters (Lin, 2005, 126)

	p	k	t	ʦ	ʧ	tx̌	s	ʃ	ç
p	–	+	+	+	+	+	+	+	+
k	+	–	+	+	+	+	+	+	+
t	+	+	–	–	–	–	–	+	+
ʦ	+	+	+	–	–	–	–	–	+
ʧ	+	+	+	–	–	–	–	–	+
tx̌	+	+	+	–	–	–	+	+	+
s	+	+	+	+	+	+	–	–	–
ʃ	+	+	+	+	+	+	–	–	–
ç	+	+	+	+	+	+	–	–	–



('c'=[continuative], 's'=[strident], 'a'=[anterior])

Poster papers

The role of phonetic and social variables in the perception of /t/ - /t:^{h}/ boundary by Greek Cypriot listeners

Katarzyna Alexander
University of Nicosia
alexander.k@unic.ac.cy

Research carried out in the framework of exemplar theory has suggested that sound categories are built bottom-up and that the process of category creation involves the storing of phonetic and non-phonetic information in our memories. In line with this approach, perception of sound categories may be influenced by non-linguistic cues and by the type and amount of exposure a listener has had to those sound categories (Johnson 1997; Hay & Drager 2010; Hay, Nolan & Drager 2006; Hay, Warren & Drager 2006; Niedzielski 1999; Pierrehumbert 2001, 2003; Strand 1999).

This paper reports on the way the perception of the boundary between voiceless singleton (/t/) and geminate (/t:^{h}/) plosives by Greek Cypriot listeners tends to be affected by a set of phonetic and social variables. It was assumed that, since the two sounds tend receive different social evaluations, /t/ and /t:^{h}/ are likely to be carriers of different social meanings, and therefore their perception might be affected by both linguistic and non-linguistic variables.

The data collection for this study included (1) questionnaires establishing the study participants' (listeners') social background and level of affiliation with Greece and Cyprus, (2) production tests establishing the values of singleton and geminate alveolar plosives produced by the participants, and (3) a series of forced-choice perceptual tests. The perceptual tests were run in three conditions, (1) in the presence of the Greek flag (symbolising the Greek culture and/or region), (2) in the presence of the Cypriot flag (symbolising the Cypriot culture and/or region), and (3) in the absence of the two flags. The participants' socio-economic background and level of affiliation with Greece and Cyprus primarily served as indicators of the amount of exposure to /t/ and /t:^{h}/.

The data from the perceptual tests, production tests and questionnaires were analysed by means of logistic regression tests. The logistic regression tests indicated that the perception of the aforementioned sound boundary tends to be affected by phonetic and social variables. The results of the present study add evidence to the assumption of exemplar theory that the type and the amount of exposure to a category, and the indexical information to which a listener is exposed affect perception of sound categories.

Historical dynamics of Even vowel harmony systems

Natalia Aralova
Max Planck Institute for Evolutionary Anthropology & University of Amsterdam
natalia_aralova@eva.mpg.de

This paper will present data from two dialects of Even, an endangered Northern Tungusic language. The most striking phonological feature of Tungusic languages is vowel harmony. According to some scholars vowel harmony is already found in Proto-Altaic. It has been described in recent papers as based on tongue root position (Li 1996, Vaux 2009, Ko and Kang 2012). However, Even data collected during multiple field trips do not demonstrate sufficient acoustic evidence for an ATR/RTR opposition. Moreover, a follow-up perception study casts doubts not only on the nature of the opposition, but also on the very existence of the vowel opposition.

Two Even dialects are investigated: the westernmost one, spoken in Sebian-Küöl, and one of the Eastern dialects, that of the Bystraia district on Kamchatka. Standard Even, the dialect of Ola, was described by Novikova (1960) as having two vowel classes /ɪ a ɔ ʊ ɪa/ vs. /i e o u ie/ opposed by pharyngealization. This clear symmetric system has been habitually used by later authors in their generalizations about Altaic languages. Field data, however, show tendencies differing from this description in the dialects under examination and also variation between the dialects. A perception study of the data from Sebian-Küöl suggests a phonetic merger of the members of the pairs of high vowels. Thus, rather than exhibiting two pairs, /ɪ/ vs. /i/ and /ʊ/ vs. /u/, the phonological system seems to have only two vowels, /i/ and /u/. However, only the /i/-merger was confirmed acoustically. Harmonic variants of /u/ reveal some differences in F1 and spectral slope, which means that the merging process is still ongoing for /u/. According to Bulatova and Grenoble (1999), a similar change in the system of high vowels has occurred in Evenki, a language very closely related to Even. The same kind of merger is also observed cross-linguistically (Schane 2005, Akinlabi 2009).

The dialect of the Bystraia district shows quite a different picture. In the perception data, consonants hold the most important role in correct word recognition. For instance, words with high vowels and liquids are recognized considerably better than words containing high vowels and fricatives. Thus, the discrimination between /irri/ ‘being cooked’ and /ɪrrɪ/ ‘dragging’ was successful in more then 90% of cases, while the discrimination between /iʃʃi/ ‘tearing away’ and /ɪʃʃɪ/ ‘reaching’ was very poor (the distribution between correct and incorrect answers is close to random). From an acoustic point of view the high vowels differ consistently with respect to F1 (/i/ and /u/ are higher than /ɪ/ and /ʊ/, respectively), but apparently consonantal cues become more important for the correct perception. Some consonants which were considered to be most sensitive to the harmonic class were analyzed in detail. In the context of so-called [-ATR] vowels (labelled pharyngealized vowels in Novikova 1960), the trill sound has a lower F2, voiceless velar stops tend to be realized as uvular with a lot of fricative noise, and the lateral approximant has a very unstable F2. It might be the case that in Bystraia Even this pure allophonic distribution is triggering restructuring of the phonological system, as has happened in the Turkic language North-Western Karaim. Stachowski (2009:159) shows that in this language the opposition between palatalized and non-palatalized consonants is not just allophonic anymore, arguing that the consonants became the actual carriers of the harmony as the vowel system was restructured.

Thus, these two Even dialects show two different patterns of phonological change, both of which deviate considerably from the phonological system described earlier for the standard variety of the language.

Rebellious Roots – an analysis of External Vowel Harmony violation in Turkish

Begüm Avar, Boğaziçi University (avarbegum@gmail.com)

There is a general consensus (cf. Lewis 2001, Göksel & Kerslake 2005 among others) on the existence of external (suffix) harmony in Turkish (henceforth, EVH), a phonological process where suffix vowels agree with the last stem vowel in terms of frontness (high vowels also agree in rounding, but rounding harmony is irrelevant to the current analysis). However, certain roots seem to trigger disharmonic suffixation. The last stem vowel in such *rebellious roots* seems to be back, but any suffix attached is realized with a front vowel. Some examples are *saat* 'hour' > *saat-i* 'hour-Acc', *gol* 'goal' > *gol-ü* 'goal-Acc', *dikkat* 'care' > *dikkat-siz* 'care-less'. (The reverse situation never happens in Modern Turkish, i.e. no root with front vowels is followed by a suffix with back vowels.) This presentation aims to show that the behavior of such roots is predictable, once standard -and generally unquestioned- assumptions on the phonological system and especially on the vowel inventory of Turkish are abandoned.

In a Government Phonology (GP) analysis (Charette & Göksel 1996), Turkish suffixes are assumed to be of two kinds: those that are underlyingly empty ({ }_) and those that are underlyingly low, ({ }A). EVH is then explained by spreading of the I element (and also of U in the case of rounding harmony) from the stem onto the suffix vowel. However, in *rebellious roots*, an additional I element seems to emerge in the suffix vowel unexpectedly, i.e. not spreading from the preceding stem vowel. This seems to pose a problem for any theory that wishes phonological processes to be both non-arbitrary and exceptionless, such as GP.

Most accounts prior to GP (cf. Clements & Sezer, 1982; Kornfilt, 1997; Kabak, 2011 among others) have proposed that the exceptional behavior of *rebellious roots* is due to their final -palatalized- consonant, which surprisingly interacts with vowel harmony either by preventing it to spread, or by spreading their own frontness/backness features, or both. Within a GP framework, this would indicate that these consonants contain the I element, which spreads onto the following vowel. A detailed analysis of such roots, however, reveals that it is the vowels of such roots, which makes them rebels.

Turkish is traditionally assumed to have eight vowel phonemes, which was recently challenged by Pöchtrager (2010). The analyses of spectrograms of rebellious roots support this challenge. The last vowels in these roots are spelled as *a, o,* or *u* in the orthography, and are assumed to correspond to the set of back vowels in Turkish phonology, leaving *ı* aside. Sound analyses, however, prove this assumption wrong. Spectrograms of pairs like *kat* 'layer', which regularly receives back vowel suffixes, and the rebellious root *dikkat* 'care' show that the vowels in these words are different, while the final consonants are the same, hence refuting the main assumption forming the basis of previous analyses. Similar analyses with samples containing orthographic *o* (*kol-u* 'arm+Acc' vs. *gol-ü* 'goal+Acc') and *u* (*kul-u* 'servant+Acc' vs. *usul-ü* 'manner+Acc') show that Turkish has at least three more vowels than the standardly assumed eight, by including fronted versions of *a*, *o*, and *u*, which contain an I element yet are different from the truly front vowels *e*, *ö*, and *ü*. (The final *l* in *rebellious roots* is palatal, which regularly occurs in the environment of front vowels in Turkish.)

Charette & Göksel (1996) proposed the licensing constraints (LCs) active in Turkish to preclude certain combinations of elements: 1) Operators must be licensed. 2) A cannot license operators. 3) U must be head. Their analysis could account for the eight vowels in Turkish: *a, e, ı, i, o, ö, u* and *ü*. In order to allow three more, a modification of the LCs is required. It will be argued that this can be done by combining the last two LCs into one: A cannot license U. With this revision, a total number of eleven vowels can be accounted for in Turkish, which is the number necessary to render the rebellious roots as obedient to the rules of EVH.

In sum, the present analysis aims to show that there really are no exceptions to EVH in Turkish (except for a few non-alternating suffixes), which is a truly phonological process affecting only nuclear expressions without any intervention of the stem consonants.

A gradient substantive learning bias in phonology

Dinah Baer-Henney[1], Frank Kügler[1] & Ruben van de Vijver[2] // [1]University of Potsdam, [2]University of Düsseldorf // {dinah.baer-henney,kuegler}@uni-potsdam.de, Ruben.Vijver@uni-duesseldorf.de

There is a growing body of studies that argue for the necessity of implementing substance into theories of phonological acquisition. They show that an alternation that facilitates perception and/or production and is thus based in substance has a learning advantage over another alternation, which does not (Wilson, 2006; Cristià & Seidl 2008; van de Vijver & Baer-Henney 2012; Baer-Henney & van de Vijver, 2012; Finley, 2012). To date experimental investigations rely on the comparison of two alternations, whether real or artificial ones. They make a categorical distinction between alternations that are substantively based and others, which are not. However, if there is an influence of substance, which is based genuinely on the phonetic motivation of an alternation, we should be able to measure stepwise advantages in learning: Alternations might differ in to what extent they facilitate processing. They should be more or less preferred during acquisition. Consequently, substance can be understood as a gradient notion rather than a categorical one (Hayes & Steriade 2004). We decided to test the predictions of this proposition with the example of acquisition of a substantively based pattern, which involves several levels of difficulty: Intervocalic voicing (IVV) of stops. According to phonetics voicing of more front stops is easier in terms of articulation than voicing of more back stops (Westbury & Keating, 1986). Hence, we can deduce three levels of difficulty: Voicing of the labial stop means less effort than voicing of a coronal stop than voicing of a dorsal stop. We were interested in whether it makes a difference if one learns IVV of labials vs. coronals vs. dorsals. Moreover, Wilson (2006), who looked at the acquisition of a pattern with two levels of difficulty, observed an asymmetric generalization pattern across groups in the sense that a pattern is only generalized to less complicated contexts and not to more complicated ones. We were interested whether we would find such a generalization pattern, too.

We ran a poverty-of-the-stimulus experiment in which 53 German adult participants have been trained with an IVV pattern in an artificial language. Groups differed with respect to the place of articulation of the stop they were exposed to: One group was trained with IVV of labials, one was trained with IVV of coronals and one was trained with IVV of dorsals. In a subsequent lexical decision task participants were exposed to items of either place; the place that they had been trained with as well as the two places they have not been trained with. First, we looked at to whether groups applied the trained IVV to items of the trained kind. Indeed we find evidence that some learner groups have advantages over others and their data is in line with what a gradient nature of the substantive bias in learning alternations predicts: While learners of IVV of labials perform as good as learners of IVV of coronals on trained items, learners of IVV of dorsals turned out to have most difficulties. Second, we observe that neither alternation is generalized much. There is, however, a tendency such that the participant accepts IVV more in that one of the two untrained conditions that is the less complicated one according to phonetics. Labial IVV learners generalize more to coronal than to dorsal contexts, coronal IVV learners generalize more to labial than to dorsal contexts; only dorsal IVV learners generalize equally to labial and coronal contexts. In sum we do not only provide further evidence for substance as a role-playing factor during the acquisition of alternations but we also shed more light on the nature of this bias. Ease of articulation can result in such a bias, making it a gradient factor and not a categorical one: The more the alternation serves to facilitate production, the more easily it is to learn.

Licensing Catalan Laryngeal Neutralization by Cue

Anthony Brohan (brohan@mit.edu) - MIT

Catalan has a pattern of voicing neutralization which has been analyzed under a licensing-by-prosody framework as coda neutralization [4]. Word-internally and across word-boundaries, stops neutralize before nasals (*hipnosi* [bn]) and [tl] clusters are neutralized (*atleta* [dl]). [s] is neutralized before nasals (*esnob* [zn]) and before laterals (*legislar* [zl], *deslletar* [zʎ]. This pattern of neutralization is problematic under a basic licensing by cue approach [2], which holds that contrast follows from cue availability, and that all pre-sonorant cues are equal. Catalan licenses contrast before sonorants in tautosyllabic sequences (*a.kla* $\sim$ *a.gla*) , but not in heterosyllabic TR sequences (*ab.na*).

This paper elaborates on the licensing by cue approach for the licensing of stops contrast in Catalan. The pattern of neutralization is a result of stop voicing cues being impoverished when the release of a stop is obscured by a following sonorant. Acoustic inspection of Catalan neutralized TN sequences indicates that stops are nasally released. Furthermore, Catalan has an prevalent process of realizing TN and [tl] clusters as geminates (*ritme* [dm] $\sim$ [mm], *atleta* [dl] $\sim$ [ll]). I take this to be a reflex of more general coarticulatory constraint in Catalan. In Catalan TR clusters, velum lowering and C_2 gestures are timed earlier than in other languages, which provides for nasal releases of stops in non-geminated stop-nasal sequences.

To test the perceptibility of a stop voicing contrast is less perceptible with an obscured burst, a perceptual experiment (currently being piloted) was conducted to determine perceptibility stop-sonorant clusters with obscured and clear releases in Russian. In Russian, homorganic [tn] and [tl] are nasally and laterally released, heterorganic [kn] and [kl] have clear release. Aggregated d' measures from a 2AFC identification task in noise with 5 native Russian speakers show decreased discrimination of voicing in clusters with obscured releases.

Contrast	t $\sim$ d	tn $\sim$ dn	tl $\sim$ dl	kn $\sim$ gn	kl $\sim$ gl
d'	1.64	1.18	0.93	1.49	1.75

This approach holds Catalan neutralization as a product of a pervasive process of coarticulation masking release bursts, yielding a poorer environment for cue realization. Extensions of this proposal to sandhi voicing and behavior of TN clusters cross-linguistically will be discussed. The pattern of fricative neutralization is accounted for separately as a gemination contrast [3]. Data from West Flemish [2] suggests a separate licensing mechanism to account for fricative neutralization, as fricatives but not stops neutralize before sonorants across word boundaries (*dat men* [tm], 'that person', *zes noten* [zn] 'six nuts').

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[amˈburger] *vs.* [odˈdɔggə]: Word-final Vowel Epenthesis in Italian Loanword Adaptation

Olga Broniś, University of Warsaw
ola.bronis@gmail.com

Italian is known to disfavor consonant-final words (eg. Thornton 1996, Krämer 2009). Given this fact, the following questions arise: what happens to loanwords borrowed into Italian with an illegitimate consonant at the word end? Does Italian employ any repair strategies to accommodate such undesired structures? The present poster attempts to answer these questions by providing a phonological analysis of consonant-final foreign words adapted into Standard Italian spoken in Rome.

Data used in my analysis come from a field study conducted in Rome, 2012. 38 native speakers of Standard Italian participated in the fieldwork, all being long-time residents of Rome. After impressionistic and spectrographic analyses of the data, 452 tokens were selected for statistical and phonological analysis. Illustrative examples are provided below.

monosyllables		**oxytonic polysyllables**		**non-oxytonic polysyllables**			
cross	[ˈkrɔssə]	Cavour	[kaˈvurrə]	assist	[ˈasistə]	Diesel	[ˈdijezel]
Dior	[ˈdjɔrrə]	Chanel	[ʃaˈnɛllə]	converse	[ˈkɔnversə]	hamburger	[amˈburger]
fard	[ˈfardə]	hotdog	[odˈdɔggə]	McDonald	[mekˈdɔnaldə]	Mcdonald	[mekˈdɔːnal]
Gap	[ˈgappə]	Mexes	[mekˈsɛssə]	pressing	[ˈprɛssiŋgə]	Rubinstein	[ˈrubisten]
Lahm	[ˈlammə]	weekend	[wiˈkɛndə]	pudding	[ˈpaddiŋgə]	Lloris	[ˈlɔːris]

Based on the data, the following observations can be made. First, it looks like vowel epenthesis applies to mono- and polysyllabic tokens whose stem-final syllable is stressed. Notice that in the case of oxytonic tokens that end in a singleton, epenthesis co-occurs with the gemination of the originally word-final consonant. Second, epenthesis also applies to all examples that end in a cluster of consonants, irrespective of their stress pattern. Crucially, however, no vowel is inserted at the end of non-oxytonic polysyllables that end in a singleton, at least if the word-final segment is a sonorant. (The behavior of non-oxytonic loans that end in an obstruent calls for a closer scrutiny.)

The phonological analysis of oxytonic tokens is as follows. It appears that both vowel insertion and gemination are stress-related. As observed by Chierchia (1986), word-final stress is highly marked in Italian. Thus, a vowel is epenthesized word-finally, so that an additional word-final syllable can be erected. As a result, the oxytonic loan has no longer the marked ultimate stress pattern. Instead, stress falls on the default penultimate syllable.

In oxytones ending in a singleton, vowel epenthesis co-occurs with doubling of the word-final consonant. I argue that gemination applies after epenthesis in order to ensure that the stressed syllable is bimoraic. As observed by Vogel (1982), Italian stressed syllables must be heavy. Given this, words such as *Gap* are still not fit to enter the system of Italian after epenthesis has been employed, as the stressed syllable in [ˈga.pə] is light. Thus, in order to render the coda of the stressed syllable heavy, gemination applies, yielding [ˈgap.pə].

Close inspection of the data shows that the rationale outlined above does not account for all cases of vowel epenthesis illustrated in the table. What is unexpected is that an epenthetic vowel occurs at the end of some non-oxytonic tokens. Observe, however, that all non-oxytonic loans that surface with an epenthetic vowel end in a consonantal cluster. Based on this observation, I argue that Italian employs word-final vowel insertion not only to improve stress pattern of oxytonic loanwords, but also as a repair strategy to rescue extrasyllabic consonants. The extrasyllabicity is caused by the fact that Italian does not tolerate complex codas. Thus, only the leftmost consonant of the word-final cluster is parsed into the coda. The consonant at the word-edge is extrasyllabic and needs to be salvaged.

