The Seventeenth Manchester Phonology Meeting

ABSTRACTS BOOKLET

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Organised by a collaboration of phonologists at the **University of Edinburgh**, the **University of Manchester**, the **Université de Toulouse-Le Mirail**, and elsewhere.

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This booklet contains the abstracts for all the papers presented at the **seventeenth Manchester Phonology Meeting**, held at Hulme Hall, Manchester, in May 2009.

The abstracts are arranged in alphabetical order by the surname of the (first named) presenter.

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**. Unfortunately, one presenter did not submit the non-anonymous version of their abstract in time for inclusion in this booklet.

All sessions for papers listed in this booklet will take place in either the **Old Dining Hall**, the **Seminar Room** or the **bar area** in Hulme Hall. The opening and closing addresses and the special session will be held in the Old Dining Hall. The parallel sessions for the oral papers will be held in the Old Dining Hall and the Seminar Room, and the poster sessions will be held in the bar area.

The Old Dining Hall is in the main Hulme Hall building, upstairs, and just through the bar area and the area where the meals are held. The Seminar Room is in the new building which is opposite the entrance to the main Hulme Hall building. It takes about a minute to walk from one to the other. The **final programme**, included in your registration pack, gives the details of which papers are in which room, and at which times.

Oral papers

On the emergence of the Korean aspirates: a dispersion account

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The well-known three-way laryngeal contrast in Korean (i.e., lax, aspirated, tense) has evolved from a simple Proto-Korean consonantal system lacking aspiration and tenseness (Poppe 1965, Starostin et al. 2003). Observing the asymmetry in (1), this paper discusses how the aspirated consonants evolved with respect to the motivation and the constraint interactions. To this end, I first briefly review the history of consonantal tensing in Middle Korean by showing that the overall emergence has evolved from an alignment constraint, requiring that a fortified edge be aligned with a certain edge, such as a morphological boundary or a higher prosodic edge, signaling a loss of an extra consonant. As for the emergence of the aspirates, the textual data (2) show that the Ancient Chinese aspirated consonants were realized either as aspirated or as lax obstruents in Old Korean literature, but we observe a gap for the velar aspirate /k^h/ (shaded in (2)) (B. Park 1971). The idiosyncratic distribution has triggered much controversy over the phonemic status of the aspirates in Old Korean (Yoo 1960, Lee 1972, Cho 1986, Park 2002, etc.). Moreover, the statistical result seems to show the universal markedness hierarchy since the coronals, i.e., apicals and laminals, were the most common aspirates. Observing this distribution, many earlier works supported the markedness hierarchy, as about 60% of the Ancient Chinese aspirates were realized at the apical region and 87 % at the laminal region, while only 36% at the labial region. If this universal hierarchy works, it could then be a case of a teleological sound change (Blevins 2004).

In this paper, however, I first claim that the aspirated consonants were part of the phonemic inventory in Old Korean. I then argue that the evolution procedure of aspirates was not constrained by the markedness hierarchy. Rather, it depended on the strong motivation to expand the phonemic inventory by aspirating the lax stops but there were inherent conflicts between this motivation and other constraints. Here I demonstrate that the paucity of the velar aspirates was a consequence of the functional overlap between the already existing /h/ and the new /k^h/ which share acoustic similarity as well as the backness in articulation. In supporting this argument, I critically review the earlier views on the status of the Old Korean aspirates. I then account for the emergence procedure by employing the pattern evaluation of Dispersion Theory (Flemming 1995, 2001) as the overall consonantal system cannot be evaluated in isolation. I also argue that the whole procedure should be described in three historical stages requiring different constraint rankings. As (3) shows, for example, MAX(asp) takes the triggering role for the emergence of the aspirates and the gradual promotion of this constraint was responsible for the each developmental stage of aspiration.

(1)

	Proto K.			>	Ancient K.			>	Old K.			>	Early Mid K.			>	(Early)Mod K.		
lax	p,b	t	k		p	t	k		p	t,	k		p	t	k		p	t	k
aspirated						t^h			p^h	t^h			p^h	t^h	k^h		p^h	t^h	k^h
tense/gem.																	pp	tt	kk
glottal fric.			h				h				h				h				h

(2) Distribution pattern

	Labial				Apical				Laminal				Dorsal			
Ancient Chinese	p		ph/fh		t/ʈ		th/ʈh		ts/tś/tʂ		tsh/tśh/tʂh		k		kh	
Old Korean	p	p^h	p	p^h	t	t^h	t	t^h	c	c^h	c	c^h	k	k^h	k	k^h
Occurrences	82	30	30	17	89	14	41	61	151	34	13	86	270	-	88	-

(3) Stage 1: KEEPDIS(asp) >> *[+asp, -bk] >> PRECASP >>**MAX(asp)**
Stage 2: KEEPDIS(asp) >> **MAX(asp) >>** *[+asp, -bk] >>PRECASP
Stage 3: **MAX(asp) >>** KEEPDIS(asp) >> *[+asp, -bk] >> PRECASP

Cumulative violations and complexity thresholds: Evidence from Lakhota

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A guiding principle of constraint-based approaches to phonology has been the claim that optimization is local and restricted: if a structure is permitted once in the word, multiple independent occurrences are also allowed—i.e., "phonology can't count" (Prince and Smolensky 2007; Pater, Bhatt, and Potts 2007). The motivation for this principle is the empirical claim that languages do not set complexity thresholds, allowing for example one closed syllable in the word (✓CV.CVC, ✓CVC.CV) but not two (*CVC.CVC). In this talk, I argue that such complexity thresholds are in fact attested, using data concerning a set of cooccurrence restrictions in Lakhota (Siouan). Statistical analysis of a database of Lakhota roots reveals that many marked structures, including fricatives, ejectives, and onset clusters, are essentially limited to one per lexical item (data below). Furthermore, certain combinations of these elements do not cooccur freely; for example, roots may not contain an ejective in one syllable and a cluster in another. These restrictions are analyzed with a grammar of weighted constraints, using a model in which multiple markedness violations may "gang up" to be worse than any individual violation.

Lakhota allows a wide variety of sequences and clusters, including fricatives ([**ʃ**a] 'red', [**ɣ**ã] 'bushy', [wã**ʒ**i] 'one'), ejectives ([**k'**u] 'lend', [**t'**a] 'die', [wa**ʃ'**ake] 'strong'), aspirated stops ([a**pʰ**a] 'hit', [**tʰ**o] 'blue'), and clusters ([**kt**e] 'go out', [**gl**i] 'go home', [**pʃ**a] 'sneeze', [**mn**a] 'smell like'). In disyllabic roots, these structures may occur in either syllable: [**tʰ**ãka] 'big', [**k'**oɣa] 'rattle' vs. [a**pʰ**a] 'hit', [na**p'**ĭ] 'wear around neck'. Carter (1974, p. 51) observes that although roots may contain clusters in any position ([**sk**uja] 'sweet', [**gl**epa] 'vomit' vs. [hã**sk**a] 'tall', [hĩ**gl**a] 'move suddenly'), roots with two clusters are vanishingly rare ([**gl**e**ʃk**a] 'spotted'). Similarly, fricatives are relatively common in both initial and medial position ([**ɣ**opa] 'snore' vs. [po**ɣ**a] 'blow'), but there are very few examples of two fricatives within the same root ([**ʃ**o**ʃ**a] 'bubbly', [**x**u**ɣ**a] 'dent'). These gaps are difficult to analyze as long-distance OCP effects, since they involve features that are not normally involved in such interactions (onset complexity, continuancy). Rather, I claim that they are a complexity effect: roots generally do not contain two marked structures. Unambiguous confirmation of a complexity effect comes from the fact that combinations of clusters and fricatives are also rare: there are few cluster-first roots like [**mn**u**ɣ**a] 'eat crunchily', [**ʃl**o**ɣ**a] 'make hominy' and no fricative-first roots like *[**x**u**gl**a].

In order to verify and quantify underattestation of complex root types, a database of roots was constructed based on 1075 verb roots (Munro 1989). A possible confound is that Lakhota verbs often involve substantial derivational morphology, and the relevant affixes have simple syllable structure (unaspirated stops, nasals, glides), creating the effect that long verbs have artificially few marked structures. To eliminate this confound, all affixes (transparent or not) were removed, yielding 399 distinct roots. Following Frisch et al. (2004), Coetzee and Pater (2008) and others, this set of roots was used to estimate the expected rate of occurrence of marked combinations, based on the independent probability of being polysyllabic (≈37%) and having marked structures in each position. For example, the probability of fricative onsets is 32% and 17% in syllables one and two, respectively. This translates to an expectation of approximately 14 two-fricative roots like [ʃaze] or [skaɣe] in the database, which is significantly higher than the 3 observed roots (Fisher's exact $p < .01$). This combination (along with many others) is highly underattested given the independent probability of its subparts. I show that this effect can be captured with a weighted constraint model in which constraints may gang up to achieve "superadditive" effects.

Blick testing word-initial consonant clusters in Slovak

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bzsu et budling dot hu

Western Slavic languages, among them Slovak, are well-known for allowing "exotic" consonant clusters word-initially that are absent in other Indo-European languages, and are rare cross-linguistically, like *#tk-*, *#lp-*, *#mdl-* or *#pstr-*. The grammatical analysis of languages with such rich inventories of clusters raises numerous questions: just because a particular cluster is attested should the grammar be formulated to allow it? Does the existence of words like *lkať* 'cry' really mean that native speakers would accept any sonority reversal sequence? And among those clusters that the grammar allows, are all "equally grammatical"? In order to answer these questions external evidence is needed.

The paper reports experimental and modeling results regarding the acceptability of onset clusters in Slovak. We tested 52 word-initial clusters from completely well-formed (e.g. *r*, *m*) to absolutely ill-formed (e.g. [bddʒ], [kxpl]) through rare and typologically marked ones (e.g. *bd*, *pt*, *nr*, *rp*, *mzd*, etc.). In the experiment native speakers were asked to rank made-up words on a scale of 7. (All test words ended either in –eva, –i[ʃ]a, –obo or –ek[i], these are typical, well-formed but not too frequent endings according to the Inverse Dictionary of Slovak.) So every single onset cluster appeared with all four "endings", which made 208 test words. Participants were presented the stimuli both visually and acoustically. Our data show that speakers strongly prefer some attested clusters over others, and some unattested clusters over others. We pay special attention to sonority reversal clusters, and claim that these sequences, although attested in the language, are "ungrammatical" and thus prone to change.

We contrasted our data to the Hayes—Wilson Phonotactic Learner, a grammatical model working on the basis of maximum entropy, and a lexical (exemplar-based) model, Bailey and Hahn's Generalized Neighborhood Model, and found that the gradient grammatical model provides better fit to the data (r = .887 vs. r = .681). These results suggest — similarly to Albirght (2007) — that grammar does distinguish among attested clusters, and that these differences are analyzed in terms of natural classes, allowing generalization to novel sequences. That is to say, gradient phonotactic judgments reflect knowledge of the relative probability of various combinations of natural classes, rather than knowledge of words in the lexicon directly.

However, similarly to Shademan (2007) we found that although the effect of grammar appears to be stronger in acceptability ratings, analogy also contributes (a multiple regression model in which the two models are combined gives r = .904)

This study whishes to contribute to the growing body of experimental results on gradient phonotactic judgments in different languages, and to the theories modeling such judgments.

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A Typological Investigation of Evidence for [sg] in Fricatives

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Vaux (1998) argues that voiceless fricatives are, in the unmarked case, phonologically specified as [spread glottis] ([sg]). In languages which observe this preference, then, we should find evidence that fricatives pattern with [sg] (aspirated) stops. In this paper, we present a typological investigation of the status of [sg] fricatives in obstruent inventories

It is well-known that there is partial devoicing of sonorant consonants in English after /p/, /t/, and /k/ (e.g., *please*, *tray*, *crank*). This is usually understood as being the same as the aspiration that occurs before vowels, though the two cases are typically transcribed differently. Whether it is assumed that the contrast in English is one of [sg] or [voice], the devoicing of sonorants is usually understood as occurring after [sg] stops. This is because, even on analyses that assume that [voice] is the phonological feature of contrast, it is assumed that the voiceless stops are specified phonetically as [sg].

What happens after /s/? Most discussions of English are silent on this issue, with occasional claims that there is the same devoicing of sonorant consonants after /s/ (and other vls. fricatives), but with no citations (c.f. Brinton 2000, Hayes 2008). However, Dougherty (1992) does report on experiments that address this question explicitly. He claims that there is clear evidence of sonorant consonant devoicing after /s/ in English (e.g., *sly*). This devoicing, of course, is expected if we assume that English voiceless fricatives are specified as [sg] and that sonorants are partially devoiced after [sg] obstruents.

In Norwegian, like English, voiceless stops are aspirated, and there is partial devoicing of sonorant consonants following these stops ([ˈpl̥ɑs] 'place'). However, unlike English, there is no devoicing of sonorant consonants following /s/ ([ˈsl̥oː] ‘to beat’), although there is following /f/ ([ˈfl̥iː] 'free') (Kristoffersen 2007). How can this be understood, especially if we assume that voiceless fricatives are [sg] as per Vaux (1998)? One possibility is that in Norwegian, /s/ is not specified as [sg]. This is not unreasonable, since there is no /z/ in Norwegian, hence the coronal fricative is predictably /s/. This is the explanation that Kristoffersen suggests: there is no laryngeal specification for /s/ and hence the partial devoicing of a following sonorant consonant after /p/, t/, /k/ and /f/ is a result of the [sg] specification of (voiceless) stops and non-coronal fricatives; /s/ does not cause this partial devoicing because it has no laryngeal specification. Note that if this explanation is to work, the lack of laryngeal specification on /s/ needs to be maintained into the phonetics if we assume that such partial devoicing is phonetic. Yet, in Icelandic, where the contrast in stops is clearly one of [sg], and there is no s/z contrast, /s/ behaves as if it is [sg] at some level because it causes the devoicing of preceding /r/ (Thráinsson 1994). Thus we cannot assume, in general, that the lack of an [sg] contrast implies the lack of an [sg] specification.

But there is no particular reason (if we follow Vaux) to suppose that [sg] is unavailable on fricatives in a language (such as Russian or Hungarian) in which [voice] is clearly the phonologically active feature on stops. Hybrid obstruent systems are clearly attested, as in German (Beckman et al., to appear), where the phonologically active feature on stops is [sg], [voice] is the feature of contrast on fricatives, but [sg] is also active on fricatives. (In *wässrig* ('watery’), the /s/ causes partial devoicing of the following consonant.) Yet the preliminary data for Russian indicate that voiceless fricatives are *not* [sg]—suggesting that Russian, unlike German, does not have a hybrid system. This raises an interesting question: Are there, in fact, any languages in which [sg] is demonstrably active in fricatives without also being active in stops? If not, what can explain this gap?

Uniform Exponence and Reduplication: Evidence from Kinande

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The last decade has seen increasing interest in the influence that morphologically-related words can have on one another (Burzio 1996, Benua 1997, Steriade 2000, Kenstowicz 2005, McCarthy 2005). The focus of this work has been on the relationship between whole words, or roots. This paper argues that identity can also be enforced between the different instantiations of individual morphemes – indeed, can be enforced between instances of *reduplicative* morphemes, despite their definitional variability. The argument is based on the analysis of verbal reduplication in Kinande, a Central Bantu language spoken in parts of the Democratic Republic of the Congo

Kinande verbal reduplication is typical for a Bantu language: a bisyllabic reduplicant is prefixed to the verbal stem (the root plus any suffixes), and means 'quickly' or 'iteratively'. What is unique about the Kinande system, however, is that reduplication of morphologically complex bases is regulated by a Morpheme Integrity Constraint (MIC, Mutaka and Hyman 1990), which prohibits partial morpheme-copying: individual morphemes must be reduplicated in their entirety or not at all.

What is interesting is the form that reduplicants of morphologically complex verbs take in order to avoid violating the MIC (1b-d): such reduplicants are identical to each other and to the reduplicant of the bare, unsuffixed verb stem (1a):

(1)	a.	eri-huk-a	*to cook*	eri-**huka**-huk-a	
	b.	eri-huk-w-a	*to be cooked*	eri-**huka**-huk-w-a	eri-**hukwa**-huk-w-a
	c.	eri-huk-ir-a	*to cook for*	eri-**huka**-huk-ir-a	*eri-**huki**-huk-ir-a
	d.	mó-tw-á-huk-ire	*we cooked (yestd.)*	mó-tw-á-**huka**-huk-ire	*mó-tw-á-**huki**-huk-ire

The data in (1) present a challenge for a correspondence-based approach to reduplication (McCarthy and Prince, 1995): in (1b-c) we see that the reduplicant can correspond to a non-contiguous substring of the Base, and in (1d) the reduplicant contains a final [a] that is not present in the base at all, and this final [a] is not the result of least-marked fixed-segmentism (Alderete et al. 2002); nowhere else in Kinande is [a] used as a default epenthetic vowel.

Previous approaches to the problem of Kinande reduplication have accounted for the MIC and reduplicant-final [a] through constraints relating reduplicants to canonical verb stems (a CVC root plus a default final morpheme *-a*), via OO-correspondence to *actual* verb stems (Steriade 1997), or via constraints requiring the reduplicant to itself be analyzable as a canonical verb stem (Downing 1999, 2000, 2002). These accounts have encountered difficulty, however, in the domain of reduplicated CV roots. Such roots triplicate under reduplication (2a), and as with canonical CVC roots, the uniform reduplicant is optionally available when reduplicating a suffixed form:

(2)	a.	eri-lw-a	*to fight*	eri-**lwalwa**-lw-a	
	b.	eri-lw-ir-a	*to fight for*	eri-**lwalwa**-lw-ir-a	eri-**lwira**-lwira

The doubled reduplicant (*lwalwa*) cannot be identified as an *actual* verb stem, because there is no root *-lwalw-*, and though the reduplicant could be analyzed as a *potential* verb stem (though the Kinande lexicon includes only very few CGVCG verb roots), that approach accounts for the striking uniformity of the reduplicants in both (1) and (2) only incidentally.

Accounting for the uniformity effects more directly, I propose that Kinande reduplicants are subject to Output-Output (OO) constraints enforcing faithfulness between reduplicative morphemes themselves, not only between morphologically related whole words. Within a set of verbs sharing the same root, reduplicants are thus subject to two separate and sometimes divergent correspondence requirements: they are required by standard Base-Reduplicant (BR) faithfulness to be identical to their linearly adjacent base, but they are *also* required by OO constraints to be identical to all other reduplicants within the root-defined set (RED-Uniformity). When BR and OO faithfulness requirements compete, the result is optionality, as in (1b). When the MIC rules out the BR faithful candidate, as in (1c-d), the uniform reduplicant is the *only* grammatical option.

The advantage of the RED-Uniformity account is that it captures the most striking property of Kinande reduplicants, their uniformity, using machinery that is only a slight extension from previous work on OO-correspondence. The broader prediction of this account is that is that *all* morphemes should be subject to constraints requiring them to have uniform realizations across contexts; this effect will be most visible, however, when the phonological content of a morpheme is highly variable, as it is with reduplication.

ǂhèẽ-ǂhèẽ !n̥ãĩ-!n̥ãĩ: Clicks, Concurrency, and the Complexity of Khoisan

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Concurrent processing, in the simplest sense of doing different things in parallel, is self-evidently inherent in the mechanics of speech production – every speech act is an exquisitely synchronized execution of many muscles. This concrete concurrency has been lifted to the abstract phonological level in gestural phonology with its synchronized scores. Concurrency also appears explicitly in the development of autosegmental phonology, where timing is abstracted away, and only a high-level synchronization beteen tiers is seen. Nowadays, concurrency appears in the dominant theory in the form of parallel OT.

However, despite its use in these phonological theories, concurrency is seldom considered at the basic, almost theory-neutral, level of phonemes and phonological systems, even when it is natural to do so – although most are happy with tonemes running in parallel with the segmental phonemes. In this presentation, we argue that Khoisan clicks should be seen as concurrent segments, even in a non-autosegmental theory, and consider a recent universal claim about clicks.

Linguists have since their earliest encounters been deeply impressed by the immense phonological complexity of the Khoisan languages. The most complex living such language, !Xóõ, is often described as having around 85 click consonants, 35 non-clicks, and around 45 vowels and many diphthongs in four tones. Accounts in the first half of the 20th century described the clicks in terms of five basic click types, with a number (now thought to be 17) of distinct 'effluxes' or 'accompaniments', so making 85. During his long and deep study of !Xóõ, Tony Traill (1985) imposed some phonological order on the vowel system, and in the course of a detailed phonetic study, brought out some relationships between the various click 'accompaniments'. He tentatively proposed a cluster analysis; and in one sentence of the book (1985), he mentioned but drew back from considering a more radical "autosegmental" re-analysis.

Recently, Amanda Miller and colleagues (2007) argued for an analysis of clicks in N|uu (a somewhat simpler, almost extinct language) that expressed the set of click phonemes in an elegant, IPA-chart style, classification using just four features, abolishing the "phonetically empty category" of accompaniment. A particular novelty was the introduction of 'airstream contours', such as a lingual→pulmonic contour, to characterize the difference between clicks with no audible posterior release, and those with a clearly audible (and uvular) release. !Xóõ also has such a distinction, and Traill claims the distinction is *both* one of timing of the posterior release relative to the anterior, *and* one of place (velar vs uvular), and seems implicitly to regard the place distinction as primary. Miller et al. propose that the timing is the only distinction, and should be viewed as a contoured airstream feature. They go further, and say that *all* clicks are basically uvular, with posterior position depending on click type, and that muscular constraints mean that it is difficult "or even impossible" to maintain a robust posterior place distinction within a click type (so invalidating parts of Miller[-Ockhuizen (2003)]'s previous analysis of Ju|'hoansi).

We present an articulatory, acoustic and perceptual experiment on posterior place discrimation in clicks, which challenges Miller et al.'s universal proposal. We propose to simplify the Khoisan inventories, simply by taking seriously what is already done, in linearized form, in all click language transcription and orthographies, by regarding the click (lingual airstream) as concurrent in abstract as well as in concrete with the (pulmonic or glottalic) 'accompaniment' – so reducing 5×17 to $5 + 17$ at a stroke. We observe that native !Xóõ click terminology supports the psychological reality of such a view. We could even rehabilitate the 'click accompaniment' as a phonetically empty but phonologically real segment present in all 17 types. Moreover, at least in !Xóõ, it seems to us plausible (and motivated by the phonetic detail) to take the idea further, and apply a similar reduction to details of the 'accompaniments', as well as to the different 'colourings' of the vowel system – another idea which Traill considered, but was unable to sustain for lack of a concurrent representation. We discuss the merits of a Traill-style cluster approach and the Miller et al. feature analysis as applied to !Xóõ. Finally, we consider the incorporation of concurrent segments into popular phonological theories.

German OSL: to be or not to be… analogical?

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The modern German (NHG) vocalic system is the result of two processes that have affected Middle High German (MHG) vowel quantity: shortening (in closed syllables) and lengthening (in open syllables). We will be mainly concerned with the second process here, known as ***open syllable lengthening*** (OSL), which lengthened MHG (short stressed) vowels in open syllables (MHG ***ne***, ***leber*** > NHG ***n***[e:] "no", ***L***[e:]***ber*** "liver"). OSL suffers a number of exceptions, among which many cases where a tonic vowel was lengthened even though it did not stand in an open syllable (MHG ***zuc***, ***sal*** > NHG ***Z***[u:]***g*** "train", ***S***[ɑ:]***l*** "hall", Reis [1974]).

In traditional (diachronic) analyses (cf. Paul [1884] among others), the presence of a long vowel in such forms is considered as ***unnatural*** and interpreted as the result of analogical levelling: it is argued that these vowels originally remained short until other (disyllabic) forms of the same paradigm (e.g. NHG ***Z***[u:]***ges*** "train (GEN.)") put pressure on the nominative (monosyllabic) forms and influenced the quantity of their tonic vowel.

Several other (synchronic or diachronic) analyses of NHG vowel length have accounted for the ***unnatural*** presence of long vowels before a word-final consonant (in NHG) thanks to extrasyllabicity/appendicity/extrametricality (cf. Giegerich [1992], Seiler [2005a, 2005b, in press], Yu [1992a, 1992b] – henceforth ***extra***-hypothesis). In these approaches, word-final consonants are not part of the syllable from the beginning[1] and are therefore unable to create closed syllables (which would be able to prevent long vowels to occur in this position).

Grounding my study on the analysis of an electronic panchronic corpus containing 15 832 NHG entries (along with the corresponding etymologies), I will show that both proposals must be rejected. The analogy analysis will be discarded mainly because the process we can observe in the diachrony of German has none of the characteristics traditionally granted to analogical phenomena[2] but has many characteristics granted to regular sound changes: unlike other analogical processes but like sound changes, lengthening before a word-final consonant is phonologically conditioned, regular (systematic) and ***can*** be predicted (lengthening occurs whenever the word-final consonant is a sonorant or a phonologically voiced obstruent).

The ***extra***-hypothesis must be rejected as well, mainly because it implies the existence of a device (e.g. "Stray Segment Adjunction") whose (only) objective will be to associate – at some point in the derivation – word-final consonants to the prosodic structure (these consonants receive a phonetic interpretation!) of the sequences they belong to.

I will propose an analysis in which MHG word-final consonants are not codas but rather are to be considered as onsets of degenerate syllables. My proposal will be couched in CVCV (Lowenstamm [1996], Scheer [2004]). As is customary in CVCV, it will be argued that the status of word-final singleton consonants (i.e. onset vs. coda behaviour; hence the possibility for a vowel to lengthen) is tied to the licensing-capacity of the word-final (empty) nucleus (a language-specific parameter). Such an approach acknowledges the possibility that some regional varieties of MHG might not have had the parameter activated: in these varieties, vowel lengthening before a word-final consonant should have been impossible. OSL and lengthening before a word-final consonant will be accounted for by only one mechanism: (new) OSL. Between MHG and NHG, (new) OSL occurred whenever a (tonic) vowel was followed by at most one singleton consonant itself immediately followed by either a nucleus linked to some piece of melody (e.g. MHG ***büne*** > NHG ***B***[y:]***ne*** "stage") or a final empty nucleus ***with*** licensing power (e.g. MHG ***zu***/ɡ/ > NHG ***Z***[u:]***g*** "train"). This approach will have the advantage of being able to **i)** dispense with notions like extrasyllabicity/appendicity/extrametricality (which need a device like "Stray Segment Adjunction") or analogical levelling (which is simply inadequate in this case) and to **ii)** be able to account for (some) dialectal variation.

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[1] The association of word-final consonants to the prosodic structure is carried out towards the end of the phonological derivation by a rule of "Stray Segment Adjunction" (cf. Giegerich [1992]).

[2] Cf. Anttila [1977], Hermann [1931], Hock [1991], Kuryłowicz [1945], Mańczak [1958, 1978, 1980, 1987], Paul [1995].

Phonology in Antebellum America (1817-1850)

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The notion of phonology in Antebellum America (the pre-Civil War period) seems like an oxymoron. But American phonology got its start in Antebellum America when Peter Stephen Duponceau read his paper on English phonology before the American Philosophical Society in May 1817. The paper was subsequently published in the *Transactions of the American Philosophical Society* volume 1 (new series, p. 228-264) in 1818 with the full title, "English Phonology: or, An Essay towards an Analysis and Description of the component sounds of the English Language". Duponceau's paper is fascinating in that it is almost certainly the earliest work that defines the nature of phonology and gives direction for what phonologists are to do. Further, Duponceau describes English sounds in a way that provides a specific phonological view on matters that are of controversy in contemporary English phonology. In this presentation I will largely focus on a discussion of Duponceau's paper. However, I will try put Duponceau's paper in the larger perspective of the almost forgotten world of linguistics in the Antebellum period where, as discussed by Andresen 1990 (*Linguistics in America 1769-1924*), Duponceau along with John Pickering, Albert Gallatin, and Francis Lieber comprised a small cohort of linguists who published on a variety of language related topics referring to what we call linguistics by the term "general philology" or "philology in the general sense" (see, in particular the entry on philology in the first edition of the *Encyclopedia Americana* v. 10, 1832 where phonology is considered one of the divisions of general philology). The discussion on phonology in the antebellum period can be found not only in Duponceau's work but also more marginally in the German grammars written in America during this period (eg, Charles Follen's *Practical Grammar of the German Language*, 1828) and in Francis Lieber's "On the Vocal Sounds of Laura Bridgeman, [sic] the Blind Deaf Mute at Boston: Compared with the Elements of Phonetic Language" in *Smithsonian Contributions to Knowledge* v. 2, p. 3-22, 1850.

