The Twelfth Manchester Phonology Meeting

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ABSTRACTS BOOKLET

Thursday 20th - Saturday 22nd May 2004

Held at
Hulme Hall, Manchester

Organised by phonologists at **Edinburgh University**, **Newcastle University**, the **Université de Montpellier-Paul Valéry, Manchester University**, the **Université de Toulouse-Le Mirail**, and elsewhere.

This booklet contains the abstracts for all the papers presented in the sessions at the **twelfth Manchester Phonology Meeting**, held at Hulme Hall, Manchester in May 2004.

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

The abstracts for the **main sessions** are presented first, followed by the abstracts for the **poster session**, and those for the **special session** on 'Phonology and Loanword Adaptation'.

All sessions for papers listed in this booklet will take place in either the **Old Dining Hall** or the **Seminar Room** in Hulme Hall, apart from the poster session, which will be held in the **bar area**. The opening address and the special session will be held in the Old Dining Hall and, when there are parallel sessions, papers are being held in both the Old Dining Hall and the Seminar Room.

The Old Dining Hall is in the main Hulme Hall building, upstairs, and just through from the bar/coffee area and 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**, which is included in your registration pack, gives the details of which papers are in which room.

Main sessions

Perception in Loanword Adaptation: A Study of English Loans into Hawaiian
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In this talk, I present the findings from an online adaptation study of English words into Hawaiian, some aspects of which are surprising in light of the recent loanword literature. Numerous cross-linguistic studies suggest that the adaptation of loanwords proceeds in such a way as to maximize auditory or perceptual similarity between input and output. However, there is often tension between preserving salient features of the source while satisfying the phonotactics of the borrowing language (Fleischacker 2000, Kang 2002, Kenstowicz 2001 and 2003). These papers demonstrate that the repair strategies used in loanword adaptation are not random or unconstrained; they are often grounded in the perceptibility of contrasts, with the goal of minimizing the perceptibility of change from input to output. This notion was formalized for non-loan phonology by Steriade (2001) under the rubric of the P-map, which proposes that knowledge of perceptibility scales forms a component of UG.

The Hawaiian language, with its small, uniquely structured phoneme inventory (no (oral) coronal stops or fricatives) and strict phonotactic constraints ((C)V(V) syllables only), can serve as a useful testing ground for these claims. The data from this study suggest that syntagmatic (contextually-based) salience and paradigmatic (segmental or 'inherent') salience contribute unequally to the preservation and adaptation of consonants. The cues to consonant identity derivable from consonant-vowel transitions are argued to be universally highly salient, overwhelmingly leading to preservation of the consonant in question. These findings are consistent with the perceptual literature first formalized (for laryngeal features) by Steriade as Licensing by Cue (1997), and taken up in Côté (2000). I will argue, however, that the native inventory of Hawaiian exerts significant pressure in constraining the retention and adaptation of non-native segments in non-prevocalic position. This force indeed seems to override purportedly universal perceptibility scales to varying degrees, in that strident sounds in borrowings are afforded no special accommodation. In fact, consonants which are phonetically less salient than stridents but are part of the native inventory are retained more often than purportedly more salient, non-native consonants (compare, e.g., the last two consonants in 'percept' [paliké:**pak**a] versus 'clasp' [kalá**p**e]). Thus, in the absence of robust cues to consonant identity, it seems that the phonology of the borrowing language can influence the choice of deletion or epenthesis as a repair.

When non-native consonants are retained, the featural adaptation exhibits some interesting variation according to manner of articulation. Coronal stops are generally retained as an oral stop, but are occasionally retained as [h] or glottal stop instead. I relate this latter fact to the reduced perceptibility of unreleased or otherwise non-salient consonants. When coronals are mapped to an oral stop, it is almost exclusively [k] rather than [p], both of which are native sounds and hypothetically possible replacements for the non-native coronals. I explain this mapping as a variety of articulatory faithfulness which is satisfied by mapping coronals to a segment which, globally speaking, relies upon the same articulator (the tongue) for articulation. Fricative sounds exhibit greater variation between retention as a stop and as [h], which I argue is a result of competing pressures to maximally retain both the manner (frication) and the presence of an oral constriction – two features which do not occur together in the native inventory. In addition, as mentioned above, the strident coronal fricative /s/ is frequently deleted rather than adapted. I will discuss the patterns observed and present an analysis in terms of competing constraints in an OT framework.

On the Diachronic Inversion of Korean Diphthongs

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This paper proposes a new account of the diachronic monophthongization and diphthongization processes which occurred in Korean during the 18th and the 19th centuries, viz., (/ɔy/ >) /ay/ > /ɛ/, /əy/ > /e/, /uy/ > /ü/ > /wi/, /oy/ > /ö/ > /we/. Specifically, through a featural analysis, we examine how these changes generated the asymmetric diphthongal system of Modern Korean, which now lacks (nearly) all of the historical offglide diphthongs.

There were seven monophthongs in 15th century Middle Korean (/i, ɨ, u, ə, o, a, ɔ/) as well as a limited number of both onglide (/wə, wa, yu, yə, yo, ya, yɔ/) and offglide diphthongs (/ɨy, **uy**, əy, **oy**, **ay**, ɔy/; those in boldface do not occur in Modern Korean). Just as in the modern language, Middle Korean had a strong restriction in diphthongal distribution in that any offglide configuration with /w/ was not allowed (*/Vw/). Moreover, /ɨ/ went into combination only to form /ɨy/ (*/wɨ/, */yɨ/), an offglide diphthong which lasted until the 20th century (and is still used by some speakers though most have merged it with /i/). There has also long been a strong OCP constraint to the effect that the vowel and the glide may not share the same place of articulation feature, [labial] or [palatal] (*/yi/, */iy/, */wu/, */wo/, */wɔ/); idiosyncratically (in view of /yu/ and /yo/), */wi/ was nonexistent as well. These phonotactic restrictions can all be accounted for in largely straightforward ways. But by the end of the 18th century, the low rounded vowel /ɔ/ had merged with /a/ and a process of monophthongization had changed (/ɔy/ >) /ay/ to /ɛ/ and /əy/ to /e/, thus forming a new system that consisted of eight monophthongs: /i, ɨ, u, e, ə, o, ɛ, a/ (K. Lee 1972, J. Park 1983, C. Park 2002). Two other off-glide diphthongs underwent monophthongization in the 19th century, /uy/ > /ü/ and /oy/ > /ö/, which resulted then in a 10-vowel system of monophthongs alongside the seven inherited diphthongs (/wə, wa, yu, yə, yo, ya/ and, marginally, /ɨy/). The two new vowels /ü/ and /ö/ did not last long, though, soon becoming the modern onglide diphthongs /wi/ and /we/, which, with respect to /wi/, filled a phonotactic gap that had existed since Middle Korean.   Thus, the compound development of /uy/ > /ü/ > /wi/ and /oy/ > /ö/ > /we/ represents a phonological 'inversion'—or perhaps reversion (diphthong > monophthong > diphthong)—which can be ascribed to the emergent suppression of offglides in the language (offglide diphthong > monophthong > onglide diphthong).

In elucidating these issues, the present paper unifies the monophthongization and diphthongization events of the 18th and 19th centuries, showing that monophthongization was a merger of features in vocalic sequences motivated by the developing aversion to offglides.. The later 'breaking' or diphthongization of the resultant front rounded vowels /ü/ and /ö/ to /wi/ and /we/ was in turn motivated by the absence of these sequences in an otherwise symmetric system of onglide diphthongs as well as by the same markedness considerations as caused front vowels to unround in the history of English. The key property of the historical monophthongizations in Korean, however, is that the height and backness qualities of the nucleus vowel (i.e., head) in the diphthong remained intact under monophthongization and emerged as well in the new nucleus vowel in the later change of diphthongization. A constraint-based approach like Optimality Theory (McCarthy & Prince 1995) would assume two feature faithfulness constraints IdentV[height] (the height of the input nucleus remains intact in the output nucleus) and IdentV[back] (the backness of the input nucleus remains intact in the output nucleus) as well as a similar input-output correspondence constraint for the feature [round] (Lombardi 1998). As the basic tendency to suppress offglides in Korean phonology then gains prominence over time, the constraint *Offglide comes to dominate the system, as it does today.

The Representational Residue: The Role of Contrast in Phonology
Peter Avery (York University) and Keren Rice (University of Toronto)

In the last decade of work in Optimality Theory, a good deal of attention has been paid to the issue of markedness and the development of constraints that are capable of reproducing the markedness facts that representational theories capture through minimal specification and default rules (Prince and Smolensky 1993; Gnanadesikan 1997; de Lacy 2002; Lombardi 2002). This has been necessitated because of OT's rejection of underlying representation as a significant phonological level. Prior to OT, underlying representations were the level at which the significant contrasts in an inventory were represented and allowed for a principled account of assimilation facts as well as providing an explanation for why the facts fell out as they did.

While OT has been largely successful in reproducing the markedness facts, it is our contention that there is still what we term a 'representational residue' that OT analyses fail to address. We argue that contrasts in a language play a significant role in determining the types of phonological processes that are present in the language and that any theory needs to explicitly encode inventory contrasts. We examine nasal place assimilation, arguing that the facts are best understood if the inventory is taken into account. When it is not considered, we miss a significant explanation for the processes and predict that the facts could easily be otherwise.

In the normal state of affairs, a coronal nasal assimilates to a following obstruent in point of articulation. Exceptions are restricted to three inventory types: (i) languages with multiple coronal contrasts; (ii) languages with a two-way contrast between a coronal nasal and a nasal at another place of articulation; (iii) languages with a nasal glide (e.g., Trigo 1988).

In languages with multiple coronal contrasts such as Sanskrit and Telugu, the coronal nasals may assimilation within their class or fail to assimilate at all. Importantly, however, they do not assimilate to following labials or velars. Other languages with multiple coronal contrasts also fit this pattern; see Hamilton 1996 for an extensive survey of Australian languages.

The second class of exceptions appears to be triggered in cases where languages have only a two-way place contrast among the nasal consonants. In Seri (Marlett 1981), there is a contrast between a labial and coronal nasal, and the labial shows unmarked patterning, being a target rather than a trigger of assimilation. In this case the choice of the marked segment, i.e., the segment that does not undergo place assimilation, appears to be language specific. A similar case can be made for Sri Lankan Portuguese Creole (Smith 1979, Hume and Tserdanelis 2002), although the facts are more complex because of the presence of a velar nasal. We reanalyze the data, showing that the primary contrast is between a coronal and labial nasal, a two-way contrast.

The third type of exception appears to be with the group of segments referred to as nasal glides, as exemplified in languages such as Chukchee. In such languages the nasal glide rather than the coronal assimilates to a following obstruent. If present in a language, the nasal glide always takes precedence as an assimilatory target.

Understanding inventory contrasts is key to an account of these patterns of assimilation. If a nasal glide is present, it can take on features from a following obstruent. The patterning found in languages with a two-way contrast suggests that markedness cannot simply be reduced to a hierarchy where the least marked element is the one to show special patterning – either place of articulation can have unmarked diagnostics. Finally, if there is a contrast between coronals, a coronal fails to pattern as unmarked. It is difficult to account for these facts without recourse to a theory that allows some variation in what patterns as unmarked, on a language-specific basis. However, it is important to emphasize that this is not variation without limit. Understanding the contrasts in the system provides the key to account for the apparent anomalies.

The Emergence of the Unmarked Syllable: Evidence from Coda-Driven Epenthesis

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There are two competing, but overlapping, OT mechanisms to account for onset/coda asymmetries in the licensing of segmental features such as Place and [voice]. One is the familiar Coda Condition (Itô 1986, 1989), usually implemented via constraint conjunction (Itô & Mester 1994); the other is positional faithfulness ("PosFaith"), in the form of IDENT-ONSET (Padgett 1995, Beckman 1998, Lombardi 1999).

Both approaches can account for coda neutralization and assimilation to a following onset. However, only PosFaith can account for the pervasively regressive direction of assimilation; CODACOND mistakenly predicts that progressive assimilation should be equally attested (1).

(1)

/bimki/	ID-ONS(Place)	*PLACE	ID(Place)	/bimki/	CODACOND	*PLACE	ID(Place)
a. bim.ki		***!		a. bim.ki	*!	***	
b.☞ biŋ.ki		**	*	b.☞ biŋ.ki		**	*
c. bim.pi	*!	**	*	c.☞ bim.pi		**	*

Although PosFaith trumps CODACOND in handling assimilation, Lombardi (2001) claims that CODACOND is necessary to account for other coda-driven phenomena. Specifically, she argues that only CODACOND, dominating the anti-epenthesis constraint DEP, can generate epenthesis to avoid coda Place features (2), as seen in languages such as Axininca Campa, Ponapean, Japanese, and Tamil.

(2)

/bipki/	ID-ONSET	*PLACE	IDENT	DEP	/bipki/	*PLACE	CODACOND	DEP
a. ☞ p.ki		**			c. p.ki	**	*!	
b. pV.ki		**		*!	d. ☞ pV.ki	**		*

With these constraints, the PosFaith grammar cannot select (2b) as optimal; DEP always favors (2a), regardless of ranking. By contrast, CODACOND, specifically targeting coda Place, selects (2d) whenever CODACOND » DEP.

In this paper, I show, with analyses of Axininca Campa and Tamil, that a CODACOND-free grammar is fully capable of generating epenthesis, provided that we look beyond epenthesis, to the phonology of the language as a whole. Languages which epenthesize to avoid coda Place also exhibit coda assimilation *whenever possible*. Epenthesis occurs only when assimilation is blocked by high-ranking constraints, such as sonority sequencing (e.g., banning obstruent codas) or alignment requirements on morpheme concatenation (e.g., banning feature-sharing across a root-suffix boundary). Coda-driven epenthesis is an emergence of the unmarked effect, reflecting low-ranked, but active, DEP; these languages default to open syllables under duress, without reference to CODACOND.

Consider Axininca Campa (Payne 1981). Within morphemes, and across prefix+root boundaries, clusters of homorganic nasal + obstruent are permitted (/i-N-tʃʰik-i/ → [iñtʃʰiki] 'he will cut'; /iŋki/ 'peanut'). In PosFaith terms, IDENT-ONSET » *PLACE » IDENT » DEP; place features are minimized, with regressive assimilation. Across a root+suffix boundary, NC clusters are banned, even when homorganic; epenthesis is mandatory (/i-N-kim-piro-i/ → [iŋkimapiroti] 'he will really hear' *[iŋkimpiroti]). Assimilation is blocked, and epenthesis enforced, by high-ranking ALIGN(Suffix, L, PrWd, R) (McCarthy & Prince 1993), and a requirement that PrWds be *crisp* (Itô & Mester 1994), with no linkage across the PrWd boundary: ALIGN, CRISPEDGE » *PLACE » DEP. PosFaith governs the outcome of assimilation where possible, but neither it nor CODACOND play any role in generating epenthesis.