The generalizations outlined above are modeled with Optimality Theory (Prince and Smolensky 1993/2004, McCarthy and Prince 1993). In order to account for different patterns of vowel epenthesis in words such as [amˈburger] and [odˈdɔggə], I argue that oxytonic loans, like other Italian words with word-final stress, end in a catalectic constituent encoded in the underlying representation (eg.Burzio 1994, Van Oostendorp 1999).

Epenthesis and intrusive vowels in Lunigiana (Italy): geography, diachrony and phonologization.

Cavirani Edoardo – Università di Pisa & Universiteit Leiden – cavirani.edoardo@gmail.com

Both Carrarese (C) and Pontremolese (P) dialects belong to Lunigiana, an area which extends over the political and linguistic borders of Emilia, Liguria and Tuscany. This may explain the fan-like shape assumed by the bundle of isoglosses (the La Spezia-Rimini line) that splits the Romance speaking area in the two well-known main blocks, and hence the high rate of linguistic micro-variation characterizing this region. These two dialects have hence been chosen because they depict tiny differences in the phonetic and phonological sides of unstressed vowel reduction and vowel insertion.

As for the reduction process, both C and P regularly delete the word final vowel of paroxitones if the resulting consonant cluster doesn't violate the SSG (Blevins 1995) (CŎL(A)PHU(M) > C [kolp], P [kurp] 'stroke'). In proparoxitones, P speakers regularly delete the word-medial unstressed vowel, producing a word-final vocoid which differs from the epenthetic vowel in melody and length ([ᵊ]/[ə]/[ø]). Instead, C speakers produce forms where the unstressed vowels are either both present, only one is present, or both are absent, no matter whether or not the resulting cluster violates SSG (SILVĀTĬCU(M) > P [sɐr'vadgᵊ] vs. C [səl'vatᵊkᵊ]/[səl'vatək]/[səl'vatᵊk]/[səl'vatkᵊ]/[səl'vatk] 'wild'). Similarly, C tolerates paroxitones with a word-final SSG violating cluster, P resorting instead to a regular epenthetic process (LĬBRU(M) > C ['libər]/[libᵊr]/[librᵊ]/[libr] vs. P ['libɐr] 'book') which applies also in proparoxitones in the case the cluster created by syncope and apocope would otherwise show an increasing sonority contour (LĪBĔRU(M) > P ['libɐr] 'free'). A significant difference can thus be found also in the melodic content of the inserted vocoid: on the one hand, P, depending on the featural content of the consonants, inserts either a non-etymological low or a back vowel (MĂCRU(M) > ['magɐr] 'thin' vs. ĂSĬNU(M) > ['asʊŋ] 'donkey'). On the other hand, the vocoid that can sometime be inserted in C shows the same formant structure of a schwa, namely the typologically less marked vowel (Oostendorp 1995; Backley 2011). Interestingly, the vowels epenthesised by P speakers belong to the phonological system of the dialect, whereas the schwa-like vocoids of C do not occur in its phonological inventory. Another difference concerns the phonological contexts triggering vowel insertion. P speakers make no difference between the pre-consonantal and the pre-pausal phrasal contexts: if the word-final cluster violates SSG, they epenthesise the vowel in both the cases. C speakers show instead a preference for the pre-consonantal context: the SSG-violating clusters are more frequently 'repaired' when the relevant word precedes a consonant-initial word than when it is followed by a pause.

These data are accounted for with reference to the model proposed by Bermùdez-Otero (2014), where the typology and the trajectory of the phonological change are explained by the modular feedforward architecture of the grammar. Indeed, the two different patterns of vowel insertion under concern are here assumed to be two different and consecutive steps along the same phonological process: the phonologization/stabilization of a schwa-like vowel release. Indeed, the vowel insertion occurring in C, showing the characteristics of an 'intrusive vowel', displays a more 'phonetic' behavior with respect to the more 'phonological' process of P, where the inserted vowel shows instead the characteristics of an 'epenthetic vowel' (Hall 2006, 2011).

No host, no problem: Romanian clitics can form independent Prosodic Words

Anca Chereches, Cornell University, ac872@cornell.edu

As in other Romance languages, pronominals in Romanian are unstressed morphemes that usually precede the verb (1), but follow imperatives and non-finite forms (2). Pronominals have a variety of surface realizations, with vowel alternations that fall out naturally from the interaction of independently motivated phonological constraints applying at the level of the Prosodic Word. This allows us to recognize that pronominals are parsed prosodically in two different ways: as enclitics when post-verbal (**(Vb Pro)$_{PWd}$**) and as independent words when pre-verbal (**(Pro)$_{PWd}$ (Vb)$_{PWd}$**). I argue that Romanian pronominals are highly selective with respect to their host: if the verb is available, they encliticize to it; if it is not, they can form independent PWds and even act as hosts to other enclitics: tense and aspect auxiliaries (3-4).

1) *îmi*	*dați*	2) *dați*	*-mi*!	3) *îmi*	*vei*	*da*	4) *mi-*	*ai*	*dat*
(ɨm^{j})$_{PWd}$	(dat͡s^{j})$_{PW}$	(dat͡si	m^{j})$_{PWd}$	((ɨm^{j})$_{PWd}$	vej)$_{PWd}$	(da)$_{PWd}$	(mj	aj)$_{PWd}$	(dat)$_{PWd}$
me.DAT	give	give	-me.DAT	me.DAT	FUT	give	me.DAT	PAST	given
'you give me'		'give me!'		'you will give me'			'you gave me'		

Romanian PWds are subject to three general phonological constraints which will allow us to determine how pronominals prosodify: **A**. PWd-final high vowels such as the plural suffix /i/ are reduced to a glide ([boj] 'oxen') or to a palatalization gesture ([pom^{j}] 'trees'). **B**. PWds must contain at least one full syllable, hence at least one vowel. **C**. PWd-internal hiatus is resolved by deleting or reducing the first vowel (e.g. the feminine marker /ʌ/, seen in [fatʌ] 'girl', deletes when the definite article /a/ is added: /fatʌa/ > [fata] 'the girl').

In (1-2), we observe the 1SG.DAT pronominal /mi/, which surfaces as [ɨm^{j}] pre-verbally (1). Note that the high vowel reduces, so it must be PWd-final (A). An epenthetic vowel is then introduced, suggesting that the pronominal needed a syllabic nucleus to become a licit PWd (B). Taken together, these data suggest that pre-verbal /mi/ forms an independent PWd: **(Pro)$_{PWd}$ (Vb)$_{PWd}$**. However, post-verbal /mi/ (in 2) surfaces as [m^{j}] and is prosodified with the verb. The lack of [ɨ] epenthesis suggests the pronominal is not a PWd, but a clitic, specifically an internal one (**(Vb Pro)$_{PWd}$**), not an affixal one (***((Vb)$_{PWd}$ Pro)$_{PWd}$**), because the verb-final high vowel does not reduce. Thus, pronominals are internal clitics post-verbally and PWds pre-verbally.

Interestingly, pre-verbal pronominals can be phonological hosts to auxiliaries (3-4). We know that they still form independent PWds because the pronominal forms (1) and (3) are identical. But pronominals must also share a PWd with the auxiliary, because hiatus is always resolved between them (C). Thus, the vowel of /mi/ in (4) is reduced to a glide, yielding [mj], which resyllabifies as onset to /ai/ (4). The only prosodic structure that allows pronominals to be independent PWds, but still share a PWd with auxiliaries is **((Pro)$_{PWd}$ Aux)$_{PWd}$**: a recursive PWd, with the auxiliary as an affixal clitic on a pronominal host (contra Monachesi 2005:162).

To conclude, we have established that Romanian pronominals want to encliticize to a verb. If they find no such host to their left, they are simply promoted to full Prosodic Words, in which case they can even act as phonological hosts to other clitics. We have seen that pronominals submit to the same phonological constraints as lexical words (see also Bermúdez-Otero & Payne 2011). Finally, this analysis highlights three different options for prosodifying function words in Romanian, raising questions about whether a single set of ranked constraints can capture this behavior, or whether we need lexical prosodic pre-specification (Inkelas 1989).

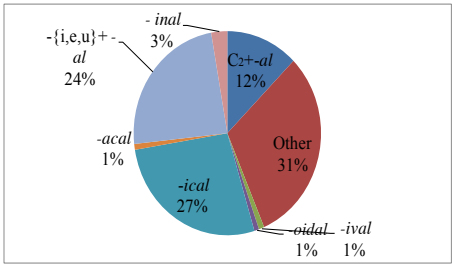
English Stress and Suffixes: Class I or Class II?

The Case of the Adjectival Suffix *-al*

Quentin Dabouis

In most of the literature on lexical stress, the adjectival suffix *-al* (≠ the nominal suffix in *arrival*) can be found among the lists of Class I suffixes, also called strong suffixes (Guierre, 1979) as opposed to Class II suffixes ("stress-neutral" in Guierre's terminology), and this has been the case from the beginnings of generative phonology up to now (Chomsky & Halle, 1968; Selkirk, 1980; Kiparsky, 1982; Burzio, 1994; Bermúdez-Otero, 2012). Previous studies (Trevian, 2003; Fournier, 2010) seem to show that the situation is somehow more complex than what is usually assumed. Empirical investigations have sometimes proven wrong traditionally accepted rules, as was the case of Descloux et al. (2010) which showed that English dissyllabic verbs were stressed on their second syllable only in about 53% of cases and that only prefixed units in that inventory were massively late stressed (93%).Therefore, only an empirical investigation through a large corpus study can shed some light on the behaviour of this suffix. This study offers to question the status of *-al* as a strong suffix and, in doing so, to revisit two issues which are central for the study of lexical stress in English: the definition of a strong suffix and the methodology to be adopted in order to determine if a given suffix is strong or not.

In order to address these questions, I will follow the approach first introduced by Guierre (1979) and will confront two definitions of strong endings proposed by Trevian (2003) and J.-M. Fournier (1998), and will propose a reformulation which takes into account what takes place leftwards of primary stress in the embedding word (Collie, 2007; Fournier, 1994; Selkirk, 1980).The methodology adopted is the one described by J.-M. Fournier (1998), and consists in studying cases for which the adding of a strong suffix would entail a different phonological behaviour than that of a stress-neutral suffix. Such cases are called "relevant cases" and the phonological behaviours observed can be stress shifts (e.g. *ˈorigin* → *oˈriginal*), vowel shifts (e.g. *ˈcrime* [aɪ] → *ˈcriminal* [ɪ]), or no shifts (e.g. *ˈspirit* → *ˈspiritual; proˈcedure* [iː] → *proˈcedural* [iː]). On the other hand, non-relevant cases are cases for which it would not make any difference whether the added suffix is strong or stress-neutral (e.g. *plaˈcenta* → *plaˈcental*; *eˈlector* → *eˈlectoral*). The analysis also takes into account variation (e.g. *ˈepoch* [iː] → *ˈepochal* [e] ~ [iː]). This methodology will be applied to a corpus of 1076 adjectives in *-al*, with data extracted from three pronouncing dictionaries, EPD, LPD and Macquarie, which are concerned with three varieties of English. The steps adopted for the constitution of this corpus will be developed in the presentation.



The analysis of this corpus reveals that *-al* seems to function in "micro-paradigms" (Girard, 2007) with very regular behaviours, such as -C_2+*-al*, complex suffixes *-ival* or *-inal* or the particular case of learned compounds, which present a different behaviour according to the nature of the second element of the compound, a behaviour similar to the one observed in words suffixed with *-ous* (P. Fournier, 2011). Some of these paradigms are larger than the corpus studied here, and it is impossible to say if we have a "conspiracy" of rules or constraints producing the same results or simply the application of a more general rule/constraint independently of *-al*. However, outside of these structures, there are very few relevant cases for analysis, and these relevant cases do not allow us to classify this suffix as strong or stress-neutral.

Vowel raising of the pretonic mid-vowels in Brazilian São Paulo Portuguese: a case of vowel harmony

Márcia Cristina do Carmo
UCL (University College London) & UNESP (Universidade Estadual Paulista)
marcia.carmo@ucl.ac.uk

This paper (CAPES 10895-13-2 & FAPESP 2009/09133-8) analyses the variable phonological behaviour of the pretonic mid-vowels /e/ and /o/ in nouns and verbs in a variety of Brazilian Portuguese (BP) spoken in São Paulo state. These vowels are subject to the phenomenon named *vowel raising*, through which the mid-vowels /e/ and /o/ are pronounced, respectively, as the high vowels [i] and [u], for instance, *p[i]queno* ('small') and *c[u]sturando* ('sewing').

Two processes can result in the application of vowel raising: (i) *vowel harmony* (Câmara Jr., 2007 [1970]; Bisol, 1981), through which a high vowel in the subsequent syllable triggers the phenomenon, for example, *an[i]mia* ('anemia') and *gas[u]lina* ('gasoline'); and (ii) *vowel reduction* (Abaurre-Gnerre, 1981), generally related to the influence of the place of articulation of the adjacent consonant(s), as in *[si'ɲɔ]ra* ('lady') and *[kume]çamos* ('we start/started'). In this research, nouns and verbs are investigated separately, based on the works by Harris (1974), Quicoli (1990), Wetzels (1992) and Lee (1995), among others, which demonstrate differences between lexical categories with respect to other phonological phenomena in BP.

The corpus of our study consists of spontaneous speech samples of thirty-eight interviews taken from the IBORUNA database, a result of the ALIP Project (IBILCE/UNESP – FAPESP 03/08058-6), available at <http://www.iboruna.ibilce.unesp.br>. This work follows the Theory of Linguistic Variation and Change (Labov, 1991 [1972]) and utilises the statistical package Goldvarb X.

The quantitative analysis of the data indicates that the vowel raising of the pretonic mid-vowels of both nouns and verbs is not influenced by social factors, since the variables *sex/gender*, *age-group* and *level of education* were not selected by the statistical package as relevant to the application of the phenomenon.

The results highlight the importance of *vowel harmony* to the application of vowel raising, as indicated by the selection of the *height of the vowel in the subsequent syllable* as the most relevant variable for the vowel raising of both /e/ and /o/, regardless of grammatical class. This result contests the claim of Silveira (2008) that the vowel raising in nouns in the variety of São Paulo state results primarily of vowel reduction, with the influence of adjacent consonant(s). Moreover, it evinces that morphological information is not substantially relevant concerning the application of the phenomenon.

Consequently, we argue that the vowel raising of the pretonic mid-vowels in both nouns and verbs in the dialect of São Paulo state is generally a case of vowel harmony, which acts as follows: a vowel /i/ in the subsequent syllable triggers the vowel raising of /e/ and /o/, whereas /u/ triggers the vowel raising of solely /o/. This difference between /i/ and /u/ triggering vowel raising can be explained by the highest position of the tongue in the oral cavity during the realization of /i/, as elucidated by Bisol (1981).

Given this actuation of vowel harmony and the absence of *vowel lowering* – a phenomenon through which the pretonic high-mid vowels /e/ and /o/ are pronounced, respectively, as the low-mid vowels [ɛ] and [ɔ], for instance, *p[ɛ]r[ɛ]reca* ('frog') and *c[ɔ]lega* ('mate'), which can be found especially in the North and Northeast of Brazil –, the variety of São Paulo can be grouped within the dialects spoken in southern Brazil (Bisol, 1981). Therefore, this research contributes to the vowel mapping of BP as part of a larger project, named PROBRAVO – coordinated by Professors Seung-Hwa Lee (FALE/UFMG) and Marco Antônio de Oliveira (PUC/MG) –, which aims to describe the phonetic realizations of vowels in different varieties of BP.

Measuring phonological distance

Elizabeth Eden, University College London (UCL)
elizabeth.eden.11@ucl.ac.uk

Similarity of phonological structure may be a factor in any interaction between two languages, whether historically or for an individual learner. Without a numerical measure of phonological similarity, this factor cannot be examined, even to be discounted in studies of other factors. A metric of phonological distance is needed to answer questions such as: Is an L2 phonological system more rapidly acquired if the system is more similar to the L1 system? What are the relative rates of borrowing in phonological and syntactic systems? Works including Ringe et al (2002, 2005) and Heggarty, McMahon and McMahon (2005) quantify the comparative method. However, this is mostly applicable to comparisons of specific language groupings and their history, rather than synchronic systems.

I examine 3 approaches to measuring similarity: edit distance, correlation and cross-entropy, and apply them to different types of phonological systems and data.

Firstly, I look at edit distance, specifically Hamming Distance. Following Longobardi and Guardiano (2009), I look at the suitability of comparing binary parametric systems using Hamming Distance. I consider the minimum number of parameters needed, and how to compare systems with privative or tertiary parameters. Applying this to the domain of stress (Dresher 1990), I find that stress systems are insufficiently complicated to provide new historical insights via this metric, since they are fully describable with fewer than the minimum number of parameters.

Secondly, I look at the correlation of ranked items. I look at the suitability of comparing constraint-based systems using the Pearson correlation, Spearman correlation and Kendall Tau. Again, I consider the minimum number of constraints needed for a meaningful comparison, and how to handle tied or unranked constraints. I apply the method to phonotactic constraints generated by Hayes and Wilson's phonotactic learner (2008) for 2 Bantu languages (Shona and Chewa) and 8 Indo-European languages (Dutch, English, French, German, Greek, Italian, Portuguese and Spanish). The quantitative correlation resembles the surface similarities of the phonotactics, rather than phylogenetic similarity. Applying this metric to a similarly detailed system of constraints in another phonological domain may have probative historical value. As applied to phonotactic constraints, this metric provides a quantification of intuitive judgements of similarity, allowing comparison of similarities and therefore comparison of acquisition studies which use different language pairs.

Thirdly, I look at cross-entropy. Following Juola (1998), I use match distance as an estimate of the entropy of a system. I look at the suitability of comparing bodies of transcribed data, such as phonological segments, feature bundles, and stress, and the availability of such data. Cross-entropy can be used to compare both phonetic data and, through annotation, underlying structure. A metric based on this approach can therefore be used in comparisons of the effects of surface and underlying linguistic features on L2 learners and language contact.

My preliminary investigations indicate that a metric based on phonological structure may have less probative historical value than one based on syntactic structure. However, such metrics can be used to compare parameter-based and constraint-based synchronic phonological systems in a quantitative fashion.

Stress as a templatic unit: an evidence from Livonian

Enguehard, Guillaume (Paris 7, LLF)

0. Livonian (Finnic, Latvia) shows a regular consonant gradation after the stressed syllable: **i.** the *Strong grade* shows more consonantal material (ex : sṷ**ʾgg**ə) ; **ii.** the *weak grade* shows less consonantal material (ex : s**u**guud). The strong grade involves two phonetic phenomena: glottalization+lengthening in (1a) (henceforth *stød*) and overlengthening in (1b).

(1) *Strong grades appear in grey cells ; the stressed nucleus is underlined*

a.	*relative*	*fish*	b.	*to swear*	*to kill*
NomPl	s**u**guu-d	k**a**laa-d	1/3SgPres	vɔ:**n**ə-b	t**a**ppaa-b
PartSg	sṷʾ**gg**ə	k**a**ʾ**ll**ə	Infinitive	v**a**n:**n**ə	t**a**p:**p**ə

I argue that stød and overlength are in complementary distribution and result from a unique phenomenon: stress. I join the CVCV framework (Lowenstamm, 1996). Following Larsen (1998), stress is represented as a [CV] unit.