Duponceau's conception of phonology as presented in the published 1818 paper involves abstract analysis of sound patterning within a language (such as English) and a consideration of the same or similar sounds across different languages. In defining what his essay is about, Duponceau writes (p. 239), "The component sounds of the English oral language, considered in the abstract, and independent of the signs which are used to represent them, are the subject of this Essay." In terms of the specifics of his discussion on English, Duponceau takes a strong view that the primary difference between English tense vs. lax vowels is really one of quantity not quality. He criticizes others for neglecting the role of quantity in English vowels. It is interesting that contemporary views of English phonology disagree as to whether the English tense-lax vowel distinction is basically one of quantity or quality. Further, Duponceau considers [y] and [w] to be positional variants of [i] and [u], respectively. And, he says the following about what we would call affricates (p. 247), "There are other organic sounds [consonants] which combine so easily with each other, that when placed in a certain juxta-position… they appear as forming but one sound. Such are the sounds of *t* and *d*, with *sh* and *zh*, as in *charm*, *joke*, etc. These blended sounds might well be represented as single letters in a phonological alphabet of the English language…There is not so much necessity for single characters to designate the various combinations of S and Z, with other consonants preceding them, such as *ks*, *gz*, *ps*, *ts*…" These are standard views today. On the other hand, Duponceau considers the velar nasal as reflecting a phonemic sequence of a nasalized vowel followed by 'k' or 'g' (eg, 'song' would be represented as /sãg/); this would be highly problematic from a current perspective. In conclusion, phonology in antebellum America isn't an oxymoron, but where phonology got its start.

The interaction of production and perception skills in infancy and their effects on word learning

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How do children develop the basic knowledge and skills needed to begin to learn to talk? We know little about the ongoing relationship between emergent abilities to perceive speech and produce speech-like vocalisations (babble), and we also lack clear evidence regarding the relationship of those abilities to the onset of word learning and use. This study explores this relationship in a longitudinal design, following 60 children in the development of word recognition and segmentation, consistent consonant production, and word production. The model is based upon Dynamic Systems theory (Thelen & Smith, 1994), which assumes that when relatively simple skills combine, more complex behavioural patterns can emerge. In this case, basic vocal and perceptual skills eventually lead to the onset of an early lexicon.

We evaluate production skills based on weekly recordings from age 9 months to the point where the child makes reliable and consistent use of two consonants or Vocal Motor Schemes (VMS). Perception capacity is assessed on the basis of two headturn tasks (HT), a word-form recognition test at 10 months and a word segmentation test at 11 months. Advances in word production are assessed based on monthly home recordings up to age 18 months. Age at first word use is defined as the age at which 4 words are identifiable in a 30-minute naturalistic observational session in the home.

Preliminary results:

- There is a correlation between proportion of looking time towards familiar words (10-mo. HT) and age at two-VMS ($r=-.258$, $p=.03$, one tailed), suggesting that proficiency with at least two consonants aids in word form recognition. We found a trend for the infants who successfully recognized the familiar words to reach the two-VMS point at an earlier age ($p=.07$, one tailed).
- There is a trend towards better segmentation of familiar words (11-mo. HT) by infants who reach the two-VMS point at 10 months ($p=.05$, one tailed).
- Age at acquiring two VMS is a significant predictor ($p < .01$), and performance on the word segmentation task a near-significant predictor ($p = .06$), of age at first word use. There was no clear connection between the recognition of isolated familiar words (as presented in a word list) and early word production.

These results suggest that babbling provides infants with an important early mechanism for connecting proprioception and audition. By recognizing that what they produce is similar to what they hear, infants can better ‘shape’ their vocalisations to conform to the patterns of the ambient language, and can also better recognise sound patterns in the input based on their similarity to their own productions. Thus, babbling serves as a control parameter, indexing change to the more complex skills of word form recognition and segmentation, and both babbling and segmentation scaffold first word use.

Phonological sensitivity to syntactic cycles: Swedish and other cases

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In Swedish, V-V hiatus is resolved by deleting one of the two vowels; the root vowel is deleted in (1a), but the suffix vowel in (1b).

(1) a. flikka-ur [flikkur] 'girls' b. flikka-ɛn [flikkan] 'the girl'
oːga-ɔn [oːgɔn] 'eyes' oga-ɛt [ogat] 'the eye'

Prima facie, the Swedish pattern seems to be unrelated the strategies for enforcing the Syllable Contact Law (SCL) in Acholi (Bavin 1996). A suffix-initial nasal is deleted in an inalienable possessive construction (2a), but the same consonant is either retained or replaced by the first half of a geminate in an alienable possessive construction.

(2) a. bad-na [bada] 'my leg' b. bad-na [badna/badda] 'my (lamb) leg'
dog-na [doga] 'my mouth' buk-na [bukna / bukka] 'my book'

Contrasts similar to those in (1) and (2) are found the Algonquian language, Ojibwa (Piggott 2008, Newell and Piggott 2008). In current phonological thinking, the Swedish contrast would be attributed to arbitrary morphological conditioning (cf. Lass 1984: 188), while some construction-specific constraint regulates consonant deletion in Acholi. We argue in this paper that the differences in (1) and (2) reflect the fact that phonology interprets morphological structure and this interpretation is cyclic, as determined by phase theory (Chomsky 2001, 2005). One component of phase interpretation from the perspective of the theory of Distributed Morphology (DM) (Halle & Marantz 1993) is Vocabulary Insertion (VI). Items within a phase are visible to well-formedness conditions **at VI**, while items in different phases are visible only **after VI**. The combination of a root and a number suffix (e.g. plural) constitutes a phase in Swedish (and other languages). Therefore, application of a hiatus resolution strategy to such a combination may target either vowel; Swedish targets the first vowel. However, definite suffixes and roots are inserted, cross-linguistically, in different phases. Since the root is spelled out early, the hiatus resolution strategy can only target the vowel of the definite suffix. Acholi exhibits a cross-linguistic feature of inalienable possessive constructions; the possessor affix and the root are always spelled out together for both semantic and syntactic reasons. The imposition of SCL **at VI** forces the deletion of one of the consonants in an obstruent-nasal sequence (2a). In contrast, the possessor affix is spelled out in a different phase in the alienable possessive construction (2b) and would be invisible to SCL at its insertion site. (The gemination option is a fast speech phenomenon, indicating the application of phonology after VI.) Both Swedish and Acholi manifest an element of 'phase impenetrability'; after a chunk of structure is interpreted phonologically, it is relatively opaque. The cyclic analysis of these languages, determined by universal properties of morpho-syntactic structure, predicts that there could not be a language Swedish´ where hiatus is resolved by deleting the first vowel in a root-determiner combination but the second vowel in a root-number sequence. Nor could there be Acholi´ where satisfaction of SCL is achieved by consonant deletion in an alienable possessive construction, but the ill-formed obstruent-sonorant sequence is preserved in the inalienable counterpart.

Contrasts comparable to those in (1) and (2) are well documented, cross-linguistically. They include the subtle difference in French between *non-aligné* [nɔnaliɲe] 'non-aligned' and *non-aligné* [nɔ̃naliɲe] 'not in a line'. Seemingly disparate and arbitrary phenomena therefore receive a unified explanation in the theoretical framework of our paper.

Rethinking the Universality of the Stress-Focus Correlation

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Samek-Lodovici (2005), like most work on the prosody-focus interface (see, e.g., Frota 2000; Gussenhoven 1984, 1996, 1999; Roberts 1998; Rooth 1992, 1996; Reinhart 1995; Selkirk 1984, 1995, 2004, Szendröi 2003, Truckenbrodt 1995, 2007; Zubizaretta 1998) argues that focused elements universally satisfy the STRESS-FOCUS constraint: a harmonically high-ranked constraint requiring them to have sentence-level culminative stress. Samek-Lodovici (2005) recognizes that Kanerva's (1990) study of focus prosody in Chichewa provides an exception to this claim, as focused elements in that language (in the data in Kanerva 1990) bear only phrasal stress, not culminative sentential stress. To account for Chichewa, Samek-Lodovici (2005) proposes a weaker version of the STRESS-FOCUS constraint – still harmonically high-ranked – which requires focused elements only to have the same degree of stress as non-focused heads in the sentential domain. They need not be assigned sentence stress.

In this talk, I present and develop an OT analysis of the results of a new study of Chichewa focus prosody that shows that even this weaker version of the STRESS-FOCUS constraint is violated. XPs in Chichewa, like other Bantu languages, are head initial (Mchombo 2004). It turns out to be impossible to assign stress to focused heads if they are not final in their XP, as phrasal stress – realized as penult lengthening – remains fixed on the final word of the XP. Examples of the mismatch arise when eliciting focus on: nouns, in noun-modifier phrases (1a); prepositions, in prepositional phrases (1b); and verbs, followed by a complement (1c). One can see that the repeated information – not the focused information (underlined) – receives phrasal stress, as it is XP-final:

(1) Stress-focus mismatches in Chichewa

(a) [Context: Did the child carry the basket for the old *man* or the old *woman*?]
A-ná-nyámulira dengu [$_{NP}$ <u>bambo</u> wókálaamba] ósatí [$_{NP}$ <u>máí</u> wókálaamba].
'She carried the basket for the old *man* not the old *woman*.'

(b) [Context: Did the chief build houses inside the village or outside the village?]
M-fúmú i-ná-mánga nyumbá [$_{PP}$ <u>mkatí</u> mwá-muudzi] ósatí [$_{PP}$ <u>kunjá</u> kwá-muudzi].
'The chief built houses *inside* the village not *outside* the village.'

(c) [Context: Did the visitors *find* or *lose* a dog in the swamp?]
A-lendó [$_{VP}$ <u>a-ná-péza</u> gaálú] ku dáambo.
'The visitors *found* a dog in the swamp.'

These mismatches between the positions of focus and stress clearly violate both the strong and weak versions of the STRESS-FOCUS constraint.

The data in (1) also turn out to be problematic for Truckenbrodt's (1995, 2007) now standard OT analysis of Chichewa focus prosody. In this analysis a FOCUS constraint aligning the focused element with the right edge of a Phonological Phrase (PhonPh) is the highest ranked constraint. Notably, it must outrank a constraint aligning the right edge of an XP with the right edge of a PhonPh. This ranking incorrectly makes it optimal to align a PhonPh with the focused heads in the data in (1).

To account for this new Chichewa data I propose we must modify Samek-Lodovici's (2005) and Truckenbrodt's (1995, 2007) analyses in the following ways. First, *contra* Samek-Lodovici (2005) the STRESS-FOCUS constraint cannot be harmonically high-ranked; it must be able to be outranked by other constraints. In the case of Chichewa, we can see that STRESS-FOCUS (replacing Truckenbrodt's FOCUS) is outranked by constraints requiring every PhonPh to align with the right edge of an XP and requiring phrasal stress to fall on the XP penult syllable. It is the resulting inflexibility in the position of phrasal stress which leads to stress-focus mismatches in Chichewa.

Contrast in the Twentieth Century and Beyond

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In his 1985 history *Phonology in the Twentieth Century,* Stephen Anderson called for a reconsideration of the assumption that phonological underlying representations do not contain redundant features. To Anderson (1985: 10–13), it appeared that this assumption was dominant in phonological thinking of the time, but also that it was based on little—if anything—more than an outdated conception of information theory and an unquestioning acceptance of Saussure's (1916) proclamation that "*dans la langue, il n'y a que des différences.*" In this paper, we take up Anderson's challenge—perhaps a little belatedly, but with the advantage of being able to view the whole of twentieth-century phonology with the clarity of hindsight. We wholeheartedly concur with his assertion that contrast has been under-examined; however, we also believe that the contrastivist hypothesis stands on much firmer ground than Anderson thought, and we show that the crucial insight that enables it to overcome what Anderson takes to be its shortcomings has in fact been present, though underappreciated, throughout most of the twentieth century.

The principal challenge that Anderson identifies for the contrastivist position is the existence of "reciprocally dependent properties." In a situation in which each of two features is predictable given the other, Anderson claims, contrastive underspecification is untenable, because eliminating *both* of the apparently redundant features would leave us with no way of recovering either of them. (A similar argument is made by Archangeli (1998)).

What Anderson overlooks is the possibility of establishing a hierarchy of contrastive features, in which the contrastive status of a feature is not evaluated globally, but rather within the context of other features which have already been established as contrastive. When two features are reciprocally dependent, the one that is higher in the hierarchy will be deemed contrastive, and the one that is lower will be redundant.

The notion of a contrastive hierarchy is presented explicitly by Cherry, Halle and Jakobson (1953), Jakobson and Halle (1956), and Halle (1959). However, these works do not fully explore the phonological consequences of this idea. For example, Halle (1959) presents a hierarchy of features for Russian phonemes that is designed simply to minimize the total number of underlying feature specifications, with little regard for whether the features in question are phonologically active. In particular, by placing [±voice] low in the hierarchy, Halle makes this feature redundant on the affricates /ʦ, ʧ/, and accounts for the fact that they pattern with other voiceless obstruents by filling in [—voice] by a redundancy rule before the application of voicing assimilation. However, a hierarchy in which [±voice] has scope over the class of obstruents as a whole (but is redundant for sonorants) will correctly predict the behaviour of the affricates.

Although Halle (1959) used the contrastive hierarchy primarily as a means of reducing the size of lexical representations (precisely the sort of information-theoretic concern that Anderson argues has been made irrelevant by subsequent discoveries about how much the human brain can and does store), this approach to feature specification had already been put to more strictly phonological use, albeit tacitly, by Trubetzkoy (1939). For example, in his discussion of the consonant system of Czech, Trubetzkoy claims that there is a bilateral opposition between /ɦ/ and /x/, which function as a voiced–voiceless pair despite their different places of articulation. Essentially, Trubetzkoy assumed a contrastive hierarchy in which the voiced–voiceless opposition has higher scope than the velar–glottal contrast. Furthermore, Trubetzkoy's analysis of German, which treats /h/ as separated from all the other consonants by its glottal place of articulation, indicates that the relative scope of contrasts can vary from one language to another. This possibility has been crucial in later twentieth-century and early twenty-first-century work that has made more explicit use of the contrastive hierarchy (e.g., Dresher, Piggott, and Rice (1994) and work arising therefrom).

A functional approach to the analysis of Egyptian Arabic intonation

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In Standard AM Theory, the identification of pitch accents as rising (LH* or L*H) or falling (HL* or H*L) is usually inferred from the surface alignment of individual f0-targets. Contrary to that, some AM models only allow for left-headed structures: H*L falls and a L*H rises (Gussenhoven 2004). Thus, the presumably same rising-falling movements in a given language have been analyzed as different pitch accent types. In EA, the rising-falling contours have been analyzed as LH* (Hellmuth 2006 and other work), as LH for prenuclear accents vs. HL for nuclear accents (Rifaat 1991), as H*L (Rastegar-El Zarka 1997) and as H for prenuclear accents and HL for nuclear accents (Rifaat 2003).

I will argue that neither analysis is apt to capture the facts of Egyptian Arabic intonation. While relying on phonetic alignment details alone results in analyzing as a rise what perceptually is a fall, the assumption that falls and rises are always left-headed is not in accord with the phonetic facts of most perceptually rising contours in which the accented syllable is clearly perceived as high.

Instead of assuming pre-established abstract pitch accents, the present approach identifies three functionally motivated intonational categories, namely *leading, linking and closing contours* similar to those suggested in the British tradition (e.g. Brazil) or by Bolinger (1986). It is suggested that these contours are brought about by the succession of high (H) and low (L) targets and the way they are associated with the lexico-semantic entities. Basically, these up-and-down movements are viewed as a correlate of rhythmic structure, creating prominence on (the stressed syllables of) lexical items. The rise-fall is anayzed in terms of an accentual phrase with a high target flanked by two lows. When each word is given its due weight it is associated with a complete rise-fall movement that starts at the beginning of the stressed syllable and falls to the of the lexical item. In spontaneous speech, however, the tonal units are more closely connected via tone-linking (Gussenhoven 1983), whereby the L of the fall merges with L of the following rise.

Drawing on empirical evidence, I will show how these basic tonal units are associated with meaningful textual entities and how they can be modified by intonational features, as originally suggested by Ladd (1983) and Gussenhoven (1983), to implement the functional intonational categories.Thus, a leading contour expressing topic may be achieved by a late peak and/or a fall that is not completed at the end of the topic expression. A closing contour expressing focus, on the other hand, may be realized by an early L at the end of the accented syllable, thus creating a steeper and mostly also lower fall. I also assume that it is a bundle of (not only tonal) features that collaborate to create intonational meaning.

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Proliferating Prosodies in Tohono O'odham Reduplication(s)

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The topics of infixation and multiple reduplicative patterns have both received considerable attention in the recent literature in Optimality Theory (cf. Riggle 2006, Kennedy 2008). In this paper, I explore implications of Tohono O'odham multiple reduplications for both issues. Tohono O'odham, spoken in the southwestern United States, uses every prosodic shape argued for in prosodic morphology, as well as employing patterns attested in other languages, such as a "filler" consonant, and vowel and consonant length. An analysis of these patterns makes three points. First, the prosodic morphology of Tohono O'odham is deeply quantitative in nature, in contrast to its quantity-insensitive stress system (Fitzgerald 2001, 2002). Second, the descriptive challenges of these patterns provide a robust argument against the infixation treatment argued in Riggle (2006). Third, these patterns present a challenge to a model that analyzes multiple reduplications as two stem-internal reduplicative morphemes, as in Kennedy (2008), because there are more than three total patterns, not all able to be decomposed. Ultimately, an analysis of Tohono O'odham proliferating prosodies provides a strong argument in favor of prefixal treatments of these multiple pattern.

O'odham plural reduplication has been the focus of most studies in reduplication. However, Hill and Zepeda (1998) and Miyashita (2004) show that the "norm" in reduplication is complicated by the fact that the basic pattern of reduplicating a CV/C also allows for "heavy" plurals (vowel lengthening, so CV: as the reduplicant) and "collateral" reduplication (two syllable or foot reduplication). The data in (1) illustrates this; (1a) represents the basic pattern, (1b) heavy plurals, (1c) collateral reduplication (with its ambiguous analysis), and (1d) distributive reduplication with consonant gemination. The example in (1e) shows medial consonant gemination (unitive-repetitive reduplication), while (1f), shows adjectival reduplication with a medial glottal onset.

(1)	Base	Reduplication	Gloss	
a.	kúi	kú-kui	'mesquite tree'	(CV redup+ base)
	tóki̥	tó-tki̥	'cotton'	(CV redup + syncope in base)
b.	táḍ̥	tá:-taḍ̥	'foot'	
c.	kadó:di	ka-kdó-dodi	'marble (Sp, ágata)	
d.	hódai	hóh-hodài	'rock, stone'	
e.	jento	jent-t-od	'to finish smoking obj'	
f.	jumal	ju'u-jmal	'low'	(CV'V redup + syncope in base)

These represent four distinct morphosemantic patterns of reduplication: plural, distributive, repetitive, and adjectival, with an even wider distribution of prosodic shapes for the reduplicant (CV, C, CV:, $C_1C_2V_2$, CVC_{gem}, C_{gem}, $CVC_{Glottal}V$). The patterns of (1a) are treated as infixation in the related dialect Pima in Riggle (2006). This infixation analysis would explode the possibilities for determining what string constitutes base and reduplicant, with a number of noncontiguous analyses of the reduplicant if the infixation analysis is treated as viable, which it is not.

The proliferating prosodies in Tohono O'odham reduplication show the strong quantitative nature of its prosodic morphology, as well as arguing against infixation. The results from the analysis of this language is a more detailed notion of the reduplicative processes in Tohono O'odham, a positive outcome augmenting the many studies focusing on plural reduplication in this language and a related dialect, Pima. This analysis also argues against the Kennedy (2008) model for multiple reduplications. The analysis argued here employs a prefixal analysis using more than two reduplicative to account for the variety in semantic and prosodic shapes of Tohono O'odham reduplication.

On the distribution of velar palatalization in Italian nouns and adjectives

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This paper analyzes the phenomenon of velar palatalization in the plural formation of Italian masculine nouns and adjectives. Recent literature (among others Celata and Bertinetto, 2005 and Krämer 2006) has emphasized the idea that palatalization in nouns and adjectives is unpredictable.

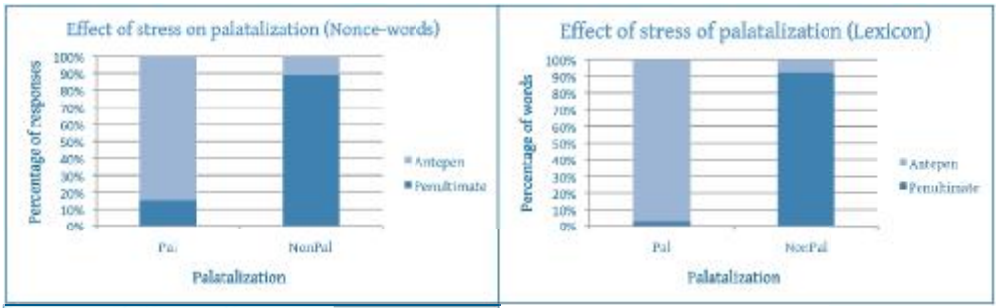
(1) Alternations in the masculine paradigm: an example

	Palatalizing	**Non-palatalizing**
Nouns	mediko, meditʃi 'doctor'	arabesko, arabeski 'arabesque'
	filologo, filolodʒi 'philologue'	sfogo, sfogi 'rash'
Adjectives	comiko, comitʃi 'comic'	antiko, antiki 'antique'
		lungo, lungi 'long'

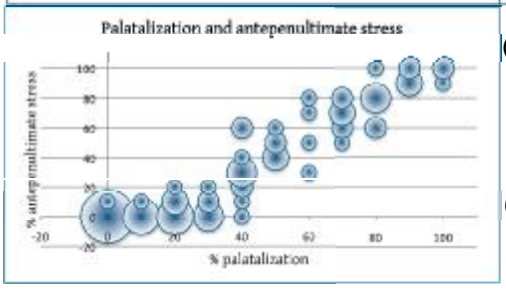
Results from a corpus study and from a nonce-word test show that velar palatalization in contemporary Italian is predictable as a function of main stress (2): whereas plural nouns and adjectives bearing antepenultimate stress palatalize, nouns and adjectives bearing penultimate stress do not. Importantly, there was great variation among subjects as to the position of the word to which the main stress was assigned, but speakers productively applied palatalization in masculine plural words, only if they had decided to put the main stress of these words on the antepenultimate syllable (2). There was therefore no departure from the stress-generalization.

The distribution of palatalization is determined, I propose, by the specific acoustic realizations of stops in the different prosodic conditions, which trigger, or block the perceptually driven change. I propose (following up on proposals in Ladefoged, 2004; Imbrie, 2005) that in the immediately post-tonic position increased pressure buildup behind the stop closure results in a sharp burst and rapid fall in the frication intensity (4a). In this position (i.e. CV.'CV.ki) the contrast between the two sounds is therefore *more* perceptible than when the velar consonant is far from stress (4b) (i.e. 'CV.CV.ki). In antepenultimate stressed words the /ki/-/ tʃi/ contrast is less perceptible and thus they are more prone to neutralization (Flemming 1995, 2006; Guion 1996, Wilson 2005).

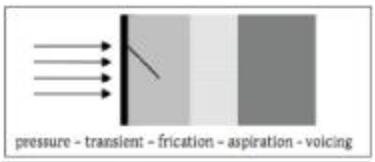
(2)



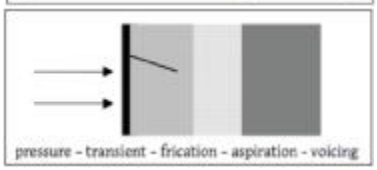
(3)



(4a)



(4b)



Vowel Harmony provides a Figure-Ground Relation for Consonant Phonotactics

Peter Graff (MIT) and Andrew Nevins (Harvard))

1. Consonant Harmony vs. Vowel Harmony Bias in Typology

Although Gafos (1996) predicts that V-to-V co-articulation should cause typology to overwhelmingly favor of Vowel Harmony (VH) over Consonant Harmony (CH), Hansson (2001) claims to have thoroughly disproved this prediction by showing CH for a wide range of features in 94 different languages. It is difficult however to imagine how to construe a quantitative metric that could identify a typological bias. Controls for genetic balance have not really been conducted, and once languages within the Altaic, Finno-Ugric, and Niger-Congo language families are collapsed over the the number of VH cases is drastically reduced (we mean here categorical cases of VH that induce alternations in morphemes or determine phonotactics). Additionally we might *a priori* expect less cases of VH simply because the number of features distinguishing vowels is smaller than the ones distinguishing consonants. Even if there was a cognitive a bias for vowel harmony, there would still be twice as many consonant features to potentially agree for. Since the evaluation of the typological data is not straightforward, we seek to answer the CH vs. VH bias question through means other than typological sampling alone.

2. CH, VH and Artificial Grammar Learning

The artificial grammar learning paradigm (Esper 1921, Smith 1966, Pycha et al 2001, Bonatti et. al 2005, Wilson 2003, Moreton 2008, among many others) can be used to tell whether human language phonologies "prefer" one type of pattern over another. The basic idea is to teach two artificial languages, one with Pattern 1 and one with Pattern 2, to speakers whose native language exhibits neither, and see if they learn one pattern more easily than the other. We tested for CH vs. VH bias by teaching Italian-speaking participants CVCVCV languages with either *C-Identity* C1 = C2 $\neq$ C3, or *V-Identity* holds: V1 = V2 $\neq$ V3. Participants heard nearly continuous streams of stimuli (separated by 20ms) and were asked to recall words in a forced choice task. Participants performed at chance for C-Identity but better than chance for V-Identity ($p < .05$). Even in follow-up experiments in which consonants had twice the duration of vowels, participants failed to learn the C1 = C2 pattern.

3. Is C-Identity Actually Dispreferred?

One might think that the above results are not due to the VH > CH bias, but in fact due to OCP effects biasing learners against C1 = C2. However, quantitative analyses of languages such as Javanese (Mester 1986) have shown that *total* identity between consonants is not dispreferred at all, although featural OCP effects arise. Typologically, C1 = C2 type-effects *are* thus robustly attested. However, the experiment reported above, as well as Boll-Avetisyan & Kager (2007) show that speakers are biased against C1 = C2 patterns when they are used for parsing continuous speech streams. The question is why this should be the case.

4. Returning to the VH bias

Traunmüller (1996) and Harris (2008) proposed a carrier-modulation model of vowels vs. consonants, whereby vowels constitute a carrier stream, and consonants impose deviations from this stream. Owren & Cardullo (1996) show that vowels are used for talker identification while consonants are used for lexical segmentation, and Niyogi & Surendran (2003) show that consonants carry three times the functional load of vowels. In other words, vowels are "glue" on top of which lexical skeleta are superimposed. Inspired by Kaye (1994), de Gelder (2001) and Vroomen (1998), we propose that vowel harmony is used for word segmentation, and more specifically, for domain-delimitation. However, this domain-delimitation goes beyond mere oronym avoidance (e.g. *nitrates vs. night rates*). Since speech is continuous, consonant co-occurrence restrictions, providing the burden of lexical distinctness, cannot be learned without a delimiting domain. In other words, predictable vowel-to-vowel relations provide the "ground" half of a figure-ground relationship, without which the "figure" part would be invisible. As all languages have smaller vowel inventories than consonant inventories (Nespor et. al 2005), and since establishing a "ground" requires losing contrastiveness, it is logical to use up the vowels to establish this ground.