PosFaith, along with independently motivated constraints, provides a superior account of assimilation, and handles epenthesis; there is no empirical motivation for retaining the redundant CODACOND in the grammar.

Contributions to the Strict CV phonology analysis of connected speech phenomena

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Abstract

The fact that the left edge of (phonological) words is a strong position counts as a phonological commonplace. This basically means that the beginning of the word favours fortition processes and disfavours lenition both synchronically and diachronically. Theories have usually attempted to account for this with reference to the word boundary (#) or to foot-initial position. As an alternative, most practitioners of Strict CV Phonology (launched by Lowenstamm 1996), which, being a subbranch of Government Phonology, describes fortition and lenition phenomena as the result of the interaction of government and licensing relations (cf. Ségéral & Scheer 1999), assume that each word of a major category starts with a melodically empty CV unit on the skeletal tier, marking the word boundary (after Lowenstamm 1999). One of the functions of the boundary-marker in a cvCV... word (that is, a word starting with a single consonant followed by a vowel, where lower-case letters denote empty skeletal positions) is to absorb the (destructive) government emanating from the first vowel of the word, thus the word-initial consonant will not be negatively affected.

So far, the study of this boundary-marker has concentrated on the behaviour of consonant-initial words, therefore this paper has two main aims. On the one hand, it investigates whether or not vowel-initial words also possess a boundary-marker; on the other hand, it looks into what happens to the boundary-marker post-lexically, i.e., in connected speech. As the discussion unfolds, drawing on the insights of Prosodic Phonology (e.g., Nespor & Vogel 1986), it is suggested and exemplified that the boundary-marker serves as a general boundary marking the edges of (all) phonological domains: certain phonological rules will arbitrarily decide to ignore it and treat it as a kind of extraprosodic skeletal material. The boundary-markers not ignored by a given rule will delimit its domain by blocking its application. Also, a typology of the effects of the extraprosodic (i.e., ignored) boundary-marker is provided, which highlights the special status of the situation when a consonant-final word meets a vowel-initial one. Several examples are given, mostly from English, and further questions are asked.

Lowenstamm, Jean (1996) CV as the only syllable type. In Jacques Durand & Bernard Laks (eds.) Current Trends in Phonology: Models and Methods. European Studies Research Institute, University of Salford Publications. 419-442.

Lowenstamm, Jean (1999) The beginning of the word. In John Rennison & Klaus Kühnhammer (eds.) Phonologica 1996. Syllables!? The Hague: Holland Academic Graphics.

Nespor, Marina & Irene Vogel (1986) Prosodic Phonology. Dordrecht: Foris.

Ségéral, Philippe & Tobias Scheer (1999) The Coda Mirror. Ms., Université de Paris 7 & Université de Nice.

Privative [voice] in OT

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The aim of this paper is dual: to explore the formal properties of faithfulness constraints in unary feature models and to contribute to the growing body of arguments for privative [voice].

The original formulation of **IDENT(F)** (McCarthy & Prince 1995:16) is given below.

(1) **IDENT(F)**

Let α be a segment in S_1 and β be any correspondent of α in S_2. If α is $[\gamma F]$, then β is $[\gamma F]$. Since this definition contains the condition "if α is $[\gamma F]$", it is *always* vacuously satisfied in unary feature models, as unary features never have values. An immediately apparent modification, "if α *contains* [F], then β contains [F]", suffers from another shortcoming: it is vacuously satisfied when α is *not* $[\gamma F]$. Thus, in a model using unary features, it prohibits feature deletion, but not feature insertion.

I propose a more precise formulation of featural identity constraints along the lines of Itô et al. (1995)'s **PARSELINK** and **FILLLINK**, establishing correspondence between association lines rather than segments or features. Every segment is represented by the set of ordered n-tuples containing the skeletal slot as the first element and the features associated to it proceeding from the skeletal slot 'downwards'. Thus, the graphic representation in (2) can be formalised as in (3). Accordingly, the re-formulated constraints are shown (4):

(2)
```
      ×
    ⁄   ˋ
   A     B
   ┆
   C
```

(3) $\begin{bmatrix} \langle \times, A \rangle \\ \langle \times, A, C \rangle \\ \langle \times, B \rangle \end{bmatrix}$

(4) Let α be a segment in S_1 and β be any correspondent of α in S_2, $\times_1$ be the skeletal slot within α and $\times_2$ be the skeletal slot within β.

IDENT(F): The set of all n-tuples containing both $\times_1$ and **F** is identical to the set of all n-tuples containing $\times_2$ and **F**.

MAX(F): The set of all n-tuples containing both $\times_1$ and **F** is a subset of the set of all n-tuples containing $\times_2$ and **F**.

DEP(F): The set of all n-tuples containing both $\times_1$ and **F** is the superset of the set of all n-tuples containing $\times_2$ and **F**.

This formulation produces the correct results in cases of feature insertion: the set of n-tuples containing a skeletal slot and a feature **F** is present in the input even if the feature itself is absent from it (in which case the set is empty), so **ID(F)** is never vacuously satisfied.

Using the theoretical tools sketched out above, I present a re-analysis of cases of asymmetrical voicing assimilation that Wetzels & Mascaró (2001) use as an argument for the need for binary [voice]. Yorkshire English and Parisian French display regressive devoicing assimilation but no (or only optional) voicing assimilation, while Ukranian shows the reverse pattern. *Contra* Iverson & Salmons (2003), who claim that devoicing assimilation takes place outside the phonology, I show that systems like these are actually predicted by a model using **MAX[VOICE]** and **DEP[VOICE]**: in Yorkshire English and Parisian French **DEP[VOICE]** crucially outranks ***[VOICE]**, while in Ukranian **MAX[VOICE]** dominates **SHARE[VOICE]**. Thus, there is no need to refer to [−voice] to account for these phenomena.

In sum, the paper offers a straightforward way of analysing asymmetrical VA without using [−voice], and presents a re-formulation of faithfulness constraints compatible with privative feature models. By combining the properties of **ID(F)** and **ID.LINK(F)**, the number of constraints is reduced, restricting the typological predictions of the model. As an additional advantage of this formulation, faithfulness constraints also become sensitive to the feature geometrical organisation of features, making it compatible with models like Clements (1991).

A laryngeal typology of Celtic obstruents: evidence from nasal mutation

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The Insular Celtic languages exhibit the phenomenon of initial consonant mutation, i.e. a series of morphosyntactically governed alternations which affect the initial consonants of words. One type of mutation is generally referred to as "nasal mutation"; this involves a process that applied historically following a nasal consonant. Nasal mutation affects fortis and lenis plosives in different ways. In Irish Gaelic, for instance, nasal mutation triggers voicing of fortis (voiceless unaspirated) plosives and nasalization of lenis (voiced) plosives:

Orthographic		Phonemic	
basic	mutated	basic	mutated
p	bp	p	b
t	dt	t	d
c	gc	k	g
b	mb	b	m
d	nd	d	n
g	ng	g	ŋ

Clearly, a phonological interpretation of this process benefits from having a set of laryngeal features that makes it possible to capture the various alternations in a straightforward fashion. Following Botma (2004), we propose an analysis in which Irish nasal mutation involves the association of a dependent element |L| to the manner component of a plosive. Depending on the internal structure of this plosive, this |L| is interpreted either as voicing or as nasalization.

While the Irish facts are relatively clear-cut, the mutation patterns of other Insular Celtic languages are more complex, and involve a number of alternations which would seem to be problematic for all known theories. In some of these languages the pattern of nasal mutation appears to depend, at least to some extent, on the kind of laryngeal contrast that is present in the obstruent system. This is the case, for instance, in the Scottish Gaelic of Leurbost (and in most varieties of Welsh), where fortis plosives, which are phonetically realized as aspirated, mutate to aspirated nasals. Other dialects of Scottish Gaelic, such as East Sutherland and East Perthshire Gaelic, employ the same laryngeal contrast in plosives, but mutate both fortis and lenis plosives to voiced prenasalized stops. Matters are further complicated by the behaviour of fricatives, which sometimes pattern with plosives (as in East Perthshire Gaelic) and are sometimes unaffected by nasal mutation (as in Applecross Gaelic).

In this talk, we consider to what extent the phonetic realization of obstruents determines the pattern of nasal mutation. The facts encountered will be analyzed in terms of the approach to segmental structure proposed in Botma (2004). This approach assumes an intimate relation between manner and laryngeal properties of segments, in line with previous work in "Dutch" Dependency Phonology (see e.g. Smith 2000).

Botma, B. (2004, to appear). *Phonological Aspects of Nasality: An Element-Based Dependency Account*. Ph.D. dissertation, University of Amsterdam.

Smith, N. (2000). Dependency Phonology meets OT: a proposal for a new approach to segmental structure. In J. Dekkers et al., eds., *Optimality Theory: Phonology, Syntax, and Acquisition*. Oxford: Oxford University Press. 234-76.

On the emergence of phonological patterns

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This paper discusses the emergence of a new phonological pattern in Brazilian Portuguese : (affricates+any vowel). It will be shown that this new pattern came into the language as a consequence of the processes of 'palatalization of alveolar stops' and 'raising of mid vowels' . These processes were combined with the appearance of new words and the introduction of loan words. It will be argued that (affricate+any vowel) emerged through a *path of change*. Bybee (2003:1) claims that the "true universals of language are the *mechanisms of change* that propel the constant creation and re-creation of grammar". These mechanisms eventually allow for *synchronic cross-linguistic generalizations* to emerge through *paths of changes*. In other words the *universal mechanisms of change* will allow *synchronic generalizations* to emerge through *paths of change*. Within this view synchronic patterns must have a diachronic dimension in order to exist. Thus, in the process of evaluating synchronic patterns one should be able to tell how they came into being by explaining the *paths of changes* that allowed these new patterns to emerge. This paper intends to be a contribution towards this theoretical perspective.

One of the major differences between Brazilian Portuguese (BP) and European Portuguese (EP) is that in the former alveolar stops become affricates when followed by a high vowel: *tia* aunt, and *dia* day. This occurs now in most BP dialects. It follows that affricates should only occur when followed by a high vowel (since this is the environment which conditions the process). Thus, we should not find affricates followed by other vowels (i.e non-high vowels). However, affricates in BP are increasingly occurring followed by any vowel. This paper will show that the (unexpected) increasing number of (affricates+any vowel) follows from the role played by the processes of 'palatalization of alveolar stops' and 'raising of mid vowels' combined with the appearance of new words and also due to the role played by loan words. The combination of these factors lead to a *path of change* that triggered the generalization of the new synchronic pattern: (affricated+any vowel). The table below shows in the dark cells the *path of change* which combined the processes of 'raising of mid vowels' and 'palatalization of alveolar stops' towards the emergence of (africattes+any vowel). Note in the 4th column that only unstressed high vowels are deleted when followed by a vowel.

te,de →	ti,di				
	ti,di	→	tʃi,dʒi	→ tʃiV,dʒiV	→ tʃV,dʒV
			'tʃiV,'dʒiV,tʃiC,dʒiC		

Interestingly, frequency effects have been playing a major role on the emergence and establishment of this new synchronic pattern. Type and token frequency will be examined for the cases that involve the processes shown in the table above as well as loan words and newly created words. The results to be presented support theories of multiple representations, such as Exemplar Models (Pierrehumbert (2001, 2003)) and also contribute towards a probabilistic analysis of linguistic systems (Bod, Hay & Jannedy (2003)). The analysis also suggests a gradual phonetic implementation of the new pattern (Browman & Goldstein (1992)). It will also be shown that the lexicon plays a major role in the organization of phonological representations (Bybee (2000,2001), Pierrehumbert (2001,2003)). Finally, this paper contributes to the assumption that the true universals of language are in fact the *mechanisms of language change* which allow *synchronic generalizations* to emerge through *paths of change* (Bybee (2003)).

Morphological minimality correlates with morphological complexity

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As work like McCarthy & Prince (1986) shows, it is widely attested, cross-linguistically, for the lexical words of a language to be required to have a minimum size, typically two moras or two syllables. Other prosodic morphemes, like reduplicants, also often have this same minimum size. Work like McCarthy & Prince (1986, 1993, 1999), Hayes (1995), Prince & Smolensky (1993) and Selkirk (1995) argues these minimality effects fall out from the Prosodic Hierarchy. Proper stress feet are exactly bimoraic or bisyllabic. Since Pr(osodic) Word dominates stress foot in the Hierarchy, all PrWords must contain one proper stress foot. Work like McCarthy & Prince (1995, 1999) and McCarthy (2000) argues that bimoraic/bisyllabic minimality conditions on reduplicants have a similar account: if these morphemes (or their Bases) are parsed into a PrWord, they must contain one stress foot.

While this theory of minimality is very elegant, it also faces numerous problems. First, cross-linguistic studies by Gordon (1999), Hayes (1995) and Kager (1992a,b) find no consistent correlation between foot size and word size, though the theory predicts one. The theory also fails to capture the generalization that there often is a correlation between internal morphological structure and minimality. Derived words can be subject to different minimality constraints from non-derived (Uhrbach 1987, Féry 1991, Inkelas & Orgun 1995). And different morpheme categories can be subject to different minimality constraints, with a bisyllabic requirement common for categories where the minimal word is (historically) bimorphemic (Orie 1997). Finally, the theory incorrectly predicts that minimally bimoraic/ bisyllabic reduplicants (or their bases) are always parsed into a separate PrWord.