1. Stød alternates with single onsets only (2a). Overlength alternates with: obstruent geminates (2b) or single sonorant onsets (2c). I argue that these single sonorants are underlying geminates patterning as in (2b) (i.e. /p**a**l**l**aab/ : /p**a**l:**l**ə/). They are etymologically coda consonants (compare with the finnish *palvon*), and they are always preceded by a branching nucleus, as coda sonorants do (e.g. a:ndab *I/he gives*).

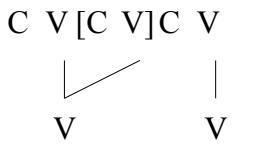
(2)	*Weak grade*	*Strong grade*	*Exemples*	*applies to...*
a.	C	ʾCC	k**a**laad : k**a**ʾ**ll**ə	obstruants, sonorants
b.	CC	C:C	t**a**p**p**aab : t**a**p:**p**ə	obstruants
c.	C	C:C	pɔɔ**l**ab *I pray* : p**a**l:**l**ə *to pray*	sonorants

2. I turn now to the representation of stress. Note that only the post-stress consonants undergo a lengthening. Consequently, I assume that the additional [CV] space involved in strong grade forms is inserted by stress. **Hence the question:** why is the stress [CV] involved only in strong grade forms ? I argue that it involved in weak grade forms too. Indeed, the overall length of the word template remains stable: **i.** If both the first and the second nuclei are not branching, we have a strong grade form (3a) ; **ii.** If one of the nuclei is branching, we have a weak grade form (3b-c) (Viisto, 2007).

(3)a. *Strong grade*

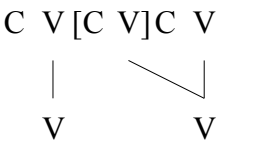
ex : l**u**ʾggə Inf « to read »

b. *Weak grade*



ex : p**uu**gə Inf « to blow »

c. *Weak grade*



ex : k**a**laa NomSg « fish »

3. Since this [CV] site is a constant and it is not linked to an own segment, it follows that it is a prosodic or/and a morphological unit. In conclusion, the Livonian consonant gradation results from a templatic condition on the realization of stress: the latter is determined by the length of the vocalic segments.

Patterns of epenthesis in Tripolitanean Libyan Arabic stop sequences

Aimen Ghummed, Raouf Shitaw, Leendert Plug, Barry Heselwood
University of Leeds

In this paper we look at the occurrence between stops of what we term 'interconsonantal intervals' (ICIs) in lingual stop sequences within words and across a word boundary.

Tripolitanean Libyan Arabic (TLA), spoken in Tripoli, the capital city of Libya, allows clusters of two stop consonants in syllable onsets and syllable codas. Examples such as /gtal/ 'he killed' and /fatg/ 'hernia' show that stops in a TLA cluster do not have to agree in voicing. Across word boundaries, TLA phonotactics allow up to a sequence of four stops – two in a coda followed by two in an onset. We thus have the possibilities of /–C#C–/ (e.g. /dag#tal/ 'hammer a wire'), /–CC#C–/ (e.g. /fatg#ta:ni/ 'another hernia'), /–C#CC–/ (e.g. /fat#gtal/ 'kill while passing') and /–CC#CC–/ (e.g. /fatg#tgawa/ 'hernia deteriorated').

The duration and voicing of ICIs is dependent not only on the number of Cs but also on their voicing, whether coronal follows dorsal or *vice versa*, and on speech rate. Our electropalatographic and acoustic data reveal two distinct types of ICIs distinguished by duration and by the effect that speech rate has on them. These types can be classed as optional non-vowel releases, or excrescent vowels, and obligatory epenthetic vowels of the kind discussed by Hall (2011). In our data, non-vowel releases vary between 0ms (release masked by following C attaining target closure) and c.20ms (occasionally reaching 30ms), the longer ones exhibiting anticipatory voicing; they often reduce to 0ms in fast speech (i.e. they disappear). Epenthetic vowels vary in duration between c.45-70ms at normal speech rate, and may be devoiced in fast speech between voiceless stops; they remain evident in fast speech but shorten by c.12ms. ICIs are more frequent, and of longer duration, in dorsal-coronal sequences than in coronal-dorsal sequences.

Excrescent vowels we interpret as evidence for variability in the closeness of the gestural co-ordination of the stops, and epenthetic vowels as evidence for their much greater gestural separation (Gafos 2002). We will also report on the vowel qualities exhibited by the epenthetic vowels as determined by auditory and acoustic analysis.

The distribution of ICI types in these sequences appears to be affected by the number of stop consonants and the location of the word boundary. Epenthetic vowels occur in all sequences of three and four stops, thus creating an extra surface syllable, but they do not occur in the /–C#C–/ context. In /–C#CC–/ and /–CC#CC–/ contexts they always occur at the word boundary. Excrescent vowels occur variably wherever epenthetic vowels do not occur.

Of particular interest is the phenomenon of 'coda capture' which we observe in all our /–CC#C–/ sequences. Consistent with the classification of TLA as a 'VC dialect' of Arabic (Watson 2007: 337, see also Kiparsky 2003), we find here an epenthetic vowel in the coda /–CC#/ such that the final C forms a cluster with the following onset C, resulting in [VCvCCV], reminiscent of Pulgram's (1970) 'maximise onsets' dictum. The coda capture analysis receives further confirmation from C-Centre measurements showing that the underlined Cs in /–C<u>C#C</u>–/ behave like a true /CC–/ onset in relation to the anchor-point at the end of the following vowel.

Icelandic Aspiration – Analysis of Two Dialects

Linda Heimisdóttir, Cornell University, loh5@cornell.edu

There are two main dialects of Icelandic (referred to here as SD and ND) which differ with respect to aspiration of stop consonants (see table; star-marked entries (*) differ between SD and ND). From a phonological standpoint, the two dialects are interesting because they neutralize 'fortis' stops in opposite directions in postvocalic pre-sonorant positions, SD to plain stops, ND to postaspirated stops. In this paper I discuss the phonological status of aspiration in the two dialects and show how the difference in patterns can be explained by different rankings of constraints on linearity and faithfulness to underlying aspiration.

Type of stop and environment	Word	Surface form SD	Surface form ND	Meaning
(a) Word-initial aspirated stop	*tala*	t^{h}aa.la	t^{h}aa.la	'to speak'
(b) Intervocalic aspirated stop*	*rata*	raa.ta	raa.t^{h}a	'know the way'
(c) Intervocalic stop (loanwords)	*radar*	raa.tar	raa.tar	'radar'
(d) Aspirated geminate stop	*lappa*	lah.pa	lah.pa	'leg' GenPl
(e) Cluster of heterorganic aspirated stops	*vakta*	vax.ta	vax.ta	'keep watch'
(f) Aspirated stop + /l, n, m/	*vakna*	vah.kna	vah.kna	'awaken'
(g) Aspirated stop + /j, v, r/*	*akra*	aa.kra	aa.k^{h}ra	'field' GenPl
(h) Sonorant + aspirated stop*	*vanta*	van̥.ta	van.t^{h}a	'to lack'

In the standard (southern) dialect, SD, postaspirated stops can only appear in word-initial position (a). Word-internal stops are either plain (b, g), preaspirated, i.e. surface as a sequence of [h] + plain stop (d, f), or preceded by an aspirated consonant (e, h). This aspiration pattern is suggestive of early onset of laryngeal gestures relative to oral ones. This is supported by phonetic research which has shown that voiceless consonant clusters in SD share a single laryngeal gesture which usually ties to the first consonant. Furthermore, what mainly sets plain stops apart from postaspirated ones is the early timing of the peak glottal gesture (Löfqvist and Yoshioka, 1981; Kingston, 1990).

In ND, the northern dialect, postaspirated stops have a much larger distribution, appearing intervocalically (b) and pre- and postconsonantally (g, h) as well as word-initially. This pattern is surprising since, despite a general tendency for late onset of aspiration (b, h), ND still has both preaspirated stops (d) and clusters where the first sound, rather than the second one, is aspirated (e). Of further interest are loanwords, where word-internal stops are pronounced identically in the two dialects, lacking aspiration in both (c).

I attribute the distribution of aspiration in SD to constraints on syllable contact and faithfulness to underlying aspiration as well as a tendency for early onset of glottal gestures. The ND pattern is more complex due to the word-internal contrast between post- and preaspirated stops. I show that the crucial difference between the SD and ND patterns is the high ranking of Linearity in ND, preventing aspiration from shifting to a previous segment. This explains why forms where aspiration is underlying on *both* segments of the cluster (e) have identical surface representations in both dialects while forms where aspiration has to shift from the stop to a preceding consonant (h) differ. As for singleton stops, the ND pattern may be attributed to a higher ranked faithfulness constraint on aspiration in unstressed onset positions. Crucially, this analysis assumes that both dialects actually favor early onset of aspiration but due to phonological constraints this is not always achieved in ND surface structure. I argue that this assumption is supported by the identical (unaspirated) output structure of loanwords in both dialects. In sum, I show that both dialectal patterns of Icelandic can be derived from the same underlying structure and that the differences between ND and SD can be reduced to slight differences in the ranking of phonological constraints.

Phonetic and phonological aspects of pre-aspiration in Aberystwyth English

Michaela Hejná; University of Manchester; misprdlina@gmail.com

Research question. The analyses of word-medial and word-final voiceless plosives in Aberystwyth English indicate a fairly consistent presence of pre-aspiration. In this paper I argue that the observed pre-aspiration is a discrete entity that must be represented in the output of the phonology, rather than a gradient phonetic phenomenon. These observations present a challenge to the representation of laryngeal contrasts, especially since fortis and lenis plosives are cued by pre-aspiration as well as post-aspiration categorically in the variety, and to the representation of complex segments, as it has been suggested pre-aspiration often originates as a process of degemination (e.g. Clayton 2010).

Methodology. Analyses of 6 female speakers from Aberystwyth, whose native language is Welsh but who are also proficient in English, were analysed. Pre-aspiration was defined as a period of voiceless friction following a vowel and preceding a voiceless obstruent. Each respondent was analysed for 550-600 tokens presenting a combination of different vowels with /p/, /t/, /k/ to provide a wide range of conditions to test for. These tokens were monosyllables (word-final plosives) and disyllables (word-medial plosives) appearing in a carrier sentence as well as isolation.

Results. The durational values of pre-aspiration have shown bimodal distribution for all six respondents. One of the peaks in the distribution is realised by zero values of pre-aspiration (i.e. pre-aspiration is absent in the tokens), which strongly suggests there are two categories: pre-aspirated and un-pre-aspirated. A question arises as for what exactly conditions whether pre-aspiration is present or absent.

Assessing three possible factors shows that although pre-aspiration is categorical, it is not obligatory and invariant, but optional and variable.

The *place of articulation* of the plosive exhibits the two categories in the vast majority of cases for all the respondents. Where present, pre-aspiration is shortest before /p/, and the respondents show variation in whether /t/ or /k/ is accompanied by the longest durations. Where pre-aspiration is absent, this is most often before /p/.

Vowel length similarly shows presence of the two categories. Long vowels show significantly shorter periods of pre-aspiration only for two respondents, and it is not the case that absence of pre-aspiration would be more frequent after long vowels.

Finally, *vowel height* reflects the two categories within /ɪ/, /e/, and /æ/ for two speakers, while in one respondent this is the case for /ɪ/ and /e/, and for the remaining three respondents only for /ɪ/. Vowel height is a highly significant factor conditioning both presence and absence of pre-aspiration as well as its durations. Nevertheless, this is only the case for [+front] vowels.

Looking at the examples where pre-aspiration is absent shows that 78% (ABE14), 89% (ABE31); 96% (ABE12), 96% (ABE24); 87% (ABE33), and 63% (ABE37) can be explained by presence of /p/ and/or presence of /ɪ/.

Conclusion. I argue that pre-aspiration is a variable surface rule of the variety, which seems to be undergoing phonologisation at a variable rate.

Can release burst be responsible for epenthesis?

Mathilde HUTIN – mathilde_hutin@hotmail.fr
– Université Paris VIII Vincennes-Saint-Denis, UMR 7023 –

Typological observations teach us that the structure of the syllable follows a rigorous path: a language that has VC will obligatorily have both V and CVC, and a language that has at least one of those will obligatorily have CV, but a language that allows CV will not necessarily allow the other syllable types. When a language allowing only the unmarked type of syllable borrows a word from a language with more complex syllables, it may have to resort to **epenthesis**. The well-known case of Japanese is exemplary: the French word [prɛtaporte] will be adapted as [puretaporute], consonantal clusters being avoided.

On the other hand, the case of Korean loanword phonology is slightly more complex. Korean allows CV-, V-, VC- and CVC-syllables. While some environments regularly trigger epenthesis, other contexts are subject to variation. Thus, when a CVC-word is borrowed from English, it is adapted either as CVC *or* as CVC**ɨ** – the high central/back vowel [ɨ] being the epenthetic vowel in Korean:

English:	s	ɛ	t	ʌ	p		but:	n	ʌ	t				
Template:	C	V	C	V	C			C	V	C	V			
Korean:	s	ɛ	t	ʌ	p	< set-up >		n	ʌ	t^h	ɨ	< nut >		

This variation is problematic because it is **not strictly motivated** by Korean phonology, epenthesis being largely independent from the melodic content of the last V and C.

KANG's [2003] hypothesis is that one of the factors motivating epenthesis in Korean lies in the English input: if the word is more likely to end with a release burst in English, then Korean speakers will be more likely to insert a final epenthetic vowel. Likewise, KIM's [2008] work showed that there is a hierarchy of English obstruents according to their propensity to trigger a release burst, and one would easily notice that this hierarchy fits the hierarchy of obstruents triggering final vowel epenthesis in Korean.

On the basis of a 2000-items database, I would like to show that the release burst in the English input might indeed be responsible for final vowel epenthesis in Korean. The database comprises KANG's [2003] and BAKER's [2008] data based on the National Institute of the Korean Language's (NIKL) list of foreign words [NIKL, 1991], and original data including mostly English and American family names. These original data were collected online thanks to a script automatically searching for Korean Wikipedia pages.

The data was entered in a detailed Excel tab, specifying for each English item: 1) its phonetic transcription; 2) the nature of the vowel preceding the coda; 3) whether that vowel is lax or tense; 4) the point of articulation of the coda; 5) its laryngeal feature; and finally 6) the phonetic transcription of the Korean word and 7) the underlying representation postulated for Korean speakers. Since release burst, as such, is not phonemic, it is not specified in phonetic transcriptions: one has to calculate its probability through other phonetic characteristics of the word.

Thanks to this reliable tool, I was able to compute whether the phonetic correlates of release burst in English matched the presence of [ɨ] in Korean.

If the probability of release burst in English and that of final vowel epenthesis in Korean did correspond, this would bring a strong piece of evidence for the importance of the release burst in (loanword) phonology, while raising interesting problems involving the relationship between what is commonly called "fine-grained phonetic detail" and phonology. How can release burst be both a crucial factor in phonological perception, and subphonemic "detail"? How should it **be modelled in phonological theory?**

Are prosodic simplifications in L2 driven by L1-phonotactics? A comparative study of coda-productions of Spanish and Portuguese L1-speakers in German

Clara Huttenlauch[1], Muna Pohl[1], Tanja Rinker[1,2]
{clara.huttenlauch, muna.pohl, tanja.rinker}@uni-konstanz.de

[1]Department of Linguistics, University of Konstanz (Germany), [2]Zukunftskolleg, University of Konstanz (Germany)

The present study investigates the influence of the mother tongue (L1) on the realisation of codas in a foreign language (L2). Transfer seems to occur particularly on the segmental level, but it is also noticeable on suprasegmental levels, e.g., in the simplification of complex syllable structures. This phenomenon may be perceived as accent in the L2, however, not all simplifications can be explained by L1-transfer.

We analysed L2-productions of German complex codas by native speakers of Spanish and Portuguese. As these languages differ largely in their phonotactic restrictions, they serve as an interesting test case to explore whether the nature of reduced codas can be explained by L1-transfer. Spanish allows not more than two consonantal segments in the coda, the second one being always an /s/, whereas Portuguese codas are restricted to only one consonant. Beyond that, both languages dispose of strict constraints as to which consonants may occur in the coda, in Portuguese again less than in Spanish. In contrast, German is less restricted in terms of the nature and number of consonants it allows in this position. L1-Spanish (N = 19) and L1-Portuguese (N = 22) beginning adult learners of German read 13 German sentences with target words in final position. Targets consisted of verbal forms of the 2nd person singular present tense ending in /Nst/, e.g., *kannst* [kanst] 'can'-2sg, *kommst* [kɔmst] 'come'-2sg. Acoustic and auditory analyses of the recordings of 512 target words revealed coda-reduction in 99 cases (19.3%). The reduced forms were further analysed with regard to the specific type of reduction and the L1 of the speakers. Results show clear transfer effects with a preference for the omission of /-t/ for L1-Spanish speakers. L1-Portuguese speakers simplified codas either by epenthesis of an additional vowel or by deletion of the nasal, often accompanied by nasalisation of the preceding vowel (see fig. 1).

Moreover, differences could be observed within the group of Portuguese speakers. Brazilian speakers showed greater difficulty producing complex codas. This can be accounted for by the fact that the European variant reveals complex consonant clusters on the surface, whereas the Brazilian one is more restricted in this respect.

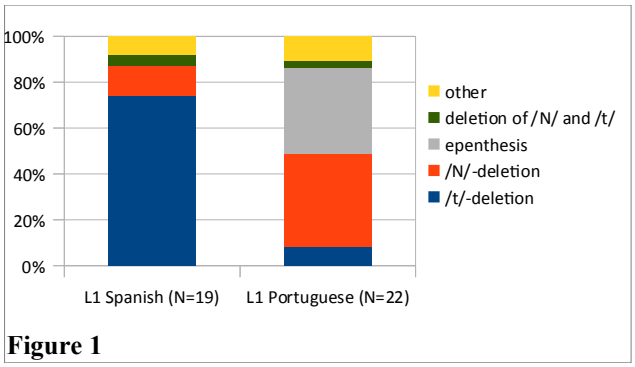


Figure 1

Further studies are planned to find out whether the comparatively small number of shortened codas (19.3%) is due to the fact that participants were just beginning to learn German. This would be in line with Abrahamsson (2003), who predicted relatively good performance in early stages of L2-learning when speakers focus more on form than on content.

“I hope you are all find”: pre-pausal and phrase-internal post-coronal [t] and [s] epenthesis in a variety of L2 Nigerian English.

Dmitry Idiatov
CNRS – LLACAN
idiatov@vjf.cnrs.fr

L2 speakers of Nigerian English in parts of northeastern Nigeria occasionally insert a coronal stop [t] or fricative [s] following another coronal pre-pausally and phrase-internally. The paper discusses this typologically unusual phenomenon for the L2 Nigerian English of speakers whose L1 is the Adamawa language Bena (ISO 639-3: yun). At least the [t] epenthesis is not restricted to Bena L1 speakers, but the exact areal distribution of this phenomenon is not known for the moment.