5. Follow-up

We are currently conducting follow up experiments to test whether speakers prefer VH over CH in a continuous speech stream when both VH and CH patterns are present and give conflicting parses, and quantitative studies to establish that all languages with featural OCP co-occurrence constraints contain predictive vowel-to-vowel featural identity alongside them.

Is the headedness of intonational and metrical (foot) domains related?

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This paper presents the preliminary results of an ongoing empirical survey of the local f0 tonal patterns on accented syllables in varieties of spoken Arabic that use an iambic metrical foot. The aim of the investigation is to test the hypothesis that there is a principled link between the type of metrical foot used in the stress algorithm of a language to determine the position of primary (word-) stress (e.g. Hayes 1995) and the 'accentual foot', a tonal domain comprising an accented (tone-bearing) syllable and all subsequent unaccented syllables (Abercrombie 1967). Prior work in intonational variation has suggested that such a link may exist, though the facts of the languages concerned (English & French) do not permit a definitive answer. This paper tests the hypothesis using spoken Arabic varieties, which are claimed in the literature to vary in their metrical foot type (iambic vs. trochaic), by analysing the local f0 alignment patterns on accented syllables in iambic varieties, for comparison with published data available for moraic varieties.

The hypothesis arises out of work on the development of notation systems for modelling intonational variation. The Intonational Variation in English (IViE) notation system (Grabe 2001) employs an 'Implementation Domain' (ID) within which local variations in the f0 contour are transcribed (for mapping to phonological categories on a separate tier). For English the ID equates to a left-headed accentual foot defined as above. However, Post & Delais-Roussarie (2006) analyse French by means of a right-headed accentual foot, with the French ID defined an accented syllable plus all preceding unaccented syllables. They suggest that "how an ID is defined in a specific language depends on the principles that govern the mapping between tonal events and segmental structure" (p2). The directional difference between English and French at the accentual/intonational level is well-established: intonational analyses of (British) English agree on a left-headed analysis of the local f0 patterns surrounding an accented syllable, meaning that phonologically relevant tonal fluctuations occurring on non-prominent interaccentual syllables are analysed as part of a preceding (rather than following) tonal event (O'Connor & Arnold 1961, Grabe et al. 1998); in contrast, most authors agree that French is accentually right-headed, with accents occurring at the right edges of some phrase-level domain (Post 2000). At the metrical level however, whilst English employs a moraic trochee in a Latin-like stress assignment system (Hayes 1995), the status of the metrical foot in French is not clear, since French arguably has no word-level accentual prominence (Dell 1984). The headedness mapping between the metrical and accentual foot cannot be argued on the basis of a comparison between English and French alone therefore.

The majority of spoken (and arguably all urban) Arabic varieties employ a trochaic metrical foot, and this includes Egyptian Arabic (EA, Watson 2002). The intonational patterns of the EA pronunciation of Standard Arabic are formally analysed as left-headed by Rastegar-ElZarka (1997), and a recent instrumental study of colloquial EA confirms that local variation in the f0 contour after the accented syllable shows principled variation (depending in part on prosodic context) whereas local variation in the f0 contour before the accented syllable is largely invariable (ElZarka & Hellmuth 2009). These facts are compared here to the results of prosodic transcription (using adapted IViE notation) of archived narrative speech recordings in Bedouin (non-urban) varieties reported to employ an iambic metrical foot in their stress assignment algorithms (Bedouin dialects in Israel, Jordan, Syria and Northern Najd, Rosenhouse 1984).

Practically, the results bear on the question of how to decide the correct domain within which local variation in f0 should be transcribed in the early stages of an intonational analysis. Theoretically, the results of this survey are explored in the context of the claim by van der Hulst (to appear) that the apparently iambic foot types observed in Bedouin varieties of Arabic are amenable to reanalysis as uneven trochaic feet (following van der Hulst 2000).

Ternary Rhythm is the consequence of Clash resolution!

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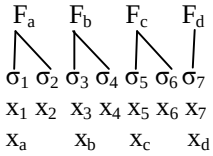
Ternary rhythm is generally thought to be the consequence of the ranking *Lapse » All-Feet-L/R » Parse-σ. This guarantees that the *minimal* number of feet is constructed without creating violations of *Lapse. The feet that *are* constructed are strategically placed, giving the effect of 'weak local parsing' (Houghton 2006, Kager 2007). In a largely neglected paper Rifkin (2003) shows that this approach does not work for Cayuvava, because it cannot account for vowel deletion. In our presentation we will clarify Rifkin's argument in detail.

We propose a nearly complementary approach, and we develop it on the basis of an in-depth analysis of Cayuvava. We claim that ternarity is *maximization* of the number of feet in order to alleviate *Clash*! The approach crucially relies on the relative autonomy of prosodic constituents and their associated gridmarks, as in Hyde (2001, 2002, 2007, 2008ab) and Vaysman (2009); constituents are in a dimension that is distinct from the one where the gridmarks are located that accompany them. A 7-syllabic word where feet are right aligned, and where an alternating rhythm is created with trochees, has this schematic structure:

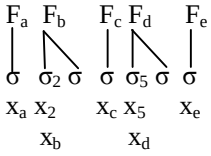
(1)



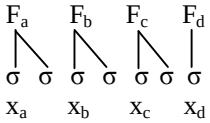
Every syllable head is accompanied by a gridmark, as required by σ-to-x_σ. Satisfaction of σ-to-x_σ is indicated by a subscripted digit. Also, every foot head is accompanied by a gridmark, as required by F-to-x_f. This is indicated by subscripted letters.

We propose that only one constraint is required to derive ternary rhythm; we call it NO-$_w$X and it says: '*a gridmark is not allowed in a foot's weak position*'. In a language, such as Cayuvava, where NO-$_w$X is undominated, binary rhythm is avoided, because that creates a clash. This is a consequence of the combination of σ-to-x_σ + F-to-x_f. To see this, leave out the marks x_2, x_4 en x_6 from (1), and you'll see that the gridmarks x_a, x_b, x_c and x_d now clash. Having undominated NO-$_w$X, Cayuvava has to find a way to avoid clashes. It does so by maximizing the number of feet. This can be shown with the Cayuvava parsing of a 7-syllabic word, given in (2a). Trochaic feet are right aligned, and in between each binary foot an extra monosyllabic foot is built containing a clash alleviating x. This x does not violate NO-$_w$X, because it occupies a foot's head position. The feet F_a, F_c and F_e are stressless, phonetically, because there is no prominent grid column in their domain.

(2) a



b



Notice that the gridmarks in the domain of the monosyllabic feet accompany feet, not syllables, as can be inferred from the subscripts. This means that in (2a) there are no violations of F-to-x_f and 5 violations of σ-to-x_σ. Compare this with (2b), the obvious alternative to alleviate clashes. In this representation, which contains just stressless feet, no high grid columns are built, so there is no clash. In (2b) σ-to-x_σ *is violated 7 times*, so from this perspective (2a) is better. On the other hand, (2b) fares better with respect to ALL-F-R. Cayuvava prefers (2a) over (2b), so it has σ-to-x_σ » ALL-F-R. We get a system, then, where a monosyllabic, stressless foot alternates with a stressed binary foot. ***But this is ternary rhythm!*** With ternary rhythm, then, a language with high ranking NO-$_w$X is able to avoid stress clash, while maximally satisfying σ-to-x_σ, at the cost of low ranking ALL-F-R. Our account has two advantages. 1) It respects Rifkin's argument, as we will show; 2) It also fully recognizes the strength of Hyde's arguments against unparsed syllables. *There are no unparsed syllables, indeed*! But it does so without Hyde's overlapping feet. *There are no overlapping feet either*!

The Emergence of the Unmarked in Finnish loanword phonology

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A variety of unrelated languages, Finnish (Karvonen 1998), Japanese (Katayama 1998), Hungarian (Nádasdy 1989), and Italian (Rando 1970, Repetti 1993, Morandini 2007) all exhibit a similar phenomenon of geminating stem-final consonants in loanwords, even though there is no obvious phonological motivation for such a process. In English loans in Finnish, for example, [i] is obligatorily epenthesized at the end of all consonant-final words, and additionally, all words ending in the voiceless stops /p, t, k/ surface with geminates, while other consonants normally are not geminated:

(1)	*Gemination of voiceless stops*	*No gemination with other consonants*
	pop→ poppi (*popi)	mile [mail]→ maili (*mailli)
	hit→ hitti (*hiti)	modem→ modeemi (*modeemmi)
	rock → rokki (*roki)	partner → partneri (*partnerri)

This non-minimal epenthesis is particularly surprising since there exist words akin to *popi, hiti* in the native lexicon of Finnish, and cross-linguistically, loanwords typically allow more, not fewer alternations and more permissive phonotactics than words in the native stratum. Furthermore, it is not immediately obvious why only the voiceless stops geminate, since all consonants besides /j/ and /h/ can occur as geminates in Finnish. This phenomenon, whereby loanwords exhibit more restrictive behavior than native words, appears to be an instance of the Emergence of the Unmarked (McCarthy & Prince 1994, 1995) and has also been termed *Retreat to the Unmarked* by Kenstowicz 2005. Surprisingly, this phenomenon has received relatively little attention in the literature to date.

Steriade (2004) analyzes the gemination seen in Japanese and Hungarian loanwords as resulting from a kind of faithfulness to the input stress in the donor word. On this view, the gemination seen in Japanese and Hungarian loans is due to a preservation of the bimoraic character of stressed syllables in the donor language. However, this analysis cannot be extended to the Finnish data for the following reasons. First, gemination occurs in Finnish even when the syllable that contains the voiceless stop does not occur in a main-stressed syllable in the donor word, e.g., robot → *robotti*, picnic → *piknikki.* Second, and more importantly, the same kind of gemination seen in English loans in Finnish occurs in a very productive truncation process that occurs in spoken Finnish, where the argument for input preservation of a bimoraic stressed syllable cannot be made:

(2)	*Original word*	*Truncated word*	*Gloss*
	peukalo	peu**kk**u (*peuku)	thumb
	väitöskirja	väi**tt**äri (*väitäri)	dissertation
	yöpuku	yö**pp**äri (*yöpäri)	pyjamas

Finally, and even more dramatically, a voiceless geminate stop may be inserted under truncation where no singleton voiceless stop exists in the non-truncated form: omena → *om**pp**u* ‘apple’, nelonen → nel**kk**u ‘number four’.

Although this might at first blush appear to be an Emergence of the Unmarked effect, I propose an analysis that views this gemination as resulting from alignment of morphological and prosodic categories, an alignment masked in the native stratum due to the restricted nature of native stems. The fact that only voiceless stops geminate in loans in Finnish is analyzed via moraic faithfulness constraints relativized to different segment types (Morén 1999), and the general preference for geminate voiceless stops reflects a functional pressure preferring them over other geminate consonants (Podesva 2002, Kawahara 2007).

Neighbor effects and analogy in Hawaiian reduplication

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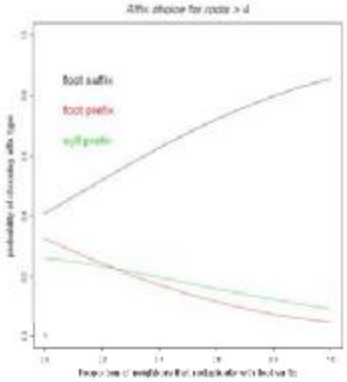
In this paper we use nearest-neighbor models to account for morphological conditioning in the reduplicative system of Hawaiian (Pukui & Elbert 1979). We show that roots of similar phonological form tend analogically to follow the same patterns of reduplicative formation. Hawaiian reduplication adheres to three general patterns of formation (Kennedy 2009): a foot suffix, e.g. *kāhana~**hana*** ‘clearing in a forest’, a foot prefix e.g. ***poha**~pohaka* ‘spot’, and a syllable prefix e.g. ***ma**~make* ‘many deaths’. The choice among these is allomorphic, as the different reduplicative patterns do not map to distinct functions. Thus for any given root, one must know which pattern to choose to derive the appropriate reduplicated structure.

We hypothesize that the choice of reduplicative pattern in Hawaiian is partially analogical, in that roots tend to adhere to the same reduplicative patterns as phonologically similar roots. To formalize this, we use nearest-neighbor models to measure phonological similarity, following their application in the analysis of Dutch morphology (Krott, Baayen, and Schreuder 2001; Ernestus and Baayen 2003, et seq.). Roots are neighbors if their edit distance (Levenshtein 1965) is 1; the edit distance for a pair of words is a tally of segmental substitutions, deletions, and insertions needed to transform one word to another. For example, *malō* ‘dry’ and *manō* ‘shark’ have an edit distance of 1, due to one segment substitution.

Using Pukui and Elbert (1986) as a comprehensive source of roots and reduplicated words in Hawaiian, we establish a series of neighbor measures. For each reduplicating root, we count the number of its neighbors that reduplicate with each of the three patterns. For example, the reduplicated word *kāhana~hana* ‘clearing’ has the root *kāhana*, which has 16 neighbors in the dictionary, of which 1 uses the syllable prefix, 1 uses the foot prefix, 6 use the foot suffix, and 8 have no reduplicated form. We also calculate a proportion of each pattern observed amongst a root’s neighbors; thus for the same form *kāhana*, of just its reduplicating neighbors, 0.75 use the syllable prefix, 0.125 use the foot prefix, and 0.125 use the foot suffix.

We use these as predictor variables in a multinomial regression, with reduplicative pattern of the root as the predicted outcome. Our results show that analogy is a strong predictor of which reduplicative affixes a base will take. For example, the figure at right shows that as the proportion of a root’s foot-suffixing neighbors increases, so does the likelihood of that root using a foot suffix. In general, for any given root, as the proportion of its neighbors that reduplicate with a particular reduplicative pattern increases, so does the probability that it reduplicates with the same pattern.



This study has implications for the role of probabilistic modeling in phonology and morphology. In particular, *k*-nearest-neighbor models (e.g., Dagan et al. 1994, 1997; Ng and Lee 1996; Zavrel and Daelemans 1997) embody an exemplar-based formalism known as lazy-learning, in contrast with non-exemplar-based approaches, such as the Gradual Learning Algorithm (Boersma and Hayes 2001) nested in Stochastic Optimality Theory (Boersma 1997, 1998). Ernestus (2007) argues that while the Gradual Learning Algorithm extracts information from individual items during learning, it does not store the details characterizing the individual items themselves, as *k*-nearest-neighbor models do (see also Ernestus and Baayen 2003). In our account of Hawaiian reduplication, the phonological component remains static, and although phonological similarity is a predicting factor, the probabilistic effect is encoded in the morphological choice of reduplicative pattern.

Phonetic cues to gemination in Lebanese Arabic

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This paper reports on phonetic and phonological patterns of gemination and vowel length in Lebanese Arabic (LA). Both short and long vowels occur before singleton and geminate consonants in LA leading to light, heavy, and super-heavy syllable structures: C**V**CV(C), e.g. /ˈtˤaba?/‘*dish*’; C**VC**CV(C), e.g. /ˈtˤaaba?/ ‘*he matched*’; C**VV**CV(C), e.g. /ˈtˤabba?/ ‘*he persuaded*’; C**VVC**CV(C), e.g. /ˈtˤaabbe/ ‘*she is bending over*’. The moraic status of geminates and their temporal relationship with their surrounding vowels has been the subject of many cross-linguistic and cross-dialectal studies (e.g. Al-Tamimi, 2004; Arvaniti, 2001; Ghalib, 1984; Ham, 2001; Hassan, 2003; Ladd & Scobbie, 2003; Local & Simpson, 1999; Payne, 2005; 2006; Ridouane, 2007). The debate revolves around whether vowels preceding geminates shorten in order to maintain the rhythmic structure of the word and enhance the singleton-geminate contrast or whether no temporal compensation occurs. Another debate revolves around non-durational indices for the geminate contrast (e.g. more centralized vowels before singletons; lenition and lower amplitude in singletons; palatalisation for geminate stops) and their implication regarding a tense/lax distinction in singleton/geminate pairs.

This study contributes to the literature on gemination by providing a detailed examination of LA. There are very few phonological studies of LA (Nasr, 1960). Consonant gemination in LA is very frequent (all LA consonants can be geminates) and plays an important morpho-syntactic role in the language. While most studies on gemination in Arabic have concentrated on durational cues to the singleton/geminate contrast, this study looks at the potential role of a variety of non-temporal cues in the implementation of this phonological contrast. Twenty Lebanese males and females were recorded reading target word-lists (390 words each) containing medial singleton and geminate consonants (nasals, fricative, liquids, and approximants) preceded by long and short vowels. Acoustic and auditory analyses of medial consonants (C(C)) and of preceding (V1) and following (V2) vowel durations were made. Temporal measurements included V1, V2, and medial C(C) duration. Non-temporal measurements included formant frequencies at mid-point and offset of V1, mid-point of sonorant consonants, onset and mid-point of V2, and intensity and *f*0 in V1, C(C) and V2.

Temporal results suggest a robust role for duration in distinguishing between short and long consonants and vowels in LA. There were separate durational distributions for singleton and geminate consonants and for target short and long vowels. A surprising result for duration is that consonant and vowels did not exhibit temporal compensation at the absolute durational level, i.e. vowels were not shorter before geminate than singleton consonants as is often found in the literature. This might be due to the fact phonological length plays an important role in vowels as well as consonants in Arabic, but temporal compensation has been found to occur in Iraqi and Jordanian Arabic (Al-Tamimi, 2004; Hassan, 2003). This may therefore suggest that medial geminates in LA are inherently moraic true geminates but they do not share their length with the preceding vowel, i.e. they contribute to quantity without weight, so no vowel shortening takes place.

Non-temporal results also show a surprising lack of difference in the spectral cues in vowels preceding and following singleton and geminate consonants, suggesting a lack of vowel quality difference in the implementation of this contrast. Moreover, vowel quality, intensity and *f*0 vary more depending on whether the preceding vowel is phonemically long or short rather than depending on the phonemic length of the consonant itself. Results so far highlight the role of temporal cues over spectral and other non-temporal cues such as tense/lax realisations in the distinction between singleton and geminate consonants in LA. This may suggest that the underlying contrast for gemination in LA is mainly temporal and its domain is restricted the 2nd syllable.

Telugu Vowel Assimilation: Harmony, Umlaut or Neither?

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There are a number of references in the literature to 'Telugu Vowel Harmony' (including in Wikipedia). These assertions – that vowel harmony processes exist in Telugu – are apparently based on a very few, very dated articles, the first of which is a structuralist account (Kelley, 1963) followed up shortly thereafter by two SPE-based accounts, one of which, Wilkinson (1974), was just a reworking of the Kelley data in an SPE framework. The other SPE account, Subbarao (1971), written with no reference to Kelley (1963), treats only a different set of data (limiting itself to verbal morphology) than was covered in Kelley/Wilkinson. The present paper examines the claims about vowel harmony in Telugu reviewing the published data and incorporating new data, including tests of productivity with nonce formations and loanwords, and spectrographic analyses. We argue that none of the vowel-vowel effects observed have the properties of vowel harmony systems. Instead, all the phenomena can be accounted for by positing 1) an 'umlaut' process that is productive but strictly local; 2) an epenthesis process; and 3) a small set of lexicalized nominal forms (comparable to the '-en' plurals of English, for example).

Cases that have been cited in support of vowel harmony in Telugu appeal to examples like the following. In (A), a short, high root-final vowel fully assimilates/harmonizes with the plural suffix (-lu) vowel. In (B), medial [u] in trisyllabic verb stems fully assimilates to the [a] of both the negative suffix and formal imperative suffix and to the [i] of the absolutive suffix. In (C), root vowels are lowered/laxed if followed by a low vowel [a] in the next syllable.

A puli (sg.) : pululu (pl.) 'tiger'; ba:vi (sg.) : ba:vulu (pl.) 'well'; (cf. anna : annalu 'elder brother' sg : pl)

B [aɖugu] 'ask, informal imperative' : [aɖag-aɳɖi]; [tʃaduvu] 'read' : [tʃadiv-i] 'having read'

C [mɛ:ka] 'goat' from UR /me:ka/ contrasts with [me:ku] 'nail' (/me:ku/); [gu:ɖu] 'nest' and [gʊ:ɖa] 'basket'. The vowel lowering/laxing is also present after external sandhi deletes the final vowels from both forms, resulting in surface minimal pairs.

The problems that arise with the characterizations in (A) and (B) above include: 1) a crucial lack of reference to interactions with the epenthetic vowel, [u], which produce pairs like nalugu/nalgu 'four' and e:ɖtʃu/e:ɖutʃu 'weep' where at the minimum, an analysis targeting trisyllabic forms is risky; 2) the tremendous number of exceptions to such harmonic-type forms; 3) the lack of productivity of these processes when native speakers are given nonce Telugu lexemes and loanwords; 4) the fact that in no case does there appear to be the sort of 'iterative' feature spreading that especially characterizes vowel harmony – effects of assimilation are seen only on the vowel in the immediately preceding syllable. The process in (C), on the other hand, does seem to be a synchronic one although not a case of vowel harmony. This lowering/laxing is also claimed to operate in external sandhi domains (again typically not characteristic of vowel harmony processes) and we explore further the conditions on this productive aspect of the phonology.

From the perspective of the bigger picture, this paper explores several issues toward which the theoretical attitude has changed relatively dramatically over the years, including how far we should go to capture patterns in the data with synchronic computations (vs. lexicalized forms) and what degree of abstractness is acceptable, in the sense of learnable by an acquirer.

Where are our r's? An acoustic analysis of the syllable affiliation of r-sandhi phenomena

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Many non-rhotic varieties of English exhibit r-sandhi phenomena. In isolation or pre-consonantally, words such as 'sore' lack /r/ but a 'linking' /r/ occurs prevocalically in 'sore again', and 'intrusive' (i.e. non-historical) /r/ may occur prevocalically in 'saw again'. Phonologists and phoneticians have debated whether or not the /r/ occurs in the underlying representation, what formalisms can best describe the phenomenon, and how to account for the appearance of /r/, rather than some other consonant.

The current study addresses the syllabic affiliation of the sandhi /r/. Various positions exist in the literature (for an overview see Heselwood 2006: 85-6). Both Wells (1990) and Cruttenden (1994: 264) suggest that intrusive /r/ is in coda position as it has a lesser degree of lip-rounding (Wells) or is shorter (Cruttenden) than onset /r/, though quantitative data is lacking. For Harris (1994: 251) and Giegerich (1999) the /r/ is in the onset of the second syllable. Gick (1999: 48) presents the case for ambisyllabicity using EMMA data which shows that the sandhi /r/ is produced with a constriction degree between that found for onset and coda /r/ for two rhotic speakers.

Acoustic data is presented here from speakers of non-rhotic varieties of British English who produced onset /r/ ('whisper rate'), sandhi /r/ ('whisper eight') and potentially ambisyllabic /r/ in word-medial intervocalic (ambisyllabic) position ('say berate'). Acoustic data from sandhi /r/ is therefore compared with onset and ambisyllabic /r/. As the speakers are non-rhotic no direct within-speaker comparison can be made with coda /r/. Each item was produced five times within a larger carrier phrase.

Results indicate that the sandhi /r/ differs from the onset /r/ in 'rate' and from the ambisyllabic /r/ in 'berate'. Tuinman et al. (2007) find similar patterns for one speaker. It seems likely that sandhi /r/ occurs in coda position, as suggested by Wells (1990) and Cruttenden (1994) and Heselwood (2006). Findings are related to recent discussions of hiatus resolution systems (Britain and Fox, 2008) and seem to support phonetically detailed exemplars as the basis for emergent phonological structure, with an unbroken chain of coda /r/ realisations stretching back to 'Rhotic Times' for the accents concerned, as suggested by Heselwood (2006).

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Now monophthong, soon diphthong?
The hybrid status of low tone as an indicator of diphthongization processes

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Diphthongization is a common process across languages, and phonological theory aims at providing insight into which changes are possible, and which are not (e.g. Harris 1995). However, the question, under which circumstances these changes can or cannot occur initially, remains obscure. We aim at shedding some light on this issue by showing that the status of low tone in a language functions as an indicator of diphthongization processes. We argue that this holds for lexical as well as for intonational tones.

The data. Our primary data come from Franconian dialects. Here we find a tonal opposition between two word accents, Accent 1 and Accent 2. In the large majority of the dialects, Accent 1-syllables carry the phonological tones HL, whereas Accent 2-words have a spread high tone (in declaration). In several of these dialects, segmental differences have developed due to the influence of the tone accents: We present data that show that under HL, diphthongs are preferred, whereas under HH, monophthongs are. For instance, in Maastricht, long high vowels only diphthongize in words where low tone occurs in the dependent position (Endepols 1955):

dɔu^{HL}f	'pidgeon-sg'	du:^{HH}ve	'pidgeon-pl'
drɔu^{HL}f	'grape-pl'	dru:^{HH}ve	'grape-sg'

The hybrid status of low tone. It is well-known that low tone and non-head positions attract each other (*Hd-L, *Non-Hd-H, de Lacy 2002). This is the case because low tone leads to a loss of prominence and is thus disfavoured in head-positions. We therefore regard the assignment of low tone as reduction on a non-segmental level. Note, however, that under this view, low tone has a hybrid status - it not only *reduces* (prominence) but also *adds* (featural structure). Since having structure can be disprefered by non-heads in general (e.g. van Oostendorp 1995), we propose that there are two types of long vowels, both of which occur in Franconian.

Two types of long vowels. One type of underlying long vowels allows for licensing low tone in dependent positions (=HL). This implies that - due to the hybrid status of low tone - these vowels also allow for featural structure which is not sponsored by the accompanying head. Thus, a monophthong of this type can be diphthongized to a closing diphthong: the outcome is a segmentally less complex dependent position which, however, carries featural structure on its own! The other type of underlying monophthongs does not like to license *any* features in dependent positions, including low tone. These vowels prefer being monophthongal and 'level-toned' (HH in declaration), since in this case, their featural and tonal structure can be fully sponsored by the head. In comparing these two vowel types, we claim that the (non-) possibility of assigning low tone to the dependent position of a monophthong signals whether diphthongization is possible or not.

Predictions and further evidence. Our analysis predicts that diphthongization to closing diphthongs is much likelier to occur in languages/dialects where the focal melody is HL instead of HH. This should hold for 'purely intonational' languages as well. There, diphthongization processes should be indicated by accompanying changes in the intonational grammar of a language. Evidence for this can be found in the history of German: In the 1920's and 1930's, a small number of scholars have argued that the NHG diphthongization was preceded by a major prosodic change. As Sievers (1920) points out, the first NHG diphthongs appear in "Otfrieds Evangelienbuch" but only when *falling intonation* (= HL) is indicated.

The Perception of the Word-Initial Quantity Contrast in Voiceless Swiss German Stops

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Various speech production studies have established that Swiss German displays a quantity distinction in voiceless stops (e.g. Dieth & Brunner 1943, Fulop 1994, Willi 1996, Ham 1998; among others). Acoustically the phonological contrast manifests itself as longer closure duration (CD) for geminates as opposed to singletons. Voicing and the stop release duration (VOT) play no role. It is particularly interesting that this lexical contrast exists not only word-medially but also word-initially (e.g. /**tt**ɛlər/ 'plate' versus /**t**ɛlə/ 'dent') creating a perceptual challenge in two specific contexts: (a) when word-initial stops are preceded by a word ending in an obstruent, and (b) when they occur phrase-initially. In the former, contrast neutralization occurs due to geminate CDs becoming shorter and singleton CDs becoming longer. In the latter, although speakers articulate significantly longer closures for geminates – as has been established in an articulatory study – the acoustic cue distinguishing short from long is missing because the starting point of the CD is indeterminable without a preceding context. In the study presented here, our goal was to find out whether listeners perceived the quantity contrast in exactly these contexts, particularly when CD was the only cue they could rely on.