The prosodic morphology of Axininca Campa (AC) illustrates these problems. Spring (1990, 1991) shows that nouns and adjectives, which can be monomorphemic, minimally contain a heavy monosyllable, as expected given AC's iambic stress system. However, verbs, which are minimally bimorphemic, are minimally bisyllabic. Minimality also conditions a productive process of verbal reduplication which takes the stem – [(Prefix+)Root] – as its base. As Payne (1981) and Spring (1990, 1991) show, subliminal stems like *na* 'carry' must be augmented when reduplicated: *[nata]-nata-waitaki* 'carry' (*[na]–na–waitaki*). McCarthy & Prince (1993) account for this by adopting Spring's (1990, 1991) proposal that the base is a PrWord. However, as McCarthy & Prince (1993: Appendix A1) acknowledge, the PrWord constituency motivated by augmentation "is incompatible with several elementary properties of the Word-level phonology." To resolve this conflict, they propose there are two levels of AC phonology, one with internal PrWord constituency, and one without. However, it is clearly undesirable to have a distinct level of phonology motivated by a single process. To eliminate this level we need a motivation for minimality augmentation that does not require the base to be parsed as a PrWord.

In this paper I argue for a morphology-based theory of minimality which builds on Dresher & van der Hulst's (1998) proposal that there is a correlation between morphological complexity and phonological complexity. Lexical heads (roots and stems) meet minimality requirements, not because they contain a stress foot, but rather because heads license branching structure. Further, the morphologically branching root-affix structure of stems is matched phonologically by branching into two syllables; morphologically simplex roots can be monosyllabic. This straightforwardly accounts for the AC minimality effects: monomorphemic nouns and adjectives are minimally heavy monosyllables; bimorphemic verbs are minimally bisyllabic. Canonically bimorphemic verbal stems (the base for reduplicative suffixation) are also minimally bisyllabic. This approach eliminates the need for an extra level of phonology to account for minimality in AC, as morphological structure, not foot structure, is cross-linguistically the better predictor of minimal morpheme size.

Non-Uniformity of Syllable Weight and Foot-Type in Capanahua

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Capanahua, an Amazonian language of the Panoan family spoken in Eastern Peru, has two superficially contradicting facts. In Capanahua, underlying glottal stops are deleted in the coda of even syllables but preserved elsewhere. As an illustration, the suffix /-riʔ.bi/ 'again', which has an underlying glottal stop in its first syllable, surfaces without it when the syllable containing it is even-numbered, but preserves it when odd-numbered (Loos&Loos:1998). The account of the distribution of this phenomenon depends crucially on *quantity-insensitive* footing. Glottal stops are deleted when aligned with the right edge of disyllabic feet.

(1) (ˈtoʔ.ko) (-**riʔ**.bi)	(2) (ˈʔo.tʃi) (ti.-**ri**) bi	(3) (ma.ˈnan) (ṣa.wɨ) (-**riʔ**.bi)
Frog -again	Dog -again	Turtle -again
'Again the frog'	'Again the dog'	'Again the turtle'

If footing were quantity-sensitive, we would wrongly expect /hisma-**riʔ**bi -wɨ/ *show-again-imperative* to surface as *(ˈhis)(ma.-**ri**)(bi.-wɨ); that is, without the glottal stop, instead of actual form (ˈhis.ma)(-**riʔ**.bi)-wɨ.

However, contrary to what is expected, Capanahua has a *quantity-sensitive* stress system in which closed syllables attract stress: main stress occurs on the second syllable if closed, otherwise, on the first one.

(4)	a. (ˈni.ʃi)	'Rope'	b. (tʃi.ˈtiṣ)	'Dust'
	c. (ˈbiʃ.pi)	'Plant shoot'	d. (his.ˈmis)	'A person who likes starring'
	e. (ˈʔi.ko)nin	'Nephew'	f. (kiṣ.ˈkan)kin	'To incline'

I solve straightforwardly this conundrum by arguing that Capanahua forces closed syllables to show contextually variable weight (=Non-Uniformity of closed syllable weight, Rosenthall & Van der Hulst:1997, Moren:1999) in order to satisfy Weight-to-Stress Principle (WSP, P&S:1993), Grouping Harmony (*(HL), Prince:1991) and disyllabicity in metrical feet (FtBin, P&S:1993). In turn, this also causes Capanahua to show Non-Uniformity of Foot-type; that is, a language with both trochaic and iambic feet.

Non-Uniformity of CVC-Syllable Weight and Foot-Type in Capanahua

(5)	CVC.CV	→	(ˈL.L), but not *(ˈH)L, it violates FT-BIN-σ
			*(ˈH.L), it violates *HL
			*(ˈHH), it violates WSP
	CV.CVC	→	(L.ˈH)
	CVC.CVC	→	(L.ˈH), but not *(ˈH)L, it violates FT-BIN-σ
			*(ˈH.L), it violates *HL
			*(ˈH.H), it violates WSP
			*(ˈL.L), it violates WBP twice

Assamese Nasals Blocking Vowel Harmony
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Assamese has an inventory of 8 vowels of which some are subject to both ATR and height harmony. For example, the –ATR vowels /ɛ, ɞ, ɔ/ are realised as [e, u, o], respectively, before the high +ATR vowels /i/ and /u/.

(1)	a.	pʰɛdɛla	'dirty' (masc.)	pʰedeli	'dirty' (fem)
	b.	sɞsɔr	'crawl' (neuter)	susori	'to crawl' (verb)
	c.	bɔsɔr	'year' (neuter)	bosori	'yearly' (adj.)

Interestingly, the vowel /a/ blocks harmony within the word. Usually, all vowels within a word agree in their ATR specification (2a-b), unless the vowel /a/ intervenes (2c-d):

(2)	a.	bɛlɛgɛ		'differently'
	b.	kotoki		'messenger'
	c.	gɔraki	(*goraki)	'owner'
	d.	dʰɛmali	(*dʰemali)	'light enjoyment'

Moreover, vowel harmony is sometimes blocked by intervening nasal consonants. In (2b), all vowels are +ATR, whereas in (3a-c) vowel harmony is blocked by an intervening nasal consonant.

(3)	a.	sɛkɔni	(*sekoni)	'strainer'
	b.	prɛmi	(*premi)	'lover'
	c.	bʰɔŋbʰɔŋia	(*bʰoŋbʰoŋia)	'open hearted, frank'

It has often been observed that harmony may be blocked by certain segments within a word. The special feature of Assamese is that there is a restriction on the nasals which block harmony: a nasal immediately preceding the potentially triggering vowel always block harmony (i.e. if the nasal is in onset position of a syllable containing /i/ or /u/, vowel harmony will not take place; see 3a-c), whereas a nasal somewhere else in the word does not function as a blocker (i.e. if the nasal is in onset position of a syllable undergoing vowel harmony it will not block harmony). In (4a-b) both words end in a high vowel and all vowels agree in +ATR despite the presence of a nasal within the word:

(4)	a.	porinoti	'consequence'
	b.	ponoru	'onion'

Also note that a nasal preceding the ending -/i/ blocks harmony in (5a), whereas a nasal in another position in the word does not block harmony (5b):

(5)	a.	dʰakɔn	'a cover'	dʰakɔni	'a cover'
	b.	bʰɛmɛsa	'crooked' (masc)	bʰemesi	'crooked'(fem)

On the basis of these observations we will propose first of all that vowel harmony is a feature changing process, i.e. if a vowel lacks a specification for ATR, it blocks rightward spreading of [+ATR]. Secondly, we argue that vowel harmony is domain specific and that a nasal in onset position of a triggering domain prevents the high vowels from spreading their ATR feature. If time permits, we will compare this Vowel Harmony system with related languages.

Warping of the perceptual space due to vowel inventory size and organization

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At least two forces seem to shape perceptual similarity: first, universal acoustic principles (e.g., Steriade 1999) have been argued to account for cross-linguistic processes such as metathesis or assimilation. Second, the language-specific phonological status of a sound crucially plays a role: whether a segment is a phoneme, an allophone or not even a sound of a particular language will affect the categorical perception of two acoustically similar sounds. In this study, we explore a third phonological variable, namely phoneme inventory size and organization, and whether it affects perception.

Although *production* studies have shown how the crowdedness of an inventory can affect the acoustic distance between phonemes (e.g., Bradlow 1995), little is known about the effects of inventory size on *perception*, due to limitations of behavioral experiments. Specifically, we are interested in determining whether the perceptual distance between pairs of sounds separated by equal acoustic distances varies as a function of inventory structure. To investigate this question, we use magnetoencephalography, a brain-imaging technique measuring the magnetic field associated with the electric activity of the brain.

The neural component we use as a measure of (dis-)similarity is the Mismatch Field (MMF), an automatic auditory brain response evoked by a deviant stimulus following a sequence of standards, peaking ~180-250 ms post-stimulus onset. Previous research has established sensitivity to both phonological category and acoustic similarity, once phonological category is controlled for (e.g., Näätänen et al. 1997). We show that the MMF is also sensitive to inventory size, but not organization, once phonological category and acoustics are controlled for.

The two languages we compare are French and Spanish, which differ in vowel inventory size and organization. The French vowel inventory is much larger than the Spanish one: it contains the 5 vowels of Spanish and has an additional 7. Furthermore, the extra French vowels are not uniformly distributed between the Spanish ones. In order to isolate the effects of inventory, we control for acoustics and phonemic status: the same stimuli were used for both language groups and were designed to be native-sounding phonemes in both languages.

We predicted that if the MMF was sensitive to inventory size, French mismatches overall should be bigger, indicating that the same phonemes are perceived as less similar the greater the number of phonemes in an inventory. We further predicted that if the MMF was sensitive to inventory organization we would find within language variation (in line with the predictions made by calculating the similarity values of our stimuli using Frisch's (1996) metric). We found that French speakers had significantly bigger MMF responses than Spanish speakers (F(1,21) = 9.95, p=.005), suggesting that inventory size has an effect on the perception of similarity. However, we found no significant within-language effect of condition for either French or Spanish.

Thus inventory size does appear to influence the amplitude of the MMF, and therefore the perceived similarity of phonemes, suggesting that speakers of languages with larger inventories perceive sounds as less similar. Just like a relatively crowded vowel space can be expanded with respect to a relatively less crowded vowel space in production, the perceptual distance between tokens with absolute acoustic values seems to be affected by the crowdedness of that space.

German vowel shortening and gliding as complementary processes

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German has a surface length contrast of non-low tense vowels, namely [iː uː yː eː oː øː] versus [i u y e o ø], the latter occurring in unstressed positions of non-native words only (Hall 1996, Wiese ²2000). Furthermore, German is described as having an optional process of gliding which realizes an underlying long /iː/ as glide [j] in unstressed and prevocalic position (ibid.), see the examples in (1).

(1)	*Linie*	'line'	[ˈliː.ni.ə]	~	[ˈli.njə]
	Indien	'India'	[ˈɪn.di.ən]	~	[ˈɪn.djən]
	Studium	'studies'	[ˈʃtuː.di.ʊm]	~	[ˈʃtuː.djʊm]

Though not mentioned in standard phonological accounts of German, gliding also seems to apply to other long tense vowels, as the examples in (2a) for the high back vowel [uː] and in (2b) for mid vowels indicate.

(2) a)	*Guave*	'guava'	[gu.ˈaː.və]	~	[ˈgwaː.və]
	Jaguar	'jaguar'	[ˈjaː.gu.aɐ]	~	[ˈjaː.gwaɐ]
	Etui	'sheath'	[ɛ.tu.ˈiː]	~	[ɛ.ˈtwiː]
b)	*Chamäleon*	'chameleon'	[ka.ˈmeː.le.ɔn]	~	[ka.ˈmeː.lɛɔn]
	Lineal	'ruler'	[lɪ.ne.ˈaːl]	~	[lɪ.ˈnɛaːl]
	Goanese	'Goan'	[go.a.ˈneː.zə]	~	[gɒa.ˈneː.zə]

Moreover, gliding appears to be possible in postvocalic position, see the examples for gliding of postvocalic /i/ in (3) (with a concomitant laxing of the preceding vowel) (the first example stems from Wiese ²2000: 160).

(3)	*ruhig*	'calm'	[ˈʁuːɪç]	~	[ˈʁʊjç]
	Alois	name	[ˈaː.lɔ.is]	~	[ˈaː.lɔjs]
	Koitus	'coitus'	[ˈkoː.i.tʊs]	~	[ˈkɔj.tʊs]

The present study proposes an account for the surface triplets [iː] [i] [j], [uː] [u] [w], etc., with a ternary feature [long] in a Functional Phonological framework (Boersma 1998). According to this proposal, long vowels are underlyingly specified as [+long] and surface either as [+long] (=long tense) in stressed position, as [0long] (= short tense) in unstressed position, or as [–long] (glided) in unstressed position adjacent to a vowel. These specific surface conditions can be formalized with a perceptual faithfulness constraint hierarchy *REPLACE, which interacts with an articulatory markedness constraint *HOLD.

Language-specific and universal factors influencing perceived similarity

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Listeners' perceived similarity may be influenced by different factors, which fall into two major groups; the first group are universal factors, which correlate with acoustic-phonetic characteristics, such as the availability of cues signalling sound contrasts, in specific positions and environments. For example, cues to the place of articulation (POA) of plosives are clearer when the plosive is released into a following vowel than when it is unreleased, as it may be word-finally. Thus a POA difference is predicted to be less perceptible word-finally than word-initially. These factors are assumed to be true universally, and thus to influence judgments of similarity cross-linguistically.

The second group of factors takes into account the language-specific organization of the phoneme inventory and phonotactics. The perceptual difficulties that language learners have with foreign phonemes have been shown by a wide range of studies on second language acquisition (see Strange 1995). An influence of native phonotactics is contested; Silverman (1992) allows for an effect of the native inventory only, whereas Dupoux et al. (1998) claim that listeners perceive foreign words according to their native phonotactic rules, e.g. in the case of Japanese with vowels intervening between adjacent consonants.