The [t] and [s] epenthesis occurs in Bena English in the following environments. A [t] is inserted after pre-pausal (especially, utterance-final) coronal continuants [n], [l] and [s]. A [s] is inserted pre-pausally (especially, utterance-finally) after a coronal stop [t] and phrase-internally after coronal continuants [n] and [l]. The insertion is not obligatory and speakers vary in its frequency. I do not yet fully understand the driving forces behind the phrase-internal [s] epenthesis, but the pre-pausal insertion of [t] and [s] arguably results from an imperfect approximation in Bena English of the durational properties and release of pre-pausal coronal obstruents of more standard varieties of Nigerian English. The following phonetic properties of Bena as L1 normally absent from Nigerian English appear to contribute to the observed outcome in particular. First, in Bena, pre-pausal obstruents are voiceless, and being followed by a glottal closure, they normally lack an audible release. In fact, pre-pausal glottalization is a more general feature of Bena prosody and is not restricted to obstruents. The glottal closure tends to have an audible release in the case of utterance-final pauses but may lack it with other types of pauses. Second, at least the pre-pausal continuant obstruents in Bena are normally also lengthened, which implies a sustained articulatory effort in their realization. Thus, if we take the case of the pre-pausal [t] insertion as an example, the following scenario for its appearance may be proposed. The Bena pre-pausal glottal closure is transferred into Bena English. However, in accordance with the overall shorter durations of pre-pausal obstruents in Nigerian English, it is released much too quickly, while the oral articulation of the preceding continuant coronal obstruent is still largely sustained. This may occasionally result in a percept of a released [t], which can later become phonologized.

The Problem of Nasal Consonant Epenthesis

Hayeon Jang (Seoul National University, optimal.hayeon@gmail.com)

(1) English *passe**n**ger* < *passager* "passer-by" (14CE) < OF *passagier* "traveler, passer-by"
Bozal Spanish *Jesu**n**cristo* < *Jesucristo* "Jesus Christ"
Korean Kyeongsang dialect *pwu**n**chwu* < *pwuchwu* "chives"

Optimality theory (Prince & Smolensky 2004) takes advantage of constraint interaction to account for the phonological process. Since the interaction between ONSET and DEP-IO is involved in consonant epenthesis, the only legitimate epenthetic site is onset, and since the language-universal consonant markedness ranking is in effect, cross-linguistically the most frequent epenthetic consonants /t/ and /ʔ/ can be interpreted as the most optimal epenthetic sounds. Nasal consonant epenthesis in (1), therefore, is problematic both in its epenthetic sound (nasal) and in its epenthetic site (coda). Furthermore, the result of nasal consonant epenthesis, i.e., [nasal+voiceless stop] sequences violates the language-universal markedness constraint *NC (Pater 2004).

Several alternative explanations have been proposed to widen the range of explanation. For example, to explain the stem-final epenthesis, Blevins (2008) redefined the legitimate epenthesis site as the edge of prosodic words, or Vennemann (1972) and McCarthy (1993) appeals to the hypercorrection based on rule inversion. These efforts, however, is orthogonal to the problem posed by nasal consonant epenthesis since it is a word-medial epenthesis and there is no historical trace to assume a rule for the change.

In this paper, through the survey of 36 languages, I argue that nasal consonant epenthesis is a specific aspect of perceptually-motivated nasality epenthesis. The most representative characteristics of nasal consonant epenthesis is that there is no existing adjacent nasal segments which generally trigger nasal assimilation through feature spreading, and in most cases an epenthetic nasal occurs before an obstruent. This is because nasal consonant epenthesis is made by the mechanism of spontaneous nasalization (Matisoff 1975; Ohala 1983), in which subsidiary resonance created in the articulatory process of pressure-sensitive obstruents, and listeners re-analyze the resonance as nasality.

Perceptually-emergent nasality has three possible realization patterns; vowel nasalization, nasal substitution, and nasal consonant epenthesis at coda position. The results of the 36 languages' survey show implicational relationship between the types of trigger obstruents and the nasality realization patterns: nasality induced by obstruent stops shows high tendency of realization as nasal consonant epenthesis as in (1), but nasality induced by gutturals (in Semitic sense, including pharyngeal and laryngeal) tends to replace the triggers as in (2).

(2) Ennemor and Endegeny /ʔaf/ > /**ã**fw/ 'bird'
Iraqi Arabic /ʔaʕtˤa/ > /ʔa**n**tˤa/ 'he gave'

The realization pattern of nasality is determined by perceptual interaction of nasality between surrounding phonetic environments. The perceptual strength of emergent nasality becomes salient when it co-occurs with elements having high nasal compatibility on the Nasal Compatibility Hierarchy (Walker 1998). Vowels are the most optimal position in which emergent nasality is realized because of the highest nasal compatibility of vowels. Then, why does nasality emerged by stops with low nasal compatibility become an independent consonant, instead of nasalizing an adjacent vowel? This is due to the perceptual place assimilation induced by the weak internal cue to place of nasals (Jun 2004). Emergent nasality which assimilates in place to adjacent stops is perceived by listeners as a consonant having its own place feature. On the other hand, the case of nasal substitution of gutturals could be explained by no place feature for gutturals in feature theory such as Sagey's (1986).

On the representation of empty codas: evidence from Selayarese

Paul John, Université du Québec à Montréal, email: john.paul@uqam.ca

Based on Selayarese, I propose a distinction between two types of empty coda, in addition to a partially empty coda specified only for nasality. The possibilities for coda Cs in Selayarese are limited to: i) geminates [CC]; ii) glottal stops [ʔC]; and iii) homorganic nasals [NC].

All three types of coda consonant are instantiated in *initial position* where, as with sC-clusters (Kaye 1992), the coda is licensed by a preceding empty onset (Piggott 2003): [ppallui]/[mma:ri]; [ʔba:lasa]/[ʔma:ru]; [mbannaŋ]/[ŋha:u]. All three also appear in *medial position*: [ʔahhattui]/[tallu]; [laʔba]/[seʔla]; [lumpa]/[kanre]. In *final position*, by definition codas formed by gemination cannot occur. As a result, the only final consonants are glottal stop and the velar nasal [ŋ]: [se:keʔ]/[to:doʔ]; [ŋa:seŋ]/[maŋŋaŋ]. Contra Kaye's (1990) Coda Licensing Principle, Piggott argues that these too should be viewed as codas.

The representation of geminates and homorganic nasals should be fairly uncontroversial. Geminates are formed via spreading of the content of an adjacent onset in its entirety to an empty coda (Kaye, Lowenstamm & Vergnaud 1990). In my view, this means that the root node that groups together the subsegmental content under the onset spreads regressively and is doubly linked to the timing slots of onset and empty coda alike. Note that this account thus presupposes a receptive timing slot in the empty coda. Homorganic nasals are partially empty codas with root nodes specified only for nasality. Place spreads to the coda root node from the adjacent onset or else, for final nasals or before [h], velar place is assigned by default.

The representation of coda glottal stops is a more thorny issue. Piggott (2003) assumes these to be underlying, hence to constitute a least marked filled coda. Based on various aspects of their behaviour, however, I will show that, whether in onset or coda position, glottal stops are best viewed as the default realization of an empty category in Selayarese. Briefly, evidence includes: the inability of glottal stops (unlike glottal [h]) to either geminate *[ʔ.ʔ] or to support a nasal coda *[N.ʔ]; and the widespread epenthesis of glottal stop, for example in codas generated in reduplication ([balala] → [balaʔbalala]). The upshot is that there are two possible realizations for an empty coda: either as a geminate or as a glottal stop.

Before obstruent onsets, geminate and glottal stop codas are in complementary distribution: only geminates occur with voiceless obstruents, and only glottal stops appear before voiced obstruents. Before sonorant onsets, however, both geminate and glottal stop codas are found: [mma:ri] and [ʔma:ru]; [tal.lu] and [seʔ.la]. There must thus be some distinction that differentiates the two types of empty coda. I propose a distinction between an empty coda with just a timing slot, leading to gemination, and an empty coda with both a timing slot and unspecified root node, triggering default insertion of a glottal stop.

This distinction is not an arbitrary one. A timing slot is clearly required in the empty coda that harbours a geminate, since it constitutes the target of spreading from the adjacent onset. Likewise a root node is necessarily present in the partially empty coda specified for nasality. The empty coda that triggers glottal stop constitutes a prosodic representation between the two: a timing slot with unspecified root node. The usual purpose of the root node is to unify subsegmental material; in the absence of underlying content, it is proposed that the root node automatically generates default content in the form of [ʔ]. Previously, it has been argued that empty onsets and nuclei with unspecified root nodes trigger glottal stop and schwa respectively (John 2014). Here, then, the analysis is extended to encompass empty codas.

Consonant confusability and similarity avoidance patterns

Sameer ud Dowla Khan, Reed College, skhan@reed.edu

The current study has two goals: (1) to **establish the confusion rates between consonant pairs in Bengali**, in quiet, noise, and babble, and (2) to explore whether this **confusability resembles the similarity avoidance patterns** seen in fixed segment reduplication (FSR). The surprising findings for (2) are that while FSR involves similarity avoidance between *onsets*, it is in confusions of *codas* that Bengali speakers reveal their similarity metric.

Background: Previous work documents the gradient similarity avoidance patterns in Bengali FSR, where base-initial consonants (Cs) are replaced with a dissimilar fixed segment (FS) in the reduplicant (RED). For most words, the FS in the RED is /t/: /kaʃi/ 'cough' → /kaʃi-taʃi/ 'cough, etc.'. However, /t/-initial words cannot take FS /t/ in their RED, e.g. /tɛɹa-fɛɹa/ 'cross-eyed, etc.' (*/tɛɹa-tɛɹa/), and even words starting with Cs *similar* to /t/ avoid FS /t/ in their RED at a gradient rate, e.g. /t^{h}oŋa-foŋa/ 'bags, etc.' (??/t^{h}oŋa-toŋa/ 21% OK), and /doɹa-foɹa/ 'stripes, etc.' (?/doɹa-toɹa/ 39% OK), with greater /t/-replacement for Cs less similar to /t/. This suggests the most similar Cs to /t/ are, in order, /t, t^{h}, d, t̪, s, t̪^{h}, k, ɹ…/, meaning that in terms of confusability, [asp] (i.e. [spread glottis]) should be the most confusable feature, followed by [voi], MinPlace, [cont], MajPlace, and lastly [son] being the least confusable.

Methods: To test this, all legal [Ca] and [aC] syllables were recorded and masked with either multi-talker babble, pink noise, or nothing ("quiet"), yielding 51 syllables × 3 conditions × 3 repetitions = 459 trials. Listeners (n = 24) clicked on the consonant they heard in each trial, presented in a Praat Multiple Forced Choice (MFC) experiment (Boersma & Weenink 2013).

Results (onsets): In quiet (92.0% accuracy), most errors involved confusions of [voi] and [asp]. Noise (69.7% accuracy) showed an increase in [cont] and Place errors, with a directional bias reflecting the added percept of a loud, high-frequency burst: 122 fricatives were heard as affricates (24 vice versa), 123 dentals were heard as alveolars (7 vice versa), and 95 non-coronals were heard as coronals (63 vice versa). Errors in babble (59.2% accuracy) largely resembled noise. Onset results indicate that [voi] is the most confusable feature across background conditions (as in English, cf. Cutler et al. 2004), followed by [asp], [cont], MinPlace, MajPlace, and [son], an order not expected given FSR patterns.

Results (codas): Even in quiet (65.5% accuracy), [asp] identification was at about chance (56% accuracy), likely reflecting listeners' perceptions of optional [asp] neutralization in codas (cf. Ahmed & Agrawal 1968 for Hindi), despite the fact that [asp] was not neutralized by the stimulus speaker. In noise (38.8% accuracy) and babble (33.7% accuracy), these errors increased, along with the types seen in onsets. The most to least confusable features in codas are [asp], [voi], MinPlace, [cont], MajPlace, and [son]. Curiously, this is exactly the rank order predicted by FSR patterns, even though FSR targets onsets, not codas.

Conclusions: While FSR involves evaluating the similarity of onsets (base-initial and RED-initial Cs), it is in codas that listeners show patterns resembling FSR similarity avoidance. Thus, I claim that confusability and FSR access the same notion of similarity, but that this must be based on the perceptual resemblance of the two Cs in positions where identification is inherently most difficult, even in the absence of background noise. For Bengali, this position is the one in which the relevant acoustic cues are most obscured, i.e. the coda.

Templatic Spreading and Epenthesis

Madelyn Kissock, Concordia University, madelyn.kissock@concordia.ca

This paper considers three surface patterns in Telugu and explores their potential interaction as well as how they might influence an acquirer to adopt one analysis over another (of URs and grammatical constraints). The patterns in question involve: 1) a limited form of non-concatenative morphology; 2) vowel epenthesis; and 3) a limited form of 'pseudo-harmony' (neither iterative nor productive) (Kissock 2009). Examples of (1) are given below.

Distal	Proximate	Interrogative	Unmarked	gloss
atanu	itanu	etanu	tanu*	3rd sg masc (neutral honorificity)
a:me	i:me	e:me		3rd sg non-masc
va:ru	vi:ru	ewaru**		3rd sg pl human
akkaɖa	ikkaɖa	ekkaɖa		there/here/where
a:	i:	e:		that/this/which

*Form is unmarked for deixis, often cited as reflexive but is simply pronominal –needs no antecedent and does not have anaphoric constraints.

Patterns such as these appear to be limited to pronominal, deictic, and adverbial paradigms. Note that vowel length is determined by the particular root while vowel quality is a lexical property of the particular deixis. Moreover, placement of the vowel with respect to the root is determined by the root. (The interrogative form with two asterisks is an apparent exception to the latter but as the root is itself lacking the predicted long vowel, such forms are suspect.)

Telugu epenthesizes [-u] to C-final forms in native and non-native lexemes. The most obvious examples come from loanwords where the UR of the form is well-established. (Determining whether or not epenthesis of [u] should be adduced for medial environments is part of the goal of this paper.) Examples include: (Hindi) pustakam>*pustakamu*; (Sanskrit) bha:ram>*bha:ramu* (Jaganath 1980); (English) doctor>*ɖakʈaru*.

Finally, the 'pseudo-harmony' referred to in (3) above takes the form of a medial vowel in a trisyllabic form surfacing as identical to a suffixal vowel. Crucially for our purposes, this phenomenon only occurs when the medial root vowel is [u] (cf. vardhillaka 'Don't prosper!' with forms below). While the absolutive [-i] prompts this behavior (but not across the board), the genitive [-i] does not, as the following Nom-Gen pairs show, e.g., ku:turu/ku:turi 'daughter'; moguɖu/moguɖi 'husband'.

Imper.sg.	Absolutive	Neg Imper.	Gloss
ʧaduvu	ʧadivi	ʧadavaka	read
aɖugu	aɖigi	aɖagaka	ask

I argue that there is convincing evidence that the 'pseudo-harmony' forms should be treated as spreading of the features of a final vowel to a medial empty V slot. As such, it falls properly in the domain of templatic phenomena, historically and theoretically separate from harmony processes. The independent presence of templatic morphology for pronominal and other deixis makes such an analysis readily available to the acquirer. The epenthetic final [-u] not only participates but also leaves evidence of its presence/participation after post-lexical sandhi processes have deleted it. For example, *nuvvu na:ku pustakam ʧaduv-ani ʧeppa:vu* 'You told me "Read the book!"' shows the regular sandhi process of final vowels deleting before initial vowels in a following word. Note that the (remaining) medial vowel in *ʧaduv* is identical to the epenthetic vowel, indicating that spreading took place. The combination of epenthesis, spreading, and post-lexical processes require a framework that posits different strata, such as Bermúdez Otero's (2011) Stratal OT theory.

Contrastive metrical structure as a trigger of vowel length alternations and 'opaque' final devoicing

Björn Köhnlein (Leiden University) b.koehnlein@hum.leidenuniv.nl

The issue. The question whether metrical structure can be contrastive (and, if so, to which degree) is a long-standing issue in phonology (see e.g. Halle and Vergnaud 1987; Hayes 1995; Inkelas 1999; McCarthy and Pruitt 2009; Van der Hulst 2012; Krämer 2012, among many others). In recent years, there has been an increase of phonological analyses where contrastive metrical structure has been held responsible for different types of surface oppositions, such as tonal contrasts (e.g. Kehrein to appear, Köhnlein 2011 for Franconian; Iosad 2013 for Scottish Gaelic; Morén 2005, 2007, Morén-Duolljá 2013 for Swedish) or contrasts in vowel quality (Botma and Van Oostendorp 2012 for Dutch; Hermans 2012, Köhnlein to appear for Franconian). In this talk, we argue that contrastive foot structure provides interrelated solutions for two other types of surface contrasts which, at first glance, seem to be problematic for synchronic analysis: a) apparent subtractive morphology in Weert Franconian vowel length alternations; b) seemingly opaque final devoicing in High Prussian.

Weert Franconian. In Weert Franconian, a former tone accent contrast has developed into a vowel length opposition; long vowels deriving from Accent 1 have shortened, short Accent 2 vowels have lengthened. Since Accent 1 correlates with morphological complexity, this change lead to minimal pairs where long vowels in the singular alternate with short vowels in the plural (Heijmans 2002):

(1) a. [æːʀm] 'arm-sg' [æʀm] 'arm-pl'
b. [kniːn] 'rabbit-sg' [knin] 'rabbit-pl'

Following the assumption that Franconian Accent 2 is a monosyllabic trochee and Accent 1 a disyllabic trochee (cf. Köhnlein 2011, Van Oostendorp to appear), the plural morpheme in these alternations can be regarded as a disyllabic trochee: in plural forms, the word-final sonorant is then syllabified as the onset of an empty-headed second syllable, whose nucleus contains an empty mora. Vowel shortening is triggered by the Iambic-Trochaic Law, which changes uneven trochees (μμ.μ) to regular trochees (μ.μ): /kniin/ + (σ.σ) → (kni.nø). Singulars receive default moraic trochees (μμ) and are therefore not subject to vowel shortening: /kniin/ → (kniin).

High Prussian. In High Prussian, a (largely extinct) variety of East Central German, final devoicing is optional (Stuhrmann 1895-98, Kuck & Wiesinger 1965, Teßmann 1969, Wiesinger 1983). Some monosyllabic words with final (phonologically) voiced obstruents show devoicing, some do not, as in /haoz/ [haos] 'house-sg' versus /taov/ [taov] 'pigeon-sg'. Historically, the opaque cases derive from schwa apocope; synchronically, this can result in alternations between devoicing singulars and non-devoicing plurals:

(2) a. [taːk] 'day-sg' [taːg] 'day-pl'
b. [brout] 'bread-sg' [broud] 'bread-pl'

Again, the patterns can be analyzed under the assumption that the plural morpheme in these alternations is a disyllabic foot. Word-final voicing is lost in singulars but retained in the derived plural forms: here, the voiced word-final obstruent is syllabified as the onset of an empty-headed syllable; that is, monosyllabic (taak) / (brout) alternate with disyllabic (taa.g) / (brou.d).

Distributional similarities. In both cases, our analysis correlates disyllabic feet with morphological complexity. Notably, this similarity is reflected in the distribution of the contrasts: for Weert, the analysis correctly predicts that there are no minimal pairs where a simplex form has a short vowel and the more complex form a long one. Likewise, High Prussian never shows alternations between voiced word-final obstruents in singular forms and voiceless obstruents in the plural. Therefore, the metrical approach not only offers synchronic analyses of problematic alternations; it furthermore illuminates phonological relations between two seemingly unrelated phenomena.

Epenthetic Vowel Quality in Fijian Loanword Adaptation
: Consonant Sonority, Harmonizing Features, and /sC/ Clusters

Gakuji Kumagai, Tokyo Metropolitan University
gakuji1210@yahoo.co.jp

Vowel epenthesis is frequently observed as a repair strategy in loanword adaptation. It occurs in Fijian loanword adaptation from English since this language prohibits coda consonants and consonant clusters. This study provides an analysis of epenthetic vowel quality in Fijian loanword adaptation.