To this aim, we designed a forced-choice cross-modal lexical-access task. The auditory stimuli were speech fragments of minimal and near-minimal word pairs with initial quantity distinction. There were two phrase-medial and one phrase-initial contexts: (1) *vocalic* context (e.g. /oni **tt**ɛlər/ 'without plate' versus /oni **t**ɛlə/ 'without dent'), (2) *consonantal* context (e.g. /nɔx **tt**ɛlər/ 'after plate' versus /nɔx **t**ɛlə/ 'after dent'), and (3) *isolation* context (e.g. ## /**tt**ɛlər/ 'plate' versus ## /**t**ɛlə/ 'dent'). The fragments contained all material up to 50ms into the vowel following the word-initial stops: (preposition +) CD + VOT + 50ms of vowel. During the experiment, the listeners first heard one such speech fragment and were then presented a word pair on the screen. The listeners then had to indicate by pressing a button whether they heard the beginning of the word on the left- or right-hand side of the screen.

The listeners showed three different types of responses, which were dependent on the context. As expected, they were highly accurate and reasonably fast in discriminating word-initial geminates and singletons in a vocalic context. Also as expected, given the results in the acoustic studies, yet somewhat unexpected, given the results of the articulatory study, they were unable to perceive the long-short contrast phrase-initially, i.e. when the CD cue was unavailable. Finally, the listeners did not reliably perceive the contrast in a consonantal context, that is, when geminate and singleton CDs were almost identical due to the influence of the preceding obstruent sound. Here geminates were particularly vulnerable and were readily mixed up with singletons, i.e. in 74% of cases (as opposed to 44% for singletons mistaken as geminates).

These results show that both obstruent consonants and phrase boundaries impede the maintenance of the phonological quantity contrast in perception. But while the latter context seems to be the real case of neutralization, where recognition is at a fifty-fifty chance level for geminates and singletons, the former context causes geminates to take on far more singleton-like cues than vice versa.

A representational take on TETU in L2 phonology: the case of final devoicing in the acquisition of final voicing contrasts

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Final devoicing is a widely attested and discussed phenomenon in the acquisition of English as an L2 by learners of a varying range of native languages which themselves do not have the attested voicing neutralisation. What is intriguing about this is that it reveals an evolving grammar (the interlanguage grammar) whose characteristics are neither like those of the native L1 nor like those of the target L2. Such patterns in L2 phonological acquisition have been used to argue that interlanguage grammars are independent natural language grammars that must be accounted for by current contemporary phonological theories (Eckman 2003).

Within Optimality Theory the L2 English devoicing facts have been treated as a case of the emergence of the unmarked (TETU) (McCarthy and Prince 1994) where a formerly low-ranked markedness constraint (NOVOICEOBSCODA) is promoted above a relevant faithfulness constraint to result in the surface observed devoicing facts (e.g. Broselow et al 1998, Grijzenhout & van Rooy 2001). Broselow, Chen and Wang (1998) investigate a case of Mandarin Chinese L2 learners of English reported in Wang (1998). What the facts reveal is that although Chinese limits its codas to glides and nasals (thereby motivating a high-ranking of NOOBSCODA), Mandarin L2 learners of English go through a stage where they devoice final obstruents which is best accounted for as a case of TETU where voiceless obstruents are preferred over voiced ones. While this analysis provides a satisfactory account of the steady state neutralizing interlanguage grammar the overall acquisition process will require the learners to demote the newly promoted NOVOICEOBSCODA in order to allow both voiced and voiceless codas in the L2 English grammar. This is unsatisfactory on a number of counts. Firstly, it seems odd for TETU to occur only to be obliterated afterwards in contrast to cases of TETU seen in reduplication and template resolution (McCarthy & Prince 1994). Secondly, it is not clear how the promotion of NOVOICEOBSCODA could undergo gradual promotion as suggested in acquisition literature as it would by-pass a ranking position that allows both voiced and voiceless obstruents on its way to resulting in TETU. Thirdly, the analysis provides no way of explaining the directionality of learning; all learners go through devoicing before the correct acquisition of the voicing contrast. If re-ranking was all there was to it then learners that skip devoicing should equally be possible.

This paper presents an alternative analysis to these facts, arguing that the learning pattern follows from representations and the depleted licensing potential of final empty nuclei as argued in Government Phonology. Supporting a parametric view of L2 phonological acquisition the learner starts from assuming the L1 parameter settings with L2 input providing the basis of phonological grammar re-modelling and the eventual re-setting of parameters in the L2 grammar. Within Government Phonology a core aspect of the phonological grammar is a set of licensing constraints that regulates the licensing and combinatorial capabilities of elements that define segment inventories. For Mandarin Chinese, although the element |L| associated with voicing is activated in the language it cannot be licensed by an empty position that follows word-final consonants. This implies the widely assumed representation where spontaneous voice does not require a voice feature so that nasals and glides can still surface in final position. Chinese learners carrying over this constraint to L2 English will, in the initial stage, never be able to produce voiced obstruents because obstruent representations without |L| will always be less costly to license because they are less complex (where complexity increases with the number of elements). The strength of this analysis lies in its relation of the L2 acquisition facts to a full characterisation of the Mandarin Chinese inventory, showing that the acquisition pattern can only be understood by a thorough investigation of the principles underlying the definition of the L1 inventory.

Dorsal Fricatives in German: Derivation and Representation

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We present the well-known case of ich-laut vs. ach-laut alternation in German, and show that its interaction with related phonological processes leads to opacity in such a way that no derivational version of OT developed so far can account for it. We propose a representational solution, to which we provide additional evidence from Greek.

1. The issue. The German consonantal phoneme inventory provides a voiceless dorsal fricative with a velar and a palatal allophonic variant as can be seen in examples such as *Bach* [bax] 'brook', *Buch* [bu:x] 'book', but *Bücher* [by:ç̞ɐ̯] 'books'and *mechanisch* [meça:nɪʃ] 'mechanical'.

The dorsal fricative surfaces as the velar variant [x] following tautomorphemic non-front vowels and as the palatal variant [ç] after tautomorphemic front vowels and the sonorant consonants /n, l, ʀ/, like in *mancher* [mançɐ] 'some', *Milch* [mɪlç] 'milk' and *durch* [dʊʀç] 'through'. These examples suggest that in German dorsal fricatives are regressively assimilated to the tautomorphemically preceding front or non-front segment.

2. Interacting Processes Leading to Opacity. A second allophonic process in German is ʀ-vocalisation, in which /ʀ/ is replaced by the "lower mid unrounded vowel between central and back" [ɐ̯] in syllable codas (Itô & Mester 2001). As a result, *durch* 'through' is actually pronounced as [dʊɐ̯ç], which illustrates that the palatal fricative also surfaces after 'back' segments - a typical case of opacity.

Furthermore, DFA also interacts with the phonological processes of g-spirantisation and coda devoicing, which account for the differences in word pairs such as *König* [kø:nɪç] 'king' / *Könige* [kø:nɪgə] 'kings'. In Standard German, underlying /g/ is spirantised if it is located in the coda of a syllable with nucleus /ɪ/. To account for the surfacing, though opaque, palatal fricative [ç], Hall (1989) and Itô & Mester (2001) suggest a derivational series including the voiced velar fricative ɣ as the first intermediate step, an element that, strictly speaking, is not part of the German phoneme/allophone inventory.

3. Account Using Derivational Versions of OT. In the first part of this talk I will shortly present an OT analysis of DFA in German and discuss OT based approaches to account for the opaque results of the interacting processes mentioned above. It will be shown that the Richness-of-the-Base principle and the problematic status of the voiced velar fricative cause problems that cannot be overcome even by using Candidate Chain Theory (McCarthy 2006), an approach for treating opacity in OT that incorporates a maximal degree of derivationalism in the analysis.

4. Account Incorporating Representations in OT. Evidence from Modern Greek, in which a similar (but reversed) dorsal fricative assimilation phenomenon can be witnessed, suggests that this assimilation process is not actively enforced by constraints but instead heavily relies on the feature geometric structure of the dorsal fricative and its preceding and/or succeeding elements and processes such as feature economy. In the second part of this talk, an alternative analysis of DFA (and related processes) in German will be introduced that incorporates representations in the OT framework. We argue that dorsal fricatives lack a vocalic place specification and therefore need to borrow this specification from their neighbouring segments. The argument will be based on Feature Geometry in OT (Uffmann 2005). Since this process is sensitive to morphological structure, ideas from Coloured Containment (van Oostendorp 2006) will be used.

Tone Sandhi Directionality and Relative Markedness Constraints

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In some Chinese dialects, disyllabic tone sandhi rules must apply from left to right to derive the outputs for some tri-tonal strings and from right to left to account for the others. One common point among them is that morphosyntactic structures play no role, a left-branching string and a right-branching string generating the same surface form.

We examined the trisyllabic sequences of four Chinese dialects: Boshan (Chen 2000), Tianjin (Chen 2000), Sixian-Hakka (Hsu 1996, Hsiao 2000), and Chengtu (Lin 2004). We argue that rule application directionality is primarily determined, in Boshan, Sixian-Hakka and Tianjin, by the (lowest) number of tonal modulations generated in the output; if the number of modulations generated by both left-to-right and right-to-left rule application is the same (which happens to occur in Tianjin), (right-to-left) directionality follows from final stress (RIGHTPROM). Thus, in Tianjin, where two tone patterns show left-to-right application of sandhi rules, and five others right-to-left application, the correct surface form never has more tonal modulations than the one generated by the opposite direction. For example, the left-to-right application HL+HL+L → L+HL+L → L͡+H͡+L implies two modulations, while the opposite direction would generate three modulations, i.e. HL+HL+HL → HL+L+HL → *H͡+L͡+H͡L. This fact, in line with the principle of least effort (Zipf 1949, Martinet 1955, Lindblom 1986, 1990), will be formulated as a constraint labeled MINMOD (minimize modulation) dominating RIGHTPROM.

The analytical task becomes more challenging in Chengtu, which has initial stress and a mid register. In three cases, the candidates generated by right-to-left application could be said to win simply because they satisfy MINMOD. However, in these cases, as well as, crucially, in four other cases in which the outputs generated by both directionalities have the same number of modulations, we observe that the illicit forms have farther-apart pitch targets compared with the attested surface forms. Thus, the sequence MH+LM+MH, where both directionalities involve three modulations, gives M͡H.L.**M͡** (left-to-right), not *M͡H.L.**H͡** (right-to-left); the same holds for the sequence LM+LM+MH, which gives L͡M.L.**M͡** (left-to-right), not *L͡M.L.**H͡** (right-to-left). Sundberg (1973, 1979) has remarked that a complicated tonal contour involving more pitch targets involves more complicated muscle state changes. In other words, if the principle of least effort is the major criterion in governing tone sandhi directionality, the output with farther-apart pitch targets must be eliminated. We posit a dominating constraint MINAMP (minimize amplitude of contour tones) to capture this fact; thereby, both MINMOD and LEFTPROM can be shown to be trivially satisfied in Chengtu.

The present analysis has an interesting result compared with a classical OT analysis. Contrary to candidate selection, in which markedness is built into grammars by means of constraint violation before candidates are submitted to EVAL, in the present analysis, MINMOD and MINAMP cannot be said to be violated (nor satisfied) before EVAL takes place. The markedness constraints proposed here are intrinsically *relative*: an output having three tonal modulations does not, *per se*, violate MINMOD, but only in comparison to the output generated by the opposite directionality. This conception is reminiscent of structural linguistics (Hjelmslev 1935, Trubetzkoy 1939, Jakobson 1941), where markedness was defined in terms of contrastive specification, not in terms of constraint violation.

An Analysis of Metaphony in Felechosa Asturian

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In this paper we present an analysis of a particularly complicated case of metaphony in the dialect of Asturian spoken in Felechosa (henceforth FA; Arias Cabal 1992), based on the first author's fieldwork. We build on Walker's (2001, 2004, 2005, 2006) work on metaphony in Romance, but we show that FA requires some modification to the previous proposals. As we demonstrate, it also provides evidence for a particular featural representation of vowel height.

In FA as in other Asturian dialects (Hualde 1998), the stressed vowel is raised in words with the M.SG suffix /-u/. The M.SG vs. PL forms in (1) show /a/ raising to /e/ (data are from our notes).

(1) pélu 'stick' pálos 'stick-PL' θapétu 'shoe' θapátos 'shoe-PL'

As in the Nalón Valley language discussed by Walker 2006, vowels between the stressed vowel and the final /u/ in a proparoxytone are transparent to metaphony (e.g., *péɕaɾu* 'bird' / *páɕaɾos* 'bird-PL'; we are currently investigating phonetic effects on these transparent vowels). We model this via featural correspondence following Walker but set the issue aside here for lack of space.

In addition to the pattern in (1), mid vowels raise to high in the metaphony context. However, there is an interesting twist not found in other Asturian dialects: in forms where a mid vowel raises to high, the /u/ of the M.SG suffix lowers to [o] (2), so that these forms actually exhibit vowel height transfer (Hyman 1988) rather than harmony.

(2) níɣro 'black' néɣros 'black-PL' uíjo 'eye' uéjos 'eye-PL'
útɾo 'other' ótɾos 'other-PL' súɾðo 'deaf' sóɾðos 'deaf-PL'

The lowering is noted by Arias Cabal (1992), but he describes it as non-neutralizing. Our transcriptions and phonetic analysis of recorded examples indicate significant lowering that may neutralize final /u/ with /o/ (pending statistical analysis of the formant measurements). Regardless, due to the lack of coarticulatory motivation for lowering in the contexts where it occurs, we assume that the lowering is phonological and lowered /u/ is featurally identical to /o/.

In order to analyze FA metaphony and fit it into the typology of metaphony systems, we adopt much of Walker's analysis, though with important differences. Walker (2004) analyzes metaphony as being driven by a constraint ∃LICENSE(height)/σ́, which requires any height feature in a high vowel to be associated to a stressed syllable. Height features in a high vowel must be licensed by a strong position, so they spread to the stressed vowel (this ignores the proparoxytones mentioned above). A highly ranked conjoined constraint against simultaneous violation of multiple height features ensures that raising is stepwise only, and highly ranked MAX[+high] prevents [+high] from simply being deleted from the final vowel in order to satisfy the licensing constraint. Note that *contra* Walker, our MAX must be specific to [+high], because a general MAX[high] would incorrectly block raising of mid ([-high]) vowels to [+high]. To account for the lowering of the suffix /u/ in words where the stressed mid vowel raises to high, we borrow from Walker's (2001) account of height transfer in Esimbi the constraint CRISP(σ, [high]) which bans [high] linked to multiple syllables. The overall ranking is thus MAX[+high], CRISP(σ, [high]), IDENT[high]&IDENT[low] >> ∃LICENSE(height)/σ́ >> IDENT[high], IDENT[low].

Note that this account requires representing vowel height with separate features [±high] and [±low]. Parkinson (1996) argued that metaphony is better analyzed in a feature system where the vowel height continuum is directly represented, as in his Incremental Constriction Model (ICM), where mid vowels have one instance of [closed] and high vowels two. In ICM, metaphony spreads a single instance of [closed], yielding one-step raising; this avoids conceptualizing metaphony as two separate processes (e.g., spreading [-low] to low vowels and [+high] to mid vowels). But as we discuss, FA metaphony and lowering do treat low vs. mid vowel raising differently – MAX and CRISP crucially refer to [high] but not [low]. We would incorrectly block raising in, e.g., /palu/ → [pelu] if MAX applied to [+low], or if CRISP to applied to [-low]. Hence, the details of metaphony in FA provide an argument for [±high] and [±low] and against the ICM (see also Kaze 1991 for a critique of earlier incremental models).

A usage-based approach to Dutch /r/-deletion

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It has been suggested that the phonology of Dutch contains an optional rule of /r/-deletion, by which an underlying /r/ is deleted in postvocalic position (Kessens, Wester and Strik 1999, Van den Heuvel and Cucchiarini 2001) . Plug (2003) and Plug and Ogden (2003) have argued against a categorical deletion rule, attributing apparent deletion to gradient variation at the level of articulatory, gestural organisation. Their argument rests on the assertion that apparently /r/-less forms may lack a rhotic *segment*, but still contain correlates of rhoticity distributed across neighbouring segments. As a result, there is no neutralisation of the contrast between, for example, /vat/ and /vart/, even if both forms may be said to be realised as sequences of three segments.

Plug (2003) and Plug and Ogden (2003) base their assertion on the analysis of a small number of speakers producing lexical items with and without postvocalic /r/ in an experimental set-up. This study attempts to replicate their analysis using approximately 13 hours of spontaneous speech by 20 speakers of Standard Dutch. Minimal pairs of the type /vat/–/vart/ will be selected for all vowels in the Dutch phoneme system, and the members of these pairs will be subjected to phonetic analysis covering rhyme duration, formant structure and spectral analysis of the plosive burst.

Given that spontaneous speech tends to show greater degrees of phonetic reduction than experimentally elicited speech, the main question is whether we will find evidence of categorical /r/-lessness — that is, complete neutralisation of minimal contrasts involving postvocalic /r/ — in this material. And if so, does this mean that the phonology of Dutch *does* contain a rule of /r/-deletion? This paper addresses this question from the viewpoint of Usage-based Phonology (Bybee 2001, Pierrehumbert 2006), which adopts an exemplar-based approach to lexical representation. More generally, it discusses how the gradient–categorical distinction, which has long been used to decide between a phonological and a phonetic treatment of variability (e.g. Myers 2000) is interpreted in this framework.

Diphthong, know thyself. Binding in Phonology

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Background. In Government Phonology (GP; Kaye, Lowenstamm & Vergnaud 1985, 1990), melodic restrictions within governing relationships (branching onsets/nuclei, coda-onset clusters) are captured by the Complexity Condition (CC; Harris 1990). The CC requires a governing position to be at least as complex as the governed position, where complexity equals the number of elements: In the diphthong in *boy* (i) the governor contains the elements **A** and **U** (complexity 2), the governee only **I** (complexity 1); the structure is licit. Note that all elements are treated as equal; only their number counts. In the spirit of van der Torre (2003), I will argue against that claim, contributing to our understanding of the nature of elements.

Problem. Despite its simple elegance, the CC is not sufficient to explain all melodic restrictions, not even in the narrow area of English heavy diphthongs, which I will concentrate on. There are two types of problems, both stemming from a failure to take into account the individual nature of elements: (P1) English has heavy diphthongs as in *high* (ii) and *how* (iii), where **A** governs **I** or **U**, respectively. The CC is satisfied, but the reverse arrangement (**I** or **U** governing **A**) is also sanctioned, yet English does not allow heavy diphthongs like *ia* or *ua*. (P2) The CC does not exclude **eu* (iv), with **A** and **I** in the governor and **U** in the governee—with **I** and **U** reversed vis-à-vis (i)—yet that diphthong does not occur in English.

Solution. I will make two claims, both taking into account the asymmetries between elements. (C1) There are clear restrictions on **A**. In English, (C1.i) **A** must be present in the head of a diphthong, while (C1.ii) **A** is disallowed in the governee. This solves P1, *ia*/*ua* are ruled out as heavy diphthongs. (C2) Assume that the elements in the governor stand in a relationship with the elements of the governee which I will refer to as binding. Also,

(C2.i) **A** does not bind. (C2.ii) **U** must be unbound. (C2.iii) **I** binds.

This explains the asymmetry between (i–iii) vs. (iv): In (i), **U** must be unbound, but **I** is in the governee and thus cannot bind the **U**. In (ii), **I** binds, but it is not in the governee; there is no problem. In (iii), **U** must be unbound, and **A** does not bind. None of (i–iii) are problematic. But in (iv), **U** must be unbound and the **I** in the governor binds **U**. Thus, (iv) is out, P2 solved.

Justification. (C1–2) model the pattern, but do they have independent support? Are they found elsewhere? I will provide three pieces of evidence where we see points of contact with other languages and/or seemingly unrelated phenomena, and discuss their implications.

(J1) The requirement that **A** be present in the governor but not in the governee (C1) is also active in obstruent-obstruent clusters (except *s*C), as in English *chapter*, where the governee does not contain **A** (*p*), while its governor must (*t*), cf. Kaye (2000), Pöchtrager (2006).

(J2) Claims (C2.i–iii) bear a striking resemblance to the licensing constraints of Turkish vowels (constraints that restrict the combinations within a phonological expression such as one defining a vowel, cf. Charette & Göksel 1996, Kaye 2001):

(C2.i)	**A** does not bind.	(C2.ii) **U** must be unbound.	(C2.iii) **I** binds.
Turk. V:	**A** does not license.	**U** must be head.	**I** licenses.

Where *bind* ~ *license* and *unbound* ~ *head*. A set of syntagmatic restrictions in English comes up as a set of paradigmatic restrictions in Turkish, which suggests that (C2.i–iii), far from being accidental, show us something deeper about the individual character of elements. (Variation, e.g. Finnish allowing *eu*, can be linked up to other cross-linguistic differences.)

(J3) Turkish merges sequences of V_1##V_2 as (long) V_2 in fast speech (Demircan 1981), unless V_1 contains **A** and V_2 does not, suggesting that (C1) could also be relevant to syntagmatic phenomena in Turkish and that (J2) is not the only surprising link between the two languages.

(i)	(ii)	(iii)	(iv)
o i	*a i*	*a u*	* *e u*
A I	**A I**	**A U**	**A U**
U			**I**

Underapplication of vowel reduction to schwa in Majorcan Catalan

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1. Data. Majorcan Catalan shows vowel reduction of [é], [ɛ́] and [á] to [ə] in unstressed position. However, productive derived words whose primitive has a stressed [é] or [ɛ́] vowel at the left edge of the stem do undergo vowel reduction not to [ə], but rather to [e]. There is, therefore, underapplication of vowel reduction to [ə]: *v*[é]*nt* 'wind'~*v*[e]*ntet* 'wind *dim.*'; *c*[é]*l* 'sky'~*c*[e]*let* 'sky *dim.*' (Veny 1962, Bibiloni 1998, Mascaró 2002, 2005). The very same patterns under similar conditions are found in inflectional verbal paradigms, although in this case underapplication of vowel reduction is not found when the alternating stressed vowel is [ɛ́] (Mascaró 2002, 2005). Learned words and loanwords with unstressed *e* also show [e], especially when located at the left edge of the stem and when preceded by a labial consonant: *esp*[e]*cial* 'special', *p*[e]*l·lícula* 'film', *b*[e]*nigne* 'benign', *f*[e]*liç* 'happy', etc. (Bibiloni 1998). **2. Generalizations & analysis.** Previous descriptive and theoretical approaches to these facts have already detected that a paradigmatic effect is at play here. According to Mascaró (2005), cases with normal application and cases with underapplication of vowel reduction exhibit different behavior because the latter bear a lexical mark responsible for the demotion, in the constraint hierarchy, of the markedness constraint which favors the schwa in unstressed position. In this paper, we provide a different interpretation of these facts. Within derivation, there are 4 crucial conditions for the underapplication of vowel reduction, which are each insufficient on their own. **2.1** The unstressed affected vowel must have a correspondent stressed vowel in the stem of the primitive word. This circumstance can be interpreted as the result of an O-OIDENT(F) transderivational F constraint (Benua 1997), which demands that surface correspondent segments must have the same featural specification; BASE-PRIORITY, on the other hand, ensures that the direction of the pressure is from the base to the derived form and not the opposite. **2.2** The vowels in the stressed stem of the primitive form must be front and mid (*i.e.* [é] & [ɛ́]), in that the pressure does not work when the primitive has [á]. This condition, as well as the fact that the result of the process is always [e] (and never [ɛ]), can be explained by the high ranking of the markedness constraints *M/a and *M/ɛ, which penalize these vowels in unstressed position and inhibit the possible effects of the constraint that demands uniformity in the stem. **2.3** The position of the vowels under surface correspondence must be at the left edge of the stem (cf. *pap*[é]*r* 'paper' ~ *pap*[ə]*ret*, *vs*. *p*[é]*ix* 'fish' *p*[e]*ixet*, *p*[e]*ixot*). This condition can be attributed to a prominence effect, in that in a prominent position (such as the left edge of the stem) a more prominent vowel than [ə] (*i.e.* [e]) is selected, whereas in a non-prominent position (such as the right edge of the stem) a non-prominent vowel (*i.e.* [ə]) is selected. **2.4** The derived form must be productive (cf. *p*[é]*ix* 'fish' ~ *p*[e]*ixet* 'fish *dim.*', *p*[e]*ixot* 'fish *augm.*' *vs*. *p*[ə]*ixater* 'fisherman', *p*[ə]*ixateria* 'fish shop'). This can be interpreted as an O-OSUBPARADIGMIDENT(F) F effect, along the lines of Ohannesian & Pons (2008). Within verbal inflection, where there is no BASE-PRIORITY, underapplication of vowel reduction applies because overapplication is blocked by the high ranked constraint *N/[ə́], which penalizes a segment of low sonority as a nucleus. **3. Theoretical & empirical implications. 3.1** § 2.3 advocates the need for recognizing an additional prominent position (*i.e.* the left edge of the stem), and the subsequent prominence hierarchy for vowels according to their position within the stem *ə/L-Stem-Edge >> *i,u/L-Stem-Edge >> *e,o/L-Stem-Edge >> *ɛ,ɔ/L-Stem-Edge >> *a/L-Stem-Edge, apart from those already detected in previous studies (Crosswhite 1999, 2004; Cabré & Prieto 2003; Cabré & Prieto 2006; Lloret & Jiménez 2008); additional evidence for this hierarchy based on data from other Romance languages will be provided). **3.2** § 2.4 demands an uneven and hierarchical structure for the paradigm candidates generated, so that the members in it can be unequally affected by the O-O F constraints (Ohannesian & Pons 2008). **3.3** The fact that labials favor [e] can be interpreted as a coarticulation effect. **3.4** The high ranking of *N/[ə́] is not an *ad hoc* stipulation: it formally expresses the fact that the phonemic character of the schwa is becoming a relic, a circumstance which is additionally corroborated by the fact that loanwords with a stressed *e* are systematically realized with [é]: *Intern*[é]*t*. **3.5** Loanwords and productive derivation exhibit, as seen, [e]; this suggests that the asymmetric unstressed vowel system of MC ([i] [u]; [ ] [o]; [ə]) is progressively becoming symmetric ([i] [u]; [e] [o]; [ə]) (see Mascaró 2002).

Lenis and fortis in Bavarian: Broadening the perspective

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The discussion around the consonantal opposition of lenis and fortis dominates the phonology of the Bavarian dialects of German. Numerous scholars have commented on the topic (e.g. KUFNER 1961, GLADIATOR 1971, BANNERT 1976, ZEHETNER 1978, HINDERLING 1980, SCHEUTZ 1984, STÖR 1999) without coming to a final conclusion. This paper has two goals. First, it will be shown that the opposition is by far more complex than has been assumed and that there are a couple of dimensions of contrast that have not been noticed so far. Second, a new hypothesis will be proposed concerning the phonological nature of the opposition.

The opposition as traditionally viewed concerns obstruents after an accented vowel, that is, plosives /p t k/, affricates /pf ts tʃ/ and fricatives /f s ʃ x/. The most salient features distinguishing the two types of /VC/ sequences are the lengths of the vowel and the consonant and a somewhat obscure type of consonant quality commonly labelled "strength". As far as Bavarian is concerned, there has been little consideration as to what strength could mean phonetically.