The latter view predicts that non-native speakers rate the similarity between forms that are illegal in their native language (L1) and those that they perceptually assimilate them to as significantly higher than listeners of a language in which both forms are legal. Conversely, Steriade (2001), Hayes and Steriade (2003) and Jun (1995) predict universal hierarchies of the relative perceptibility of certain contrasts (in specific environments). To determine the relative influence of universal and specific factors, an experiment comparing the similarity of pairs of sound sequences as perceived by native speakers of different languages was conducted. Predictions of both views were tested. 10 English and 8 Russian listeners rated the similarity of pairs of Russian pseudo-words differing word-initially in the following ways:

    1) C_1C_2 vs. $C_1\partial C_2$
    2) C_1C_2 vs. $C_{1/2}$
    3) C_1C_2 vs. C_1C_3 / C_4C_2 (one feature change per comparison)
    4) $C_1\partial C_2$ vs. $C_1\partial C_3$ / $C_4\partial C_2$

Results showed evidence in favour of both sides. A number of findings suggest effects of universal perceptibility hierarchies: a voicing change is more similar than a change in nasality for the English as well as the Russian group. POA changes are more perceptible in C_1 than in C_2, and for fricatives as compared to plosives, irrespective of language. Similarly, the perceptibility of the presence or absence of a consonant is also influenced by position, and by manner of articulation and thus sonority, and in any case is more dissimilar than the presence or absence of schwa. Also against the phonotactic influence of the native language speaks that the legality of pairs did not have an effect on English listeners' ratings.
However, there was also support of the claim that language background has a bearing on the way listeners perceive differences and similarities. In a comparison of the ratings of cluster pairs and the corresponding epenthesised onset pairs (3 and 4) only Russian listeners showed the predicted lower similarity ratings for the case of two released consonants (4) and thus made use of the added acoustic cues. Furthermore, the English listeners rated POA changes significantly more similar than Russians, but the presence or absence of schwa significantly less similar.
These findings suggest that there is a division of labour between the universal acoustic-phonetic and the language-specific factors, and that they interact to determine perceived similarity.

Phonological phrasing, prosodic weight and rate effects in Cairene Arabic

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This paper proposes sources of evidence for phonological phrasing in the dialect of Arabic spoken in Cairo (Egypt), whose prosody above word-level is largely uninvestigated. Analysis of a corpus of read speech yields phrasing generalizations from which we establish the nature of the mapping in Cairene Arabic (CA) between prosodic structure and syntactic structure (Nespor & Vogel 1986; Selkirk 1986, 2000; Truckenbrodt 1999). Rate-dependent variation in phrasing suggests that in CA limited prosodic restructuring may occur at slow speech rates.

Following Elordieta et al (2003), a corpus of SVO sentences was created in CA in which both syntactic complexity and prosodic weight (number of syllables/prosodic words [ω]) are systematically varied. These were recorded with two female speakers of CA at varying speech rates, along with read/retold narratives. An auditory transcription was made of the recordings by the author, produced with reference to the F0 contour and spectrogram, using a proposed autosegmental-metrical analysis (Ladd 1996) for CA which builds on existing descriptions of CA intonation (Mitchell 1993, Rifaat 2003).

We present evidence for two types of cue to prosodic phrasing in CA: (non-) application of a syllable repair rule of epenthesis (Watson 2000), which marks intonational phrases (IPs), and a range of post-lexical tonal phenomena including local pitch range reset, final lowering, and phrase tones which, together with optional pre-boundary lengthening, mark phonological phrases (PPs). No recent study has explored the relation between prosodic structure and syntactic structure in any dialect of Arabic, and these cues thus reveal prosodic phrasing generalizations for CA for the first time, with the majority of sentences produced within a single phonological phrase: (SVO). A constraint-based analysis is provided demonstrating that cohesional forces (WrapXP), and a preference for branching phonological phrases, in CA outweigh the need to align phonological phrases with syntactic maximal projections [BinMaP, WrapXP >> AlignXP,R].

(1)   Phonological phrasing in CA at normal speech rates (complexity of subject varied):

(*il-film*   *biyɣumm*   *bint ʕammi*   )PP
  the-film   upsets   my-cousin(f)
(*siɣaasi*   *muhimm*   *biyxumm*   *baladna*   )PP
  a-politician   important   cheats   our-country
(*il-muhandis* *il-miʕmaari*   *l-muhimm*   *biyxumm*   *biladna*   )PP
  the-architect   the-important   cheats   our-country
(*il-mumassil*   *il-muhimm*   *fil-film*   *biyɣumm*   *bint ʕammi*   )PP
  the-actor   the-important   in-the-film   upsets   my-cousin(f)
(*il-miɣannawaati*   *l-muhimm*   *fi-nihaayat-il-film*   *biyɣumm*   *banaat ʕammiti*)PP
  the-singer   the-important in-the-end-of-the-film upsets   my-cousins(f)

The interaction between alignment and binarity is most clearly observable in sensitivity to speech rate since it is in slower speech that (S)(VO) renditions emerge; insertion of prosodic boundaries is in contrast unusual at the normal (fast) production rates used by speakers during narratives. The criteria used in CA to assess prosodic binarity appear to change as speech rate decreases – specifically, binarity at the level of the prosodic word becomes sufficient in slow speech. This phenomenon is analysed as a form of prosodic restructuring occurring only at slower speech rates (Yip 1999), and the theoretical implications of the account are explored.

In adding to the database of languages for which empirically-based prosodic phrasing generalisations are known, the present study contributes to our understanding both of the nature of conditions holding at the syntax-phonology interface and to the typology of cross-linguistic prosodic variation.

Deleted consonants and morphological complexity in Limburg dialects of Dutch

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An etymologically coherent set of nouns in Limburg dialects of Dutch pose an interesting puzzle for the phonology-morphology interface: if the noun ends in a cluster in the singular, the second consonant in this cluster is deleted in the plural. If the stem has a front vowel, this is the only difference between singular and plural forms (1a); otherwise we also find a difference in umlaut (1b). This holds independently of the historical process (velarization in the south or *palatalization* more to the north) which resulted in the cluster.

(1)   a. Southern Limburg: <u>vrʌŋk</u>¸ <u>vrʌŋ</u>   'friend(s)'
        b. Middle Limbug   *hanjdj – henj*   'hand(s)'

This looks like subtractive morphology: a more complex morphological form is derived by deleting some segment from the base. Subtraction, however, is not desirable as a morphological device; at least there is hardly any evidence for it in Germanic languages. In this paper we argue that subtraction is not necessary in order to describe the pairs in (1), once we look at suprasegmentals, in particular at tone.

    Stressed syllables in Limburg Dutch display a two-way tonal contrast: they either have a 'dragging' tone (which we will transcribe as HH) or a 'falling' tone (HL). A sample minimal pair is given in (2) (acute accent denotes H, grave denotes L).

(2)   *bíé – bíè*   'with' - 'bee'

Both contours share a H on the first mora; this H thus is predictable. We show that there is evidence to assume that the only L tones are phonologically active – H tones are filled in by default on all empty mora's within the stressed syllable. The dragging tone thus is unmarked.

As goes from (2), tone is exploited to mark lexical contrast. But the tonal contrast can also be (and often is) used morphologically, e.g. to express the difference between [+/- singular] in nouns:

(3)   *béín – béìn*   'leg(s)'   *dááx - dááx*   'day(s)'

The plural suffix is expressed by a L tone. The singular *bein* is tonally unmarked and thus gets the dragging tone contour HH by default. In the plural, L docks on the second mora, and thus creates a falling tone. We assume that the same happens to the examples in (1): also in these cases, the singular has a dragging tone, and the plural has a falling tone. So plurality is expressed primarily by a lexical low tone; the incompatibility of the tone with some segmental aspects of the cluster causes deletion of the second segment.

    We propose that tone interacts with consonantal structure in the following way. If we have a sequence stressed vowel-sonorant-voiceless obstruent, this structure *always* gets a dragging tone. The reason for this is that there is an intimate relation between Low tone and voicing; Low tone cannot be linked in any way to a coda which also contains a voiceless obstruent. This means that, different from *bein* or *bie*, the singular forms in (1) have a dragging tone not just by arbitrary lexical specification, but because their segmental composition dictates it. But this means that the L tone expressing the plural *cannot* be added to this form, since it would result in an unwell-formed structure. The solution these dialects take, is to delete the offending voiceless consonant, so that the L tone can now dock onto the rhyme. The examples in (1) thus are the result of 'normal' additive morphology interacting with 'normal' phonology.

Functional Unity and Context-Sensitive Changes: Avoiding Onset Glides in Squliq Atayal

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    The functional unity of various processes within or across languages is often captured within the framework of Optimality Theory by a high-ranked markedness constraint and several lower-ranked faithfulness constraints, with the lowest-ranked faithfulness constraint determining the actual strategy employed to avoid a certain configuration (Pater 1999, Kager 1999). This paper examines the phenomena of glide strengthening and glide deletion in Squliq Atayal (Austronesian, Taiwan) and shows that the two processes are both motivated by the need to remove high-sonority onset glides. Allowing both strategies to apply correctly poses a challenge to OT because the two constraints IDENT-SON (violated in strengthening) or MAX-C (violated in deletion) cannot be ranked lowest at the same time.

    Glide strengthening in Squliq Atayal is manifested in the following aspects. First, onset glides become fricatives when followed by homorganic vowels (/thaj+i/ [thaži]'to be left over (imp.).' Second, syllable-initial /w/ dissimilates to [ɣ] when followed by another /w/ in postvocalic position. Third, syllable-initial glides turn into fricatives when the following nucleus vowel is weakened to a schwa due to stress shift, as shown in /jaqeh/ [jaqéh] 'bad,' /jaqeh-an/ [zɨqehán] 'bad (Loc.Voice),' /hwiru/ [həwíru] 'turn around,' and /hwiru-an/ [həgərwán] 'turn around (LV)'. Finally, stem-initial glides surface as fricatives in reduplicants when prefixal reduplication copies the first consonant and induces vowel epenthesis between consonants, as in /RED-japit/ [zɨjapit] 'many flying squirrels' and /RED-witaq/ [ɣəwitaq]. As to glide deletion, it occurs when stem-final homorganic vowel-glide sequences are followed by vowel-initial suffixes. Deletion of stem-final glides is followed by glide formation or coalescence to avoid onsetless syllables, as shown in /bhij+an/ [bəhjan] 'hit (LV)' and /bhij+i/ [bəhi] 'hit (imp.).'

    Ranking either IDENT-SON or MAX-C lower requires the presence of another higher-ranked constraint that, in appropriate contexts, blocks the application of the primary strategy and allows the other strategy to repair glide onset. In the proposed analysis, three markedness constraints motivate the various changes: *GV prohibits homorganic glide-vowel sequence, *Gə disallows the combination of a high-sonority onset and a low-sonority nucleus vowel, and *V.G is a type of constraint on syllable contact, banning an onset glide following a homorganic vowel. IDENT-SON ranks lower than MAX-C, suggesting that strengthening is the primary strategy. The paper argues that the high-ranked constraint that leads to deletion must be a conjunction of a markedness constraint *VOBS ('disallowing vowels followed by homorganic voiced obstruents') and the faithfulness constraint IDENT-SON. One reason for such a conjoined constraint is that which strategy applies depends on the vowels flanking an onset glide (markedness), rather than on morphological information as in Pater 1999; the other reason is that underlying and derived fricatives behave differently (faithfulness). The rankings mimic the effect of context-sensitive changes in traditional rule-based analyses.

GOVERNMENT PHONOLOGY AND PATTERNS OF McGURK FUSION

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The Government Phonology (GP) framework (Kaye, Löwenstamm & Vergnaud, 1985) is based on primes – *elements* carrying both articulatory and auditory aspects of speech segments, and are audible in speech to the extent of having *acoustic signatures* (Ingleby&Brockhaus, 2002). GP is known for its power to model coarticulation phenomena as assimilation or loss of elements (Harris, 1994); but, more recently, Harris and Lindsey (2000) have prepared the way for using the framework to model visual aspects of speech, too. For the GP place elements they have postulated *visual signatures* – characteristic mouth- and lip-shapes. A phonological framework based on subsegmental primes that are both audible and visible is ideal for modelling audiovisual speech phenomena: we illustrate this by working with cross-channel processes that produce McGurk fusion (McGurk & MacDonald, 1976). Humans report fusion when listening to, for example, a labial nonsense syllable 'ba' aligned with an image of a speaker saying velar 'ga': the perception 'da' is reported by many subjects. Such McGurk fusion phenomena are now known to survive embedding in the many natural languages, at least for English, French, Dutch, Finnish, Spanish and Chinese . We present some examples of English natural speech with induced incongruities after the talk. Empirical studies on English speech, with incongruity localised in one segmental site only, show that the proportion of subjects reporting fusion is sensitive to linguistic context: for example incongruous coda consonants are fused much more readily than onset consonants in CVC and CVVC words; and fusion rate differences are statistically significant (Ali, 2002 & 2003).

We report similar experiments on a wider class of words including some with branching onset, branching coda or both. To avoid experimenter effects, all our tests were conducted double blind, with incongruent stimuli randomly interspersed amongst congruent stimuli presented in the same way. To ensure that any observed effects of incongruity site were not due to poor audio or visual stimulation, separate control experiments on audio-mode only (no visual channel) and visual-mode only (no audio channel, participants simply lip-reading) were carried out. No unimodal controls showed significant dependency of recognition accuracy on segmental site, but bimodal experiments showed that for stimuli with incongruity located in a branching onset or coda, the McGurk fusion rate is sensitive to constituent position: incongruence in either branch of a coda elicits fusion at a significantly higher rate than in either branch of an onset.

These findings suggest that syllabic constituents are represented in the mental lexicon complete with their phonological content. We accordingly attempt to model the patterns of McGurk fusion using the GP framework. The essence is that elements in conflict between audio and visual channels *cancel* – to leave the impression of a third place element absent from both channels. For example, palatal 'hid' in audio conflicts with labial 'hood' in video, to cancel both I and U elements from the vowel nucleus leaving behind A, corresponding to the perception 'had'. The same pattern shows in the audio 'mat', video 'map' leading to perception 'mack'. The cancellative model predicts accurately the observed patterns in branching onset and coda consonants and consonants in polysyllabic words.

Phonological fusion has been known for some decades in diotic audition (Cutting, 1975). Incongruity between speech presented simultaneously to left and right ears – known as *dichotism* in acoustics – elicits fusion. We discuss the applicability of cancellative GP modelling to such hitherto unexplained speech perceptions. We also discuss the prospect of using incongruent data as a tool of laboratory phonology – to test disputed hypotheses about syllabification of a natural language.

The realisation of Irish initial consonant mutations by L2 learners and the universal markedness hierarchy of place features

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In this paper we investigate the acquisition of Irish initial consonant lenition by native English speaking school children learning Irish as a second language in two primary schools in the Republic of Ireland. One of the morpho-syntactic contexts in which lenition occurs with a grammatical function is the Aimsir Caite (past tense) formation. Non-coronal stops are lenited to fricatives of the same place of articulation and coronal stops surface as a laryngeal fricative, while fricatives become laryngeal or are deleted. Testing the school children's performance in mutation of verb root-initial consonants to mark past tense, we found that children have more problems in realizing mutations of labial and dorsal consonants than they have with coronal consonants. This finding is relevant for postulations of universal rankings of constraints referring to consonantal place features. Prince & Smolensky (1993/2003) as well as Lombardi (2001) propose a universal ranking of Optimality-theoretic markedness constraints to account for asymmetries in consonantal place assimilation patterns, with constraints against labial and dorsal outranking the constraint against coronal. However, markedness constraints cannot be taken responsible for the uneven realization of mutations, since it is not the realization or absence of a place feature as such which drives the pattern. If markedness constraints were the reason for this pattern we would expect deletion of labials and dorsals rather than lack of mutation.