►Background: According to Schütz (1978), it seems that epenthetic vowel quality of Fijian is determined by several factors such as articulatory assimilation, acoustic effects, and vowel harmony. However, we still have at least three questions that remain to be solved:

(1) Why do some labial consonants (e.g. /m/) show the effect of their articulation while others (e.g. /p/, /b/) do not?
(2) What determines epenthetic vowel quality when the adjacent consonant is a dorsal or liquid (e.g. /k/, /l/)?
(3) Is there a difference of repair strategies between resyllabifying coda consonants and breaking up onset clusters of English?

►Analysis: This study offers answers to the three questions:
(Epenthetic vowels in question are underlined here.)

(1) More sonorous labials (e.g. nasals) favor articulatory assimilation while less sonorous labials (e.g. plosives) favor vowel harmony with the adjacent vowel.

Nasals:	bom<u>u</u>	'bomb'	rum<u>u</u>	'room'
Plosives:	sop<u>o</u>rano	'soprano'	sitab<u>a</u>	'stamp'

(2) Vowel harmony occurs when the adjacent consonant is a dorsal or liquid.

Dorsals:	tik<u>i</u>	'tick'	kok<u>o</u>	'cork'	Liquids:	bil<u>i</u> 'bill' be:l<u>e</u>ti 'belt'

Harmonizing vowels include the following pairs: {i ~ e}; {a ~ o}; {u}.

{i ~ e}:	rek<u>i</u>	'rake'	el<u>i</u>	'hell'	{a ~ o}:	lok<u>a</u>	'lock'	dol<u>a</u>fina 'dolphin'
{u}:	boul<u>u</u>	'bowl'						

(3) For the vowel epenthesis to resyllabify coda consonants, coronal consonants such as /t/ and /s/ exhibit a strong preference for articulatory assimilation. However, there is a difference between breaking up onset /tC/ clusters and onset /sC/ clusters: vowel harmony occurs in onset /tC/ clusters while it does not in any /sC/ clusters.

Onset /tC/:	t<u>a</u>rabu	'trump'	t<u>o</u>roika	'troika'	Coda /t/:	kat<u>i</u>	'cut'	not<u>i</u>	'note'
Onset /sC/:	s<u>i</u>pai	'spy'	s<u>i</u>koa	'score'	Coda /s/:	bas<u>i</u>	'bus'	ros<u>i</u>	'rose'

►Discussion:

(1) Less sonorous labials are more likely to trigger vowel harmony in Fijian loanword adaptation. This is also found in Shona loanword adaptation (Uffmann 2007).
(2) Dorsal and liquid consonants favor vowel harmony over articulatory assimilation. This can be explained by assuming that dorsal consonants are more marked than labials and coronals, and that liquids are unspecified for place features. The vowel harmony allows the place features of Fijian vowels to be specified as follows: /i, e/ = [coronal]; /a, o/ = [dorsal]; /u/ = [labial].
(3) The vowel epenthesis between /sC/ clusters should be distinct from that between other consonantal clusters.

►Conclusion: The choice of repair strategies of vowel epenthesis is determined by the following factors: the place feature and sonority of the adjacent consonant and consonant clusters of English.

Gemination in Hungarian loanword adaptation

Lilla Magyar, MIT (lilla@mit.edu)

An interesting puzzle of Hungarian phonology is gemination in recent loanwords borrowed from English and German (and occasionally, from French and Italian). A consonant following a short stressed vowel in the source word is often geminated in the loanword, even if the consonant doubling does not have an orthographic reflex (Nádasdy (1989), Törkenczy (1989), Kertész (2006)). This is a gradient phenomenon involving considerable inter- and intra-speaker variation. The propensity of consonants to undergo gemination in loanwords depends on position within the word. Gemination is most predictable in monosyllables at the end of the word (e.g. *fitt* [fit:] 'fit' (Eng. *fit* [fɪt])), fairly predictable but slightly less common intervocalically in polysyllabic (especially disyllabic) words (e.g. *vekker* ['vɛkːɛr] 'alarm clock' (G. *Wecker* ['vɛkɐ])) and at the end of polysyllabic (especially disyllabic) words (e.g. *piruett* ['pirʊɛtː] 'whirl' (Fr. pirouette [pi'ʁwɛt])) . Consonant manner class is also an important factor: some consonants are more likely to lengthen in loanwords than others. Voiceless stops, affricates and fricatives, and nasals undergo loanword gemination very frequently, whereas voiced stops, liquids and voiced fricatives hardly ever lengthen in the same contexts in loanwords.

Since both singleton consonants and geminates are legal in the above described contexts in the native Hungarian phonology, the motivation for loanword gemination is unclear. However, we can find a similar process in some dialects in the western part of Hungary: consonants in intervocalic and word-final position are pronounced long following a short stressed vowel even in native Hungarian words. In order to test whether there is an L1 source for the loanword gemination process in Educated Colloquial Hungarian as well, we conducted a pilot experiment with 6 native speakers of Hungarian. They were asked to read out two lists consisting of 76 sentences each (one in a pseudo-random order and the other in reverse order). Every sentence contained a word which has a consonant in one of the following contexts: (i) intervocalic position, following a short stressed vowel; (ii) intervocalic position, following a short unstressed vowel; (iii) word-final position, following a short stressed vowel; (iv) word-final position, following a short unstressed vowel. The durations of different consonants in different contexts were compared and analysed in R using linear mixed effects models (Bates et al. (2011)). We found that consonant classes which tend to undergo gemination in loanwords are the ones which exhibit significant post-tonic lengthening following short vowels in native Hungarian phonology. The only odd-one-out is the class of voiced fricatives: they undergo post-tonic lengthening but do not participate in loanword gemination, for which could be various reasons, e.g. cross-linguistic geminate markedness (Steriade (2004)); partial devoicing of word-final fricatives (Bárkányi and Gráczi (2012)) or difficulty in perception of length contrasts (Kawahara (2007)). The following table shows which consonant classes undergo only loanword gemination or post-tonic lengthening, both or none. The t-values in boldface indicate that consonants are significantly longer following short stressed vowels than those following an unstressed vowel.

LW gemination only	**Posttonic lengthening only**	**Both**	**None** (marginally)
none	voiced fricatives (**t=-6.972**)	voiceless stops (**t=-3.943**) fricatives (**t=-4.625**) and affricates (**t=-4.041**) nasals (**t=-4.494**)	voiced stops (t=-0.848) liquids (1.062)

We propose that the probability of gemination in loanwords can be predicted fairly accurately by post-tonic lengthening, along with universal geminate markedness, which is reflected by the frequency distribution of singleton consonants and geminates in Hungarian monomorphemic stems.

Two types of implicit knowledge of probabilistic phonotactics

Claire Moore-Cantwell and Lisa Sanders
University of Massachusetts Amherst
cmooreca@linguist.umass.edu, lsanders@psych.umass.edu

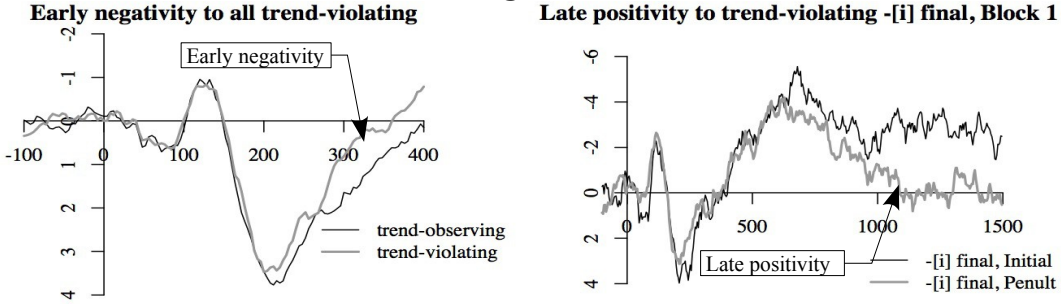
Linguistic knowledge consists of a lexicon of memorized forms as well as a system of generalizations used in the production of novel outputs. These generalizations can be formalized as abstract grammatical rules or constraints, or as an epiphenomenon of the organization of the lexicon, and some researchers have argued that Dual- route (Pinker, 1999) and two-system (Ullman, 2004) models divide phonological knowledge up into categorical generalizations formalized as abstract rules, and probabilistic generalizations which are the result of analogy over lexical items. We use behavioral and neurological evidence to argue instead that speakers have abstract knowledge of some probabilistic generalizations and 'epiphenomenal' or lexicon-based knowledge of others.

We tested two probabilistic trends within the English stress system. In words longer than two syllables, stress is typically penultimate ('banana') or antepenultimate ('Canada') (Chomsky and Halle, 1963 et seq.). A search of the CMU pronouncing dictionary (Weide, 1994) revealed that words ending in [i] were biased towards taking antepenultimate stress, and [ə]-final words were biased towards penultimate stress. In three-syllable, monomorphemic words, all of whose syllables are light, [i]-final words take antepenultimate stress about 80% of the time, and [ə]-final words take penultimate stress about 70% of the time. When the search space is expanded to include longer and morphologically complex words, the [i]-final trend becomes more robust, with the trend-observing pattern occurring 88% of the time, while the [ə]-final trend becomes less robust with the trend-observing pattern occurring only 54% of the time. Thus, the [i]-final trend spans more of the lexicon than the [ə]-final trend, and can be learned before morphology while the [ə]-final trend cannot.

Final V	Trend-observing		Trend-violating	
[i](more robust)	**(A) Antepenult:**	récipe	**(C) Penultimate:**	spaghétti
[ə] (less robust)	**(B) Penultimate:**	vanílla	**(D) Antepenult:**	nébula

40 three-syllable English words ('spaghétti'), their mis-stressed counterparts ('spághetti'), and 80 nonce words ('bamaki') were presented auditorily, while articipants (21) rated them on a 1-4 scale based on how likely they were to be an actual word of English. Meanwhile, EEG was recorded.

Results: [i]-final penultimate nonwords were rated as less word-like than all other shapes ($F(2,42)=4.44$, $p<0.05$). Both types of [ə]-final nonwords were rated as equally word-like. Very early after word onset (280-380ms) a greater negativity was found for trend-violating **(A, B)** than for trend-observing **(C, D)** words and mis-stressed words ($t(20)=-2.31$, $p=0.02$). In the first block of the experiment, [i]-final penultimate **(C)** nonwords elicited a late positivity (1000-1500ms) relative to their antepenultimately stressed counterparts **(A)** ($t(20)=-2.73$, $p=<.05$).



Both the trends we tested affect very early stages of lexical processing, trend-violating words being more difficult to process than trend-observing words. Only the trend which is more robustly supported by the lexicon is respected in speakers' ratings of nonwords, and is reflected in a late positivity closely related to that elicited by phonotactic violations (Domahs et al., 2008; Pitkanen, 2010), and syntactic violations (e.g. Osterhout and Holcomb, 1992).

Not getting to the root of the problem: a case study of Kalenjin

Beata Moskal, University of Connecticut (beata.moskal@uconn.edu)

For morpho-phonological purposes, the root has been identified as a privileged position (see e.g. Alderete 1999). Similarly, in Distributed Morphology (Halle & Marantz 1993) it has been proposed to be a separate spellout domain, which would mean that it should be closed off for further interaction. While roots are not closed off entirely, there is an interesting asymmetry in that prefixes (and potentially proclitics) usually are less closely related to the root/stem than suffixes (and potentially enclitics) (e.g., Nespor & Vogel 1986).

Specifically, in vowel harmony systems both roots and suffixes can be 'dominant', i.e., donating the harmonic value to an unspecified vowel. However, it seems to be the case that there are no languages with dominant prefixes (Baković 2001); i.e., prefixes never donate a harmonic value to a following morpheme. Consider Kalenjin, which has ATR vowel harmony (Hall et al. 1974, Lodge 1995).[1] In effect, there are three types of morphemes: ones specified as [+ATR] (normal font), ones that require an ATR value (CAPITAL LETTERS), and ones specified as [-ATR] (italics) which block harmony (see below).

(1)	ke:r -UN +ATR		[ke:run]	'see it from here'
(2)	KA- A- KU:T -e +ATR		[ka:ɣu:te]	'I was blowing'
(3)	KI- A- ke:r -IN +ATR		[kiage:rin]	'I saw you'

In (1), the suffix receives [+ATR] from the root. In (2), the suffix provides the value for the root and also for the prefixes. In (3), a dominant root spreads [+ATR] to the suffix and prefixes.

Crucially, though, Kalenjin has no (dominant) prefix spreading its [+ATR] value rightward, in accordance with Baković' (2001) claim that this is never attested.

As mentioned, Nespor & Vogel (1986) identify that if languages have an asymmetry between prefixes and suffixes, then prefixes are more independent from the stem than suffixes (see also van Oostendorp 1999; *cf*. Cohn 1989, McCarthy & Cohn 1994 on Indonesian; Booij 1977, 1981 on Dutch; Szpyra 1992 on Polish; Levergood 1984 on Maasai; see also Greenberg 1957: 86-94; Cutler et al. 1985; Hawkins & Cutler 1988; Bybee et al. 1990; Cysouw 2009). Indeed, it has been proposed that prefixes form separate prosodic words, while suffixes are incorporated into the stem (e.g., Generalized Alignment theory; McCarthy & Prince 1993). In this paper, I assume that *the left edge* of prosodic words align with roots. Furthermore, while edge material can influence outer material (roots can influence prefixes), outer material cannot cross an edge. This accounts for the unattested case of dominant prefixes.

Associating the left edge of prosodic words with roots predicts that when there is no root the restriction should not hold. Indeed, this is exactly what we see in Kalenjin (Lodge 1995):

(4)	TUKA	ča:k -ET +ATR	[*tuɣa* ča:ɣet]	'those cows of ours'

Crucially, in (4) we see that harmony does proceed rightward, from a prefix onto its following morpheme (the first morpheme, /TUKA/ 'cows', surfaces as default [-ATR]). This is exactly what we expect if we associate the left edge of prosodic words with roots.

In sum, I combine the insight that it is *roots* that are special with the prefix/ suffix asymmetry to account for the apparent lack of dominant prefixes in vowel harmony systems.

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[1] At this point, it is irrelevant whether Kalenjin vowel harmony is analysed as a dominant/recessive system (Hall et al. 1974, Baković 2000) or as a directional vowel harmony system (Lodge 1995, Nevins 2010).

Prosodic structure and prominence constraints on epenthesis: Evidence from hiatus resolution across Portuguese varieties

Pedro Oliveira, Marisa Cruz, Nuno Paulino & Marina Vigário
University of Lisbon
p.oliveira@campus.ul.pt, marisasousacruz@gmail.com, npaulino@campus.ul.pt, marina.vigario@mail.telepac.pt

Languages tend to avoid hiatus and different means may be used to achieve this end, including the deletion or semivocalization of one of the vowels (Casali 1997, Frota 2000, Cabré & Prieto 2005). These processes usually apply within particular prosodic domains, and are often blocked under stress clash configurations (Nespor & Vogel 1989, Frota 2000, Cabré & Prieto 2005). Another way of breaking hiatus is through epenthesis, a common process usually motivated by phonotactic requirements or metrical structure (e.g. word minimal size, rhythmic alternation of stressed and unstressed vowels – Hall 2011, 2013). In this talk we focus on a particular case of epenthesis that is active in non-Standard, Northern and Central varieties of European Portuguese, which consists of the insertion of [j] to break a hiatus formed by central mid or low vowels (*a-a*), when V2 bears word stress (e.g. *a aula* [ɐ**j**ˈawlɐ]). Besides playing a role in the definition of the context of epenthesis, we show that prosodic and prominence conditions further constrain the phenomenon in non-trivial ways.

Although [j]-insertion has long been reported in the literature (Vasconcelos 1895, Cintra 1971, Segura 2013), important details on the phenomenon are largely ignored, which we address here: (i) its prosodic domain of occurrence; (ii) possible effects of higher levels of prominence and of the prosodic status of the unit V1 belongs to (prosodic word – PW, or clitic – CL); (iii) its geographic area; (iv) external factors that may affect its occurrence (e.g. type of speech, age).

Speech data were recorded from three districts in the North (Oporto, Braga, Viana do Castelo) and one in the Centre of Portugal (Portalegre). The preliminary data reported below, from 20 subjects, include 3 urban and 3 rural data points. Collected speech comes from three sources: (i) a sub-corpus of a reading task (27 sentences, produced twice by each participant), and (ii) semi-spontaneous tasks (a Map Task and an Interview). In the read speech corpus, prosodic constituency and prominence are controlled for: the hiatus sequence occurs inside or across prosodic words (PW), prosodic word groups (PWG), phonological phrases (PhP) and intonation phrases (IP); and V2 appears as the head/non-head of each domain inside IP. Speakers are evenly distributed in two age groups (20-45 years-old and above 59 years-old).

Results from the three tasks show that all of the regions exhibit some amount of insertion, but the frequency and contexts of glide occurrence vary. Globally, there is more insertion when V1 belongs to a CL than to a PW (28% vs 12%, respectively), but some areas almost never show insertion when V1 belongs to a PW (i.e., Portalegre). In the latter cases, the prosodic phenomenon seems to be restricted to maximally local prosodic contexts. Results from the read speech corpus show that, when V1 is part of a PW: (i) only in one region (Viana do Castelo) glide insertion optionally applies across PhP; in most areas, glide insertion optionally applies inside and across PWG; IP boundaries, by contrast, always block insertion; (ii) to the exception of the rural point in Oporto region, higher levels of prominence matter across regions, since there is preference for insertion when V2 is the head of PhP or of PWG (21%), in contrast with non-head contexts (5%). Although older subjects tend to insert more, across age groups there is also a clear effect of type of speech, as semi-spontaneous data favours glide insertion (53% vs 17% in the reading task). This suggests that rather than simply a pattern of change, we may be in face of dialectal *struggle* within bidialectal communities, especially evidenced in more formal speech: prosodic and prominence constraints favour epenthesis, while external constraints (i.e. Standard prestige) press towards inhibition of glide insertion.

Overall, this research contributes to determining language internal and external factors (and their respective weights) in glide epenthesis (along the lines of Coetzee 2009, 2012), and, more in general, to deepen our understanding of the mechanisms involved in phonological variation and change.

In vino veritas: vowel (de)nasalization in Portuguese and the "sharing makes us stronger" hypothesis

Heglyn Pimenta – Université Paris 8 Vincennes-St-Denis / UMR 7023 (heglyn@gmail.com)

Overview. This communication tackles the long-standing problem of Portuguese's (Pt) nasal vowels by investigating a point somewhat neglected by the previous studies: the cases where Old Galician-Portuguese (GP) vowel nasality did not survive, as in Lat. LUNA > GP *lũa* > Pt *lua* 'moon', as opposed to Lat. VINU > GP *vĩo* > Pt [vi.ɲo] ~ [vĩ̯.o] 'wine'. Investigating the reasons why vowel nasality was lost, and thus, by focusing on what Modern Pt nasal vowels and diphthongs *are not*, provides a better understanding of what they *are*: in accordance with HONEYBONE's (2005) concept of "sharing makes us stronger", nasality remained a property of the vowel if and only if it could get itself associated to two slots.

Literature. Modern Pt has a series of nasal vowels and nasal diphthongs that have been analysed either as phonemic single vowels (*e.g.*, HALL JR 1943, ROGERS 1954, etc.) on the basis of the contrast between nasal and oral vowels (*e.g. vim* [vĩ] '(I) came' *vs vi* [vi] 'I saw'), or as oral vowels followed by a nasal segment (*e.g.* CÂMARA JR 1953, BARBOSA 1962, MATEUS 1982, PARKINSON 1983, 1997, etc.) on the basis of final nasal diphthongs, preconsonantal nasals (*e.g. ca*[m]*po* 'field'), and of the fact that nasal vowels behave like closed syllables. This second analysis is supported by CARVALHO (1988, 1989) and WETZELS (1997), who interpret them as bimoraic sequences. However, one point was hitherto neglected in the discussion of the phonological status of Pt nasal vowels: the constraints on their historical formation, and, especially, the instability of the nasal feature in hiatus contexts.