In detail, lenis consonants are typically short and weak, while fortis consonants are typically long and strong. In addition, there is a law stating that lenis consonants have to be preceded by a long vowel, while the vowel before a fortis consonant has to be short (PFALZ 1913). Thus, the lengths of the vowel and the consonant are complementarily distributed. The examples below, which are taken from West Central Bavarian, illustrate this distribution. The diacritics /ˋ/ and /ˊ/ are employed to designate lenis and fortis sequences, respectively.

lenis	/ˈlàetn/ [ˈlaedn̩] 'to suffer'	/ˈplìts/ [ˈpliːts] 'thunderbolt'	/ˈòfa/ [ˈoːfɐ] 'oven'
fortis	/ˈláetn/ [ˈlaetːn̩] 'to ring'	/ˈplíts/ [ˈplitːs] 'thunderbolts'	/ˈófa/ [ˈofːɐ] 'open'

Apart from these features there are further dimensions in which lenis and fortis consonants may differ. The following have been described in the literature: voice (e.g. ZEHETNER 1978), degree of closure (e.g. STÖR 1999), compressibility of vowels (BANNERT 1976), and syllable number (KRANZMEYER 1956). Several others, however, have not been mentioned so far. These are: compressibility of consonants, potential length (i.e. length only surfacing under special pragmatic conditions), similarity to /ˈV#/, similarity to /#C...ˈ/, compactness (i.e. allowance for leftward spread of secondary gestures such as the velar gesture in nasals), syllable affiliation, length in clusters, and relation to cluster complexity.

The main problem, thus, is the formal diversity of the opposition as opposed to its functional simplicity. Previous approaches try to solve this problem by assessing phonological relevance to only one dimension of contrast, notably to consonant length (as gemination in KUFNER 1961), to suprasegmental "syllable cut" (GLADIATOR 1971, ZEHETNER 1978), or to complementary length (BANNERT 1976). None of these approaches, however, tries to incorporate more than some of the known dimensions of contrast, not to mention the unnoticed dimensions listed above. What is more, none except BANNERT tries to explain why and how the one dimension considered phonologically relevant motivates the others.

To achieve these two goals, the approach presented here will employ two concepts from Articulatory Phonology (BROWMAN and GOLDSTEIN 1986): gestural coupling points (BROWMAN and GOLDSTEIN 1988, "landmarks" in GAFOS 2002) and competitive coupling (BROWMAN and GOLDSTEIN 2000, NAM and SALTZMAN 2003). It will be argued that the release of the vowel gesture preceding a lenis consonant is coupled to the center of the primary closing gesture of the consonant. By contrast, in the case of fortis sequences, the center of the vowel gesture is coupled to the target of the consonant. It will be shown that under these two assumptions it is possible to adequately model the central characteristics of the oppposition (especially potential length, subsuming vowel and consonant length) and at the same time explain their connectedness to most other dimensions of contrast. To account for the behaviour of lenis and fortis in clusters, it will furthermore be assumed that subsequent consonants are sequentially coupled when lenis but competitively coupled when fortis.

Evidence for indeterminate representations: schwa-insertion/intrusion in Dutch

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Conceptions of the phonetics-phonology interface range from those within a strictly modular view of the grammar, where the interface is a translator between the discrete categories of phonology and the gradient, continuous matter of phonetics (Hale and Reiss 2000), to its non-existence in a number of essentially non-modular views of an integrated phonetics-phonology in which phonological categories and phonetic matter interact directly (Browman and Goldstein 1992, Boersma 1998). Scobbie (2007) argues against both extremes and advocates a "quasi-modular" view, in which phonetics and phonology are distinct domains, but *overlap* rather than interface. In this grey overlap area, categories have fuzzy boundaries, and processes and representations can be indeterminate between phonological and phonetic for speakers.

Empirical support for such indeterminate representations is found in new, phonetically detailed data of phenomena that have been subject to "boundary disputes" between phonetics and phonology. One such phenomenon is the appearance of a vocalic element of central quality in Dutch word-final liquid-nasal and liquid-obstruent clusters. While traditionally described as a purely phonological rule of schwa-insertion (Trommelen 1984, Booij 1995), it has also been argued to be a phonetic process of vowel intrusion (Hall 2003). The examples in (1) show the traditional transcription. The focus will be on word-final clusters of /r/, which has a highly variable realisation in Dutch (Sebregts 2004), and a nasal or non-coronal obstruent.

(1) *kerk* /kɛrk/ [kɛrək] 'church' *arm* /ɑrm/ [ɑrəm] 'arm'

Data from a large number of speakers of various urban accents of colloquial Standard Dutch shed new light on this issue, and reveal a large amount of intra- and interspeaker variation. Spectral analysis and duration measurements of the vocalic element internal to rC clusters suggest that a purely phonological analysis in terms of a rule inserting schwa in rC clusters is an oversimplification, as the "inserted" vowel is both spectrally different as well as considerably shorter than the lexical schwa of words such as *beraad* 'deliberation' or the plural morpheme in *sturen* 'steering wheels'. Bruges Dutch in particular seems to invite a phonetic, intrusive vowel analysis, as the duration of the vowel in rC clusters is only 38msec on average (while that of lexical schwa is twice as long), and the shortest tokens are below 20msec, which is equal to the open phases of an alveolar trill (the realisation of /r/ in Bruges being largely alveolar, this suggests the intrusive vowel is simply the final open phase of /r/ transitioning into the word-final consonant). In fact, the term "schwa" seems a misnomer, since the quality of the intrusive vowel is strongly influenced by the canonical vowel that precedes it. In addition, vowel intrusion in Bruges also takes place in clusters of /r/ and a coronal obstruent – a context which is banned from the traditional phonological rule.

In contrast, Nijmegen Dutch seems much more amenable to the phonological analysis than a phonetic one, as the duration of the vowel in rC clusters is almost equal to that of lexical schwa, its formant structure is more consistent, and its appearance is not predicted as a "natural" transition sound between /r/ and a following consonant, given that the realisation of /r/ in Nijmegen is a uvular approximant or fricative.

Crucially, dialects where there is more variation in /r/ realisations take a middle ground between these two extremes. The duration of the epenthetic/intrusive vowel in Utrecht Dutch, for instance, is consistently shorter than that of lexical schwa, but never as short as the Bruges transition vowel. This suggests phonologisation (insertion), but with the retention of process-specific phonetics. Representations in these dialects cannot be deterministic as to their phonetic or phonological status, and indeed need to be flexible to accommodate the variation found. Such indeterminacy in representation poses problems for modular and non-modular views alike, but is exactly in line with quasi-modular views in which phonetics and phonology do not interface, but overlap.

Release and reduction: two origins of schwa

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This paper focuses on two origins of schwa: consonantal *release* and vowel *reduction*.

Schwa deriving from consonantal release: When lexical or morphological structure brings two consonants together (**C**$_1$(+)**C**$_2$), the identity of **C**$_1$ may, on occasion, fail to be successfully communicated. In the absence of consonantal release into a more open gesture—ideally, a vowel—cues that would otherwise be associated with the release of **C**$_1$ may become jeopardized. Such cues include offset formant transitions and plosive burst frequencies associated with oral place of articulation, and the noise, pop, or low frequency cues associated with aspiration, glottalization or voicing, respectively. In many languages, the loss of such cues sets the stage for merger or neutralization, such that **C**$_1$ loses its contrastive oral configuration, its contrastive laryngeal setting, or perhaps both. (Lombardi 1991, Steriade 1997). But a very different diachronic route is taken in other languages: in the context **C**$_1$(+)**C**$_2$, **C**$_1$ is released into a "little vowel" before the **C**$_2$ constriction is fully achieved. Upon the release of **C**$_1$, the aforementioned cues that crucially rely on this segment of the speech stream are much more likely to be saliently encoded in the speech signal, and hence tend to be more resistant to neutralization or merger. The proposal is that some schwas have their diachronic origin in such "little vowels". Hall (2004) observes several properties of such "intrusive" schwas: they tend to be heterorganic (thus increasing the likelihood of **C**$_1$ release), they tend to be "invisible" to syllabification and stress. They also tend to bear the influence of neighboring vowels. Indonesian schwa (Cohn 1989) is considered as a case study. Finally it is suggested that release into schwa may be a functional response to the potential loss of contrastive information in the absence of **C**$_1$ release.

Schwa deriving from vowel reduction: In other languages, schwa may alternate with a full vowel under stresslessness. Dutch (Van Oostendorp 1995) and English (Chomsky and Halle 1968) are considered, with special emphasis placed on the instrumental studies of English schwa by Browman and Goldstein (1992), Flemming and Johnson (2007) and Flemming (2007). Schwa here is heavily coarticulated (more so than other vowels), though all these researchers agree that schwa possesses inherent qualities that are not determinable by context alone. In short, stresslessness induces shortening, and as a consequence of its short duration, vowel quality distinctions are reduced, perhaps to the point of being neutralized. Once neutralized, coarticulation may be engaged in with few limits, as there are no longer any lexical contrasts that might be maintained by inhibiting such coarticulatory tendencies (see especially Öhman 1966 and Manuel 1990, 1999 on the inhibitory role that lexical contrast may play in coarticulation). It is suggested that languages may tolerate reduction to schwa if such reduction does not induce excessive homophony.

Schwa-zero alternations: As a consequence of schwa's acoustic and auditory indistinctness, its *presence* in a given phonetic context may be confusable with its *absence* in an otherwise identical phonetic context. When two or more auditory events are confusable with each other, a condition is set up that may lead to diachronic change. One plausible outcome of this particular situation may be the introduction of a ə~∅ alternation: in certain acoustic contexts and/or under certain functional conditions schwa may diachronically survive, while in other acoustic contexts and/or under other functional conditions schwa may disappear. Two cases of ə~∅ alternation are considered: Hindi (Ohala 1983) and Chukchee (Kenstowicz 1994). I report that schwa is more likely to delete in contexts where cues to neighboring consonants are not jeopardized to the point of their deleting as well. Also, a language is more likely to evolve schwa deletion if the resulting strings of consonants are already present in the language.

Morphological Lenition in Manx as Consonant Coalescence

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In this talk, I argue that a case of morphologically conditioned lenition in the Celtic language Manx which is apparently problematic for concatenative approaches to consonant mutation (Green, 2005) follows naturally under the interpretation of mutation as coalescence of a defective segment (de Lacy, 2008). **Problem:** Green (2005) claims that data from Manx provide compelling evidence against any analysis of Celtic consonant mutation which assumes affixation of phonological material as the trigger of mutation. His main argument is the fact that Manx has a purely phonologically conditioned lenition process (triggered in intervocalic position and concomitant to voicing) besides a morphologically conditioned lenition process (triggered by various syntactic constructions and without concomitant voicing). While both processes roughly transform stops into fricatives (1a), morphological lenition involves debuccalization of coronal obstruents whereas phonological lenition does not (1b):

(1) **Lenition in Manx**

	Underlying	**Phonological Lenition**	**Morphological Lenition**
a.	p	b ~ v	f
b.	s	z ~ ð	x ~ h
	t	d ~ ð	x ~ h

According to Green this leads to the ranking paradox that Id(cor) ≫ *ð/*z holds for phonological lenition, but *ð/*z ≫ Id(cor) for morphological lenition evidencing that morphosyntactically triggered mutation is not derived by the interaction of phonological constraints, but by purely morphological mechanisms. **New Analysis:** I show that Manx morphological lenition receives a straightforward phonological analysis under the assumption that the mutation morpheme consists of a defective segment S (de Lacy, 2008) which contains an unassociated aperture grid mark (Trommer, 2009) and the feature DORSAL. S undergoes coalescence with a stem-initial obstruent resulting in a combination of the aperture grid marks of both segments, hence lenition. Debuccalization follows from the technical details of the interpretation for the constraint Ident Place under coalescence: Only a segment which is neither specified for DORSAL nor for CORONAL satisfies Ident Place for an output segment which corresponds to two input segments with these diverging place specifications:

(2) **Violations of Ident Place under Coalescence**

Input Segment	**Input Segment**	**Output Segment**	**Violations**
$[\text{DOR}]_1$	$[\text{COR}]_2$	$[\text{DOR COR}]_{1,2}$	★ ★
$[\text{DOR}]_1$	$[\text{DOR}]_2$	$[\text{DOR}\ \ ]_{1,2}$	★
$[\text{DOR}]_1$	$[\text{DOR}]_2$	$[\ \ \text{COR}]_{1,2}$	★
$[\text{DOR}]_1$	$[\text{COR}]_2$	$[\ \ \ \ ]_{1,2}$	✔

Asymmetries in the behavior of different place features are implemented by distinct Max constraints for CORONAL, LABIAL, and DORSAL. Since Max LABIAL is ranked above Ident Place and Max DORSAL, labial obstruents get neither dorsal nor do they debuccalize. On the other hand, coronal obstruents show optional debuccalization/velarization since Max DORSAL and Ident Place form a ranking tie. Crucially, phonological lenition is not subject to debuccalization because it is not infected by a coalescing dorsal segment.

Phonological development in Late Talkers

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Expressive 'late talkers' (LTs) show a small productive lexicon at age 2-3 years, despite age-appropriate comprehension. Many 'catch up' rapidly, suggesting that some typically developing children simply start late, but others prove to have genuine language problems at a later age (e.g., SLI or dyslexia). Can the groups be distinguished based on their phonology?

We hypothesize that some LTs fail to induce patterns from their emerging lexicon. Each word is treated as a new item, with little transfer of knowledge. Phonetic knowledge remains 'hyper-detailed' (Pierrehumbert, 2003); new words are learned with difficulty. Evidence that this is true for some LTs comes from studies of older children with language disorders (SLI, dyslexia), who often begin as LTs and who tend to have problems with phonological abstraction (Beckman, Munson & Edwards, 2004; Bishop & Snowling, 2004). We expected to find two groups of LTs with different sources of delay: Group I: limited production practice (i.e., little babbling); Group II: limited production practice plus a deficiency in pattern extraction and thus in emergent phonological systematicity (Vihman & Croft, 2007).

Our analyses are based on 11 typically developing children (TDs) and 11 LTs (comprehension within 3 mo. of norm on the Reynell Scales at 2;6, expression at least 4.5 mo. below the norm). All were recorded several times in naturalistic 30-minute home sessions; analyses are based on the first session with about 25 word types (25w[ord]p[oint], TDs: 15-26 months, LTs: 27-36 months), typically marking the end of the single-word period.

To assess systematicity in pattern formation we adapted a computational program (Farmer, Christiansen & Monaghan, 2006) that aligns child word forms and adult targets to compute a match of features within segments for each comparison pair. This made it possible to assess similarity among the word forms a child produces and also their distance from the adult target, on the assumption that children who have begun to develop phonological systematicity, based on implicit induction of patterns latent in their word forms, should show relatively high between-word similarity as well as high distance from target (adaptation). We found that while the TDs show no single pattern, the scores of the LTs range from high adaptation with high similarity (suggesting emergent systematicity) to low adaptation with low similarity (suggesting lack of systematicity).

We then added to our assessment a measure of size of consonant inventory (CI), which proved to be negatively correlated with age at 25wp (-.496, $p = .019$, two-tailed) – i.e., the later the child reaches the 25wp, the smaller his/her consonant inventory. Children with smaller inventories should adapt word forms the most often, given their constrained production capacities. If, despite a relatively small CI, a child scores low on both similarity and adaptation, s/he is apparently missing the potential in the linguistic patterning (systematicity) that underlies the words. Furthermore, high use of labials has been shown to relate to rapid lexical advance (McCune & Vihman, 2001). In this study, labial use proved to be bimodal, with five TDs and six LTs showing over 40% use of labial words. Two of the three children low on both systematicity measures also failed to make heavy use of labials, with their potential visual cue to support word production.

We expect those three children to fall at the low end of our outcome measures for phonology, morphosyntax and lexicon, as applied to the children's spontaneous speech both at 3.5 years and 14 months after the 25wp (if these differ by over 2 mos.). The low similarity and distance scores, despite a small CI and coupled with the failure to make use of the implicit visual cue to word formation provided by labials, suggest a deficit in pattern induction and procedural learning such as has been posited for children with SLI (Ullman & Pierpont, 2005; Tomblin, Mainela-Arnold & Zhang, 2007). Our outcome measures will provide a concrete test of the hypotheses, confirmation of which would suggest that LT phonology can provide a critical early indicator of persistent delay.

Measuring phonetic precursor robustness

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Introduction: What factors shape the synchronic typology of sound patterns and how should these factors be assessed? One commonly recognized factor is known as channel bias (Moreton, 2008). That is, certain sound patterns might be intrinsically more frequent and salient than other patterns due to the relative robustness of the phonetic precursors. How the robustness of a phonetic precursor is measured remains a vexing problem, however. Using a rational optimal listener model to speech perception, a method, called Slope of Precursor Robustness (SPROB), is proposed, which estimates phonetic precursor robustness by the degree of uncertainty a given context introduces to the identification of an intended sound category. The utility of SPROB is illustrated through a case study of the phonetic precursors to vowel-to-vowel height dependencies (HH) and dependencies between vowel height and consonantal voicing (HV).

The model: A phonetic precursor's robustness corresponds to the degree of uncertainty intra-contextual variation introduces to sound categorization. The amount of uncertainty about a category that a particular cue provides is inversely proportional to the variance of that cue for that category; the more overlap in the probability distributions of two categories, the more uncertainty the listeners will have about which category they are hearing (Clayards et al. 2008). Using an optimal rational listener model (Feldman & Griffths 2007, Flemming To appear, Clayards et al. 2009), we assume that listeners hear a signal S in context k and decide its probability of belonging to category or , assuming normally-distributed around target pronunciation , itself normally distributed around a category mean. Formally:

$$T|c_i, k \sim N(\mu_{c_i,k}, \sigma_c), \quad S|T, c_i \sim N(T, \sigma_S) \tag{1}$$

Using Bayes' rule, the amount of uncertainty given the amount of overlap (variance of the probability distributions) can be estimated by the normalized slope of a categorization function (2). The shallower the slope, the more categorization uncertainty exists; the higher the uncertainty, the more robust the phonetic precursor is going to be.

$$\text{Slope of Precursor Robustness (SPROB)} = \frac{(\mu_{c1,k} - \mu_{c2,k})^2}{4(\sigma_S^2 + \sigma_c^2)} \tag{2}$$

Results and conclusion: The relative robustness of HH and HV precursors is evaluated in terms of the uncertainties of /i/ and /e/, on the one hand, and /a/ and /e/ on the other, in the context of a following obstruent that is either voiced or voiceless (the HV precursors) and the uncertainty of the same vowel pairs in the _Ca and _Ci contexts respectively (the HH precursors). The SPROB scores were calculated based on results of a cross-linguistic production study of English and Turkish that examined the effect of anticipatory vowel-to-vowel height coarticulation (HH) against the effect of consonantal voicing and vowel height interaction (HV). The SPROB score comparison indicates that the HH precursor introduces more uncertainty to the signal than the HV precursor. The HH precursor is thus more robust than the HV precursor. At first glance, the present result contradicts that of Moreton 2008, which argues that the HV precursor is more robust than the HH precursor. A reexamination of Moreton's phonetic survey suggests that the opposite conclusion is warranted; the HH precursor is more robust than the HV precursor.

Non-concatenative allomorphy as argument against paradigmatic REALIZE MORPHEME

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The phenomenon that different types of non-concatenative morphology can realize one and the same morpheme in different contexts (=non-concatenative allomorphy) is often taken as a main argument for an OT-constraint REALIZE MORPHEME. I will argue that a RM-based theory is neither necessary nor empirically adequate to account for instances of non-concatenative allomorphy.

Background: The original concept of REALIZE MORPHEME demands the mapping of each morpheme to some phonological element in the output (e.g. Samek-Lodovici (1992), Walker (2000)). In contrast, RM as defined in Kurisu (2001) is satisfied if the output is phonologically different from its base: A morpheme could be realized by any conceivable operation the languages phonology provides. He discusses non-concatenative allomorphy as a strong argument for such an approach: e.g. in Saanich (1), a morpheme is realized through reduplication, infixation or metathesis – whereas each of these allomorphs has its own (phonological) context.

(1) *Saanich continuative aspect* *Montler (1989)*

reduplication	q^{w}ə̲l’	“say”	q^{w}ə̲q^{w}əl’	“saying (sth.)”
infixation	wə̲qəs	“yawn”	wə̲ʔqəs	“yawning”
metathesis	sq’ə̲t	“tear it”	sə̲q’t	“tearing it”

Problems: *First*, analysing metathesis as morphological exponent which falls out from low-ranked LIN predicts metathesis of two consonants as a possible morphological exponent: LIN does not differentiate between the kind of segments whose underlying order it preserves. This prediction is empirically wrong since metathesis in a morphological context always involves CV-reordering (cf. e.g. the survey in Hume (2001)). *Second*, I will show that any RM-based analysis must be empirically inadequate since general markedness constraints, crucial to exclude allomorphs in wrong contexts, mispredict phonological repair operations in phonologically licit structures. A ranking paradox in the analysis Kurisu (2001) gives for Saanich illustrates this point. Since any (non-concatenative) realization of a morpheme violates some faithfulness constraint, their ranking determines a preference order for different allomorphs – in Saanich (following from Kurisus ranking (2)): /ʔ/-infix ≫ reduplication ≫ metathesis.

(2) RM ≫ *COMPLONS ≫ *COMPLCODA ≫ LIN ≫ INTEG ≫ CONTIG

A less preferred allomorph is only chosen if another allomorph‘s realization would result in a marked structure; *COMPLEXCODA for example is necessary to exclude the /ʔ/-infix in stems with a closed first syllable like reduplicating /q^{w}ə̲l’/ or metathesizing /sq’ə̲t/ (*/q^{w}ə̲ʔl’/ and */sq’ə̲ʔt/). But this high-ranked general markedness constraint mispredicts phonologically improving candidates not being considered by Kurisu to become optimal: a correct metathesis form /sə̲q’t/ for example looses against a reduplicating candidate /səq’ə̲t/. Reranking INTEG above *COMPLEXCODA would exclude this but would incorrectly prohibit reduplication in general.

Proposal: A survey of attested patterns of non-concatenative allomorphy shows that they are always analysable as affixation of some phonological structure (e.g. a single (abstract) feature for consonant mutation and insertion in Irish (Trommer (2009), Rice (1993)) or a mora resulting in nasal insertion, V-, or C-lengthening in Shizuoka Japanese (Davis and Ueda (2002))). I will show that the Salishan allomorphy Kurisu (2001) discusses can be reduced to affixation of a mora (Saanich) or a foot (Upriver Halkomelem). A language might provide different strategies to realize those morphemes in the output (e.g. metathesis might be one strategy to achieve prosodic weight, i.e. realize a morphemic mora, cf. e.g. Stonham (2007), Mc Carthy (2000), Buckley (2002)), but the number of potential allomorphs is quite smaller than in a RM-based theory and most important, no general markedness constraints are crucial for the exclusion of allomorphs but rather faithfulness constraints like MAX-μ/FT. In addition, analysing metathesis as result of mora-affixation excludes CC-metathesis as possible morphological exponent since reordering of two consonants does not change the prosodic weight of a syllable.

Poster papers

Differences of Syllabic Structure in Mental Models

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In this paper we continue to probe syllabic structure of words in the mental models that mediate lexical access. We build on experimental work using lexical decision time under priming and masking constraints (Mehler et al, 1981; Segui, 1984 etc.), and using response to incongruent speech stimuli. The latter can elicit syllable migration effects (from left-ear/right-ear incongruence, Kolinsky and Morais 1993; Mattys and Melhorn 2005), and phonological fusion (Cutting, 1975) responses (from audiovisual incongruences,). We review these experimental tools, then select our method for its suitability to contrast lexical access by Anglophone and Arabophone participants, noting that Anglophones are usually conditioned to branching onsets and to coda/onset distinctions in their apprehension of complex words, whereas Arabophones are brought up to an orthography emphasizing coda-less CV and CVV units without branching onsets.

Our method uses the McGurk effect (McGurk & MacDonald, 1976), by which an audio stimulus 'baits' dubbed onto visual gesture 'gates' elicits from the majority of participants a fusion perception 'dates', which is different from the real signal in either the audio or visual channels. The size of this majority vote varies systematically with the location of the incongruent segment in whatever lexical hierarchy mediates normal lexical access in the participant group. For example, it has been noted that Anglophones habitually fuse codas at higher rates than onsets, and that the differential survives embedding in a variety of contexts that might over-ride the effect: in branching constituents, in polymorphic words and in natural phrase contexts in which neighbouring words might prime semantically for or against phonological fusion.

Arabic is a particularly apposite source of contrast, and is interesting for having competing traditions of syllabication: a Western tradition from classical scholars treating Arabic like Latin and Greek with some closed CVC, CVVC, CVCC syllables, *versus* an Arab tradition going back to Sybawaih and supported by modern theorists (e.g. Lowenstamm, 1996, Scheer 2000) where only CV and CVV units are used to account for stress, vowel harmony etc.. We began with a set of Arabic word stimuli in which incongruence was dubbed into consonantal sites at onsets and at (word-medial, word-final) sites that would be classed as codas in the Western tradition. To ensure ecological validity, we embedded incongruent stimuli at random amongst congruent stimuli based on the same words, and put them to Arabophones. Our results show no significant difference of fusion rates between onset and 'coda' sites, favouring a no-coda view of the mental models of these participants. Our Anglophone participants tended to impose coda/onset contrast even on nonsense words, so we put the Arabic words to them as nonsense stimuli: they imposed codas in the Western tradition. Finally we put the Arabic words to a group of Anglophones who had been learning Arabic for 2-3 years from audio-visual course materials. Their fusion patterns were little different from those of Arabophones, suggesting that their learning experiences had internalized CV, CVV structure even in the students who were far from fluent in Arabic.

These results raise issues about learnability, the access units to the Semitic lexicon (root, stem, etymon, mora etc.) theories of syllabification (universal *vs.* language-specific). We discuss these and their impact on design of future experiments on lexical access. To our knowledge, empirical investigation probing *roots* and *syllables* in Arabic is still limited. Other than our present study, only Idrissi et al. 2008; Mahfoudhi, 2007; Boudelaa and Marslen-Wilson 2004; Prunet et al. 2002; Bohas, 2000) have probed the mental lexical representation of Arabic.

The (hi)story of laryngeal contrasts in Government Phonology

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The paper, couched in the framework of Government Phonology (Kaye et al. 1985, etc.), develops the argument that laryngeal properties are all privative and presents a means to represent these contrasts in a privative element system using [h] for [spread glottis] (as in English and German) and [N] for [voice] (as in Hungarian and French).

The structures that are proposed to represent laryngeal contrasts in obstruents build on ideas developed in Backley and Takahashi (1996), Nasukawa (2005) and Nasukawa and Backley (2005); specifically, the notions of element activation, tier complement and the model we informally dub the Leiden Model are assumed to account for all the necessary contrasts. The model of consonantal representation adopted is explained in detail. The paper analyses the set of relevant phenomena with ample representations using this model (regressive voicing assimilation in Hungarian and French, etc.), highlighting the crucial observation that laryngeal constrasts need to be licenced (in other words, they are prosodically defined).

The proposed structures naturally account for the loss of laryngeal contrasts in word-final position – which leaves some problems behind. Specifically, how to account for word-final voiced obstruents in [voice]-languages like Hungarian and French? What to do with English where there is no complete devoicing word-finally?

The phonological history of [voice] languages like Hungarian and French may shed some light at least on under what circumstances such systems arise. There is clear evidence that French had a stage with final devoicing and no final voiced obstruents ("stage 1"), and it was the later loss of final schwa that brought about the present system ("stage 2"), cf. Lat. *vivus* 'alive; MASC' > Fr. stage 1 *vif* [vif] > Fr. stage 2 [vif] 'lively; MASC' versus Lat. *viva* 'alive; FEM' > Fr. stage 1 *vive* [vivə] Fr. stage 2 > [viv] 'lively; FEM'.