Following a proposal by Krämer (in press) and Grijzenhout & Krämer (2000) we account for the observed pattern by specific faithfulness constraints guarding the realization of manner and voicing, which are restricted to the three different places of articulation. Just as the above-mentioned markedness constraints, these are universally ranked, with faithfulness to the manner of labials and dorsals outranking faithfulness to manner of coronals. This is illustrated in table (1), where the trigger of lenition is represented by the place holder constraint LENITE! for the sake of simplicity.

(1)		LENITE!	IDENTLAB/DORS(manner)	IDENT(manner)
☞ a.	p ~ p	*		
b.	p ~ f		*	*!
c.	t ~ t	*!		
☞ d.	t ~ h			*

Furthermore, the realizations of consonant mutations in our subject group display a high degree of variability. Variability posits a problem for OT in that Optimality-theoretic grammars usually consist of exhaustive rankings of constraints resulting in the unambiguous choice of one output representation for each input representation as optimal. Variability can be captured either by crucial unranking of constraints or by the use of fluid or stochastic rankings as proposed by Boersma (2000). As can be seen in tableau (1) unranked constraints here result in 100% of non-coronal outputs showing no mutation, which is incorrect. If we assume LENITE! and the specific faithfulness constraint to be ranked along a scale, where faithfulness outranks LENITE! only to 66% and 34% constitute a higher ranking of LENITE!, we arrive at appropriate figures. This is possible and plausible in a theory of acquisition in which constraints are literally 'dragged' downward, moving along the ranking scale, and in which two constraints have to have a minimal distance on the scale to establish a stable ranking.

Graduality and closedness in consonantal phonotactics — a perceptually grounded approach

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The central claim of the paper is that sound patterning, including consonantal co-occurrence restrictions on two-member consonant clusters, can be influenced by language-external, functional and phonetic factors. It is argued, following Steriade (1997; 1999) and Flemming (2001), that the markedness of segmental contrast is only meaningful if it is **relational** and if it is **positional**. A segment is claimed to be perceptually **marked** (or 'suboptimal') if it is difficult to identify from another segment: it is not a segment in itself that is marked or unmarked but its **contrast** with another segment. Furthermore, certain positions favour segmental contrast because in those particular contexts the contrast is well-cued, while in others the same contrast is less salient. Employing Steriade's (1999) Licensing by Cue principle, the paper shows that segmental contrast be can placed in a perceptual difficulty scale, which predicts what contrast in what environment is possible, and where it is predicted to be neutralized. Neutralization is predicted in positions with poor perception cues. Importantly, the scale also corresponds to the frequency scale of phonotactic co-occurrence patterns: perceptually marked segmental combinations will be shown to display a low frequency within languages.

Another important claim of the paper is that phonotactics is **gradual** and that it is **closed**. The perceptual difficulty scale of a contrast cannot be interrupted, it cannot contain gaps. To express this notion, the **Principle of Phonotactic Closedness** is evoked (following Rebrus & Trón 2001), according to which, if a given contrast occurs in a given environment, *the same contrast will also occur in a perceptually less marked position* (one that provides more and/or better cues for the contrast). In other words, the set of segmental contrasts is **closed** (uninterrupted) with respect to positional markedness toward the unmarked cases: *the more marked element will imply the presence of the less marked*. For instance, using a hypothetical example, we can claim that if there is a contrast between the voiceless bilabial and palatal stops, /p/ − /c/, before /s/ (/apsa/ − /acsa/), the same contrast will also occur before /n/ (/apna/ − /acna/), before /l/ (/apla/ − /acla/), as well as before vowels (/apa/ − /aca/), the pre-sibilant environment being the worst-cued one in the scale for the contrast in question. In other words, a system in which there is a /p/ − /c/ contrast before /s/ but no contrast before, say, /l/ is predicted **not** to exist, (thus: /acsa/ > /acna/ > */acla/ > /aca/, where 'A > B' means: 'A is perceptually more marked than B').

As a secondary effect of graduality and closedness, the proposed hypothesis also predicts that the number of existing words with the perceptually less marked cluster should be higher than those with the perceptually more marked cluster (more words of the type /aca/ are predicted to be found than of the /acsa/ type, for example). In some cases, this number is zero — this is when the contrast is neutralized (remaining with our examples, only /p/ occurs before /s/, but /c/ does not). The workings of the 'closedness' principle will be shown through the phonotactics of two-member consonant clusters in Hungarian and English monomorphemic words. English will be mentioned as a problematic language with respect to closedness: there are apparent violations, involving word-final /ŋg/ and /mb/ clusters. Phonetic arguments apparently predict that these clusters should be unmarked (cf. Hayes 1996 on post-nasal voicing). It will be shown that the dimension of intervocalic clusters and that of word-final ones must be separated. The argument projects the necessity of a multidimensional phonotactic space in which a given segmental contrast is unmarked perceptually when considering one particular dimension, but the same contrast may be more marked if another dimension is considered. The paper argues, through the case of nasal–stop clusters, that the following dimensions must thus be taken into account: the position of the cluster (intervocalic vs. word-final), the place of the stop (coronal vs. non-coronal), the voicing of the stop (voiced vs. voiceless), the quality of the pre-cluster vowel (high vs. non-high), and the length of the pre-cluster vowel (short vs. long). If nasal–stop clusters are considered in these separate, independent dimensions, phonotactic graduality and closedness are not violated.

Ockham's Razor, Chatton's Anti-Razor, and (French) phonological theory

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Ockham's Razor constitutes a well-known principle of parsimony, conventionally expressed by the formula *Pluralitas non est ponenda sine necessitate* 'A plurality is not to be posited without necessity.' What is less known is the existence of a counter-principle to the Razor, called the Anti-Razor, 'Posit as many entities as necessary,' proposed by a Franciscan colleague of Ockham's, Walter of Chatton (Maurer 1984). The purpose of this paper will be to apply both principles to a review of three theories which have dealt with French phonology over the past four decades, generative phonology (GP), non-linear phonology (NLP), and optimality theory (OT).

The crucial claim made in this presentation is that the Razor and the Anti-Razor are best considered as complementary, not as mutually exclusive, a conclusion that might be reached at first glance in view of their names. The evolution of a theory will be seen as consisting of an Anti-Razor stage first, followed by the Razor stage second. Globally, the Anti-Razor methodology allows for the inclusion of a great variety of facts and generalizations, an attitude of 'comprehensiveness.' The Razor is then conceived of as a natural reaction, which will eliminate, or 'shave off', all unnecessary, or superfluous, entities posited in the preliminary Anti-Razor period of theoretical development. In this way, a superior result ought to be obtained.

This paper illustrates such a two-stage sequence by way of the TGP (transformational-generative phonology) and the CP (concrete phonology)(cf. Schane 1968, Tranel 1981) branches of GP, with special focus on the phenomenon of French *h-aspiré*. The concrete portrayal of a word like *héros* as underlying /ero/ is viewed as a 'razoring' of the abstract /hero/, the latter probably motivated within an Anti-Razor framework. The two phases of GP, a theory based on rules, are examined with respect to *h-aspiré* in a thorough point by point juxtaposition. It will be shown that the linking phenomena relevant to *h-aspiré*, liaison, elision, and nasalization, can be accounted for in CP by one less rule, as the latter will need consonant insertion, elision, and denasalization, while TGP requires consonant deletion, elision, h-deletion, and nasalization. Crucially, all rules posited in this CP analysis are morphologically (lexically) conditioned, while they are considered pure phonological rules in the TGP counterpart. The absence of h-deletion in CP uncovers its parsimony compared to TGP in a transparent way. Less detailed will be the analysis of h-words within NLP (Encrevé 1988), but the principle of a two-stage Anti-Razor followed by Razor evolution will be maintained for this approach (based on representations) also: the 'generous' use of the concept of floating segment undergoes a razoring process when comparing Encreve with other NLP accounts. Finally, some comments will be made on the distinction between universal and language- specific constraints within OT, its application to *h-aspiré* (Tranel 2000), and its relevance for a Razor and Anti-Razor complementarity.

This paper concludes by emphasizing the 'commensurateness' of theoretical positions in order for them to be subjected to the Anti-Razor *cum* Razor treatment. Thus, such a procedure is considered possible only **within** GP, **within** NLP, and **within** OT, and not in a juxtaposition of GP, NLP, and OT.

Loanword Accentuation in Japanese: The Emergence of the Unmarked

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The goal of this paper is to demonstrate that loanword accentuation of (Tokyo) Japanese sheds light on some crucial properties of the phonological structure of the language, which would otherwise remain uncovered. Moreover, most of the properties thus uncovered reflect universal rather than language-specific features of accent assignment.

The paper will begin with the fact that ninety percent of loanwords in Japanese are accented, i.e. involve a sudden pitch fall, while a majority of native and Sino-Japanese (SJ) words are unaccented, i.e. are pronounced with a rather flat pitch contour and no sudden pitch drop. Because of this and other facts, loanword phonology has been regarded as a peripheral area in Japanese phonology. We will challenge this traditional view by demonstrating the following four points.

First, the dominance of accented loanwords over unaccented ones is attributable to two independent factors: (a) a force to preserve the auditory similarities between the input (foreign, mostly English, words) and the output (Japanese pronunciation) and (b) a trochaic pattern hidden in Japanese accentuation itself, which shows itself very clearly in native baby words whose accentual patterns crucially resemble those of loanwords.

A second important point concerns the well-known rule of Japanese loanword accent whereby the syllable containing the third mora from the end of the word is accented (McCawley 1968). An Optimality-theoretic analysis reveals that this rule can be decomposed into several universal constraints, notably Nonfinality and Edgemostness, whose interaction with each other as well as with other constraints produces the antepenultimate effect. For example, the ranking in (1) accounts for the fact that the word /wa.sin.ton/ 'Washington' bears an accent on /sin/.

(1) Nonfinality-syllable, Nonfinality-foot >> Edgemostness, Parse-syllable

Third, this analysis of loanword accentuation can be extended to native and SJ words in a natural way. In fact, the only major difference between loanwords and native/SJ words is that many words belonging to the latter group are compound nouns consisting of two or more morphemes. Compound nouns are subject to a faithfulness constraint requiring the maximum preservation of the accent of input elements (Kubozono 2002). In OT terms, this can be captured by adding Max-accent as a constraint that vacuously applies to morphological simplex words like loanwords. Thus, the same grammar in (2) accounts for the accentuation of all types of words in Japanese—native, SJ and foreign words as well as both morphologically simplex and complex words (cf. Kubozoono 1997)

(2) Nonfinality-syllable >> Max-accent >> Nonfinality-foot >> Edgemostness, Parse-syllable

Finally, analysis of loanword accentuation reveals that the distinction between accented and unaccented words is linguistically predictable although this distinction has been assumed in the literature to be unpredictable and, hence, specified in the lexicon. In fact, loanwords exhibit a remarkable asymmetry whereby four-mora words ending in a sequence of light syllables are mostly unaccented, whereas words of other phonological lengths and four-mora words involving different syllable structures all tend to be accented (vs. unaccented). This interaction between syllable/mora structures and word accent can only be understood through analysis of loanwords.

A saturation point in licensing?

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In Government Phonology the word is defined via phonological domains which are in turn defined via licensing. In fact, all phonological processes applying within any phonological domain must be licensed in some way (Kaye 1990). This paper tries to address why there are limits on word size in language by relating this to a language specific upper limit on the amount of licensing permitted within a phonological domain.

The question at hand is brought to bear in examining an NC cluster voicing dissimilation process in a variety of Bantu languages. The dissimilation rule in question targets sequences of voiced NC clusters that are simplified to avoid a sequence of voiced NC's. The result of simplification (or lack thereof) results in at least four divergent outputs:

(1) NCvNCv → (i) NNvNCv
                 (ii) NvNCv
                 (iii) NCvCv
                 (iv) NCvNCv

Following assumptions of *Licensing Inheritance* (Harris 1997) the idea that will be developed in this paper is that the licensing of voiced NC clusters, which generally result from a consonant hardening process and involve inter-onset government results in a scenario where the amount of licensing processes required cannot be met due to language specific restrictions on licensing power within a phonological domain. The meta-variables for determining this saturation point will be syllable structure type and the number of onsets and nuclei present in the phonological domain. A consequence of this proposal will be that different types of licensing processes will be given a universal ranking along the lines of (2).

(2) Hierarchy of licensing functions in a domain:

nuclear licensing » onset licensing » licensing government-licensors
» government licensing » licensing to switch » p-licensing

This ranking acts as the ladder that phonological domains aim to mount and sheds light on the age-old observation that a strict CV syllable type is more basic that one endorsing consonant clusters.

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Restraining Loans

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Loans may not ever introduce new phonological contrasts, be it segmental or metrical — this is the central claim of the paper. The borrowing language always accommodates lexical items within its existing phonological system. At most, accomodating loans may lead to existing allophonic alternations becoming phonemic. We go through a number of examples showing how the phonological system adapts to the pressure of loans, including Sanskrit, Malayalam, English, German, Dutch, Swedish, Norwegian and Swiss German. Marked phonemes or marked quantity systems which apparently seem to be the result of borrowing are shown to be only a by-product of other phonological processes. These include retroflexion, umlaut, trisyllabic laxing and initial geminates. We argue that the adult native speaker is very conservative and is very reluctant to change his/her phonological system. It is only as a consequence of reanalysis by the child language learner that the system can change.