Analysis. Modern Pt nasal vowels derive from GP vowels that (until the 13th c.) were nasalised by a nasal coda in three contexts: preconsonantal (*campo* < CAMPU 'field'), intervocalic (*mão* = *[mãŋ.o] < MANU 'hand') and final (*pan* = *[pãŋ] < PAN(E) 'bread').[1] Thus, vowel nasality (i) required to be connected to two slots (VC); (ii) combined with the place feature of the following obstruent (*campo*); (iii) surfaced as an unmarked velar elsewhere (*mão*, *pan*). Portuguese later diverged from Galician (14th-15th c.) in the overall lenition of the unmarked coda: final [ŋ]s underwent vocalization, along with conservation of nasality and spreading of the vowel's place feature, if any, whence the oldest Pt nasal diphthongs (*p*[ãŋ] > *p*[ãw̃ɰ̃], *v*[ẽŋ] > *v*[ẽĩ] 'he comes', *le*[õŋ] > *le*[õõ] 'lion', etc.). Also, [Vŋ.V] sequences gave rise to a number of hiatuses, most of which became monosyllabic in a third stage. Interestingly, in this latter process vowel nasality *was preserved* if the hiatus was eliminated (MANU > [mã(ŋ).o] > *mão*; LANA > [lã(ŋ).a] > *lã*, etc.), but *was deleted* if the hiatus remained unchanged (VENA > [vẽ(ŋ).a] > [ve.a] > [vej.a][2] *veia* 'vein'; SĬNU > [sẽ(ŋ).o] > [se.o] > [sej.o] *seio* 'breast'; BONA > [bõ(ŋ).a] > *boa* 'good (fem.)'; LUNA > [lũ(ŋ).a] > *lua* 'moon'). Assuming, as does CARATINI (2009), that diphthongs, unlike hiatuses, require the sharing of melodic material, vowel nasality can be said to have disappeared whenever the surrounding vowels could not merge into a diphthong or a single vowel, that is whenever at least one feature, including [nasal], did not spread to an additional V position. This is crucially confirmed by the evolution of words like VĪNU > *vĩo* > *vinho*, in which both dissyllabicity and nasality were exceptionally preserved: either vowel nasality is optional, and the nasal feature is hosted by the onset ([vi.ɲo]), or the vowel is systematically nasal, and nasality is anchored in two V positions ([vĩ̯.o]).

Conclusions. (i) The constraint on vowel nasality did not change since the times of GP: in Modern Pt two positions are still required by the nasal feature, though these can now be of both forms VC and VV. (ii) This confirms the bisegmental views of Pt nasal vowels, (iii) brings an interesting piece of evidence for the "sharing makes us stronger" hypothesis, and (iv) shows how historical changes can shed light on synchronic phonological patterns.

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[1] [ŋ] is attested word-finally in Galician, and between vowels in some north-eastern Pt dialects (Santos 1967: 214-215).

[2] Arguably, words such as Pt *maio* [maj.o] differ from Spanish *mayo* [ma.jo] because Pt has no word-initial glides.

Phony Metaphony

Markus A. Pöchtrager & Jonathan Kaye

Cases of apophony (ablaut) like German *singen/sang/gesungen* or cognate English *sing/sang/sung* display vowel alternations which are not phonological in nature: They are an idiosyncratic property of the verb in question. On the other hand, there are vowel alternations that are clearly phonological, such as Turkish vowel harmony, where a relationship between target and trigger can be established (spreading of the elements **I**/**U**) and which apply without exception (as argued in Pöchtrager 2010).

In this paper we want to address the question where metaphony (umlaut) fits in: Is it more like ablaut or more like Turkish vowel harmony? For a phenomenon to be called phonological we will require that it conforms (among other things) to the Non-Arbitrariness Principle (NAP, requiring a direct relationship between target and trigger; Kaye, Lowenstamm & Vergnaud 1990) and the Minimality Hypothesis (MH, requiring that processes apply whenever their conditions are met; Kaye 1995).

There does not seem to be an uncontroversial formal definition of metaphony, and the cases bearing that label look more like a loose collection of disparate phenomena. A typical example is German *ertrag-en* 'to bear' vs. *erträg-lich* 'bearable'. The stem vowel change is traditionally assumed to be caused by the unstressed vowel of the suffix; umlaut can then be interpreted as the spreading of an **I**-element. Likewise, in Korean we find *mek-i* 'food' from *mək-* 'eat'. Again, this can be taken as **I**-spreading.

Further inspection of both languages makes clear that they do *not* conform to the NAP or the MH, however. German *-lich* sometimes does and sometimes does not trigger metaphony. From *Sache* 'thing' we get either *sach-lich* 'factual, objective' or *säch-lich* 'neuter', from *Amt* 'government office' only *amt-lich* 'official' (**ämt-lich*). Similarly, *Hund*/*Hund-e* 'dog sg./pl.' but *Bund*/*Bünd-e* 'union' with what seems to be the same plural suffix—a suffix that, crucially, does not contain an **I**-element. The most extreme case is *Mutter*/*Mütter* 'mother sg./pl.' without any suffix, but with metaphony. Metaphony is not exceptionless, nor is there a connection between target and trigger (mostly there is no trigger to speak of). It rather depends on a host of morphological factors. (Attempts invoking a floating **I**-element to "account" for cases where there is no trigger are obviously circular/irrefutable. No such tricks are required for clearly phonological phenomena.) Korean is no less problematic: The nominaliser *-i* can trigger metaphony, nominative *-i* cannot. The phonological shape of the suffix does not allow any prediction whether umlaut will apply or not. Furthermore, similar arguments can be made for other languages claimed to have umlaut of some kind (Icelandic, Chamorro, Arielli Italian, Djingili, Nyangumarda and Warlpiri).

While there does not seem to be any instance of metaphony that fulfills both the NAP and the MH, this does of course not answer the question of *why* we do not find cases where metaphony *is* phonological (i.e. meeting the NAP and the MH). We will discuss and evaluate three possible answers:

(i) Most cases of metaphony target the stressed vowel. There might be a restriction that the stressed vowel cannot undergo any phonological change (pace Walker 2005). The stressed vowel seems to play a crucial role in parsing/looking up the lexical entry, and thus such a restriction might be unsurprising.

(ii) Directionality: **I**- and/or **U**-spreading in vowel harmony always seems to go from left to right, the reverse of what we find in metaphony. Directionality might be the crucial factor here.

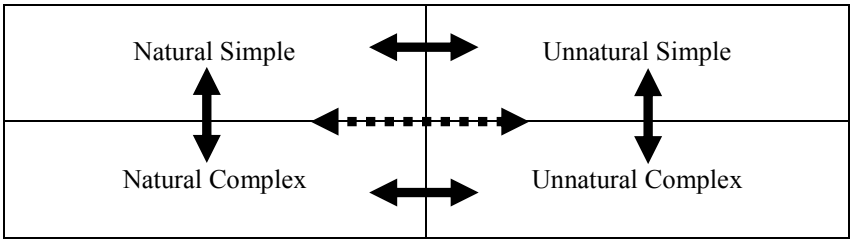
(iii) Is phonological umlaut impossible because it would have to stop at a specific point (the stressed vowel)? If yes, this might be derivable from the NAP, requiring the unchecked application of a process.

The Effect of Complexity versus the Effect of Naturalness on Phonotactic Learning

Brandon Prickett – UNC Chapel Hill – bpricket@live.unc.edu

In this study, constraint complexity and naturalness were both found to affect native speakers' grammaticality judgments of novel words, with naturalness having a greater effect on judgments than complexity. Recently a "surfeit of the stimulus" has been noticed in languages; specifically speakers do not seem to be learning all of the phonological patterns that exist in their language (Becker et al. 2007, 2008, 2011). Using the Hayes and Wilson (2008) phonotactic learner software to create a list of phonological patterns that are in English words, Hayes and White (2013) found that phonological constraints that were "natural"—that is typologically common and phonetically logical—had a much larger effect on grammaticality judgments than constraints that were not. This could suggest that these natural constraints were being learned better by speakers. Hayes and White (2013) only varied constraints on their naturalness, with their natural constraints being generally simple and their unnatural constraints being generally more complex. Constraint complexity is a factor that has been shown to influence phonological learning in artificial languages (Suffran and Thiessen 2003, Pycha et al. 2003, Skoruppa and Peperkamp 2011, Moreton et al. 2014) and should also be studied in the context of real-world languages to determine how speakers are deciding which patterns to learn in their native language.

For the purposes of this study complexity was defined as the number of phonetic features needed to describe a phonotactic constraint (see Chomsky and Halle 1968). For instance, a constraint that applies to all consonants would be considered less complex than a constraint that only applied to voiced coronal consonants. In this study constraints created by the Hayes and Wilson (2008) phonotactic learner were divided into four categories: Natural Simple, Natural Complex, Unnatural Simple, and Unnatural Complex. For each of these categories, novel words that violated each type of constraint were used as stimuli, as in Hayes and White (2013).



■ ■ ■ Comparison made by Hayes and White (2013) ▬ Comparisons made in this study

77 subjects took part in an online experiment that presented an orthographic representation and an audio recording for each of the stimuli. Subjects were asked to numerically rate each of the words on how "good" they sounded in English and ratings of the experimental stimuli were compared with control group partners that did not break any constraints to determine how much of an effect each constraint had on the speakers' judgments. Both naturalness and complexity were shown to affect how much a constraint influenced speakers, indicating that an innate bias towards natural rules in language could exist. The effect of naturalness was found to be larger than that of complexity—contradicting the findings of many recent studies on artificial language learning (for example Pycha et al. 2003, Skoruppa and Peperkamp 2011) and suggesting that there could be significant differences in the processes that speakers use to learn real-world languages such as English and those used to learn artificial languages in a lab.

Prefixes in Maasai: Experimental Evidence

Lindsey Quinn-Wriedt (University of Iowa)

Maasai, an Eastern Nilotic language of Kenya and Tanzania, has dominant-recessive vowel harmony; vowels can be divided into two sets—(dominant) ATR [i, e, o, u] and (recessive) non-ATR [ɪ, ɛ, ɔ, ʊ, ɑ]. If there is an ATR vowel anywhere in a word, all vowels are ATR. It has been suggested that *no* language with dominant recessive vowel harmony has a lexically specified ATR prefix (Hall & Hall1980, Baković 2000). Yet Maasai has been described as having a single ATR prefix, /e-/, the third person prefix for class II verbs which has directional effects, that is. it only causes vowels to its left but not its right to harmonize (Tucker and Mpaayei 1955, Mol 1995, Levergood 1984). This *right to left* only harmony would be in direct opposition to the other harmony pattern--all other ATR vowels cause harmony in both directions (i.e. roots cause prefixes and suffixes to harmonize, suffixes cause roots, prefixes, and other suffixes to harmonize). Hence, the claims that an ATR prefix is found in Maasai are worth investigating.

This paper reports on a study of whether *perceived* differences in the pronunciation of the third person singular prefix with class II versus class I verbs reflect a difference in underlying representations, /e-/ vs. /ɛ-/. or whether the surface differences result from coarticulation caused by the following /ɪ-/ prefix which always occurs with class II verbs, but not with class I verbs. All sources agree that /ɛ-/ is the 3rd sg. prefix for class I verbs; the disagreement is whether there are two distinct prefixes or only one prefix for both verb classes, class I and II. Thus, the question is what is the underlying form of the prefix in a verb such as "s/he joins" (class II) is /**e**-ɪ-dik/or /ɛ-ɪ-dik/.

F1 is the best acoustic correlate of ATR; ATR vowels have lower F1s than their non-ATR counterparts (Ladefoged 1964, Lindau et al. 1972, Guion et al. 2004). The distinguishing characteristic between the two verb classes in Maasai is that class II verbs all begin with the prefix /ɪ-/. Because the purportedly ATR /e-/ prefix always precedes /ɪ-/ for class II but not class I verbs, coarticulation could lead to the perception of an ATR vowel because the formants for [ɛ] lower in anticipation of the following [ɪ].

In the first experiment, the controversial prefix for class II verbs with non-ATR vs. ATR roots was considered. If the prefix were ATR in the input, no difference in the prefix vowels should be observed since the prefix vowel in both conditions would be ATR (as an ATR vowel cannot become *more* ATR). A difference *was* found between the F1s of the prefix vowel with non-ATR vs. ATR roots for all subjects (n=6). This suggests that the prefix is non-ATR /ɛ-/ in the input for both class I and class II verbs, and it harmonizes as expected with an ATR root. The second experiment confirms this result; prefixes left of /ɛ-/ were considered. F1s of a non-ATR prefix before /ɛ-/ with class I and class II verbs were compared; no significant differences were found. This also supports the claim that the putative ATR prefix is not ATR in Maasai.

If the 3rd sg. prefix is not ATR for class II verbs, what has given rise to this impression? There are potential effects of coarticulation. A final experiment investigated this possibility. The F1s were compared for the /ɛ-/ prefix with non-ATR class I (no following /ɪ/) and non-ATR class II verbs (with a following /ɪ/) in order to determine whether the proximity to /ɪ/ affects the /ɛ/ vowel. We would expect the F1 of [ɛ] to lower in anticipation of the following [ɪ], a vowel with a lower F1. The expected difference was found. This F1 lowering cannot be attributed to the prefix being ATR, which was ruled out by the first two experiments, so coarticulation provides the most satisfactory explanation. Thus, there is only one third person singular prefix, /**ɛ**-/, for class I and II verbs. Overall, no evidence was found to suggest that there is an ATR prefix in Maasai. This means Maasai provides no counterevidence to the claim that there is no ATR prefix in any dominant recessive harmony language.

The triple life of Greek glides

Anthi Revithiadou & Giorgos Markopoulos / AUTh
revith@lit.auth.gr; gmarkop@lit.auth.gr

In this paper, we argue that glides come in three different forms in Greek and its varieties: (a) as derived glides (e.g., Levi 2008; Naderi & van Oostendorp 2011) which originate from vowels and mostly pattern with them (CASE-A), (b) as underlying glides which pattern with consonants and are employed to satisfy syllable wellformedness conditions (e.g., Harris & Kaisse 1999) (CASE-B) and (c) as onglides in stressed diphthongs (e.g., Chitoran & Hualde 2007) (CASE-C).

CASE A: In all Greek varieties as well as in the standard language, glides may derive from high vowels – mainly /i/ – in hiatus environments (1a). A glide will turn into a consonant due to the spreading of [+cons] from a preceding consonant (1b) or may fuse with it (k, g, x, ɣ, l, n) (1c).

(1)	a.	/tro-**i**/	trój	'eat-3SG'	(cf. pez-i 'play-3SG')
	b.	/elaf**i**-a/	eláf**ç**a	'deer-NOM.PL'	(cf. eláfi 'deer-NOM.SG')
	c.	/kapák**i**-a/	kapá**c**a	'lid-NOM.PL'	(cf. kapáci 'lid-NOM.SG')

CASE-B: Next to underlying glides, e.g., *mjázo, émjasa/*emíasa* /m**j**az-o/ 'resemble-1SG.NONPAST/PAST' (cf. *parusjázo, parusíasa* 'present-1SG.NONPAST/PAST', Topintzi & Baltazani 2011; Topintzi 2011, a.o.), certain Greek dialects (Ikaria, Skyros, a.o.) exhibit an epenthetic *j* which arises only in intervocalic environments in order to smoothly break off the vowel sequence by means of a segment that is as close to a vowel as possible (Uffman 2007):

(2) a. *i **j** ómorfi* 'the pretty one', *i **j** aðerfí* 'the sister', *i **j** uraní* 'the sky-NOM.PL', *to **j** éma* 'the blood', *to **j** ifáði* 'the abb', *o **j** apáno* 'the above'

b. *afi**j**eróno* 'dedicate', *ávri**j**o* 'tomorrow' (Phavis 1909; Blanken 1951)

CASE-C: The most fascinating aspect of glidehood, however, comes from a group of Northern Greek varieties (Kozani, Ipirus, Chalkidiki, etc.), whereby single vowels get diphthongized strictly under stress. In contrast, unstressed vowels in these dialects delete (i, u, (a) → ∅) or reduce (o, e → u, i). The data in (3a-c) are instructive: the glide does not interact with any neighboring consonants either by triggering palatalization or by becoming a palatal consonant itself as in (1b) nor does it act as a transitional sound from an onset to a peak, as has been argued by Baltazani &Topintzi (2010). The latter scenario is excluded because the glide can appear after CR clusters, e.g. *pr^{w}óvta* /próvata/ 'sheep-NOM.PL', which suggests that the need for smooth transition from the margins to the syllable core is already satisfied by the sonorant member of the cluster. More importantly, the glide develops before a stressed non-low vowel /e, i, o, u/, as opposed to a low vowel /a/ that lengthens instead (3b). This set of facts, which are complemented by current day fieldwork data (3c) (Thalis-Vocalect, University of Ioannina), indicates that augmentation in the form of diphthongization and lengthening is driven by stress and, more specifically, by the need to maximize prominence contrasts between the stressed and unstressed syllables in dialects with dramatic reduction processes (Revithiadou & van de Vijver 1997, a.o.).

(3) a. ***j**éfaɣa* /éfaɣa/ 'eat-1SG.PST', ***fj**étu* /féto/ 'this year', *im**j**éna* /eména/ 'me', ***j**íxa* /íxa/ 'have-1SG.PST', ***j**ímastan* /ímastan/ 'be-1PL.PST' (Papadopoulos 1926; Phavis 1956)

b. *m^{a}áθami* /máθame/ 'learn-1PL.PST', *kal^{a}á* /kalá/ 'well' (Phavis 1956)

c. *pandrim**j**éno* /pandreméno/ 'married-ACC.SG.MASC', *ikθ**j**ésis* /ekθésis/ 'essays-PL', ***w**óçi* /óxi/ 'no', *ðimutik**w**ó* /ðimotikó/ 'elementary school' (fieldwork, Ipirus)

It is evident, therefore, that both derived and underlying glides co-exist in Greek. Moreover, glides are also employed to incarnate length distinctions that may arise under the pressure of prosodic factors. In this paper, we explore the triple life of glides and aim at a theory that can appropriately accommodate all of its aspects.