Hungarian presents a different pattern of change: originally there was no voice contrast in (stem-)final obstruents because there were no obstruents in this position, all stems ending in a vowel. Curiously, the loss of this final vowel did not trigger devoicing (which seems to have been the case in Slavic languages like Polish where loss of final vowels led to devoicing). Although the precise reason(s) for this pattern are not yet clear, it is suspected that it had to do with some other prosodic property of Hungarian which has yet to be identified (or linked to this property).

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Consonant representations revisited: The problem of ejectives

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This paper revisits, recontextualises and reworks an old(-ish) problem of theoretical phonology: the internal structure of phonological representations. My contribution to this debate arises from an investigation into certain properties of Semitic sound systems. In particular, it is the issue of glottalisation which proves problematic for an element-based approach to phonological representations.

In some Semitic languages[1] emphatics are realised as ejectives (i.e. glottalised voiceless obstruents), and these are fully contrastive (Tigrinya, for example, has the triadic series voiced – ejective – voiceless aspirated).[2] However, working within an element-based framework, several problems are encountered in considering the phonological representation of ejectives, whether from the Semitic viewpoint or, more broadly, cross-linguistically. Essentially, the problem of the representation of ejectives is theory-internal; however, both the arguments and the potential resolution are of relevance to other theoretical frameworks, and thus have a broader application than the purely GP-internal.

The framework used here is an adaptation of the minimalist approach to elements (sometimes termed 'Revised Element Theory', or RET), with six elements: A I U H L ?. Using data from Tigrinya and San'ani Arabic, as well as evidence from non-Semitic languages, I talk through some issues in the phonological behaviour and status of ejectives that form the basis of my argument that the category of 'ejective' (and, more broadly, glottalisation) maps onto the element ? ('stop' or 'edge'). The theoretical problem concerns the status and function of ? in representations.

In essence, I look at two main issues with respect to the role of ? within the phonological expression. Firstly, the element ? behaves not only as a 'manner' element but also as a 'laryngeal' element. Therefore, it has a dual role in representations, which may be seen in parallel with L and H under the RET approach. This leads onto the issue of how ? is manifest in the phonological expression in order to satisfy each of these roles. That is, how is one role representationally distinct from the other? In this respect, I show how a linear view of representations cannot handle certain types of contrast involving ?, which leads into the argument for contour representations. While the 'contour' approach to the internal structure of phonological representations has received considerable attention within feature-based frameworks,[3] it is not so often worked on in element-based approaches (although see Harris' 1994 element geometry, Nasukawa & Backley 2005, Botma 2004). Certain types of contrast have traditionally been handled by appeal to the (problematic) notion of headedness. Here, however, I demonstrate how (contrastive) glottalisation mitigates against the use of headedness to represent some contrasts (those involving the dual function of elements). Building on some of the proposals advanced by Nasukawa & Backley (2005) and Botma (2004), I argue for a contour structure which is capable of handling contrasts which are not typical of Indo-European languages, and I demonstrate this structure within the context of Semitic languages. The structure proposed differentiates the varying roles of the six elements, and incorporates a hierarchy borne out by observations of cross-linguistic markedness.

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[1] Predominantly the Ethio-Semitic languages. Although ejectives have been reported in Modern South Arabian, their phonological status is questionable. See Watson (in press), Watson & Bellem (forthc.).
[2] Bellem (2007).
[3] Feature geometry was one of the central debates of the late 80s and 90s, see in particular the approaches advanced by Sagey (1986), McCarthy (1988, 1994) and Clements (1991), among others.

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Association under control

In this contribution we explore a formal option that is offered by autosegmental representations but has lied waste thus far: the control over the association of melodic items. We argue that association in some cases is not automatic, i.e. that the decision to associate a given item or not may express (at least) three kinds of control: grammatical, lexical and socio-linguistic.

In case of grammatical control, the association line is actually a morpheme. Semitic languages offer ample illustration, both in terms of traditional description and modern implementation. Given the unmarked form I in Classical Arabic, $C_1V_1C_2V_2C_3$, form II (reciprocal) is derived by lengthening V_1, while form III (intensive, iterative) is produced by geminating C_2. Guerssel & Lowenstamm (1990) have unified both derivations by calling on an (empty) [CV] unit that is inserted in derived forms, C_1V_1[CV]$C_2V_2C_3$, and on which either V_1 or C_2 branch. While this analysis creates the conditions for forms II and III to be derived, it needs to be further informed since the mere presence of the [CV] unit gives no indication whether V_1 or C_2 spreads. This spreading is under morphological control: form II gives order to V_2, form III to C_2. We present further illustration of this pattern from Kabyle Berber where a melodic item associates only in a specific morphological context.

The control over association may also be lexical. That is, a piece of melody is lexically specified for a particular (non-)action regarding association when it is injected into a derivation. Evidence for this pattern comes from the contrast between suffix-initial vowels that do vs. do not alternate with zero in Slavic languages such as Polish and Czech. On the assumption that morphemes always end in a nucleus (which is eventually empty), the suffixal vowel of the Polish diminutive *pies-ek* "dog, dim. NOMsg" must lexically float: it needs to end up in the root-final empty nucleus since it causes the preceding root vowel not to be deleted. The root vowel indeed alternates with zero (*ps-a* "dog GENsg"), and we know independently that the zero is triggered when the following nucleus is filled (as in *ps-a*), except if it hosts a vowel that alternates itself with zero (as is the case in *pies-ek*, whose GENsg is *pies-øk-a*). Also, the vowel of *-ek* must float because the difference between vowels that do and vowels that do not alternate with zero (which are phonetically identical in Polish: [ɛ]) is a matter of association (e.g. Rubach 1986). That is, the difference between the alternating vowel in *pies - ps-a* "dog, NOMsg, GENsg" and the non-alternating vowel in *bies - bies-a* "devil, NOMsg, GENsg" is represented in terms of association: stable vowels are lexically associated, while alternating vowels float.

The trouble is that there are also floating suffix-initial vowels that do not alternate with zero such as in the adjective marker *-ow-*. The properties of *-ow-* may be inspected on the occasion of a word such as *bez-cł-ow-y* "duty-free, adj.": like all suffix-initial vowels, the *-o* provokes the absence of the preceding alternating vowel (cf. *cło - ceł* "customs NOMsg, GENpl") and hence must sit in the final empty nucleus of the root. It therefore must be lexically floating. At the same time, though, it must be lexically associated since it does not alternate with zero itself: the adjectival NOMsg marker *-y* sits in the final empty nucleus (cf. *pełen - pełn-y* "full, attributive vs. inflected form NOMsg"), but fails to provoke the absence of the *-o* (**bez-ceł-øw-y*). In sum, then, the *o* of *-ow-* should lexically float and be associated at the same time (recall that stable vowels are lexically associated). Or, in other words, the alternating vs. non-alternating character is a lexical property of floating vowels. We therefore submit that the association of floating vowels is specified in the lexicon: the *o* of *-ow-* associates no matter what, while the *e* of *-ek* is not specified for automatic association.

Finally, French liaison without enchaînement (Encrevé 1988) is a case of association under socio-linguistic control: whether the word-final consonant attaches to the next word as in *j'avai[z] un rêve* "I had a dream" (with enchaînement) or to its own word (without enchaînement, which provokes a pause between *avai[z]* and *un* as well as the appearance of a glottal stop, i.e. *avai[z | ʔ]un*) is decided by style and sociological parameters.

Korean loanword adaptation is simply L1 phonological perception

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Most accounts of loanword adaptation regard the phenomenon as either "phonological" (e.g. LaCharité & Paradis 2005), "perceptual" (e.g. Peperkamp & Dupoux 2003), or a combination of both (e.g. Yip 2006). We will present recent work in which we show that perception itself is phonological. The subject matter of our talk is the adaptation of English words into the Korean language.

Typically, the Korean loanword contains vowels that the English source lacked, see (1). At the same time, vowel insertion is not a favoured process in the native phonology of Korean, which prefers to neutralize, delete and assimilate instead, see (2) (the phonetic form contains IPA notation; the underscore stands for silence).

	Underlying form	*Surface form*	*Phonetic form*	
(1)	|pʰols'ɨ|	/.pʰol.s'ɨ./	[_ˈpʰːóls'ɨ]	'false'
	|tɛkʰɨ|	/.tɛ.kʰɨ./	[_ˈd̪ɛ̰k˺_ˈkʰːɨ]	'deck'
	|pʰikʰɨnik|	/.pʰi.kʰɨ.nik./	[_ˈpʰːík˺_ˈkʰːɨnik˺_]	'picnic'
(2)	|os|	/.ot./	[ot˺_]	'clothes'
	|kɑps|	/.kɑp./	[_ˈg̊ɑ̀p˺_]	'price'
	|kuk+min|	/.kuŋ.min./	[_ˈg̊ùŋmin]	'nation'

We argue, with Yoonjung Kang (2003), that vowel insertion takes place in perception. In contradistinction with Kang, however, we argue that this vowel insertion is influenced by phonological considerations (Korean-specific phonotactics of consonant clusters), and that therefore perception itself must be phonological.

We will present a precise account in three-level OT, which distinguishes between underlying form, phonological surface form, and phonetic form (Boersma 2007), as in (1) and (2). Perception, then, is the mapping from phonetic to phonological surface form, and is therefore influenced by structural (e.g. phonotactic) constraints that evaluate the phonological surface form (the same structural constraints that influence phonological production). For instance, the English sound [_ˈd̪ɛ̰k˺_ˈkʰ] 'deck' will be perceived by Koreans as their surface form /.tɛ.kʰɨ./, where the occurrence of a phonetic final release burst cues the Korean interpretation of a final vowel; the perceived form is subsequently stored in the Korean lexicon as |tɛkʰɨ|, which according to (1) will then be produced by the Korean phonology as /.tɛ.kʰɨ./ and pronounced by the Korean phonetic implementation as [_ˈd̪ɛ̀k˺_ˈkʰːɨ]. A crucial example is provided by the English minimal pairs [_ˈt̠ʃa̰p˺_ˈtʰə] 'chapter' and [_ˈpʰɪk˺_nɪk˺_] 'picnic', which have comparable cues against the presence of a cluster-internal vowel but are nevertheless contrastively perceived as /.tsʰæp.tʰʌ./ and /.pʰi.kʰɨ.nik./, respectively, as a result of a Korean phonotactic constraint against plosive-nasal sequences such as /kn/.

The result is an account of loanword adaptation that does not have to posit loanword-specific processes or constraints but only has to work with processes and constraints that are at work in Korean native-language processing.

Markedness and a vowel change in progress in the Catalan spoken in Barcelona

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The current linguistic situation in Barcelona is a good illustration of the interaction of two systems that have long coexisted, although the force of each language has changed over time. In the last thirty years Barcelona and Catalonia have experienced two important immigrant waves of Spanish-speaking population. After a long dictatorial period, in which Catalan was banned in public domains, the linguistic policy carried out in the country brought the language back to normalcy. It tried to reestablish the grammatical norm and boosted the number of speakers among the newcomers. Although the number of Catalan speakers has largely increased due to the linguistic policy, this does not mean that all the Catalan phonological features are currently maintained.

In order to find out whether the influence of the Spanish vocalic system, which is in many respects less marked than the Catalan one, is contributing to a sound change in the Catalan spoken in Barcelona, a group of children (age 3-5) and adults (corresponding to either the father or the mother of each child interviewed) in two different districts of Barcelona were recorded. The districts differ in the presence of Spanish there and in knowledge of Catalan among their inhabitants. Whereas Gràcia is a traditionally Catalan district with good knowledge of Catalan among its inhabitants and small presence of Spanish, Nou Barris is a mainly Spanish-speaking district with one of the lowest levels of Catalan proficiency in Barcelona, according to the linguistic census carried out by the Institut d'Estadística de Catalunya (2006). The comparison of the production by speakers in one district and in the other allows us to control for language in the environment (Spanish in the district reinforces the unmarked whereas Catalan does not), and the analysis of production by the different generations allows us to control for the input children receive at home.

Their production was auditorily analysed in order to check how these bilingual speakers pronounce Catalan vowels that do not exist in Spanish (i.e., /ɛ/, /ɔ/ and [ə]). Results are consistent with those from previous studies with a smaller sample population and without such a systematic control of the different factors (Lleó et al., 2008). Input at home does not seem to play as crucial a role as language in the broader social environment in the development of the children's production of these Catalan vowels. No matter the language dominant at home, children's pronunciation seems to be determined by the language dominant in the district. Even markedness is less strong a predictor than language in the environment because the children in Gràcia are still maintaining the Catalan vocalic marked features with no difficulty. Thus, the production by the younger generation seems to be changing only in the district with most Spanish influence.

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The phonology of Latin ⟨gn⟩-initial stems

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This paper discusses an aspect of the history of the Latin word-initial cluster represented in writing as ⟨gn⟩ and presents an analysis of the central issue on the phonology–morphology interface. The prefixed forms of such stems fall clearly into two groups: those with *ad-*, *in-* and *con-* are demonstrably more archaic than those with the other prefixes, such as *de-*, *per-* etc. This fact (which has not yet been reported in the literature) receives a phonological explanation if one assumes that in the initial cluster ⟨gn⟩ original ***gn** first developed into a floating [+back] + **n** sequence before developing into a plain **n** (i.e. ***gn-** > $_{[+back]}$**n-** > **n-**). Another general assumption is that place features do not occupy the same position in the feature geometry of consonants and vowels (cf. Clements–Hume 1995 or Morén 2003). On these two assumptions it can be demonstrated that the restriction on prefixes accompanying ⟨gn⟩-initial stems dates to the period when these stems began with a floating [+back] feature. The coronals **d n** being prone to place assimilation, the floating [+back] was able to link to their place nodes; with other consonants and with vowels this was impossible, and thus the floating [+back] would have remained trapped as an unlinked (and thus unlicensed) feature, thereby preventing such prefixed forms from emerging. The combination of ⟨gn⟩-initial stems with prefixes other than *ad-*, *con-* and *in-* became possible only after the floating [+back] was eventually lost and such stems were relexicalised in a form indistinguishable from original **n**-initial stems.

On the acoustics of the Northern Mansi vowel system

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Mansi is a Finno-Ugric language spoken by about four thousand people East of the Ural mountains in Russia. The only surviving but highly endangered dialect is Northern Mansi. The vowel system of Northern Mansi was described by Béla Kálmán in the fifties of the last century. However, he did not give a detailed information on what was the basis of setting up phonemes and allomorphy rules. The vowels of the non-first syllables are highly problematic. According to Kálmán, the schwa, attested exclusively in non-first (and therefore non-stressed) syllables, is a member of the vowel system. Nonetheless, some facts suggest it is not the case. On the one hand, schwa is attested in positions where an epenthetic vowel is needed to get a well-formed syllable and it is absent where syllable structure does not need its presence. On the other hand, schwa, /a/ and /e/ alternates with each other freely or at least according to still undescribed rules. (For example, the word for '(s/he) went' is written as minas, but sometimes also minəs. The alternation between e and ə is much more rare and can be a result of typographical error.) None of these is stated explicitely by Kálmán, but is a quite clear evidence in the texts published by him.

I did have a possibility to work with the digitalized version of Béla Kálmán's recordings made to reel-to-reel tapes at the end of the fifties in Leningrad. I attempted to establish the typical formants of the vowels. The first syllable vowels show the expected values but the non-first syllable ones show a contradictory picture. In over 30% of the cases, schwa of the transcriptions cannot be identified on the recordings (even in cases when it should be necessary for a well formed syllable structure: *ne:γl(ə)s* '(s/he) arrived', *jonγe:γ(ə)t* '((they) play, (they are) playing', *te:γ(ə)m* '(I) eat, (I am) eating'). When it can be identified, its main formants are sometimes very similar to those of the first syllable /a/ (F1: ~875 Hz, F2: ~ 1950 Hz) or /e:/ (F1: ~570 Hz, F2: ~2670 Hz). Similarly, the non-first syllable /a/ and /e/ are pronounced as either a mid central vowel or cannot be detected at all. There is not a strict borderline between non-first syllable /a/ and /e/, they are overlaping in the acoustic space -- moreover, in one case the third syllable vowel written as /e/ is pronounced considerably lower than the second syllable /a/ in the same word (*samaγe* 'his/her two eyes').

The result suggests that our present concept on the Northern Mansi vowel system, especially what the non-first syllable vowels concerns is not well-grounded. It is not clear why should we establish different underlying phonemes for sounds that are proved to be the same and vice versa. As an extreme case, we can suppose that /a/, /e/ and /ə/ are one and the same phoneme arising as an epenthetic vowel in a considerable number of cases. To draw a final conclusion, a wider range of material and recordings of higher quality should be analysed in the future.

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Omnisyllabicity and Hiatus in Sino-Tibetan Languages

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The term "omnisyllabic" has been used to refer to tonal pheneomena in those ST languages in which individual syllables have tonal assignments relatively unaffected by syllables and word-level prosodies (Matisoff 1999). Beyond just tone however, in some ST languages, omnisyllabicity is an appropriate cover-term for phonology in general; the syllable is its own 'phonological island' for most patterns and processes. Good examples come from languages like Lahu (Matisoff 1973) and Kayah-Li (Solnit 1997), where few cross-syllable processes are attested. This leads to a question about omnisyllabicity in ST languages overall. ST is a big family covering a vast geographic area, with typologically diverse languages. As such, in what ways can we see omnisyllabicity in action in ST (and what exceptions), and what are the implications for phonological theory? One way to observe this is via a survey of patterns and processes necessarily spanning more than one syllable—for example hiatus phenomena (the presence of, and potential resolutions to, heterosyllabic vowel sequences V_1-V_2).

Across languages, hiatus can be resolved in many different ways, or else there may be no resolution at all (heterosyllabification). One prediction under a strict interpretation of omnisyllabicity could be of a lower than average frequency of resolutions vs. not. Indeed, a survey of hiatus phenomena in a sample of 10 Indo-European (IE) and 11 ST languages shows that in IE, resolution is overwhelmingly favored, while in ST the situation is more mixed, with as many languages favoring heterosyllabification as resolution (Hildebrandt 2006). In addition, in ST languages, many languages show *mixed* responses to hiatus (e.g. in individual languages, heterosyllabification is favored in some instances and not in others). Even more interesting are frequent cases of free variation, where one instance of V_1-V_2 in a single domain can show variable resolution or else heterosyllabification, without obvious structural motivations.

This talk focuses on the following phenomena: **Weight-sensitivity**: In some languages (e.g. Belhare), hiatus resolution is preferred, but only under conditions respecting underlying foot and morpheme boundaries. Kham also favors resolution; some strategies are sensitive to syllable weight, but interestingly, heterosyllabification is favored when V_1-V_2 has identical vowel qualities**. Elision and position-sensitivity**: As noted by e.g. Casali for Niger-Congo languages (1997), there may be a tension between the preservation of initial material vs. the preservation of crucial semantic content in vowel elision. In some languages in this sample, initial position takes precedence over final (suffix) material, with V_2 elision, even if it means morpheme loss (e.g. Dolakha Newar *bi-i* > [bi] give-NF) (Genetti 2007: 54). However, Ao shows positional asymmetries in that sometimes root morphemes are protected from elision, and other times they are targeted (e.g. *tə-asuʔ* > [tasuʔ] PROHIB-be.small vs. *ʧàʔ-āŋ* > [ʧāŋ] consume-IMPER) (Coupe 2007: 52, 55). **Prosodic domains**: Another observation is whether the resolution (and type) is sensitive to prosodic domains beyond the syllable. Other studies have shown word domains in ST to be proliferated and variably aligned (cf. Hildebrandt 2007; Hall & Hildebrandt 2008; Bickel, Hildebrandt & Schiering forthcoming). In Limbu, hiatus resolution strategies respect different, non-aligning domains, complicating a notion of wordhood (e.g. prefix-stem > insertion; stem-suffix/suffix-suffix permit only other resolution types).

The abundance of resolution strategies in this survey reaffirms that omnisyllabicity is relevant more to specific processes (e.g. suprasegmental vs. segmental) in ST. At the same time,

Change in progress leading to atypical asymmetries in the vowel system

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Diachronic linguistics has shown that vowels of the same height tend to cluster and behave in a remarkably similar way (e.g. Wiesinger 1982). As a result, the development of the vowel system of most West Germanic languages and dialects is characterised by a high degree of parallelism, as can be illustrated by the classic symmetry of the Great Vowel Shift during which the high long vowels î – û were both diphthongized and the other long vowels moved pairwise upward (e.g. the mid long vowels ê – ô raised to [iː] – [uː]). Similar processes have taken place in Standard German and Dutch: vowels that share the same feature of height [+high], [+mid] or [+low] have developed along parallel paths, compare for instance the diphthongization in *Eis/ijs* 'ice' and *Haus/huis* 'house'. These vowels thus develop(ed) as a series rather than as individual sounds.

This symmetrical development was also clearly noticeable in the distribution of Germanic umlaut, that generally can be seen as the fronting of a (stressed) back vowel caused by an initially (unstressed) *i* or *j* in the following syllable. Most words with umlaut originally differed from their non-umlauted stems mainly by the feature [±back], as for instance German *Fuß* 'foot' – *Füße* 'feet', in English additionally also by [±round]. The same holds for the eastern Dutch dialects (e.g. [mʉːs] 'mouse' – [mʏːs]/[miːs] 'mice'), where the development of these vowels also maintained a back/front parallelism. Furthermore, in most of the southeastern Dutch dialects, the opposition is intensified by a contrast between two tone accents, traditionally called 'tone accent 1' (TA 1) and 'tone accent 2' (TA 2), which is characterised by a slightly prolonged pronunciation. The parallelism in the vowel system has only rarely been phased out, e.g. the development of West Germanic û in a central area of the southern Dutch dialects (Goossens 2000; compare German *Maus* [maʊs] – *Mäuse* [mɔizə]). In several dialects with an additional tone opposition long high vowels with TA 1 developed to diphthongs, whereas they remained long monophthongs under TA 2 (e.g. [mʉː^{2}s] 'mouse' – [mœy^{1}s]/[mɛi^{1}s] 'mice').

The tone-vowel interactions in these dialects have been and still are the object of several studies. Non-tonal related sound shifts, on the other hand, have so far been somewhat neglected or at least not systematically studied, so the rather atypical difference in height between West Germanic ô and its umlaut (e.g. [buːk] 'book' – [beːk] 'books') in Zutendaal in the Belgian province of Limburg has remained unnoticed. Historic data reveal a clear example of a (recent) pull or drag chain and illustrate two of Labovs (Labov 1994) general principles of linguistic change: firstly, the original back vowel [uː] fronted to [yː] (e.g. [buːk] became [byːk] 'belly') after all rounded front vowels had already been unrounded in an earlier stage (e.g. [biːk] 'bellies'); secondly, West Germanic [oː] rose and filled the empty position of [uː], in turn leaving behind an empty position.

This development raises some interesting questions to be answered. Why did West Germanic ô in Zutendaal not front as West Germanic û (as for instance Philadelphian /ow/ and /uw/, e.g. Tucker 1944), but instead moved upward? What are the implications of this shift with respect to the other subsystems of the Zutendaal vowel system? How can the relationship between the words with umlaut and their non-umlauted stems be redefined from a phonological point of view? Finally, are there any factors indicating that this reported instance of change in progress will move on, i.e. that present [ɔː] (and [aː]) will also rise or on the contrary rather remain stable?

Th'interpretation of t'definite article in th'North of England

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A non-standard form of the definite article is used by upwards of a million speakers every day and yet it has received little attention in terms of a phonological analysis. The most recent discussions have been a historical and contemporary survey (Jones, 2002), spectrographic investigations (Jones, 2007), and sociolinguistic surveys (Rupp & Page-Verhoeff, 2005; Tagliamonte & Roeder, in prep.). It is clearly a complex issue and has relevance to a number of theoretical questions, some of which are rarely addressed. Some of the relevant questions relating to the phenomenon are the following.

(i) What are the phonetic forms?
(ii) What is the phonological distribution of the forms?
(iii) What is the social distribution of the forms?
(iv) What is the historical development? Will this help with a synchronic analysis?
(v) How many lexical storage forms are there? Should they be identified with the lexical item normally written *the*?
(vi) Are they all related historically?

I shall attempt to answer all of these except (iii).

The forms to be considered are [t], [θ] and [ʔ]. Their syllable alignment may vary, but that must be accounted for by the phonology. The distribution varies between localities and between speakers; many speakers also use standard English *the*. The historical development is not at all clear, but does throw some light on what the synchronic grammars should be like. There appears to be a break between those grammars in which the phonetic forms of the definite article are predictable in terms of the phonological environment and those, later, grammars that have lexically specific forms. The changes that have taken place cannot be explained in terms of simple system-internal mechanisms and some knowledge of the socio-historical background to the emergence of the new grammars is necessary. This paper looks at historical sources from the mid 18th century onwards to try to determine the changes that have taken place in the northern dialects concerned, and proposes population movements and expansion as a determining factor in the changes that are in evidence. One possible scenario in terms of new-dialect formation during the 19th century is suggested. For the modern variants polysystemic, declarative grammars are proposed, with the possibility of grammar-switching under certain circumstances, such as repair or interaction with outsiders. From a historical point of view it may well be that the voiced fricative variants of the definite article are a purely southern British phenomenon.

Phonetics- Phonology Interface in the Adaptation of Nasal Vowels

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The present paper aims at analysing the repair strategies operating in French loanwords in Moroccan Arabic (MA, hereafter). The focus will be made on nasal vowel adaptation. This paper outlines the current analytical frameworks for such adaptations, and examines their applicability to a new set of French loanwords in MA. In particular, this paper shows the downfalls of the current models and therefore attempts to provide an alternative approach of loanword adaptation.

Previous literature maintains that in languages –like MA- that lack phonemic nasal vowels, the latter are repaired as a sequence of oral vowel + nasal consonant (VN, henceforth). That is the nasal vowel undergoes the process of "unpacking" and is adapted as VN (Paradis & Lacharite 1996, Paradis & Prunet 2000, Rose 1999). On the one hand, Paradis & Lacharite (1996) claim that nasal vowels are "universally" adapted as a sequence of VN as long as the requirement of the Theory of Constraints and Repair Strategies (1986) (TCRS, hereafter) are met. In particular the Preservation Principle and Threshold Principle require the segmental information is maximally preserved as long as no more than two repairs are applied. As far as MA is concerned, they claim that the nasal vowels are adapted as NV "in all cases" (p.415). Furthermore, Paradis & Prunet (2000) attribute instances of deletion to "complicating analogical factors", and introduced a Two-Root-Node model to account for adaptations in loanword phonology. On the other hand, Rose (1999) introduced a one Root-Node approach to explain preservation and deletion in nasal vowel adaptation -presenting evidence from Fula and Kenyarwanda. He basically claims that the nasal part of the nasal vowel (which is the result of unpacking) is preserved when there is an available licenser, and deleted only when there is none. Hence, both approaches to nasal vowel adaptation embrace the phonological approach and refute all possible phonetic explanations.

I will bring these two approaches together to account for the adaptation of nasal vowels in French loanwords in MA. I shall present data where various adaptation strategies are manifested. Consider the following examples:

MA	**French (IPA)**	**French**	**Gloss**
1-fran	frɛ̃	Frein	Brake
2-klakson	klaksõ	klaxon	Horn
3-kwansa	kwɛ̃se	coincer	To block
4-zbiktur	ɛ̃spektør	inspecteur	Inspector
5-kofra	kufrã	Coup-franc	Out-of-boards
6-gufəl	gõfle	gonfler	Swell

From these examples, it seems that there is no uniformity in adapting nasal vowels in MA, they are repaired as (i) VN, (ii) V (iii) or deleted altogether. The above approaches can account for the first repair (e.g 1-3), but clearly not the second and third (e.g. 4-6). Within the optimality framework, I shall present a unified analysis of the different strategies manifested in the examples above, namely, one that incorporates both phonology and phonetics. I will argue that the asymmetry manifested in the loanword data in hand is the product of the interaction between phonetics and phonology rather than the "morphological" and/or "complicating analogical factors" as suggested in previous works. This in return will provide an account not only for French loanwords in MA, but also provide an alternative analytical framework for loan-phonology as a whole.