Pilszczikowa-Chodak (1972) pointed out a regular correlation between vowel height and tone value in Hausa verbs and noun plurals. She suggested that the values of the tones assigned to the final vowels depend on the quality of these vowels. Thus, for example, a [low] tone is assigned to a [+low] vowel whereas a [+high] vowel has a [high] tone. Here below in [1] I give some examples. I limit myself here to plural nouns (the vowels concerned with this correlation are underscored):

[1]

	Singular	Plural		Singular	Plural
« bicycle»	kèekée	kéekún<u>àa</u>	« woman »	máatáa	máat<u>àa</u>y<u>ée</u>
«dog»	kàrée	kárnúk<u>àa</u>	« axe »	gàatáŕii	gáat<u>ú</u>r<u>àa</u>
«earth»	kásáa	kás<u>àa</u>sh<u>ée</u>	« stream»	ràafii	ráaf<u>ú</u>k<u>àa</u>
«garden»	gárkáa	gár<u>àa</u>k<u>ée</u>	«old cow, man»	gúzúmáa	gúz<u>àa</u>rée
«itinerant trader»	fàŕkée	fát<u>àa</u>kée	«type of drum»	táushìi	táf<u>àa</u>shée

In his reply to Pilszczikowa-Chodak's proposals, Newman (1975) brings several counterexamples which do not undergo the generalisation described above:

[2]

	Singular	Plural		Singular	Plural
« boy»	yáaròo	yáaráa	«clod of corn»	dámìi	dâmmáa
« friend »	àbóokii	àbòokái	«ring»	zóobèe	zôbbáa
« woman »	màcè	máatáa	«edge»	géefèe	gyâffáa
« wife»	míjìi	mázáa	« heathen »	áŕnèe	áŕnáa

I suggest to reconsider Pilszczikowa-Chodak proposals and to re-examine Newman's counterexamples. I show that the tone-vowel correlation is relevant and that it is morphologically conditioned by a "templatic effect". This means that only the vowels which are "templatically" derived undergo the correlation. In other words, the tone-vowel correlation takes place in particular domains located in the plural template. I suggest that there are two main domains in the plural forms given in [1]: the first domain is located between R1 and R2 (R = radical consonant) while the second one is located at the end of the form. Here below in [3] I delimit them by brackets (full stops between R positions stand for vowels):

[3]   R1.R2.{ }$_{D1}$R3.{ }$_{D2}$

The first domain (D1) is used to derive internal plurals whereas the second domain (D2) serves to derive external or suffixed plurals (cf. Kihm (2003) for an analysis of Classical Arabic internal plurals by means of an internal domain). In several cases, both domains are activated. My analysis of the tone-vowel correlation and the "templatic effect" is based on the assumption that *all and only vowels inside the two domains in [3] undergo the correlation.* In other words, [+low] vowels which connect inside these domains take a low tone whereas [+high] vowels take a high tone.

In turn, the counterexamples brought by Newman have nothing to do with templatic derivation. They use none of the two domains specified in [3] and thus they do not undergo the generalization suggested by Pilszczikowa-Chodak. Their final vowels simply alternate with their singular counterparts.

Two main consequences : (i) tone-vowel correlation is locally constrained in Hausa plurals; (ii) there are at least two major classes of plurals in Hausa : (i) those that use templatic derivation (examples in [1]) and (ii) those that use vowel alternation (say apophony) (examples in [2]).

On deletion and epenthesis in loanword phonology

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The interest in Loanword adaptation has grown among researchers, in general, and phonologists, in particular. It is a commonplace that languages borrow words from other languages. Words that are foreign to the host language undergo, among other things, phonological changes. Despite the fact that different linguists approach these changes differently, in general they agree on the fact that epenthesis is the normal repair strategy that languages opt for, whereas deletion is the last resort, and is often restricted to certain conditions.

Silverman (1992) suggests a two scansion model, under which loan word adaptation takes place in two steps. During the first scan, listeners may not detect the contrasts between the source and the host languages. In the second scan, segments that are detected appear in the output after undergoing some phonological processes if they are considered ill-formed in the source language. Paradis et.al. (1993), (1995) and (1997) introduced the Theory of Constraints and Repair Strategies (TCRS). She suggests that languages tend to retain phonological material provided by the source language via epenthesis. This position is also maintained by Brasington (1981) and (1997) who agrees on the fact that phonological material in the input survives via epenthesis. He even claims that epenthesis word initially and deletion word finally are natural processes. In her study of English loans in Cantonese, Yip (1993) uses an Optimality Theoretic account, and introduces a constraint called "MIMIC" to show that languages prefer to retain phonological material.

The present paper brings these approaches together to investigate how and to what extent phonological material is rescued in French loans in Moroccan Arabic (MA, hereafter). In particular, I will refute the claim made by TCRS. I will show that it cannot account for French loans in MA. I will also argue that epenthesis word initially is not most favoured as Brasington claims. My focus is loans that start with a vowel in the source language. The prediction, according to TCRS, is that Moroccan Arabic, a language that needs an onset, would insert one, and, hence would retain all the phonological material given by French. However, the striking observation is that MA never epenthesizes (especially word initially). It either deletes or retains (without inserting) material in the source language to avoid the fatal violation of the highly ranked constraints "ONSET". I will present data to show that epenthesis is not the strategy that MA chooses to repair the onsetless syllables.

Consideration of a large body of data shows that MA does go for more than one strategy to save the onset requirement. Hence, we need an approach that allows variation. This paper will have the following claims: epenthesis is not necessarily a favoured repair over deletion; TCRS is not equipped enough to account for the data. Moreover I will proceed within an OT based analysis (Prince& Smolensky 1993) in an attempt to propose a model that accounts for variation present in the data.

Positional markedness effects on onset clusters in a child with Grammatical-SLI

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A pertinent question in the study of children with disordered phonology regards the pattern of these children's phonological acquisition. Do they acquire phonology in the same way as typically developing children, just more slowly, i.e. delayed, or whether they show a deviant pattern which is not found in typical development? The answer to this question has implications for the limits of a universal phonological grammar.

In this paper I address this issue using data from a fourteen year-old child, GD, who has a Grammatical-Specific Language Impairment (G-SLI). GD has severely impaired syntax, morphology and phonology, despite relatively spared lexical skills and an average non-verbal IQ. I focus on GD's realisation of complex onsets in two positions - word-initial and word-medial - as measured by a non-word repetition task. GD generally realises complex onsets correctly when they are in word-initial position but never when they are word-medial. GD uses two identifiable strategies to simplify word-medial onset clusters. The first is vowel epenthesis, with, for example, fəklɛt being realised as kəlɛt. The second is cluster reduction, with, for example, dəfrɪmp being realised as dəfɪmp. In this paper I argue that a positional markedness analysis within an OT framework can account for GD's pattern of performance on complex onsets. I also argue that his choice of simplification strategy for any given cluster is influenced by lexical factors.

Typically developing children aged between four and ten years old also show some evidence of positional markedness effects on their realisation of onset clusters, but they experience much greater success on word-medial onset clusters than GD does. When they do simplify word-medial onset clusters they use the same strategies of vowel epenthesis and cluster reduction as GD, but they have an overwhelming preference for cluster reduction. I show how these data can be modelled using the same OT constraints as are active in GD's grammar, but with different rankings.

In sum, the analysis presented in this paper demonstrates that a child with disordered phonology can show a pattern of phonological behaviour that looks deviant but which can be described using the same constraints as those needed for describing typical development. I also argue that the study of disordered phonology can alert the researcher to phenomena, in this case positional markedness effects for onsets, that are less obvious in typical child data but which are nevertheless present.

**Accounting for Serbian Consonant-Vowel Interactions and Alternations
Using the Parallel Structures Model of Feature Geometry**

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Serbian displays several complex relationships among its phonetic, phonological and morphological components that pose serious challenges to current theories of phonological features. Specifically, there are consonant-vowel interactions and alternations suggesting that consonants and vowels use the same sets of phonological features for both place and manner of articulation (in support of Clements (1991) and Morén (2003)), and that the mapping between phonological feature specification and phonetic realization is not as universal and straightforward as is usually assumed.

There are three main goals of this paper. The first is to establish some of the empirical facts regarding Serbian phonetics, phonology and morpho-phonology and to suggest that they provide direct support for a new perspective on the phonetic and phonological relationships among consonants and vowels. The second is to provide a unified analysis of several puzzles in Serbian phonology using a limited set of phonetically grounded features and simple representations. The third is to demonstrate the importance of viewing the phonological system of a language as a whole when dealing with specific phenomena.

The paper is organized as follows. First, I present a detailed description of the Serbian segment inventory and point out several phonetic and phonological issues, such as phonetic enhancement strategies and curious inventory gaps. Second, I describe four morpho-phonological consonant-vowel interactions (i.e. velar palatalization, velar dentalization, iotization and mid-back vowel fronting), and demonstrate that these cannot be explained using traditional feature theory. Third, I discuss a puzzling alternation between lateral approximates and mid back vowels (i.e. /l/ --> [o]) that is not phonologically "natural" under most models. Fourth, I propose a unified account of the inventory facts, consonant-vowel interactions and consonant-vowel alternation using a minimal set of articulator-based phonological features and simple phonological representations.

The analysis is couched in terms of the Parallel Structures Model of feature geometry (Morén 2003), which is similar in nature to some current work of van der Hulst (to appear), and combines the insights and intuitions of several other more traditional models - most notably Clements (1991) and Steriade (1993). The main claim of the Parallel Structures Model is that there is a limited set of features and feature-geometric structures that are used for both consonants and vowels. This unification of consonant and vowel representations makes it a perfect tool for analyzing the consonant-vowel interactions/alternations in Serbian.

Some highlights of the Serbian analysis are: 1) Phonetic affricates are phonological stops (i.e. C-manner[closed]). 2) Laminal alveolar obstruents have a C-place[cor] feature, apical post-alveolar obstruents have a V-place[cor] feature, and laminal post-alveolar obstruents have both. 3) Velars and mid-back vowels are placeless. 4) There are two types of front vowels - one has V-place[cor] and the other C-place[cor]. 5) Velar palatalization is the result of assimilation to V-place[cor]. 6) Velar dentalization is the result of assimilation to C-place[cor]. 7) Mid-back vowel fronting is the result of assimilation to V-place[cor]. 8) The trigger of iotization is a mannerless V-place[cor] segment that merges with most preceding segments, but becomes a lateral (i.e. C-manner[closed] and V-manner[closed]) following labials due to syllable structure requirements and structural markedness considerations. 9) The /l/ --> [o] alternation involves loss of C-manner[closed] in particular prosodically-defined positions.

Phonological processes in the early acquisition of British Sign Language

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This research looks at the emerging phonological systems in two deaf children of deaf parents acquiring British Sign Language (BSL) between the ages 1;6 and 3;0. The children, known as Gemma and Mark, were recorded in the home in naturalistic interaction with adults and siblings at least twice a month.

The first case study looks at the applicability of Stampe's Processes model of spoken English (Stampe, 1979) to Gemma's first sign productions. Her output across 19 one hour sessions was coded to identify error patterns in the parameters of location, handshape, movement, repetition and timing. The results showed that simplification processes were used by the child in all sign parameters. The child's simplification processes fitted into the Stampe model for syllable structure, assimilation and substitution. A new type of broad substitution process was identified.

The second study examines the phonological acquisition of the handshape parameter in Mark's first signs using the Dependency Phonology model of van der Hulst (1993) and factors proposed by Boyes-Braem (1990) for the development of handshape, including substitutions based on anatomical complexity, fingertip contact, extension and perceptual feedback. Six 2 hour recordings were analysed during the ages 1;10, 2;2, 2;6, 2;8, 2;9 and 3;0. Analysis of the data supported the mechanisms of the Dependency Phonology model and parts of the Boyes-Braem model.

Questions remain about the acquisition of the selection of the little finger. A modality specific finding emerged for the nature of handshape acquisition in that absence of visual feedback influenced the proportion of handshape substitutions made. Findings from both studies are discussed in terms of universal principles in phonological development.

References
Boyes-Braem, P. (1990). Acquisition of the handshape in American Sign Language. In V. Volterra & C. Erting. (eds). From gesture to language in hearing and deaf children. pp 107-127. Washington DC: Gallaudet press.
Hulst, H.van der (1993). Units in the analysis of signs. Phonology 10, 2, 209-241
Stampe, D.L. (1979). A dissertation on Natural Phonology. New York: Garland.

Language Specific Feature Geometry

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Optimality Theory (OT) [1] requires full specification of phonological forms to account for phonological processes. Feature Geometry (FG) [2] on the other hand depends on underspecification, which permits transparent segments and – in case a feature was filled in – blocking of assimilatory processes. As a consequence, OT has largely ignored FG, in fact, it is widely assumed that segments have no internal structure but are unordered 'feature bundles' [3].

FG can be incorporated into OT as a system of interacting constraints on the segmental structure, without losing the explanatory power of FG. The full specification demand of OT requires changes in FG: There are many different language-specific feature geometries instead of one universal FG. Language specific feature geometries are supported by so far contradictory language data for several features: Tahltan (1) has coronal harmony, but laterals are transparent [4], thus the feature [lateral] *cannot be under the coronal node.* English nasal assimilation (2) *requires [lateral] under the coronal node,* because lateral assimilates together with place.

(1)   Transparent laterals in Tahltan, /s/ assimilates to place of following coronal (bold)
    a. yaʃt̪ɬ'ɛtʃ   'I splashed it'   b. noʔdɛːʃɬɛʤi   'I melted it over and over'

(2)   English nasal assimilation, nasal of *in-* assimilates to place of following consonant
    i[m]possible   i[n]tangible   i[ŋ]grown   i[r]rational   i[l]legible   i[m]measurable

Similar language specific positions in the feature geometry can be found for the feature [continuant]. It assimilates together with place in Havana Spanish [5], but does not assimilate with place in Tahltan [6]. The interaction of two vowel harmonies leads to similar observations, and parasitic harmonies [7] and dominance hierarchies [8] also support language specific feature geometries.

Those language-specific feature geometries are derived by the interaction of two constraint families, ROOT(F) and BIN (3).

(3)   a. ROOT(F)   Feature F is dominated by the root node
                    (one violation per node between F and the root node)
    b. BIN   Binary Branching (one violation for each additional/fewer node)

The Tahltan feature geometry, with [lateral] directly under the root node, is derived by ROOT(LAT) ≫ ROOT(COR). The reversed ranking ROOT(COR) ≫ ROOT(LAT) derives the English feature geometry, with [lateral] directly under the [coronal] node. BIN prevents that all features are directly under the root node (because there would be no ROOT(F) violations) and structures the feature geometry according to the ranking of the ROOT(F) constraints.

References:

[1]   A Prince & P Smolensky 1993.   [2]   G Clements 1985.   [3]   E Baković 2000.
[4]   J Blevins 1994.   [5]   J Padgett 1995.   [6]   P Shaw 1991.
[7]   J Cole & R Trigo 1988.   [8]   A Mester 19984.