No Place for /h/: an ERP investigation of [Place] in English intervocalic fricatives

Kevin Schluter, Stephen Politzer-Ahles, and Diogo Almeida
NYU Abu Dhabi

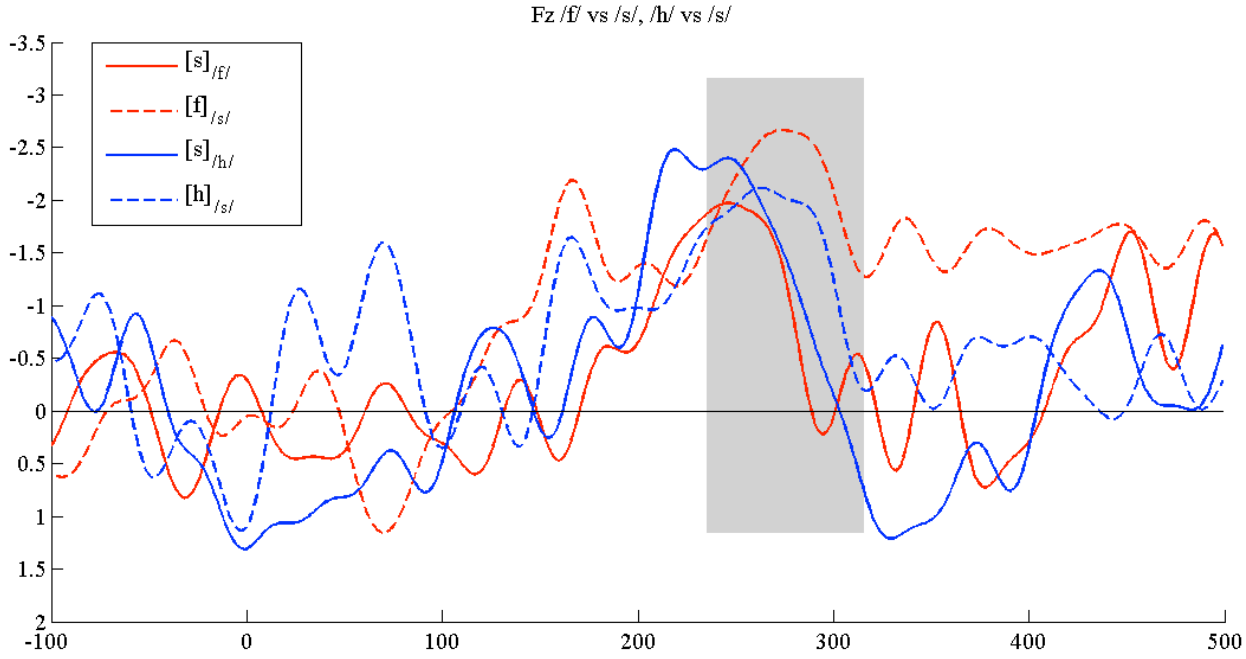
This paper investigates the organization of speech sounds during language comprehension. Recent investigations have used the mismatch negativity (MMN) to test for the presence or underspecification of phonological features (Lahiri and Reetz 2010). MMN is an event-related potential (ERP) component that is more negative-going when a person detects a difference between rare stimuli (deviants) and common stimuli (standards) that they are mixed with. Lahiri and Reetz (2010) suggest that a bigger MMN is elicited when a deviant segment that is underspecified for a feature is embedded in a series of standards that are specified for that feature, and a smaller MMN is elicited when the standard is underspecified and the deviant is specified. MMN studies have detected asymmetric effects including vowel height (Eulitz and Lahiri, 2004) and place and manner features for consonants (Cornell et al. 2012). While previous literature has focused primarily on stop consonants, this paper looks at place features for fricatives, namely English /f/, /s/, and /h/. Theoretical literature suggests that coronal is the unmarked or default place (Avery and Rice, 1989, among others), but also that /h/ has no place (McCarthy 1988). We test the hypothesis that /s/ is the default fricative, while /h/ is equally or less specified than /s/, having no place of articulation (McCarthy 1988).

Using the MMN passive oddball paradigm (1000 standards, 150 deviants) with a 32-channel EEG, we tested four blocks: standard /s/ to deviant /f/, standard /f/ to deviant /s/, standard /s/ to deviant /h/, and standard /h/ to deviant /s/. Each stimulus was presented in intervocalic context (i.e. [afa], [asa], [aha]). We hypothesize that, if [Coronal] is not stored, deviant /s/ will show a stronger negativity than /f/. Lahiri and Reetz (2010) suggest [Laryngeal] is a place of articulation, which—if true—should produce a similar asymmetry with more negativity for deviant /h/ than /s/. Otherwise, if there is no place feature for /h/, there will be no asymmetric mismatch between /h/ and /s/.

Pilot results from 2 participants (Figure 1) suggest deviant [f] elicits a stronger negativity than /s/. This is inconsistent with /s/ being less specified than /f/. Unlike stop consonants, this may result from an additional feature which /s/ is specified for, distinguishing it from the other coronal fricatives /θ/ and /ʃ/. The segment /f/ needs no such additional feature since English does not use /ɸ/ contrastively.

The data for /h/ vs. /s/ is less clear but shows a weak trend: there is less negativity for /h/ than for /s/. This is consistent with the featurally underspecified lexicon (Lahiri and Reetz 2002) if /h/ is posited to have no place of articulation, rather than a [Laryngeal] place. All these patterns show a time-course consistent with reported MMN effects. The token frequency counts of spoken English show that /s/ is more frequent than both /f/ and /h/ (Vaden et al. 2009), so an alternate hypothesis based on frequency appears untenable.

Figure 1: Grand average difference waves for /f/ vs /s/ (red) and and /h/ vs /s/ (blue) at Fz. The time course of this MMN is about 235ms to 315ms (grey) because of the 100ms initial vowel.



Kinande Reduplications in Precedence-Based Phonology

David Ta-Chun Shen
National Taiwan Normal University
david.shen@std.ntnu.edu.tw

The authenticity reduplication for nouns and the unintensive reduplication for verbs in Kinande (Mutaka and Hyman 1990, Mutaka 2000/1) are analyzed in the Precedence-Based Phonology (Raimy 1999 et seq.), a model which invests on explicit precedence relationship in the X-tier and where reduplication is affixation and the by-product of looping on the precedency. Although I follow Mutaka and Hyman's suggestion that syllabification precedes reduplication, I do not consider that their Morpheme Integrity Constraint (and any of its later incarnations) is necessary as this constraint is look-ahead. Meanwhile, I also consider that Frampton's (2009) constraint-like prosodic adjustment is unnecessary. In the end, I reach a rules-only analysis for the reduplicative patterns, which brings me closer to the Substance-Free approach to phonology (Hale and Reiss 2008). The thrust of my analysis for both nouns and verbs is to count the number of onset after syllabification. For nouns, instances with one onset, like *Ø-[e-ka:]* 'at home' (the length diacritic is tone-related and is considered reduplication-irrelevant), undergo total reduplication twice (*Ø-e-ka~eka~eka* → *Ø-e-k~ek~eka*). For nouns with more than one onset (e.g. *e-[ri-oli]* 'cucumber'), they partially reduplicate the portion from the penultimate onset to the end (*e-ri-oli~rioli* → *e-rj-oli~rjoli*). Still some other instances which do not reduplicate (e.g. *o-[mu-herukį]* 'bride') might be attributed to the layers of lexicon as Mutaka and Hyman write that these instances "are relatively rare and are often borrowings or have compound stems". The domain for authenticity reduplication to take place is bracketed in the above examples, but it is necessary for the material outside the brackets to be present. The onset counting continues into the unintensive reduplication. For verbs, the domain is the verb stem, verb root plus any suffixes. Use the verb root *oh* 'pick' to discuss the following three sub-conditions. When there is one onset after syllabification, two rounds of total reduplication occur (*oh-a:*: *oh-a~oha~oha:* → *oh~oh~oha:*). When there are two onsets, the portion spanning from the first/penultimate onset to the end is reduplicated (*oh-er-a*: *oh-er-a~hera*). When there are more than two onsets, reduplication with fixed segmentism (/a/ in this case) is observed. The materials from the first onset to the second one are repeated with an /a/ in between (*oh-er-an-a*: *oh-era~h-er-an-a*). All these rules are formalized in Samuels's (2009) Search-based format whose use is extended from Mailhot and Reiss's (2007) idea on vowel harmony—as one of Samuels's goals is to identify the primitive operations for the phonology component. Lastly, even though the focus is on reduplication, I provide a possible piece of evidence to contrast Raimy, Frampton, Halle (2008), and Reiss and Simpson (2009). All four takes (Samuels included) are precedence-based but differ in the use of bracketing (Halle and Frampton) or looping (Raimy) to represent what is reduplicated except for the latter. Reiss and Simpson view reduplication as projecting two exact copies. It is projection that presents the needed environment for the interaction between reduplication and imbrication—Halle, Raimy, and Frampton cannot handle it with their existing tactics. In sum, the reduplications in Kinande is not only analyzed in the Precedence-Based Phonology but also immersed in the Substance-Free Phonology.

English listeners' use of vowel phonotactics for speech segmentation

Katrin Skoruppa (University of Essex, kskor@essex.ac.uk), Andrew Nevins (UCL, a.nevins@ucl.ac.uk), Stuart Rosen (UCL, s.rosen@ucl.ac.uk)

Finding word boundaries in fluent speech is a challenging task for listeners, as there are no reliable acoustic cues signaling them. Numerous studies have shown that language-specific phonological cues, such as word stress and consonant clusters, can help during this process (for a review see Mattys, White & Melhorn 2005).

The present study asks whether restrictions on vowel positioning can also be used for speech segmentation, or whether vowels are disregarded for lexical purposes, as posited by Nespor, Mehler & Peña (2003) in the context of the division of labor between consonants and vowels in language processing and acquisition. In the present study, we specifically investigate the use of the lax vowel constraint: the fact that typical English words do not end in a lax vowel (e.g. [*diːtʊ]).

In a first experiment, we show that English adults (n=16) can exploit the lax vowel constraint in a nonsense phrase-picture matching task. When presented with trisyllabic nonsense phrases (e.g. [ˈnaɪzʌˈteɪ]) that could be segmented in two different ways (early boundary: [ˈnaɪ] + [zʌˈteɪ] or late boundary: [ˈnaɪzʌ] + [ˈteɪ]), listeners tended to avoid the late boundary option if it created a word ending in a lax vowel. Specifically, they chose the late boundary option significantly less often if the vowel in the second syllable of the phrase was lax ([ˈnaɪzʌˈteɪ]) than if it was tense ([ˈnaɪzɔːˈteɪ], z = 2.844, p =.004 in a mixed effect logistic regression model with random intercepts for participants and items). We thus conclude that English listeners can use vowel phonotactics for segmenting novel words, in contrast to null results in previous studies using existing words (Norris et al. 2001; Newman et al. 2011).

We then investigated whether the lax vowel cue is vulnerable to disruption by background noise, an effect observed previously for consonant cluster cues (Mattys et al. 2005). To address this question, a second experiment was conducted using the same task with a further 24 English adults. There was a significant effect of Listening Condition (quiet vs. background noise; z = 2.12, p = .034), which interacted with the effect of Vowel Type (lax vs. tense; z = 3.15, p = .002). Participants used the lax vowel cue in quiet (z = 3.09, Bonferroni-corrected p = .004), thus replicating the first experiment, but did not do so if the stimuli were presented in speech-shaped noise at 0dB SNR (z = 1.41, Bonferroni-corrected p > .1).

Our results suggest similar mechanisms for processing vowels and consonants in segmentation tasks. We will discuss the implications of our findings for theories concerning the weighting of phonological cues in speech segmentation (such as the one proposed by Mattys et al. 2005), and for theories on diverging roles of vowels and consonants (such as Nespor et al. 2003).

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The Loi de Position and the Acoustics of French Mid Vowels

Benjamin Storme (MIT), bstorme@mit.edu

In French, mid vowels have a peculiar distribution (often called *loi de position*), with closed mids [e], [ø], [o] tending to occur in open syllables and open mids [ɛ], [œ], [ɔ] in closed syllables. Phonological accounts of these facts in different frameworks are based on assumptions about the duration and quality of French oral vowels and the way syllable structure affects vowel duration: (i) high and low oral vowels [i], [y], [u], and [a] do not have distinct open and closed syllable allophones, but mid vowels do; (ii) closed mids are inherently long, open mids short, and non mids are neither long nor short; (iii) closed syllables do not allow long vocalic *nuclei*, open syllables do not allow short ones. Put together, these three assumptions derive the syllable-conditioned distribution of French mid vowels.

However, so far, little acoustic evidence has been provided to support these claims. Typically, formant values of non mid vowels are averaged across syllable types in phonetic studies of French oral vowels (Calliope 1989), making it hard to evaluate claim (i). Claim (ii) has been shown to be false if long and short are to be understood as long and short *with respect to all other vowels*: increasing F1 correlates with increasing duration in French (Rochet & Rochet 1991), with high vowels being the shortest vowels and [a] the longest. However, there is another way to make sense of a claim along the lines of claim (ii): (ii′) closed mids could be long and open mids short *with respect to their height*. In this study, we report results of a production study designed to test claims (i) and (ii′), leaving claim (iii) for further research.

Method. Six male speakers were recorded pronouncing nonce words with vowels [i, y, u, e, ø, o, a] in unstressed and stressed open syllables, and nonce words with vowels [i, y, u, ɛ, œ, ɔ, a] in unstressed and stressed closed syllables. F1 was taken at the center of the vowel, and duration was measured from the first to the last visible period in the waveform.

Results. A linear mixed effects model was fit predicting F1 distance between closed and open syllable allophones with height, stress, and an interaction term as independent variables, and random slopes for each effect. We found that the distance between closed and open syllable allophones is larger on average for mid allophones as compared to low allophones ($t = 4.5$), and is increased under stress ($t = 2.3$). However, open syllable low and high allophones are not significantly different from their closed syllable counterparts. Another linear mixed effects model was fit predicting vowel duration with F1, vowel height, and stress as independent variables, and random slopes for each effect. In addition to the well known effects of stress and F1 on duration, we found that high vowels are a lot shorter ($t = -6.0$) and closed mids a little longer ($t = 1.9$) than one would predict if the relationship between F1 and duration was perfectly linear. However, we found that closed mids are not significantly longer than predicted by F1 alone when syllable type is included in the model ($t = 1.6$): the small additional duration that we found earlier is likely to come from closed mids occuring only in open syllables. The two linear models tested above were compared to variants with fewer predictors and shown to account better for the data ($p < 0.001$).

Discussion. These results confirm claim (i), according to which there is no general lowering of vowels in closed syllables. However, claim (ii) is not supported, even under its weakest version (ii′): open mids have not been found to be short with respect to their height, and closed mids do not appear to be long when syllable structure is controlled for. This last result, if true, poses a serious challenge to the traditional phonological accounts following Morin's (1986) hypothesis that vowel duration is the moving force behind the *loi de position*. To conclude, we will discuss possible alternative analyses where vowel quality plays a major role in deriving the distribution of French mid vowels.

Level of Abstraction in Early Lexical Representations

Katalin Tamási[a,b], Cristina McKean[b], Adamantios Gafos[a], and Barbara Höhle[a]

[a]Center of Excellence Cognitive Science, University of Potsdam
[b]School of Education, Communication & Language Sciences, Newcastle University
{tamasi, gafos, hoehle}@uni-potsdam.de, cristina.mckean@ncl.ac.uk

Studies measuring infants' ability to detect mispronunciations demonstrate that infants represent more detailed phonetic information than has been previously evident from studies of children's production (Charles-Luce & Luce, 1995). When presented with known words, infants are shown to be sensitive to manner, place and voicing changes (White & Morgan, 2008). These findings suggest that early word representations are detailed, but do not address the issue of whether the details are stored as acoustic representations or as abstract distinctive features. Thus, it is still an open question as to how abstract early words are: whether words in the infant mental lexicon are represented in terms of purely auditory dimensions or, alternatively, in terms of distinctive features.

We propose to study this question with 30-month-old German children by employing pupillometry, a method highly suitable for assessing phonological and lexical knowledge, being based on a psycho-sensory reflex, i.e., pupil dilation (Richert, 2013). Our study gauges children's ability to detect mispronunciations in onsets by looking at differences in pupil dilation. Previous work has shown that pupil dilation is associated with cognitive load in general (Kahnemann & Beatty, 1966) and processing deviant pronunciation in particular (Hochmann, 2013). In our study, we introduce place, manner and voicing changes in words. Children are presented with a familiar image (e.g., that of a comb) along with its (correct or mispronounced) auditory label. By systematically manipulating the number of feature changes, we created word triplets that exhibit deviations of one to three features (see Table 1).

To assess whether early words are processed exclusively via auditory or, in addition, via language-specific mechanisms, we discuss two proposals that put forth different predictions. According to a non-linguistic approach that we term (1) 'confusion account', word recognition recruits auditory mechanisms only (Phatak, Lovitt, & Allen, 2008). Confusion matrices determine how likely each sound is to be confused with one another based on acoustic measures. Specifically, the confusion account predicts that the differences in pupil dilation are a function of auditory distance. In contrast, (2) the abstract featural account states that sounds are composed of abstract distinctive features. Thus, the discriminability of two sounds is predicted to be, above and beyond auditory distance, a function of their featural differences. The study can adjudicate between the two proposals by examining the pattern of pupil dilations: whether (1) a change in pupil diameter can be solely explained by auditory distance; or, (2) abstract features can explain part of the variation after controlling for auditory distance.

Table 1: Experimental manipulation shown with 2 (out of 20) items (ΔnF = n-feature change)

Items (*English*)	Δ1F	Δ2F	Δ3F
Kamm (*comb*)	/p/amm	/f/amm	/v/amm
Sonne (*sun*)	/d/onne	/f/onne	/p/onne

Against reductionist accounts of reduction: Converging evidence

Rory Turnbull
turnbull@ling.osu.edu
Dept. of Linguistics
Ohio State University

Phonetic reduction is pervasive in naturally occurring speech. Decades of research into the acoustic and articulatory mechanisms involved in reduction, and the accompanying phonological processes, has led to a much clearer picture of this phenomenon. However, there is still no consensus on *why* reduction even occurs (or conversely, why it does *not* occur in particular contexts).

Some reductions can plausibly be explained through physiological mechanisms, such as articulatory undershoot due to speech rate or vocal pathology, while other reductions are phonologically predictable, such as vowel neutralization in unstressed syllables. The specific topic of this paper is predictability-based phonetic reduction, defined as any phenomenon of phonetic reduction that (1) affects the magnitude of a physical property such as duration of any spoken language element, and (2) is mediated by or correlated with some observable property of the predictability of that element. Examples include reduction due to frequency, phonological neighbourhood density, semantic predictability, or second mention.

In this paper I review evidence from phonetics, phonology, and psycholinguistics, which suggests that reduction is a complex and multi-causal phenomenon, in contrast with the majority of current theories which invoke a single mechanism or set of mechanisms to account for phonetic reduction. This result implies that competing theories may be simply describing different phenomena, and not actually competing at all.

One group of theories emphasizes that speech entails a balance between minimization of effort and maximization of contrast (e.g. Aylett and Turk, 2004; Flemming, 2010; Lindblom, 1990). Similar theories posit active constraints which manipulate phonetic content in real time to satisfy phonological restrictions (e.g. Kirchner, 2001). An alternative approach from the psycholinguistic literature relies on purely speaker-internal or "egocentric" models (e.g. Baese-Berk and Goldrick, 2009; Bard et al., 2000), which hold that reduction is an epiphenomenon arising from the cognitive processes involved in lexical retrieval and access in the course of speech production, with no recourse to contrast maximization or concern for the intended recipient of the message. Finally, another group of theories suggests, in contrast to the active and online mechanisms posited by the above theories, that reduction results from passive and long-term constraints on language acquisition and use (e.g. Blevins, 2004; Pierrehumbert, 2001; Silverman, 2012). Under these accounts, reduction is simply a consequence of the organization of the lexicon and the phonological system of a language.

I analyse data from a series of production experiments investigating the relationship between individual variation in theory of mind skills and implementation of phonetic reduction. The results indicate that semantic predictability-based reduction is sensitive to such variation, but that second mention reduction is not, suggesting that separate cognitive mechanisms are responsible for these phenomena. I also present findings from a corpus study of reduction in the Buckeye Corpus of Conversational Speech (Pitt et al., 2007) which demonstrates that frequency, second mention, and neighbourhood density exhibit different patterns of phoneme deletion effects. Taken together, these results support the conclusion that reduction cannot be reduced to a single factor.