Why are phoneme frequency distributions skewed?

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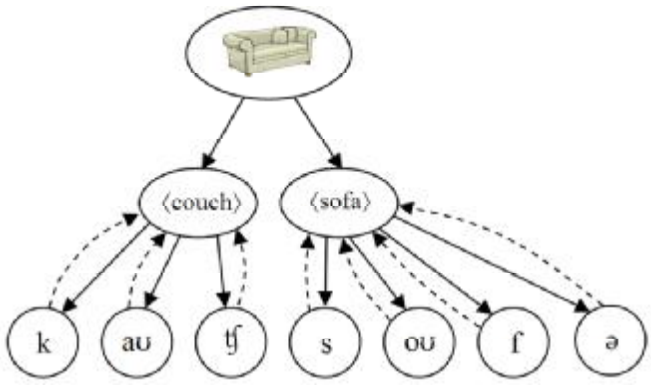
Phoneme frequencies are typically distributed according to a power law—for example, the five most frequent consonants of English, /t/, /s/, /n/, /r/, and /l/, together account for more than half of all the consonants occurring in English words (data from Baayen et al. 1993). Because such a skewed distribution results in a less efficient coding scheme (Huffman 1952), languages pay a price for using some sounds much more often than others. Why, then, are languages structured this way?

I will argue that the answer lies in the fact that the composition of the lexicon, which determines phoneme frequencies, reflects the lexical choices made by speakers, which are themselves biased by the same frequencies. New words typically compete with existing words having the same meaning, and any property that confers an advantage in these Darwinian competitions will rapidly come to dominate the lexicon. I will present a concrete model of lexical competition using an independently motivated speech production system, and show that this system predicts that words containing high-frequency phonemes have an advantage over synonyms with low-frequency phonemes. In this model, words that contain more frequent phonemes are more likely to enter the lexicon, thereby making these frequent sounds even more frequent, in a "rich get richer" feedback loop. Any slight deviations from a uniform distribution will thus become exaggerated over time, ultimately resulting in a skewed distribution.

The speech production system is a simple associative network implemented as in Dell 1986. The node representing a concept is activated, which activates the nodes of the words for that concept, which in turn activate the nodes for their constituent phonemes (see (1)). Such networks are typically used to account for cases in which there is a single lexical entry for the concept; my account is novel in that it uses the same architecture to model competition between alternative ways to express the same concept. The production of an appropriate word for a given concept is thus a race, in which the first lexical entry whose activation passes a threshold ends up being spoken.

(1) Competition between synonyms



Feedback in the network (dashed lines in (1)) means that a word containing high-frequency phonemes will reach the threshold faster, giving it an advantage over a competing synonym (Dell and Gordon 2003). If a lexical entry's resting activation, and therefore chance of being used, increases each time it is produced, one word from a set of synonyms will eventually come to be used exclusively for that concept, "killing" its competitors. The winner will tend to contain higher-frequency phonemes than the losers, resulting in a positive feedback loop which results in a few phonemes becoming much more frequent than the others.

This speech production model thus predicts that power-law frequency distributions are an expected, emergent property of languages. Although other factors such as markedness must be invoked to explain *which* sounds end up as the most frequent, markedness preferences alone would not explain the power-law character of these distributions.

Polish palatalisation in a split-component phonology

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This paper advocates the idea that the bulk of palatalisation-related phenomena in Polish can be handled in an abstract representational morphophonology, based on Government Phonology in general, and CVCV (Scheer 2004) in particular, as long as a phonology–phonetics interface, not representational phonology as such, is recognised as being responsible for phonetic actualisation of abstract morphophonemics.

In Polish, palatalisation phenomena can be divided into two groups, depending on the morphosyntactic level at which they occur: word level and phrase level, as shown in (1).

(1) *pa<u>n i</u> pa<u>ni</u>* 'Mr. and Mrs. _' [nʲi ɲi]

/i/-induced palatalisation gives different phonetic results when occurring within a word ([ɲi]) and across word boundaries ([nʲi]). The pattern characteristic of the phrase level is also found within words, in foreign roots, as shown in (2).

(2) *<u>si</u>nus <u>i</u> co<u>si</u>nus* 'a sine and a cosine' [sʲi sʲi sʲi]

Still, word-level palatalisation is fully productive even with foreign roots, as shown in (3), where the diminutive suffix *–ik* is introduced during the derivation.

(3) *<u>si</u>nu<u>si</u>k i co<u>si</u>nu<u>si</u>k* 'a sine (dim.) and a cosine (dim.)' [sʲi ɕi sʲi ɕi]

An otherwise non-palatal consonant never surfaces unpalatalised before [i] in Polish. Such sequences as *[si] or *[ni] are not on record. This is fully predictable in phonetic terms.

Gussmann's (2007) GP analysis of Polish postulates a well-formedness condition on palatalised consonants. Among the constraints that Gussmann's analysis posits for Polish, *I-alignment* (p. 52) requires that "[a] nucleus shares I-head with the onset it licenses." This is the point of entry for the present analysis, in which Gussmann's *I-alignment* is run over abstract morpholexical representations built on CVCV skeleton and GP/CVCV melodic primes. The relation of [ɕi] and [sʲi] to native words vs. foreign words and word boundaries is taken not to be accidental. (The same applies to a number of CV sequences whose distribution follows the pattern exemplified in (1)–(3); see Gussmann (2007: 3–8) for more examples.)

The problem with Gussmann's approach is that his analysis assumes "the need for a separate morphophonology component" (p. 19), but its location within grammar, let alone relation to phonology proper, is left undefined. Crucially, the change of /s/ to /ɕ/ in Gussmann's analysis is delegated to a morphophonological *palatalisation replacement pattern*, in which /s/ is replaced by /ɕ/ as a whole segment, not as features (unlike in Gussmann's (1980) classic). This appears to go against the autosegmental appeal of GP, where the element {I} might spread from a vowel onto a consonant, thus making it palatalised. Still, even if that were the case, phonetically-concerned proponents of GP would notice that a /s/ enriched by {I} should be [sʲ], and yet native Polish //s+i// sequences are always [ɕi], not [sʲi].

This paper argues that morphophonologically, the [sʲ] in *sinus* or *cosinus* is not palatalised, and that its phonetic palatalisation is only a matter of the interpretive interface. Conversely, a morphophonologically palatalised /s/ is argued to be interpreted as [ɕ]. Effectively, the paper argues for pushing morphophonology back into representational phonology, and for leaving phonetic interpretation to an interface, which is sensitive to word boundaries. This sensitivity is assured by feeding the interface with morpholexical (phonological) representations one by one, the edges of which form a natural object to which the interface may refer. The [sʲi] across a word boundary is taken not to form a single morpholexical entity, thus its interpretation as [sʲi], and not, say, *[si] or *[ɕi], is the sole domain of the interface, not morphophonology.

Phonological prominence as a signal of prosodic left edges in Stockholm Swedish

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In this paper I present data from Stockholm Swedish showing that the left edges of phonological phrases are signaled tonally with increased phonological prominence on the leftmost stressed word, crucially without this word being pragmatically or information structurally important. I use the term *initiality accent* to refer to this phenomenon, which has not been satisfactorily described in previous accounts of the Stockholm Swedish dialect.

I show that the initiality accent is deaccented in the vicinity of a focal accent, and that some types of focus have a stronger tendency to cause deaccentuation than others. I also show that the initiality accent is sensitive to the internal syntactic structure of the phonological phrase in the sense that a) a strong syntactic boundary intervening between the phrase edge and the initial lexical stress inhibits the initiality accent in the phrase, b) a phrase internal syntactic boundary cancels the deaccenting function of a nearby focal accent.

Because of downdrift and f0 reset, the left edge of a phrase is generally characterized by higher f0 values than the right edge. It is also well known that high pitch or large pitch excursions are used in many languages to signal prominence on a particular word. Because these are both gradient phenomena they are not always easily separated. However, the phonological system of Stockholm Swedish lends itself particularly well to such a separation. As is well known, this dialect of Swedish has a lexical tonal distinction between two word accents (*accent 1* and *accent 2*). In addition to this, there is a distinction between two prominence levels (*focused* and *accented* respectively) which are signaled with separate tonal contours. For each word accent, then, there is one contour that signals the higher prominence level focus, and one that signals the lower prominence level accented. Thus, we do not rely only on gradient variation of pitch height to diagnose the degree of prominence, but we can also rely on the shape of the tonal contour. In this sense the phonological system allows for a separation between the gradient realization of a pitch accent and the prominence level it signals, which is not as clear in other well-studied Germanic languages.

Once the existence of the initiality accent is established and some of its basic distributional properties are understood, we have access to a non-gradient phonological reflex of the left edge of a phonological phrase in Stockholm Swedish. Previous research already provides a comparatively good understanding of the *right* edges of such phrases. Access to non-gradient phonological reflexes of both phrase edges allows for the study of various phenomena such as conditions on the syntax–phonology interface, and asymmetries between left and right phonological edges, which carry implications for the discussion on phonological recursion in the higher levels of the prosodic hierarchy.

Taiwanese EFL Learners' Perception of English Word Stress

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Native speakers of tone languages tend to interpret L2 word stress as tonal differences. Strong evidence comes from Cheng (1968), in which an English unstressed syllable was reported to trigger the 3rd tone sandhi (i.e., a low tone becomes a rising tone when it is followed by another low tone) when English words are inserted in Chinese sentences (e.g., *hao* LL *professor* → *hao* MH *professor* 'good professor'). It is not clear whether the tendency of Chinese speakers to interpret word stress as tonal differences translates to a tendency to identify the location of English stress using tonal contours. This study aims to know whether Taiwanese EFL learners over-rely on F0 to identify stress in English words at the expense of other phonetic correlates of stress.

A pair of nonsense words differing in stress position (i.e., *férсept* 'girl' vs. *fercépt* 'boy') was put into two contexts: (i) yes/no-question carrier sentences (e.g., *Are you a férсept?*), and (ii) affirmative-answer carrier sentences (e.g., *Yes, I am a férсept.*). In the affirmative answers, the stressed syllable was signified by high F0. However, in the yes/no questions, the stressed syllable was signified by other phonetic correlates because the rising pitch occurs in the sentence final position. The design allowed us to see whether EFL learners were able to identify the position of stress using other phonetic cues of stress. Another pair of nonsense words with segmental contrasts (e.g., *túku* vs. *túpu*) was also constructed for comparison. After being trained on matching sound stimuli and corresponding pictures, 20 Taiwanese EFL learners who had learned English for at least 8 years participated in a forced choice perceptual experiment: they saw two pictures on the screen, heard a nonsense word in the sentences, and then made a choice of which picture matched what they had just heard by pressing the associated button.

The results show that, while the participants had no difficulties in perceiving segmental minimal pairs (i.e., *túku* vs. *túpu*) in both contexts, the same performance was not found in the stress minimal pairs (i.e., *férсept* vs. *fercépt*). Specifically, while the Taiwanese participants had few difficulties in perceiving the two nonsense words in the affirmative answers, they were apparently poor at perceiving them in the yes/no questions. This suggests that Taiwanese EFL learners took tonal interpretations to English word stress in English sentences. This study provides something different from Dupoux et al's (2008) claim that L2 learners whose native language does not have lexical stress do not suffer from "stress deafness" by showing that French learners are able to distinguish Spanish nonsense words differing in stress position (e.g., *mípa* vs. *mipá*). Specifically, it is not clear what phonetic correlates of stress have been taken by French speakers, i.e., multiple cues, as taken by native speakers of stress languages, or only certain information, as taken by Taiwanese EFL learners.

Swimming against the current: CVCV compensatory *shortening*.

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The languages of the world feature various types of quantitative phenomena. A process that received much attention is compensatory lengthening (CL), or more specifically so-called CVCV CL (Kavitskaya 2002). This phenomenon entails that the loss of the second V results in a durational enhancement of the first V as known from e.g. Friulian, Low German (LG), and Slavic. We do find, rather unexpectedly, also the opposite effect of vowel *shortening* after deletion of a final vowel. This is a development that is indeed present in the Dutch dialect of Weert (independent from the phenomenon of Closed Syllable Shortening) and cannot be accounted for in moraic terms.

The issue. A common restriction to CVCV CL is that the lengthening is permitted only if the intervocalic C is voiced. Such a quantitative development is explainable by means of Mora Theory (Hayes 1989) and laryngeal features. Low German (LG) for example has a laryngeally specified moraic fortis series, whereas the (non-moraic) lenis series is left unspecified. The lenis Cs occur outside of the syllable in an extrasyllabic position. The effect is such that a preceding V is able to lengthen. A strikingly different quantitative development is CVCV *shortening* – a phenomenon occurring in the originally long high vowels of the Dutch dialect of Weert. What we find here is that originally long high Vs are shortened due to apocope in voiced / sonorant C context. This is (almost) the identical context in which CL occurs in LG! Without apocope or with a voiceless C intervening, the vowels remain long. Obviously, no CL comes about. The according developments from Middle Dutch (MD) are illustrated in 1 (cf. Hendrickx 1978).

1. a) MD *miuse* ‘mouse-Pl.’ > [mys]
{ / C $i^{\mu\mu}$ C / $^{\mu}$} > / C i^{μ} C^{μ} /
+voi +voi

b) MD *mūs* ‘mouse-Sg.’ > [mu:s]
/ C $i^{\mu\mu}$ C / > / C $i^{\mu\mu}$ C /
+voi +voi

c) MD *biuke* ‘belly-Pl.’ > [by:k]
{ / C $i^{\mu\mu}$ C / $^{\mu}$} > / C $i^{\mu\mu}$ C /

The length development is completely counterintuitive in the sense that vowels before voiced obstruents are supposed to lengthen at least phonetically. What we find instead is a binary division into short V with a mean duration of 148 ms for the cases in 1. a) and long V with a mean duration of 213 ms for the cases in 1. b) (Fournier 2008:58). The shortening process as a sort of ‘Compensatory Shortening’ cannot be properly analyzed by means of moraic length or laryngeal features. Since Weert is a voicing dialect (rather than the fortis language LG), CL would be expected in connection with an intervocalic voiceless C.

Tones rather than length. Where the length account fails, tones are the remedy to the problem. The Limburgian area in the vicinity of Weert shows instead of a short : long vowel quantity distinction rather a tonal contrast between Accent 1 and Accent 2 in the crucial cases. These tones are indeed able to explain the shortening. The MD final schwa holds a low tone L while the main syllable has a high tone H. Deleting the schwa does not do away with the mora and the L of σ_2. Being a morpheme, it seeks to remain incorporated in the PrWd and associates to the /z/ that links to σ_1. The weak mora of σ_1 is then deleted in favor of a binary configuration, adhering to MAXBIN.

2. a) MD *miuse* Weert *mys* ‘mouse-Pl.’ (Accent 1)

Voiceless Cs are inherently unable to bear the L. The prosodic / morphological content of σ_2 cannot associate and is therefore deleted along with the schwa. The vowel of σ_1 remains long, the tonal contour is here HL_i. The tones are abandoned synchronically in Weert, yielding an almost completely opposite system to LG with shortened Vs in connection to apocope.

Testing usage-based predictions on Hungarian vowel reduction

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Recent years have seen a renewed interest in the effect use has on language. Proponents of usage-based functionalism (Bybee 2001; Pierrehumbert 2001) claim that language phenomena gain additional explanation if viewed from a perspective of use. We have conducted an experiment on Hungarian vowel reduction to see whether frequency of use has a significant effect on it. Our pilot results are controversial, calling for a more complex approach.

Generative theories regard reduction as a phonetic change, having an even effect on all lexical items (Kiparsky 1985). Usage-based functionalists, however, argue that an item's representation is a set of the richly detailed exemplars of its use, so since reduction occurs during a word's use, if it is used more, reduction will be larger. Jurafsky et al. (2000) discuss a dataset of content words ending in t/d in American English. They find that high frequency words are significantly shorter, and final segment deletion also correlates with token frequency. Hooper (1976) discusses correlations of frequency and temporal reduction in a study on schwa-reduction and deletion in American English with similar results.

Experiments on vowel reduction in Hungarian (cf. Szeredi 2008) have shown that very frequent function words like articles (definite *a*, *az* and indefinite *egy*) and the complementizer *hogy* are reduced the most as they receive the least stress. The question is whether their reduction follows from solely their lexical class or also from their high frequency.

Our experiment tests whether frequency effects vowel reduction in Hungarian. The usage-based null hypothesis is that it should. Yet, our pilot results seem to go against these predictions. In the pilot study four native speakers were asked to read sentences with two environments ([tok] and [tɒk]) that occured inside words of different frequencies according to the Szószablya webcorpus (Halácsy et al. 2003). The following table shows the statistics of the [tɒk] environment with the lemma frequencies from the corpus and phonetic reduction cues (the average formant values in Hertz, average duration in milliseconds and average intensity in decibels):

Word	freq.	F1	F2	dur.	int.
pɒt**ɒ**kot ('lake-ACC')	16256	569	1350	48	58
csɒt**ɒ**kot ('swelter-ACC')	102	535	1331	37	57

As it can be seen, if there is correlation of the frequency of the given words and their reduction in this environment, it is the other way round than expected, as the vowel in the less frequent form is longer. The next set is even more problematic:

Word	freq.	F1	F2	dur.	int.
tit**o**k ('secret')	55430	519	1147	79	64
tsolʃt**o**k ('folding ruler')	26	500	1317	39	56

Each word was placed in the same syntactic and prosodic environment yet these results are seen for every speaker, not only for the gross average.

These findigs either mean that Hungarian vowel reduction is different in nature from the above examples or suggests that the correlation of frequency of use and sound change is more subtle than the blueprint provided by the usage-based functionalists.

Positional Asymmetries in Spanish Nasal Codas: Velarisation, Alvelarisation and Surface Underspecification

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Research into Spanish nasal allophony has highlighted a dialectal dichotomy between word-final nasal alveolarisation (e.g. [pan] 'bread') and word-final velarisation (e.g. [paŋ]) (Harris 1984). Others, under the assumption that dorsal place is marked, have reanalysed putative *ω*-final [ŋ] as a placeless *anusvara* (Baković 2000), or a 'glottal nasal stop' (de Lacy 2006). Nevertheless, it has been generally agreed that word-medial nasal codas are homorganic with following consonants (e.g. [pa̪n̪da] 'panda'; [paŋga] 'barge'). Based upon initial observations from acoustic data, I propose an alternative analysis: nasals in preconsonantal contexts do not consistently take on place features from following consonants, resulting in the surface underspecification (Keating 1988, 1990) for place in /VN.C/ contexts. I argue that some speakers do articulate a robustly dorsal *ω*-final [ŋ]: this indicates that, at phonological output, coda nasals are only required to be specified for place word-finally.

Along the lines of *SPE*, previous accounts of Spanish nasals have assumed the generation of fully-specified surface structures. Place assimilation in /VN.C/ obtains through the discrete spreading of consonantal place features to preceding nasal codas; full output specification is achieved by default epenthesis of [coronal] or [dorsal] features word-finally (Harris 1984; Terrell 1975; Trigo 1988). As noted above, a placeless word-final nasal in non-alveolarising Spanish has also been posited on the basis of the suboptimality of dorsal codas (Baković 2000). Crucially, however, no empirical evidence is drawn upon in support of these claims, and phonology-phonetics interface questions are not given due consideration.

In this paper, I present experimental data in support of the hypothesis of categorically distinct final-nasal realisations amongst alveolarising and velarising speakers. I interpret a pattern of convergence of F2 and F3 over [V-N] transitions (quantified by regression analyses; $\beta < 0$) as evidence for *ω*-final [ŋ] amongst velarising speakers. Likewise, I infer the presence of *ω*-final [n] in alveolarising Spanish from a pattern of F2 and F3 divergence (quantified by $\beta > 0$). I argue that acoustic characteristics of preconsonantal nasals attest to an opposite implementational strategy to that predicted by existing phonological treatments. Where *ω*-final [Vn] and [Vŋ] sequences are characterised by abrupt shifts in spectral energy, marginal perturbations of waveform distortion patterns evince much more gradual transitions, extending from the acoustic quality of the vowel well into the expected duration of the nasal in [-VN.C-] tokens; this pattern is especially salient in [-VN.C-] sequences produced by velarising speakers. Thus, the absence of robust changes in spectral energy over these [V-N] transitions is taken as evidence that velarising speakers may have nasal continuant realisations preconsonantally (e.g. *panga* [paa̰ṵ̃ŋga]).

These experimental results therefore motivate an analysis which reverses the claims of the most recent phonological accounts on Spanish nasals. From the acoustic correlates of nasal continuancy, I infer that nasals are underspecified for place in /VN.C/ contexts. Furthermore, I show that deductive reasoning on the basis of universal markedness theory (Baković 2000; de Lacy 2006) has fuelled analyses of Spanish word-final nasal allophony, whose predictions are not borne out empirically. I conclude that a more refined notion of place markedness is required to account for the permissibility of *ω*-final [ŋ] than models based upon universal place hierarchies and coda place restrictions (irrespective of manner features) allow.

Reduplication and Linearization

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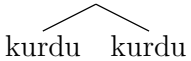
This work continues the tradition of tackling linearization of segments in reduplicated forms initiated by Raimy (2000). We present a model derived from Halle (2008) in which reduplication is computed by the linearization of segments, driven by the insertion of various morphological junctures (brackets) into an underlying form. We use the brackets to define domains that *project* (possibly with nesting) to create a hierarchically structured representation whose linearization is simply read off from the terminal nodes in the resulting tree from left to right. All brackets are introduced by the morphology, relying on insertion at phonologically defined anchor points or pivots (e.g. Yu 2007). Having introduced the model, we demonstrate its tractability.

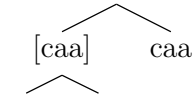
An illustration of some tree structures resulting from our scheme are in (1):

(1) a. [kurdu]



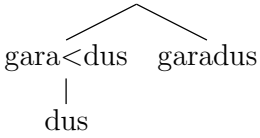
⇝ *kurdukurdu*

b. [caa}]k



⇝ *caacaacaak*

c. [gara<dus]

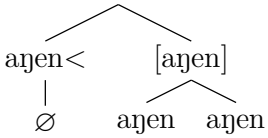


⇝ *dusgaradus*

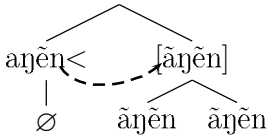
One implication of this model is that notions of 'base' and 'reduplicant' are unnecessary for explaining observed linguistic patterns. Since we generate all copies of output segments as projections from the input, we differ from most other models in not recognizing B and R—even in a simple case of total reduplication, there are two projections of the input string and neither has a privileged status. In this respect we find happy convergence with a major claim of Inkelas and Zoll (2005), although they argue on the basis of morphosyntactic considerations. Given our rejection of B-R correspondence, we re-examine the typology of reduplication—in particular, infixation—and argue that our use of recursive projection for reduplication structures not only is explicit and provides wide empirical coverage, but also leads to unforeseen solutions to old problems based on the simple linguistic notion of structure dependent rule application.

Combining the analyses in (1b) and (1c)—failure of projection to a subsequent level, as in *dusgaradus* and triplication as in *caacaacaak*—we can now generate a form like (2). If we apply a rule nasalizing vowels after a nasal at the second level of this tree, but do not project the first of the three copies of the input string /aneŋ/ we derive surface *ãŋẽnãŋẽn* in (3), which is the famous case of Malay overapplication—the word initial vowel is nasalized despite the fact that it does *not* follow a nasal on the surface.

(2) [{aŋen<]



(3) [{aŋen<]



Finally, having motivated the appartus sketched above through additional analyses of backcopying and fixed segmentism, we return to Raimy's graph theoretic representations, examining possible methods for translating between graph and juncture formalisms with reference to a computational implementation in Haskell.

Curl as a link between tonal accent and stød

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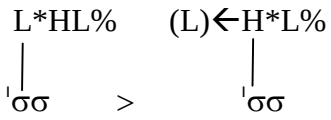
According to an earlier hypothesis (Riad 2000), one finds in the varieties of the Mälardal region in Sweden (roughly west of Stockholm) all the elements needed to reconstruct stød as it appears today in the standard dialect of Danish. The general purpose of the present study is to document features in the Mälardal varieties that play into the frame for the reconstruction of the older Danish tonal system spoken in Sjælland.

The poster focusses on the Central Swedish variety of Eskilstuna. Eskilstuna exhibits a characteristic tonal configuration known as ***Eskilstunaknorr*** (~curl) which cooccurs with so-called Mälardal diphthongization. Eskilstuna also exhibits ***facultative*** stød in curl contexts as a phonetic (but not phonologized) phenomenon, especially under emphasis. The hypothesized account for Eskilstuna has four elements, illustrated with F0-tracings in the poster.

- First, curl/stød is more likely to occur in stressed syllables than in unstressed ones, because of the added emphasis of the tonal contour under stress. (Confirmed)
- Second, curl/stød requires a tonal fall (HL) where Central Swedish usually has a rise (LH). We therefore expect instances of Eskilstuna-curl and stød to exhibit clear falls. (Confirmed)
- Third, to the extent that Eskilstuna is really still close to the Central Swedish type, there should be a synchronic shift of from rise to fall in curl contexts. It could, of course, also be the case that the variety has a fall as a more stable phenomenon. In this scenario, the dialect as a whole will have begun the tonal shift that we find in the next variety to the north-west (Dalabergslag variety, see below). (Under investigation)
- Fourth, the driving force in tone shift (> curl > stød) is a L boundary tone being pulled leftward into a stressed syllable. In that process, the preceding H is also shifted to the left, in turn pushing the preceding L leftward out of the stressed syllable. Schematically:



If L% is the main operator, we predict that the fall should be sharp. If the preceding H is shifting on its own accord, we don't. (Under investigation)

The second half of the poster provides a sketch of the surrounding varieties that are relevant to the reconstruction of the Danish stød system. In the Dalabergslag variety to the north-west of Eskilstuna the entire melodic contour has shifted permanently, yet, the tonal grammar remains the same as in Central Swedish. In the reconstruction of Danish stød this corresponds to the tonal dialects nearest to Sjælland (South Swedish, South and West Norwegian).

To the east of Eskilstuna (southwestern Uppland) we find the phenomenon of generalized accent 2, where the tonal accent distinction has in fact been suspended by virtue of assigning accent 2 to any form that contains a posttonic syllable. This phenomenon goes some way toward accounting for the fact that accent 2 gets suspended in Danish, in conjunction with the phonologization of stød.

Riad, Tomas. 2000. The origin of Danish stød. In: Aditi Lahiri (ed.) *Analogy, Levelling and Markedness. Principles of change in phonology and morphology*. Berlin/New York, Mouton de Gruyter. 261–300.

Phonological theory in clinical linguistics

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The progress of phonological theory has recently been the subject of considerable debate in mainstream linguistics. Varying opinions on how the phonetics-phonology interface should be handled have emerged, and usage-based phonology has offered a stark departure from traditional generative accounts (see Scobbie, 2007). As phonologists look for ways to test their theories, applied fields of linguistics often provide fertile ground for the evaluation of theoretical concepts. Clinical phonology, the application of ideas from mainstream phonological theory to the study, assessment, and treatment of speech disorders, provides the opportunity for such evaluation. It encompasses both normal and pathological language acquisition, and also the area of acquired phonological disorders.