Phonetic design as a social accomplishment: arguments for socially shared cognition.

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Phonological theories typically invoke 'meaning' on a number of levels: lexical, pragmatic, and, to a lesser extent, paralinguistic. They overwhelmingly assume that meaning is the product of an individual mind, and treat interaction as secondary, to be explained after the behaviour of individual (e.g. Levelt 1989). In this paper, we suggest another approach, which foregrounds social aspects of meaning, and we draw on data from two sequential locations in talk-in-interaction. The data lead us to the view that in order to account for much detail at the phonology-pragmatics interface, a model of language needs to have an account of socially shared cognition (Schegloff 1991).

Our first set of data comes from a collection of c.100 naturally-occurring assessment sequences (e.g. A: *It's gonna be boring* B: *No, it's gonna be really good*). In the second turn of such sequences, a relevant action is to display agreement or disagreement with the first assessment. To convey agreement or outright disagreement, a second assessment is produced with a pitch span that is expanded relative to the prior. To convey weak agreement which prefaces disagreement (e.g. A: *She's really really nice in't she* B: *She is nice, but…*), the pitch span is narrower than in the prior turn. It is possible using this latter device to produce a turn which lexically displays strong agreement, (e.g. A: *Isn't that good news at long last?* B: *Yes, it's very good news*), but which conveys impending disagreement. This means that the interpretation of the second assessment depends on its phonetic relation to the immediately prior turn; and some aspects of phonetic (and other linguistic) design are sensitive to those in a turn produced by another speaker. Thus some aspects of the production and the 'meaning' of such turns are not the product of one mind, but are social accomplishments.

The second sequential location we consider is a collection of over 120 collaboratives. Collaboratives are lexically, syntatically, pragmatically and intonationally coherent utterances jointly accomplished by two speakers, rather than one (e.g. A: *Once those cameras start flashing, particularly with the infants,* B: *it puts them off*). Collaboratives demonstrate that participants attend to the moment-by-moment evolution of complexes of phonetic detail and what that detail encodes about other levels of linguistic organization so that they can locate the precise temporal moment to begin their talk.

These phenomena show that participants monitor the detail of both their own talk and the talk of others. Participants can entrain the rate, rhythm, timing and also pitch range and loudness characteristics of their speech to that which has just been produced by another speaker. The meaning of a turn is partly a product of its sequential and consequent phonetic design. We conclude that two socially sensitive factors which theories of the phonology-pragmatics interface need to address are recipient design (Sacks 1992) and the elaboration of context (cf. Hawkins 2003).

The Acquisition of Weight-to-Stress Principle:
Evidence from Chinese-English Interlanguage

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Much research on the acquisition of second language (L2) stress by speakers of another stress system indicates that the development is constrained by principles of metrical phonology (e.g. Archibald 1993, 1995; Pater 2000). However, it remains to be seen whether this generalization is extendable to the acquisition of L2 stress by learners whose native language does not exhibit dynamic stress. The current study presents evidence that the acquisition of English stress by native speakers of Chinese is constrained by the Weight-to-Stress principle despite the lack of stress system in their L1.

Fifty-three Mandarin/Taiwanese speakers participated in three experiments. The first experiment was an auditory identification task with 48 pairs of English monosyllabic and disyllabic words, which contained the contrast between English tense and lax vowels. The second and third experiments were preference tasks. The stimulus words were English disyllabic and trisyllabic pseudo-words. The words had stress on the heavy syllable, which was either 1) open and contained a tense vowel (CVV), 2) open and contained a lax vowel (CV), 3) closed and contained a lax vowel (CVC), 4) closed and contained a tense vowel (CVVC).

In the first experiment, there were 20 Chinese-speaking subjects who performed not differently from the control group in their identification of monosyllabic words (e.g., *BEAT* vs. *BIT*). However, the same subjects showed a tendency to perceive a tense vowel as a lax vowel when it was in the stressed syllable of a disyllabic word (e.g., *BEAter* → *BITter*). This suggests that their otherwise accurate perception of this contrast was influenced by their tendency to equate stressed syllables with closed ones. This interpretation was supported by the results from the second and third experiment, in which the Chinese-speaking subjects preferred penultimate (for trisyllables) and final (for disyllables) stress when the syllable was closed. Overall, these results indicate that despite the lack of dynamic stress in their L1, Chinese learners of English do show gradual sensitivity to metrical principles in an L2.

There is no post-verbal liaison in French: [t] in *fait-il* [fɛtil] is epenthetic.
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This talk is about a phonological consequence of a syntactic process: the placement of clitics in French. I argue that the order of placement of an enclitic after a verb is marked in phonology by both the insertion of a syllabic object and the call for a specific marker in the lexicon. Two different syntactic phenomena in French provoke the same treatment in phonology: the inversion of the subject (*il parle* "he speaks" [ilparl] → *parle-t-il* "does he speak?" [parltil]) and the placement of clitics in the imperative (*parles-en* [parlzã]). On the phonological side, both trigger the compulsory insertion of a consonant, [t] or [z]. Two hypotheses are likely to explain this fact: the epenthesis is either due to verb inversion or to the placement of clitics. If the first hypothesis were right, we should observe it in *passe Alice* "Alice comes"; this is not the case (*[pastalis]). So the epenthesis is due to the placement of clitics. I will first show why the consonant cannot be argued to belong to the verb nor to the clitic itself. If it belonged to the verb, we would expect to hear it in ordinary liaison contexts, since the phonological situation is the same, namely a floating consonant, a morphological boundary, and an empty onset as the first element of a clitic. This is not the case, at least for verbs ending with a graphic *-e*: *il parle un peu* "he speaks a bit" cannot be pronounced *[ilparltɛ̃pø]. If the consonant were a part of the clitic (eg. Morin 1979), it should always be the same before a same clitic. This is not the case: in *prends-en* "have some" [prãzã], *en* is preceded by [z], but by [t] in *ils vont en vacances* "they go to holidays" [ilvõtãvakãs].

Since the consonant that is observed doesn't belong to any of the words involved, it has to be epenthetic, which is the analysis offered by Tranel (1981). His analysis distinguishes between the insertion of a consonant and the nature of the consonant inserted, depending on the subject. The problem with his analysis is that it is not explanatory, only descriptive: it gives the context of the insertion, namely a verb and a clitic beginning with a vowel, but doesn't explain why this context implies the insertion of a consonant. Since the only context of compulsory post-verbal liaison is before a clitic, I propose that the consonant observed is the phonological trace of the order issued by the syntax that moves the clitic beyond the verb. This order is interpreted by phonology as the insertion of skeletal space. Following Lowenstamm (1996), I argue that the minimal skeletal unit is an onset followed by a nucleus. The insertion of this CV unit creates a strong position in the sense of Scheer & Ségéral (2001) on the empty onset of the clitic, which is the reason why it requires a consonantal epenthesis. The nature of the consonant inserted is also linked to syntax: when a speaker chooses a person, syntax selects in the lexicon the associated agreement marker, which then associates to the representation only in strong position; the consonant is not a personal morpheme.

This analysis unifies the treatment of verbs (the phenomenon is the same in *parle-t-il* [parltil] as in *fait-il* [fɛtil], this last case being usually considered as a liaison case), explains why the epenthesis is not correlated to its lefthand melodic environment and unifies the treatment of post-verbal liaison (which is never compulsory, all the more facultative).

LOWENSTAMM, Jean 1996. CV as the only syllable type, in *Current trends in phonology, models and methods*, Jacques DURAND & Bernard LAKS eds., 419-441.
MORIN, Yves-Charles 1979. More remarks on French clitic order, in *Linguistic analysis* 5, 293-312.
SCHEER, Tobias & Philippe SÉGÉRAL 2001. La coda-miroir, dans *Bulletin de la Société de Linguistique de Paris* XCVI, 107-152.
TRANEL, Bernard 1981. *Concreteness in Generative Phonology, Evidence from French*. Berkeley & Los Angeles: University of California Press.

Adaptation of loanwords and licensing strategies in Italian.

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My study analyses the strategies of adaptation of loanwords in standard and non standard varieties of Italian. The study mainly focuses on the adaptation of word final consonants (not a native feature of the Italian lexicon) and on the adaptation of internal and initial clusters that do not comply to Italian phonotactics. Such clusters are mainly present in words borrowed from Greek (*psicologo* "psychologue", *atmosfera* "atmosphere", *stricnina* "strychnine", *afta* "aphtha" etc.). The strategies of adaptation of foreign clusters go from lengthening of the first member of the cluster (*atleta* "athlete"⇒ *at[:ʃleta*), to assimilation (*tecnica* "technique" ⇒ *ten[:ʃica*), from epenthesis (*psicologo* "psychologue" ⇒ *pisicologo*) to debuccalisation *Vietnam* ⇒ *Vie?nam*). The strategy of adaptation of final consonants, instead, when they are not members of a cluster, mainly consists in lengthening, even though in some Italian varieties and dialects deletion may also be employed a strategy. If a final cluster is present, strategies range from deletion to epenthesis in the varieties more regionally marked, while the cluster remains unchanged in the standard variety. To my knowledge the adaptation of clusters has not received much attention whereas the lengthening of final consonants has been of interest for many scholars (Chierchia 1982-86, Repetti 1993, Scalise 1994, Bafile 2003 among others). The so called lengthening occurs in derived and in phrasal domains and it has been interpreted mainly as a prosodic process of lengthening triggered by stress (Chierchia 1982-86, Repetti 1993). Scalise (1994) noticed that also the quality of the consonant involved is relevant in triggering the phenomena and identified the rule for gemination in derivation as:

$$C \rightarrow C: / V\_\_+V$$

[-son]   [+stress]   without further comments as to the causes of lengthening.

A corpus of experimental data that I have collected by submitting a task to 20 speakers and the corpus of written data resulting from a thorough search on dictionaries and dictionaries of neologisms made by Rainer (1996) provide endless counterexamples to the prosodic analysis: the analysis of both corpora indicates that the quality of the consonant is more relevant than the position of stress. The corpora also indicate that speakers show a great amount of variation and the data are somewhat puzzling at a first glance. In my analysis it is shown that, as far as word final consonants are concerned, two kinds of adaptations take place: as far as the underlying phonological form is concerned, word final consonants are adapted through gemination according to their intrinsic sonority (less sonorous segments are adapted as geminates whereas more sonorous segments are adapted as singleton). This is shown in derivation where *formattare* "to format" or *cheffaccio* "bad chef" surface with geminates and are therefore opposed to *milanista* "supporter of Milan FC" and *posterino* "small poster" that surface with singleton. As far as the phonetic surface forms are concerned, a further "adaptation" takes place when word appear in isolation: in this case all word final consonant, regardless of the underlying form that has resulted from adaptation are realized as geminates. This is because, as I will show, the singleton/geminate opposition is neutralized in word final position in favour of the geminate realization. This explain some otherwise puzzling data (e.g. *modemaccio* "bad modem" that indicates an underlying form with singleton vs. *modem[:ʃacceso* "modem switched on" with a small pause intervening and *modemacceso* with no pause intervening). The analysis of both the adaptation of final Cs and the adaptation of internal and initial clusters converges towards the observation that those adaptations are ultimately driven by licensing. The data are therefore most suitable to test different views of licensing such as coda licensing (Kaye 1990), prosodic licensing (Itô 1986, 1989, Goldsmith 1990, Lombardi 1991, 1995) and licensing by cue (Steriade 1997) The second part of the study is then devoted to the investigation of how different theories manage to account for the data in question: which one is more economical, which is more immediate, which, if any, may account for all data recorded.

I am prepared to present this paper either as an oral paper or a poster.

Phonetic motifs and their role in the evolution of sound structure

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The picture emerging from a growing body of research (e.g. Carter, 2003, Nolan, 1999, Barry 1992) is that there is a high degree of language-specific variability in phonetic interpretation. Variability may be localised to specific phonological 'segments', in that we find many cross-language/accent differences in place, manner, timing and phonatory setting, or may occur over a longer domain, for example co-articulation strategies and indices of prominence. Being neither predictable nor random, these facts of phonetic interpretation are structural properties of specific languages and therefore must form part of users' linguistic knowledge, yet they remain distinct from what is supposedly a purely 'mentalist' knowledge of phonological contrast. In this paper I propose modelling linguistic-phonetic detail as phonetic *motifs* and discuss how these motifs can be a source of structural innovation which may become ingrained in higher-level sound structure. My paper avoids subscribing to a particular theory of phonology, opting instead to reflect more generally on the dichotomy of 'sounds in the mind' and 'sounds in the physical world', and how the notions of structure, form and meaning map on to this dichotomy.

Unlike constraints generating phonological patterns (as in e.g. OT), motifs are descriptions of recurrent language-specific *low-level phonetic* events (though they may interact to give the *percept* of more abstract constructs, e.g. a syllable). These behavioural norms distinguish particular speech communities and are not random. If language A executes a sequence of consonants with a greater degree of coarticulatory accommodation than language B, this is a non-arbitrary property of language A. I illustrate my discussion with a comparison of co-articulation strategies in different regional varieties of Italian, based on experimental investigation of consonant clusters.

The second half of my paper explores how motifs may be a source of structural innovation, providing insight into mechanisms of sound change. A given motif or combination of motifs may yield, epiphenomenally, more complex sound structures such as epenthesis, devoicing, assimilation, lengthening, secondary articulations, etc, which over time may become phonologised. While these 'structures' remain functionless they can be considered sound 'junk' (after Lass, 1990), but they may come to be exploited for new, unplanned purpose (extending Lass's notion of linguistic exaptation to phonetics and phonology). For example, gestural lengthening (which may be a language-specific prominence motif) and coarticulatory accommodation of clusters may both yield long consonants, which remain junk unless and until exapted for a specific function e.g. lexically contrastive geminates, or simply become more structurally ingrained, as in postlexical syntactic doubling. Different degrees of 'motif grammaticalisation', with motifs becoming associated with particular speech styles and/or boundaries, may give rise to language specific connected speech processes. Structure may also act conservatively to maintain its 'shape', affecting the likelihood of exaptation (cf Kiparsky's 1995 notion of structure dependency). This source of phonological change is distinctly (phonetic-)linguistic in that innovation comes from within the (phonetic-)linguistic structure and not, directly, from the physics (e.g. Ohala, 1983, 1993) or functions of speech (e.g. Lindblom, 1986, 1990, Lindblom and Maddieson, 1988). It is also non-universal, in that innovation is unique to that language, and not reliant on any notion of universals, be they phonological or phonetic.