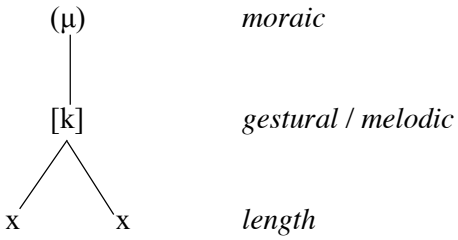
A unified representation of geminates: autosegmentalism and set theory

Shanti Ulfsbjorninn (SOAS – University of London, 150669@soas.ac.uk)
Faith Chiu (University College London, faith.chiu.11@ucl.ac.uk)

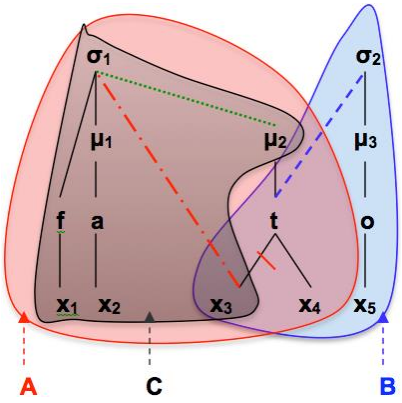
This presentation takes a recent proposal for a unified representation of geminates (Baker 2009) and shows how it fails to account for geminate behaviour in relation to the metrical lengthening facts of Italian. We then propose a novel account.

The autosegmental representation of geminates has emphasised the traditional divide between their intrinsic properties: length and weight. The former is represented with C-slots (McCarthy 1979), x-slots (Lowenstamm & Kaye 1984; Levin 1985) or a different breed of C-slot (Lowenstamm 1996; Scheer 2004), and the latter is represented by the mora (Hyman 1985; Hayes 1989). Having distinct units, x-slots and moras appears to be useful in analysing geminate typology. While geminates (in non-initial positions) are almost always long, they are not always heavy (cf. Ngalakgan stress assignment in Baker 1999; Ringen & Vago 2011), although they often show precisely this property (cf. Chuukese minimal word effects in Davis 1999, 2011). A recent attempt to form a universal geminate representation encoding both length and weight units is found in Baker (2009) and favoured by Davis (2011).

(1) Baker's (2009) geminate representation



(2) Resultant sets



Despite the attractiveness of the compatibilist model in accounting for both heavy and light geminates, this model bears intrinsic and intractable structural problems. Firstly, it does not conform to the principles of constituency, which are central to formally rigorous theories of phonology such as Feature Geometry. Secondly, its choice to subsume length units under the gestural tier, as in (1), is a reinstating of the feature [+long] (Chomsky & Halle 1968) in all but name. Thirdly, empirically, the structure in (1) is unable to account for the behaviour of geminates in Italian metrical lengthening.

In Italian, geminates must be seen as heavy and long (Chierchia 1986; Krämer 2009), and length and weight of syllables are subject to strict phonotactics and trade offs. Incorporating the representation (1) into an analysis of these Italian facts proves impossible because of how each tier is associated *i.e.* syllabified; this option violates the foundations of licit association in autosegmental phonology (Leben 1973; Goldsmith 1976), which are formally definable in terms of set theory. This is also taken to be axiomatic in syntax (Chomsky 2012).

All possible associations produce illicit sets as outlined in (2) for the word [fat:o] 'fatto' *fact*. These sets correspond to syllables A, B and C, all illicit. A and B violate syllable requirements of Italian. Set A, in red, indicates the members of σ1 as [fat:] and includes 2 moras, and 4 x-slots; σ1 being A={μ_1, μ_2, f, a, t:, x_1, x_2, x_3, x_4} is too long and heavy. Using the flopped structure, σ2 in blue consists of B={μ_3, t:, o, x_3, x_4, x_5} producing [t:o]. While set C, in grey, consists of the desired members {μ_1, μ_2, f, a, x_1, x_2, x_3} but the association lines required to generate it violate the set theory principles underlying constituency. Our proposed unified representation for geminates account for their weight and length behaviour cross-linguistically by using only skeletal slots projected above the 'gestural tier'. Geminate weight is non-representational but parametrically defined, in line with Ulfsbjorninn (forth.).

Replace your old opaque phonology with a new transparent morpho-phonology today!

Sławomir Zdziebko
(John Paul II Catholic University of Lublin)
s.zdziebko86@gmail.com

The aim of this paper is to show that (i) Polish segmental alternations are not phonological but morpho-phonological; (ii) palatalizations and depalatalizations apply whenever their conditions are met: no extrinsic rule ordering/constraint ranking is necessary for the description, and (iii) the opacity associated with morpho-phonology of palatalizations/depalatalizations is only apparent.

I will show that (de)palatalizations are arbitrary in nature, i.e. the environments in which the changes take place do not form a phonological natural class and the input-output mappings triggered by coherent sets of affixes cannot be expressed by means of coherent sets of distinctive features.

The claim that palatalizations take place whenever their conditions are met is faced with several sets of counterexamples. The first set involves the palatalization of post-alveolar spirants in Polish virile declensions. The Nominative and Vocative plural of the adjective ci[x]-y 'silent' is ci[ɕ]-i, arrived at by the joint application of two independently attested rules: one replacing the velar /x/ with the post-alveolar /ʃ/ (c.f. ci[ʃ]-a 'silence') and the other replacing /ʃ/ with the palato-alveolar /ɕ/ (c.f. gor-[ʃ]-y 'worse' - gor-[ɕ]-i). The rule deriving /ʃ/ with /ɕ/ is independently known to replace the voiced post-alveolar /ʒ/ with the voiced palato-alveolar /ʑ/ in the same context (c.f. świe[ʒ]-y - świe[ʑ]-i 'fresh'). Yet another rule that applies in the Nominative and Vocative plural replaces /r/ with /ʒ/ as in star-y - sta[ʒ]-y 'old'. If all the rules apply at once, the output of the last derivation should be the unattested form *sta[ʑ]-i as /r/ should go to /ʒ/ and /ʒ/ to /ʑ/. The opacity is resolved if palatalizations are assumed to be triggered by decomposed case features which are rewritten as stem-final consonants and erased from the representation (in the spirit of Bobaljik 2000). Crucially, the /r/ /ʒ/ change is triggered by the superset of the features that trigger the /ʒ/ /ʑ/ change and bleeds it.

The second type of opacity is the consequence of the fact that depalatalizations and palatalizations sometimes seem to be triggered by the same exponents. Thus, the multi-functional affix -(e)k- is claimed to trigger the palatalization of /ɡ/ to /ʒ/ as in brze/ɡ/ - brze/ʒ/ek 'edge - diminutive.' and depalatalization of /ʒ/ to /r/ as in piłk-a/ʒ/ - piłk-a/r/-ek 'footballer - female footballer, gen. pl.' I will show that in masculine stems the depalatalization is triggered by the configuration involving the feminizing head (an *n* head with feature [+FEM] or a ЖK head proposed in Pesetsky 2013) realised as -(e)k-, but not by -(e)k- alone. In non-masculine stems the rule is non-exceptionless (c.f. pla/ʒ/-k-a 'beach, fem, dim.').

The third type of opacity is attested in the morpho-phonology of transposition where the de-verbal noun rzut /ʒut/ 'a throw' surfaces with /t͡s/ in the verbal noun rzuc-a-ni-e /ʒut͡saɲɛ/ 'the act of throwing', but the noun zgrzyt /zgʒɨt/ 'grating' surfaces without affrication as zgrzyt-a-ni-e /zgʒɨtaɲɛ/ 'the act of grating'. Moreover, the de-verbal noun gryz /grɨz/ 'a bite' surfaces with /ʑ/ as gryzi-e-ni-e /grɨʑɛɲɛ/ 'the act of biting' while wy-wóz /vɨvuz/ 'disposal' ends up with /ʒ/ as wy-wo -e-ni-e /vɨvɔʒɛɲɛ/ 'the act of disposing of'. I will argue that the exponents of the roots √ZGRZYT and √GRYZ terminate in the dental /t/ and /z/ while the exponents of the roots √WO and √RZUC end in the post-alveolar spirant /ʒ/, the dental affricate /t͡s/, respectively. The appropriate depalatalization rules derive /z/ and /t/ in the exponents of √WO and √RZUC in the configuration [√ROOT *v*]n_{def}]. Crucially, no depalatalization is attested when the Asp(ect) head is present as in verbal nouns such as wy-wo -e-ni-e /vɨvɔʒɛɲɛ/, gryzi-e-ni-e /grɨʑɛɲɛ/ 'the act of biting' *etc*.

A Correlation between Stress and Reduplication: Diyari and Beyond

Sam Zukoff, MIT · szukoff@mit.edu

McCarthy & Prince [M&P] (1986) demonstrated the direct relationship between reduplication and prosody. One of their banner examples is the Australian language Diyari. M&P (1994) analyze Diyari's prosodically-fixed (henceforth "*PF*") disyllabic reduplicative "template" in terms of optimal footing of a separate prosodic word. Following Stanton's (2013) work on cyclic stress in Pama-Nyungan, we can build on M&P's insight to provide an even more compelling account of the Diyari-type reduplication pattern based on the interaction of independently verifiable constraints on stress. After considering reduplication patterns in Diyari and similar Australian languages, we can extrapolate that stress considerations actually determine what reduplication patterns are possible for a language.

Diyari, just as many other Australian languages, has a quantity-insensitive left-to-right iterative stress pattern (henceforth "QI L→R"). This basic pattern can be modeled with three non-foot-based stress constraints (Gordon, 2002): STRESSL, *CLASH, and *LAPSE. Diyari also shows clear effects of Base-Derivative stress faithfulness (Stanton, 2013), which we can encode with a constraint BD-IDENT(stress). When these constraints are ranked above any constraints which would directly reference the shape of a reduplicant ("templatic" constraints, economy constraints, etc.), a *PF* disyllabic reduplicant emerges, as a monosyllabic reduplicant would be unable to simultaneously satisfy both STRESSL and *CLASH without violating BD-IDENT(stress).

The reduplication pattern follows from the stress pattern. This raises the following possibility: it is a general property of language that reduplication patterns develop such that they maximize satisfaction of the prosodic constraints active in the language. Put more technically, a language will not permit a *PF* reduplicative template that violates stress constraints which are evidenced to be undominated in the non-reduplicative grammar.

A survey was conducted to assess this hypothesis. The survey identified 19 Australian languages with a QI L→R stress system (a la Diyari) and at least one clearly identifiable reduplication pattern. 12 languages reflect the desired stress system almost perfectly and indeed display forms with disyllabic reduplicants (e.g., Dyirbal, Warlpiri). These languages do not have *PF* monosyllabic reduplicants. 4 languages (e.g., Gooniyandi) show the desired reduplicative behavior and generally alternating L→R stress, but are slightly weight sensitive and permit clashes in limited cases.

Ngalakgan (Baker, 2008) and Ngan'gityemerri (Reid, 2011) are the only languages in the survey which appear to have *PF* prefixal monosyllabic reduplicants (both also have disyllabic patterns). Both languages have certain monosyllabic prefixes that reject stress (violating *STRESSL) in favor of retaining stress on the base-initial syllable and avoiding a clash. They also permit clashes across compound boundaries. It may thus be the case that these languages permit prosodically non-optimal reduplication patterns because they show evidence in the non-reduplicative grammar for the violability of relevant stress constraints.

The most interesting case is Wambaya (Nordlinger, 1998). It has peninitial stress when the second syllable has a long vowel, but otherwise has alternating L→R stress. (It appears to allow clashes only in very specific morphological environments.) It has two distinct prosodically-determined reduplication patterns. One is a disyllabic pattern (a la Diyari); the other, however, is a monosyllabic infixal pattern. (The stress on these forms is not reported.) The properties of the stress pattern do not provide any obvious justification for the infixal reduplication, but we might speculate that infixal patterns are immune to prosodic optimization factors, possibly due to difficulties of assessing BD-faithfulness.

Additional support for our hypothesis may come from Ponapean (Austronesian). Ponapean has an alternating R→L stress pattern (based on moras), and a prefixal reduplication pattern which is not *PF*, but instead variable. Kennedy (2002) proposes that *CLASH (operating over moras) plays a crucial role. This constraint is inviolable in the non-reduplicative grammar, and thus its operation in reduplication follows from our hypothesis.

Special session

Epenthesis

Epenthesis as a UG reflex

Iris Berent (Northeastern University)

It has long been known that illicit syllables (e.g., *lbif*) are prone to epenthesis (e.g., *lbif*→*lebif*), but the origin of this phenomenon is controversial. One view asserts that epenthesis reflects a passive failure to encode the phonetic form of unfamiliar inputs. But on an alternative account, epenthesis is a grammatical phonological process that actively recodes ill-formed onsets to abide by universal markedness pressures. To adjudicate between these possibilities, one must determine (a) why are certain syllables prone to epenthesis; and (b) whether epenthesis invariably operates at an auditory/phonetic level. This talk addresses these questions

As a case study, I examine the sonority restrictions on onset clusters. I demonstrate that onsets with small sonority clines are systematically epenthesized—the smaller the sonority cline, the more likely the epenthesis. I next review behavioral and neuroimaging evidence that gauge the mechanisms of epenthetic repair. Results suggest that the perceptual misidentification of ill-formed onsets is unlikely to result solely from an auditory/phonetic failure (e.g., the phonetic form of [lbif] [ləbif]), as (a) people demonstrably have an accurate phonetic record of stimuli that they typically misidentify; (b) the misidentification of ill-formed onsets persists even for printed stimuli; and (c) it is associated with hemodynamic response in Broca's area (rather than primary auditory cortex alone). Misidentification is also unlikely to result solely from lexical analogy (e.g., *lbif* is dissimilar to attested English syllables), as similar preferences obtain across adult speakers of different languages that vary markedly on their onset inventory, and their precursors are detected in the brains of neonates.

By elimination, these results suggest that epenthesis is a grammatical reflex that recodes ill-formed syllables to abide by markedness pressures. Finding that speakers of different languages—adults and infants—converge on the same syllable hierarchy despite minimal to no relevant linguistic experience opens up the possibility that markedness pressures might be universal.

Intrusive vowels and the dynamics of gestural coordination

Louis Goldstein (University of Southern California)

I will be talking first about how to evaluate whether some examples of epenthesis (those that are typically called "intrusive") could (or could not) be modeled as a change in temporal coordination of consonants without adding any specific gestures. To do this evaluation meaningfully, we need to understand the "neutral postures" in particular languages. I will talk about real-time MRI research from our laboratory investigating these neutral postures [5], how much they are or are not like genuine gestures, and why languages have particular neutral postures (it turns out that confer a kind of mechanical advantage [4]). Then I will discuss two examples that are at least plausibly of this kind, the English past tense ("needed") [1,2] and Tashlhiyt Berber intrusive vowels in non-sonorant words that require pitch accents [3]. I will present analyses using the coupling graph representation, prosodic gestures, and dynamical grammars.

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The diversity of vowel epenthesis

Nancy Hall (California State University, Long Beach)

In this talk I argue that the term "epenthesis" covers a diverse set of phenomena, which vary along a number of dimensions such as:

- The well-studied phonological variables of epenthetic **vowel quality and location**.
- **Interactions** between epenthesis and other processes.
- **Motivation for epenthesis**, which is not always as simple as removing marked structures.
- The **phonetic nature** of the vowels, which may be acoustically different from lexical vowels.
- **Speaker awareness** of the vowels, including the ability to hear and consciously control the presence of epenthesis.
- **Optionality** of epenthesis.

The first two dimensions above traditionally receive the most attention in phonological theory, but we may not be able to fully account for these patterns without reference to the other factors, which are often under-described. A fully articulated typology of epenthesis needs to look for correlations between the types of variation described above.

As a case study, I will discuss a case where epenthetic vowels are acoustically different from lexical vowels. Levantine Arabic has an optional process of vowel epenthesis that inserts vowels into CCC and final CC clusters ([bint] ~ [binit] `girl'). This phenomenon has been extensively analyzed for its complex, opaque interactions with stress and other processes, but the phonetic, sociolinguistic, and psycholinguistic characteristics of these epenthetic vowels have been less explored. My work (with Maria Gouskova and others) has found that many speakers produce epenthetic vowels that are acoustically distinct from lexical vowels. In a noun like [libis] 'clothing' (from /libs/), the epenthetic second vowel may be shorter and more centralized than the lexical second vowel in [libis] 'he wore' (from /libis/). For some speakers, the two vowels are categorically different; for other speakers, the vowels are statistically significantly different yet overlap heavily, and for some speakers the two vowel types are the same.

This acoustic differentiation, as well as the optionality, may contribute to the survival of opaque phonological interactions. For the first language learner, there are acoustic cues to signal the vowels' special status at the early stage where stress is acquired, before the acquisition of morphological alternations.

Possible epenthetic segments: the role of faithfulness

Christian Uffmann (University of Düsseldorf)

In discussions about the potential quality of epenthetic segments, there have been two fiercely opposing views: on the one hand, that any segment could be an epenthetic segment, that UG does not provide any filter on epenthetic segment quality (and that common vs uncommon choices are merely an effect of diachrony), on the other hand the view that the range of possible epenthetic segments is indeed constrained by UG. This talk will adduce evidence for the second view, but argue against the standard claim that substantive markedness constraints function as the primary filters. Instead, this talk will reappraise the role played by faithfulness.

Faithfulness may seem to be of little relevance, as de Lacy (2007) points out: since epenthetic segments have no input correspondent, we should expect faithfulness constraints to be irrelevant and markedness constraints being given free reign. This line of reasoning, however, also seems to be an effect of the focus on default segment epenthesis that permeates the literature, disregarding the many cases where the quality of an epenthetic segment is at least partially determined by feature spreading. In addition, endorsing the recent reappraisal of underspecification (see e.g. Dresher 2009, Moren 2008) would entail that different possible epenthetic segments violate feature faithfulness differently, less specified segments being more optimal epenthetic segments, disregarding markedness effects. An additional consequence of this approach is that phonetically unusual epenthetic segments could be explicable, if there is independent evidence that these segments are phonologically underspecified.

This talk is structured as follows: After a brief critical introduction to the notion of markedness (and outlining some problems a markedness-only account of epenthesis fares, including perceptually-based approaches), I will provide a survey of epenthetic vowels and epenthetic consonants, based also on evidence from loanword adaptation (Uffmann 2007a) and develop the faithfulness-based approach further, showing that default epenthesis frequently alternates with spreading-based epenthesis and is used as a last resort when spreading is not available for some reason. Moreover, the pervasiveness of default epenthesis in a language can be directly linked to the degree of underspecification of the epenthetic segment. The discussion of consonants will include an appraisal of the role of sonority, further developing the model proposed in Uffmann (2007b): prosodic positions may attract high-sonority or low-sonority material, again, mediated through faithfulness.

The last parts of the talk will then discuss the model critically and defend it against alternative approaches. The idea that diachrony and rule inversion are a sufficient explanation (as commonly adduced for English 'intrusive [r]', for example) will be challenged, also by showing that some segments seem to be more susceptible to rule inversion than others: while nasals are frequent targets for deletion, crosslinguistically, they are virtually unattested as epenthetic segments (with apparent counterexamples being discussed here; see also Ortmann & Uffmann 2011). Finally, a celebrated example of the 'anything goes' approach (see e.g. Vaux & Samuels 2013), Buryat 'epenthetic [g]' will be analysed in depth, arguing that a careful analysis shows that the Buryat case is highly problematic, and that alternative analyses are readily available. It also demonstrates the importance of a thorough analysis of the phonological system of a language instead of making sweeping claims on the basis of a handful of examples, and it raises important questions regarding the architecture of the phonological module of UG.