The clinical phonology revolution of the 1970s saw an increasing trend for applying phonological theory to speech disorders (Grunwell, 1982). This began with linear rewrite rules of the kind found in standard generative phonology and has continued through autosegmental graphs, phonological processes, articulatory scripts, and optimality theory (Ball & Kent, 1997; Ball, Muller, & Rutter, 2009). In this presentation, we will document the extent to which the theoretical ideas of phonology have been faithfully implemented in clinical phonology, and consider their success as clinical tools. We will also talk-back to the theory, considering the implications for linguists and phonologists. The presentation is based on a larger project analyzing the success of clinical phonology as a discipline, and a major theme in our work is a suggestion that the vocabulary and schemata of linguistic theories have often been brought to clinical phonology, but subsequently been used in quite different ways. We discuss, for example, the notion of an *underlying representation* and find that this is often used in clinical phonology to mean something approximating the concrete adult realization of a word, rather than an abstract, underlying form. This likely cause of this is because phonologists are primarily interested in lexically significant detail across languages, whereas speech pathologists are interested in finer phonetic detail of the individual speaker.

The implications of this for the success of clinical phonology have been considerable, and the resulting explanatory adequacy of clinical phonology for the underlying cause of speech disturbances is often elusive. We will consider some specific examples of applying generative phonology, specifically autosegmental phonology, to some cases of articulation errors in children, and find that explanations arising from the analysis are heavily grounded in theory internal principles, rather than objective rationale. This has serious implications for the extent to which speech-language therapists are going to take seriously the usefulness of clinical phonology for the client.

We conclude by considering the future of phonological theory, and specifically usage-based phonology (Bybee, 2001). At this early stage, we see considerable potential for adapting such an approach to phonology for the purposes of accounting for normal language development and speech/language disorders. Rather like sociolinguistis, speech pathologists are not interested in how languages differ, but how individual speakers vary in their productions, and a usage based account may well prove to be fruitful.

From Strings to Loops & Back

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Raimy (1999, et seq.) established that allowing 'loops' in the precedence relationships of phonological strings can account for a wide variety of morphophonological processes, from reduplication to subtractive morphology. However, the questions of how loops are established in phonological representations and when those loops are subsequently removed from the representations (i.e., linearized) remain largely unanswered. In this talk, I address those questions in a way that constrains the theory considerably, thereby matching more closely the attested typology of morphophonological processes. Specifically, I argue that loops are destroyed as soon as they are created: previous accounts of over-/under-application effects in the loop-based framework are too permissive in that they allow for linearization to occur at later stages in the derivation.

If we take seriously Marantz's (1982) view that reduplication involves the introduction of a phonetically null morpheme, it becomes possible to treat reduplication and affixation as being driven by the need to find a host for a newly-introduced morpheme. Each time a string enters the phonological workspace, before anything else happens, it must be combined with the string which is already present. I argue along with Gagnon (2007) and contra Fitzpatrick (2006) that there are no looped representations in the lexicon. Loops are created only when it is necessary to concatenate two morphemes.

I extend the search & copy procedure for computing long-distance dependencies in phonology (i.e., vowel harmony) advanced by Mailhot & Reiss (2007) to the creation of precedence loops. Specifically, I use a modified SEARCH algorithm to locate the anchor points at which the morphemes will attach (I have argued elsewhere that these anchors are the {first, second, stressed, penult, last} elements of type {X, C, V, foot} in the string), and use the COPY mechanism to integrate the precedence relationships carried by the new morpheme with the ones already present in the workspace. This combination of SEARCH and COPY creates representations of the Raimyan type, but by virtue of the SEARCH mechanism itself and the values of the parameters which it takes, the variety of representations which are generable end up closely matching the typology of attested reduplicant size and affix placement.

In the latter portion of the talk, I argue that loops must be linearized immediately after their creation (using the version of Dijkstra's Shortest Path Algorithm adapted for this purpose by Idsardi & Shorey (2007)): in other words, phonological rules cannot apply to non-linear representations. This runs contra to Raimy (1999, 2000a,b), who argues that over-/under-application (or 'backcopying') effects first described by Wilbur (1973) result from application of phonological rules to looped representations. However, eliminating the necessity of applying phonological rules to loops is a crucial step in reconciling Mailhot & Reiss' proposal with Raimy's: if phonological rules involve the SEARCH algorithm, then we should be concerned about the possibility of the SEARCH algorithm getting 'stuck' in the loops of a non-linear representation. I bring to bear on this debate evidence from putative over-/under-application cases in Akan, Chaha, Chumash, and Luiseño, all of which I show can be analyzed without appealing to rules applying to looped representations. This conclusion is of further consequence because it provides a principled place in the derivation for linearization; we need not order linearization extrinsically with respect to other phonological processes.

Onset prominence and phonotactics

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While acoustic features are generally described in terms of numerical values, the auditory system treats speech in a more 'phonological' manner, reducing the amount of information to be processed in the perception of phonological entities. A striking case of auditory information reduction is found in the temporal domain: the onsets of acoustic stimuli receive a perceptual boost, which is then followed by followed by a period of auditory saturation (Wright 2004:44). Perceptual attention is thus focused on onsets, which license the greatest number of functional contrasts in any phonological inventory.

Traditional accounts of syllable structure focus largely on syllabic nuclei. The oft-invoked sonority scale may be a seen as ranking of segments' potential to occupy the nuclear position. However, this concentration of theoretical attention may be at odds experimental findings that point to the primacy of onsets in syllabic parsing (Content et al. 2001). If perception plays a role in the delineation of phonological structure, then it is reasonable to assume that cues associated with onset boosts should be the crucial entities that define phonological constituents.

This paper will present a theory of *Onset Prominence* (Schwartz 2007), by which segments are privatively specified for auditory properties associated with the onset position: silence, rapid rises in amplitude, aperiodic noise, and formant transitions. Fortis plosives, which produce all of these cues, occupy the highest position on the scale of onset prominence. The auditory properties associated with onset prominence produce pseudo-discrete landmarks (Shattuck-Hufnagel and Veilleux 2007) in the speech signal. Since phonology deals with discrete entities, it follows that the study of the phonetics-phonology interface should be concentrated on the pseudo-discrete elements in speech.

Onset prominence allows an insightful, non-circular account of a range problematic phenomena: including consonant clusters, coda conditions, the presence or absence of OCP effects, and extrasyllabicity. The positional absence of onset cues produces asymmetries between segmental onset specifications and the speech signal, which may be subject to perceptual reinterpretation (Ohala 1981) that is hypothesized to be the source of marked phonotactic patterns.

Content, A., R. Kearns, and U. Frauenfelder. (2001). Bondaries versus onsets in syllabic segmentation. *Journal of Memory and Language* **45**, 177-199.

Ohala, J. 1981. The listener as a source of sound change. In C. S. Masek, R. A. Hendrik, and M. F. Miller (eds.), Papers from the parasession on language and behavior . Chicago: Chicago Linguistic Society. 178-203.

Schwartz, G. (2007). Prominence in beat structure. *Poznan Studies in Contemporary Linguistics*. 43 (1), 129-152.

Shattuck-Hufnagel, S. and N. Veilleux. (2007). Robustness of acoustic landmarks in spontaneously-spoken American English. *Proceedings of ICPhS XVI*, Saarbruecken. 925-928.

Wright, R. (2004). Perceptual cue robustness and phonotactic constraints. In Hayes, B., R. Kirchner and D. Steriade (eds). *Phonetically Based Phonology*. Cambridge: Cambridge University Press, 34-57.

Vowel insertion in Latin – the problem of two "epenthetic" vowels

Norval Smith (ACLC/Dept. of Linguistics, University of Amsterdam)

There are a number of clear cases of vowel epenthesis in Latin, whereby the vowel /e/ is epenthesized in an environment involving a sonorant consonant. Compare the following cases:

lintr-is	'small boat (gen.)'	*but*	lint**E**r	'small boat (nom.)'
agr-um	'field (acc.)'	*but*	ag**E**r	'field (nom.)'

Compare also the following accusative forms:

domin-u-**m**	'master (acc.)'	o-stem
mens-a-**m**	'table (acc.)'	a-stem
manu-**m**	'hand (acc.)	u-stem
hosti-**m**	'enemy (acc.)	i-stem [more frequently *hostem*]
die-**m**	'day (acc.)'	ē-stem

but

reg-**Em**	'king (acc.)'	consonant-stem

This type of epenthesis plays a significant role in the formation of diminutive forms in Latin:

ag**E**r	'field (nom.)'	ag**E**l-l-us	'field (dim.) (nom.)'
kapr-a	'she-goat (nom.)'	kap**E**l-l-a	'she-goat (dim.) (nom.)'

However, this epenthesis competes with another kind, whereby /u/ is apparently inserted:

kist-a	'box (nom.)'	kist-**U**l-a	'box (dim.) (nom.)'
kell-a	'cellar (nom.)'	kell-**U**l-a	'cellar (dim.) (nom.)'

Latin also possesses double and treble diminutive formations. An example of these can be demonstrated with the above-mentioned *kist-a*:

kist-a	'box (nom.)'	kist-**U**l-a	'box (1Xdim.) (nom.)'
		kist-**E**l-l-a	'box (2Xdim.) (nom.)'
		kist-**E**l-l-**U**l-a	'box (3Xdim.) (nom.)'

The distribution of inserted /e/ and /u/ can in fact be simply stated. I will attempt to provide a phonological/phonetic explanation of these facts in terms of syllable structure effects in an Optimality framework.

The effect of the type and position of morpheme boundaries on the production of morpheme-final pitch accents by British English learners of Japanese

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This paper presents novel experimental production data to establish generalisations about accent patterns produced by BE learners of Japanese. The results show a clear effect of type and position of morpheme boundary, suggesting that British English (BE) learners of Japanese are moving the accent to respect boundaries that L1 speakers ignore.

Research into Japanese pitch accent produced by American and Australian English learners (eg. Horiguchi 1973, Kuno 1999) has shown that English learners produce errors in accent type, where accent type refers both to the presence or absence of an accent and its position. Moreover, repeated words are not always pronounced with the same accent type (eg. Toki 1980, Yoshimitsu 1981). However, it is not clear what factors govern the accent types produced. Yamada (1994) categorizes productions of Japanese by Australian English speakers as having either initial accent, an accent within three morae before an 'element boundary', or having no accent. This could be summarized as 'any accent type', especially as 'element boundary' is not clearly defined, seeming to correspond with some but not all morpheme boundaries. However, this raises an interesting question of how the type and position of morpheme boundaries affect the accent types produced by learners of Japanese. This paper tests whether the accent types produced by BE learners of Japanese for words with morpheme-final accent in standard Japanese are affected by the *type* and *position of the morpheme boundary*. The *types* of morpheme boundary investigated are i) between a verb with an accent on its last mora and a function word, eg. /su<u>ru</u>+kara/ (hereafter the underlined mora is accented and '+' denotes a morpheme boundary), ii) between a noun with an accent on its last mora and a function word, eg. /ka<u>gi</u>+da/, iii) between two nouns in a compound noun, with an accent on the last mora of the first noun, eg. /gi<u>fu</u>+shi/, iv) in unaccented verbs in citation form, eg. /suru/, v) in accent-final nouns in citation form, eg. /ka<u>gi</u>/. Citation form unaccented verbs are included because they have a morpheme-final accent when followed by the function words investigated, although traditionally only nouns (Kindaichi & Akinaga 2001:10) and not verbs (Kindaichi & Akinaga 2001:49) are treated as finally accented. The effect of *position* is investigated using tokens with a two or three mora first morpheme and a one or two mora second morpheme.

Ten BE learners of Japanese each produced 80 different tokens in pseudo-randomised order, which were identified by three native Japanese phoneticians. The results show that accent types produced are indeed affected by the type and position of the morpheme boundary, as well as by the part of speech of the content word. Accent patterns produced are shown to vary with part of speech, with no verbs and only 1.7% of verb-derived nouns having an accent 3 morae before the end of the word, compared to 33.3% of pure nouns. The finding that in citation form nouns tend to be produced unaccented (59%) and verbs accented (55.5%) replicates a trend seen in Portuguese learners of Japanese (Sukegawa 1999). No content-function word sequences were produced with an accent after the content-function word boundary, no 5-mora content-function words were produced initially accented and 5% or fewer of each type of compound noun were produced with an accent more than 3 morae before the end of the word, suggesting that the correct generalisation for BE learners of Japanese is that Japanese words are produced either unaccented or with an accent within 3 mora from the end of a content word.

Markedness and Economy

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In a series of recent papers (2003, 2005 & 2006), Clements proposes to revisit the martinetian notion of economy). He considers a set of constraints (*Mutual Attraction*, *Avoidance of Isolated Sounds*, *Trans-Categorial Economy*) leading him to the conclusion that systems disfavour isolated use of features and tend to maximise the area of application of a distinctive feature. Starting from this general frame and explorating UPSID database' statistical regularities, he produces a set of evidences supporting his hypothesis. By the way, he reintroduces functionalism : the more economical the system, based on the relation between maximal distinctiveness and articulatory inertia, the easier the communication as in Martinet (1955). This functionalism is clearly visible in the link established between Clement's proposal and Stevens' *Quantal Theory* through the constraint of *Feature Enhancement*.

In this paper, we would like to point out several problems that this proposition raises.

One of those is the presence of gaps in the systems which have no effect on the calculus of systems'economy and which have no known *cognitive effects*. The only positive role of these *empty slots* is that they provide a significative explanation of phonological change (which is a good predictive result) but they have no effect on the representations and no more in the actualisation of these representations. We argue, discussing examples from french phonological system and, particularly, on the internal structure of obstruents, that we must recuse the existence of these gaps following propositions dating back to Hockett (1955), Jakobson (1984),Jakobson & Waugh (1979), Malmberg (1974). The proposition here is to go a step further toward an element-based (or particle-based) representation of segments in relation to positions defining syllable structure (Brandão de Carvalho, 1997, Klein 1993).

This way, economy can no more rely on a simple calculus of the number of features involved in a segment, but rather must consider the interaction between segments and positions : this way, we can go past the static view of economy (the more features, the more marked) and build representations embedding distal and proximal relationships (this is not the segments that are marked or unmarked, but configurations in a given language). This involves change in the evaluation measure which is not related to *parsimony* but directly to economy.

This concept of economy is directly related to a systematic view of phonology. In his various papers concerning economy, Clements relies heavily on the notion of system (even if we call them segments, in this case they are the same as the *bundle features*, i.e. phonemes). The system, as emphasized by praguian linguists, is a net of distinctive oppositions, where every phoneme is defined negatively (a vision deeply related to the saussurean view of language).

But we cannot forget, that this vision of systematic phonology defined in Trubetzkoy's *Logical Classification of Opposition* had to deal with another notion, markedness, which had much more posterity than the phoneme. In Clements (2003) there is no link made from economy to this fundational notion which is rather consistent for the paper relies on Martinet (1939) analysis of systems'economy which had already « rejected » the trubetzkojan classification, and by the way, *markedness*. But in a more recent paper, Clements (2006) proposes a peculiar view of markedness and of the notion of universal implication, rejecting both, and introducing new key features of this economy apparatus : *Marked Feature Avoidance*. We will show that this point, by still neglecting the notion of markedness as defined first by Jakobson and Trubetzkoy (Seriot : 2006, Trubetzkoy :1939, Jakobson :1969, Jakobson & Waugh :1979 or, even, Kean :1975) go back to a vision of markedness which is directly related to the *intrinsic content of segments*, and pardoxically neglecting recent history of this concept.

Opacity revisited within the light of OT-CC and autosegmental phonology

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1. Opacity in OT. Phonological opacity still remains one of the most significant problems for a global and parallel theory such as OT [Prince & Smolensky 1993/2004].
In OT-CC [McCarthy 2007] a derivational device is introduced because candidates are not output forms, but a chain of abstract intermediate representations that map the input onto the output through small steps. These candidate chains meet two requirements: *gradualness* (only one unfaithful mapping is permitted at each step in the derivation) and *harmonic improvement* (every unfaithful mapping improves harmony according to the language-particular hierarchy of CON). In this model GEN has access to EVAL in order to construct valid candidate chains that obey the aforementioned requirements and thus candidates become finite. OT-CC also introduces a new type of constraint forcing an explicit order of violation between the forms of a candidate chain (PREC (A,B) constraints) that is similar to rule ordering in *SPE*-like generative models. **2. Hypothesis.** We will show that a case traditionally considered as opaque becomes transparent if we integrate OT-CC and the autosegmental conception of *features as entities* described in McCarthy 2007c and McCarthy 2008 without making reference to PREC (A,B) constraints. In McCarthy 2007c and McCarthy 2008 debuccalization, or loss of place feature specification of codas that involves a violation of MAX (place) instead of IDENT (place), is conceived as a necessary step before assimilating or deleting codas in order to make better performance of CODA-CONDITION. In our analysis CODA-CONDITION is conceived to rule out those representations in which a consonant in coda position is not linked to the place feature of the following onset consonant, rather to its own place specification. **3. Data.** In Majorcan Catalan a splitting process of palatal nasals applies when followed by a consonant that gives rise to a diphthong and a homorganic nasal to the following onset: (a) a[ɲ] 'year' ~ *a*[jm] *petit* 'little year') [Bibiloni 1983, Mascaró 1986, Pons 2005]. But an opaque interaction arises in the following examples: (b) /n##ɲ/ surfaces as [ɲ.ɲ] but /ɲ##ɲ/ surfaces as [j.ɲ] instead of more faithful [ɲ.ɲ] and (c) /n##c/ surfaces as [ɲ.c] whereas /ɲ##c/ maps to [jɲ.c] instead of more faithful [ɲ.c]. These cases are resolved in Pons 2005 within Comparative Markedness [McCarthy 2003] because old M constraint $_{O}$*ɲC dominates FAITH and FAITH dominates new M constraint $_{N}$*ɲC. **4. Analysis.** On the one hand, the (a) mapping is obtained because CODA-CONDITION dominates INTEGRITY and HAVE-PLACE dominates NO-LINK (place) (✓<ɲ.p, jN.p, jm.p>; LUMs sequence: {INTEGRITY, NO-LINK (place)}). On the other hand, the (b) mapping is the optimal one because CODA-CONDITION dominates MAX (place) (✓<n.ɲ, Nɲ, ɲ.ɲ>; LUMs sequence: {MAX (place), NO-LINK (place)}). But fully faithful [ɲ.ɲ] is not the optimal output derived from /ɲ##ɲ/ because the first palatal nasal violates higher-ranked CODA-CONDITION. In fact, in ✓<n.ɲ, Nɲ, ɲ.ɲ> the first palatal nasal becomes linked to the PAL autosegment of the following onset, whereas in *<ɲ.ɲ> the first palatal nasal violates CODA-CONDITION because it is directly linked to its own palatal place autosegment and has not undergone debuccalization. The case of (c) is parallel to (b): [ɲ.c] from /n.c/ does not violate CODA-CONDITION because the nasal in [ɲ.c] is linked to the PAL autosegment of the following onset because it has undergone debuccalization whereas *[ɲ.c] from /ɲ.c/ has not. In this case involving an underlying palatal nasal, the candidate chain *<ɲ.c, N.c, ɲ.c> is less harmonic than ✓<ɲ.c, jN.c, jɲ.c> because of the ranking MAX (place) >> INTEGRITY.

Special session

The History of Phonological Theory

Methods and Theory in Phonology

John Goldsmith (University of Chicago)

The call for this conference voices a disquietude for the health of phonology arising out of a nagging concern that cumulativity should play a larger role in our conception of the science of language, and a sense that if there is indeed a rationality lurking behind the succession of phonological theories, it is not a rationality that we fully understand. I will suggest, first, that method is as important as theory in the life of a discipline, and that a sense of this has driven opposition movements in phonology for several decades; and second, that an understanding of this point was both central to American structuralism and a reason for the continued misunderstanding of Zellig Harris's conception of linguistics. I will end by suggesting reasons to believe that a restoration of balance between theory and method will bring with it a salutary change in our understanding of cumulativity in phonology.

Systematic phonetics and phonological theory

Bob Ladd (University of Edinburgh)

Phonology and phonetics are normally thought of, following Trubetzkoy, as complementary but distinct fields, relating to langue and parole respectively. In fact, however, the theory of phonetics implicit in the IPA alphabet (what Chomsky called "systematic phonetics") has been an essential element of all mainstream phonological theorizing since the emergence of the phonemic principle in the late 19th century. In this paper I sketch some key developments in the phonetic foundations of phonological theory. I suggest that systematic phonetics is based on two key premises, which may be referred to as the segmental idealization and the universal categorization assumption, and that these premises yielded the key theoretical constructs generally known as the phone (or segment) and the feature. Modern phonetic research shows clearly that there are important problems with both premises, but few phonological theorists have reconsidered the foundational role of systematic phonetics in phonology, much less the resulting theoretical constructs.

Modularity and translation in structuralist and generative phonology

Tobias Scheer (University of Nice)

The modular perspective on the architecture and the functioning of the mind/brain is one of the deepest layers of generative thinking: Chomskyan linguistics is the application of the cognitive science programme that was laid out in the 50s to a specific area of cognitive activity. Modularity is the idea that cognitive computation is specialized, rather than all-purpose: the mind/brain is made of a number of computational units that can only carry out a very narrowly defined task, which are insensitive to eventual teleological goals of the global system, and which work only with a specific vocabulary (domain specificity). Of course modules network,

and a necessary condition of intermodular communication that follows from domain specificity is translation: a given module can understand only its own vocabulary.

The talk aims at providing an overview of modularity and associated translation in structuralist and generative phonology regarding two specific modules, morpho-syntax and phonology (whether morphology and syntax represent one or two modules is orthogonal to the discussion). The conception of morpho-syntax and phonology as two ontologically distinct computational units is shared by the structuralist and the generative approach to language. In the former, so-called Level Independence organises grammatical activity: the use of morpho-syntactic information in phonology is prohibited. However, this hardwired prohibition is circumvented by juncture phonemes, which is the form that translation takes in structuralist phonology: morpho-syntactic information is converted into phonological vocabulary (a phoneme).

The basic phonological vocabulary has changed over time, but translation has remained constant: after juncture phonemes, its output were segments in SPE (the hash mark #, which was a [-segment] segment since segments were the basic units now) and autosegmental trees (the Prosodic Hierarchy) when phonology was autosegmentalised in the early 80s.

In early generative phonology, phonological computation was allowed to take untranslated morpho-syntactic information into account: while morpho-syntactic structure was translated and appeared as (clusters of) hash marks in phonology, the input to phonological computation was a bracketed and ***labelled*** string where morpho-syntactic labels (N, V, A) could be directly accessed by rules. After a conflict with so-called direct syntax approaches that upheld this option, emerging Prosodic Phonology imposed Indirect Reference in the mid-80s, a position that was largely accepted by the field. Indirect Reference installs true modularity by outlawing any reference to untranslated morpho-syntactic information in phonology (curiously enough, though, this was done without any reference to modularity).

Another debate of the 80s could also have been decided by modularity, but was led without reference to it: interactionism (i.e. the interleaving of concatenation of pieces and phonological interpretation) was introduced by Lexical Phonology, but vigorously rejected by orthodox generative phonology and namely by Morris Halle, who upheld that all concatenation must precede all interpretation. It is obvious from hindsight that cyclic derivation (i.e. interpretation of pieces following morpho-syntactic structure, i.e. from the most to the least embedded item), a key property of generative linguistics, is only compatible with modularity if the communication with phonology is interactionist. This is precisely the evolution that current syntactic theory has taken, and which appears to be consensual in generative quarters today (including Morris Halle, who is actively engaged in interactionist Distributed Morphology): derivation by phase is the application of the Lexical Phonology insight to syntax and by syntacticians. It is the spine of current minimalist syntax and within this frame has acquired a new quality: derivation by phase is the instrument that unburdens workbench memory by cutting the derivation of a whole sentence into pieces. Shaping grammatical theory according to extra-grammatical conditions of cognitive/brainal implementation is indeed the motor of minimalist thinking.

Finally, current interface practice in OT is critically reviewed in the light of modularity and translation: we face a situation where Indirect Reference and the request for translation is commonly ignored and violated without discussion or comment. A salient aspect of the behaviour of (classical) OT is anti-cyclicity, i.e. the rejection of cyclic derivation because of its serial character. OT has produced a whole anti-cyclicity literature (which has an important intersection with the anti-opacity literature) that proposes alternative, strictly parallel ways of communicating with morpho-syntax: co-phonologies, indexed constraints, OO faithfulness and so-called interface constraints. On the other hand, DOT and Stratal OT uphold the derivational/interactionist architecture of Lexical Phonology. For some reason, classical OT has extended anti-derivationalism from phonological computation (i.e. events within a module) to the relationship among modules. This appears to be a category mistake: nothing withstands derivational intermodular communication (which is how modularity works elsewhere in the cognitive system) combined with strictly parallel computation inside the phonological module.

Diagnostics for OT's misty and largely unreflected relationship with modularity are the following: 1) customary and uncontradicted violations of Indirect Reference: ALIGN and WRAP constraints make constant reference to morpho-syntactic structure and labels; interface constraints such as FAITH-root and FAITH-affix make reference to designated morpho-syntactic categories (even reference to individual morphemes is not a problem: this is the reincarnation of SPE-practice where rules were supplemented with morphological diacritics); 2) mapping (of morpho-syntactic into phonological prosodic categories) is done *in* the phonological constraint hierarchy (rather than outside of the phonology as was the case in Prosodic Phonology): ALIGN and WRAP are interspersed with purely phonological constraints; 3) constraints whose formulation combines phonological and morphological instructions are commonplace.

All this is incompatible with a modular view of the cognitive system in general, and of grammar in particular. A reason for what I call the scrambling tropism of OT (i.e. the tendency to have everything computed in the same constraint chamber and thereby to eliminate modular contours, also with phonetics, and also incorporating more and more aspects of the lexicon) may be its empiricist origins: the self-understanding of OT is certainly generative, but this is only half of its genetic endowment. The central idea of OT, parallel computation, was developed in the second half of the 80s by connectionism, the empiricist challenger of the standard modular and rationalist theory of the cognitive system. Connectionism promotes PDP, Parallel Distributed Processing, and the question is whether it is possible/reasonable to cherry-pick just the two Ps (parallel processing) while refusing the D. Distributed processing means that computation is all-purpose, rather than specialized, i.e. the exact opposite of the modular idea. Prince & Smolensky (1993, chapter 10.2) are explicit on the fact that OT does cherry-picking in the connectionist toolbox – the question is whether this option is viable: the systematic violation of modularity in current OT practice is probably not unrelated to the anti-modular conception of the mind/brain that lies at the heart of connectionism.

The goal of the talk is not merely historiographic: the constancy of translation and its various incarnations over time raise the question what translation should look like. One property of translation that is shared by all structuralist and generative incarnations is that its output has only been thought of in terms of diacritics: of course juncture phonemes /#,+/ are not real phonemes like /a/, /p/ etc., and of course #s are not segments like [a,p] etc. (something that was demonstrated early on by Pyle 1972), and of course the Prosodic Word, ω, is not anything that is known in phonology. Common to these items is their absence in phonological processes that are unconditioned by extra-phonological information (such as, say, a palatalisation): they only enter the scene when extra-phonological information plays a role, and their *exclusive* function is to carry this information (they act like a buffer that stores and unstores information). They are thus diacritics, i.e. phonological aliens. If phonology is a module, however, it is unable to understand alien vocabulary. In a sound interface theory, the output of translation must therefore not be diacritic: candidate carriers of morpho-syntactic information reduce to representational items that pre-exist in phonology and are also used for purposes other than just the transmission of boundary information, i.e. in phonological processes that are not conditioned by any extra-phonological information.

I call this requirement for using only truly phonological vocabulary as the output of translation Direct Interface: there must be no diacritic mediation between phonology and morpho-syntax.