Meinhof's Law in Eastern Bantu Languages

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In many Eastern Bantu languages, there is a well-known case of dissimilation of nasal compounds variously known as Meinhof's Law/Rule or Ganda Law (henceforth, ML). As Herbert (1977, 1986) demonstrates, ML, far from being a case of dissimilation, is a process of nasal assimilation that targets oral segments flanked by nasals. ML takes a number of distinct forms. For instance, in Bantu languages such as Kikuyu and Lamba, ML takes /NC…N(C)/ as the input and yields [N…N(C)] as an output: /ko-N-rem-a/→koo-**n**em-a 'cultivate' (Kikuyu) and /i-N-βansa/→**im**ansa 'courtyards' (Lamba). In LuGanda, ML produces [NN…N(C)] - a geminate nasal - from the same input: /N-limi/ → **nn**imi 'tongues' and /N-bumb-a/→**mm**umba 'I mould'. In all three languages, only NC compounds serve as targets and both nasals and NC compounds can serve as triggers. Since its initial description in LuGanda by C. T. Wilson (1882), ML has attracted attention from the Bantuists and linguists in general. There are numerous accounts of ML in individual Bantu languages. These accounts range from the rule-based accounts (Myers 1974; Katamba 1974; Herbert 1977) to government phonology-based accounts (Kula 1999) to OT-based accounts (Piggott 1994; Alderete 1995; Archangeli, Moll & Ohno 1998).

ML presents a number of challenges for an optimal-theoretic account. First, ML, as manifested in Kikuyu and Lamba, involves what appears to be counter-bleeding rule ordering. It has been proposed that the account of [m… N(C)] in Kikuyu and Lamba types of languages involves two rules in counter-bleeding rule ordering: a) nasal place assimilation (i.e. /Nb…N(C)/→mb…N(C)) and b) consonant deletion (i.e. mb…N(C)→m… N(C)). If deletion were to apply first, it would bleed assimilation. Second, not all NC's participate in ML in Bantu languages with this phenomenon. A thorough account of ML has to explain why only some NC compounds are targeted, a fact ignored in some accounts of ML (i.e. Alderete 1995). Lastly, as we show through Kikuyu and Lamba and LuGanda, there are cross-linguistic variations in the surface manifestations of ML. Apart from the geminate vs. non-geminate difference, there are at least two other variations: a) whether a language allows compensatory vowel lengthening in pre-NC and pre-N(N) environments and b) whether pure nasals trigger ML, with some languages allowing only NC compounds as the triggers. Perhaps because of these challenges, we know of no comprehensive analysis of ML. For instance, Archangeli, et. al. present only an analysis of Kikuyu, while Kula (1999) is concerned only with Bemba. It is hard to see how these analyses can account for the cross-Bantu differences.

We present an optimal-theoretic analysis of ML and its cross-Bantu variations. We show that ML in Kikuyu and Lamba does not involve consonant deletion and counter-bleeding rule ordering. We propose that an output such as [m…N(C)] stems from three processes: a) nasal place assimilation (Nb…N(C)→mb…N(C)); b) nasalisation (mb…N(C)→mm…N(C)); and c) anti-gemination (mm…N(C)→m…N(C)). Nasal place assimilation and nasalisation together produce geminates prohibited by the anti-gemination constraint, resulting in what appears to be "consonant deletion". This analysis of ML, which views the loss of postnasal C as a case of antigemination, has three advantages. First, counter-bleeding rule ordering becomes superfluous under this view. There is no need to appeal to stratal OT or other opacity-related devices to explain ML. Second, this view makes it possible to explain the geminate vs. non-geminate difference between LuGanda and Kikuyu/Lamba through constraint re-rankings. Under our analysis, the anti-gemination constraint is low-ranked and can be violated at the expense of other constraints in LuGanda. In Kikuyu and Lamba, it is undominated, giving rise to the geminate vs. non-geminate difference. Lastly, this view relates ML to other requirements on surface segment sequences in these languages. There is clear evidence that LuGanda allows geminate consonants, not just geminate nasals created by ML and that Kikuyu-type languages do not allow geminates at all. Our analysis provides an account of these surface facts. In contrast, a consonant deletion view does not.

On the role of loanwords in the analysis of Norwegian stress and quantity

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The prosody of a prototypical Norwegian word is characterized by the following properties: (i) it is disyllabic, (ii) the initial syllable is bimoraic and stressed, and (iii) the final syllable is monomoraic and unstressed (Kristoffersen 2000). The weight of the initial syllable can be realized either with a long vowel or by closing the syllable, e.g. with a geminate, yielding minimal pairs such as *kú:.be* 'cube' and *kúb.be* 'log'. Norwegian words can also be monosyllabic, having either a final geminate (*hatt* 'hat'), a final singleton (*hat* 'hatred'), or a final open syllable (*se* 'see'). Stress can be assigned to such a word by constructing a trochee at either edge of the word, and indeed both analyses have been advocated (Rice 2003, Kristoffersen 2003).

The details of the correct assignment of stress only become clear through the behavior of loanwords, since loanwords provide structures deviating from the norm, e.g. by having final stressed closed syllables in disyllabic words (*trafikk*), or by having longer words (*antelópe*), or by having stressed final open syllables (*komité*). The longer loans (such as tetrasyllabic *antelópe* or trisyllabic *bikíni*) show that the foot is oriented towards the right edge of the word, nonetheless maintaining the standard Norwegian property of nonfinality in polysyllabic words. These facts form the basis for advocating a right-edge oriented analysis of stress in Norwegian.

Of particular interest here, however, are two different types of nonaccommodation revealed in the disyllabic loans with final stress. Loanwords with final stress can preserve their final stress in Norwegian, even though no native words have this pattern. I claim here that such loans with final closed syllables (e.g. *trafikk*, *tomát*) are able to preserve this pattern because of the parallels between the final syllables of the loans and the native monosyllables. Examples with short vowels and final geminates (*trafikk*) are analyzed like monosyllables with final geminates (*hatt*), such that the double linking of the geminate (e.g. to a subsequent catalectic syllable, or to a word final onset position) protects stress from violating the requirement that the stressed syllable not be word final (e.g. NONFINAL as in Prince & Smolensky 1993, in an OT analysis). In a similar fashion, a loan with final stress on a long vowel (*tomát*) can also survive, given the extrasyllabic status of the final [t], which again protects the stress pattern from violating nonfinality, parallel to the analysis of monosyllabic *hát*.

In contrast with the consonant-final loans, words with final stress on open syllables (*komité*, *armé*, *allé*) cannot be generated by the grammar, the existence of monosyllabics words such as *se* notwithstanding. Such monosyllabic words violate nonfinality, but surface as possible words – from an OT perspective – because some candidate must be optimal, and because violation of DEP (e.g. to epenthesize a final C) is worse than violation of NONFINAL. However, in a polysyllabic word, the grammar can never yield stress on a final open syllable, because NONFINAL will force stress off the final syllable if there is another candidate host (i.e. if the word has more than one syllable). We argue here against Kristoffersen's (2003) that the grammar must accommodate these forms; indeed Kristoffersen (2003) points out that such an accommodation leaves the analysis of native forms *ad hoc*, appealing to cophonologies and other stipulations. Instead, our claim is that this group of loans – which has only a handful of exemplars – are extragrammatical, i.e. that they remain loans with a foreign stress pattern. This claim is supported by (i) the behavior in some dialects, which Norwegianize the stress pattern of these words, and (ii) the orthographic requirement that these words be written with a final accent.

Voice and aspiration in Swedish: Theoretical implications
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In a recent paper, van Rooy & Wissing (2001) distinguish between what they call the "broad" and "narrow" interpretation of the feature [voice]. According to the broad interpretation (Lisker & Abramson 1964), languages with a two way [voice] contrast may implement this contrast phonetically with any two of the following: voice onset precedes plosive release, voice onset immediately follows plosive release, voice onset substantially lags behind plosive release. According to the narrow interpretation (Jakobson 1949, Jessen 1989) [voice] is employed only when actual vocal fold vibration is present. Van Rooy & Wissing claim that languages with distinctive [voice], on the narrow interpretation, always have regressive voice assimilation. The purpose of this paper is twofold: First we show that Swedish employs the feature [voice] on the narrow interpretation, but does not have regressive voice assimilation. Second, we present an OT account of the Swedish data and discuss the theoretical implications of this analysis.

Six native speakers of Central Standard Swedish were recorded in a sound-treated room at Stockholm University. The speakers read a list of words containing stops from both stop series of Swedish, referred to here as fortis vs. lenis stops. The stops occurred in word-initial position, in intervocalic position and in word-final position, as well as in word-medial and -final clusters. The vast majority of word-intial fortis stops were aspirated. Word-medial fortis stops were preaspirated or unaspirated. The vast majority of instances of word-initial lenis stops exhibited prevoicing. All intervocalic lenes were voiced and practically all word-final lenes were voiced as well. Among the test words were two suffixes, one /-t/ and one /-d/e.

köpa 'buy' kö/p+t/ > kö[pt] 'bought (ppart)' kö/p+d/e > kö[pt]e 'bought (past)'

väga 'weigh' vä/g+t/ > vä[kt] 'weighed (ppart)' vä/g+d/e > vä[gd]e 'weighed (past)'

Our data indicate clearly that in underlying mixed voice/voiceless clusters, the cluster is voiceless on the surface. Hence the claim that languages with narrowly defined voiced plosives exhibit regressive assimilation of voice is incorrect. In Swedish both progressive and regressive assimilation to voicelessness are found.

To account for the data, we assume two faithfulness constraints, one requiring an input segment specified as [voice] be specified as [voice] in the output and one requiring that an input [spread] segment be [spread] in the output. We assume markedness constraints (*voi) to prohibit voiced obstruents and (*sg) to prohibit [spread] segments. A constraint, SPECIFY, requires that stops be specified for laryngeal features, and another constraint, Agree, requires that adjacent obstruents agree in their laryngeal specifications. The two tableaux below show how these constraints account for progressive (a) and regressive (b) assimilation. This account shows that, contrary to Wetzels & Mascaró (2001), voice assimilation in Swedish does not require reference to [-voice] and hence does not provide evidence that voice is binary rather than privative. This analysis also avoids the majority rule problem discussed by Baković (1999).

(a) kö/p^{sg}+d/e	SPECIFY	AGREE	FAITH [sg]	FAITH [voi]	*voi	*sg
kö[pt]e	*!*		*	*		
kö[p^{sg}+d]e		*!*			*	*
kö[bd]e			*!		**	
☞kö[p^{sg}t^{sg}]e				*		**
(b) la/g+t^{sg}/	SPECIFY	AGREE	FAITH [sg]	FAITH [voi]	*voi	*sg
la[k^{sg}t]	*!	*		*		*
la[gt^{sg}]		*!*			*	*
la[gd]			*!	*	**	
☞la[k ^{sg}t^{sg}]				*		**

Staged Parallel Evaluation
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Evidence is available in the literature that the parallel constraint evaluation currently standard in OT (cf. Kager 1999, McCarthy 2002, 2003, etc.) often needs to be carried out in stages, rather than in one single go: cf. e.g. Booij (1997), Rubach (1997, 2000), Itô & Mester (2003), Kiparsky (2003). Some simple but particularly compelling facts of Spanish examined here indeed support independent word- and phrase-bounded evaluations, thus adding to this body of evidence. The data also suggest that the Structure Preservation Condition (Kiparsky 1982, 1985, Mohanan 1982, Borowsky 1986) standard in the model of Lexical Phonology may be spurious.

The argument runs as follows. In order to maintain **full** parallelism, evaluation needs to be limited to the phrasal level. However, some Spanish data call for a separate word-bounded evaluation. First, (in most relevant accents) /s/ aspiration (/s/. → [h].), illustrated in *inglé[h]*. 'English' ~ *ingle.[s]a* 'English-FEM'. Relevant data for the parallelism issue are *de.[s]a.tar* 'to untie', contrasting with *de[h].tapar* 'to lift the lid', on the one hand, and *de.[h]u.no* 'you give-SBJ one' (paralleling *de[h].cuatro* 'you give-SBJ four'), on the other: a single, phrasal evaluation would yield *de.[s]u.no*, since onset [s] does not aspirate. The true form *de.[h]uno* also militates against the SPC, since at least in some such accents [h] is not an underlying segment (/x/ is instead): in these accents, therefore, non-underlying [h] will need to be licensed **pre-phrasally**, contra the SPC (although cf. Borowsky 1993 on the 'word-level').

The second set of data concerns /i/ strengthening, instantiated in the alternations *cre.c[i̯]eron* 'they grew' vs. *cre.[ɟ/ʃ]eron* 'they believed', or *Paragua[i̯]*. 'Paraguay' vs. *paragua.[ɟ/ʃ]o* 'Paraguayan' ([ɟ/ʃ] represents a range of corono-palatal consonantal realisations; cf. Harris & Kaisse 1999). This process supports a ranking ONSET, *H/O >> IDENT[cons] (H = high vowel; O = onset). The process clearly takes place word-internally, and it would also need to occur phrasally for a single parallel evaluation to be viable. However, the copulative conjunction *y* /i/ does not show up as ([ɟ/ʃ] in the relevant contexts: cf. *José.[i̯]An.tonio* 'Joseph and Anthony'. Onset [i̯] entails upgrading of IDENT[cons], and the alternative parse in a (complex) nucleus downgrading of ONSET. Either way, two distinct rankings and two distinct evaluation domains, are necessary. Opposing rankings for ONSET in the word and phrase domains is also suggested by the realisation of *y <h>uevos* 'and eggs' as [i g̯u̯e]*vos*, with /u/ parsed in the onset and consonantalised (one ONSET violation, on [i̯]), rather than as *[i̯u̯e]vos*, with an onset vowel [i̯], and [u̯] parsed with [e] in a complex nucleus (no ONSET violation).

The facts of [i̯] are particularly damaging to the SPC: structure-changing allophonic /i/ strengthening is compulsory in the word domain, while in the phrase domain no such strengthening takes place, although it clearly could (and ought to). Our conclusions will be that the SPC needs further refinement, or perhaps outright abandonment, and that the division into word- and phrase-bounded levels is a fact of language, independent of theories, and consequently it must be readily (and joyfully!) accepted in OT also. On the other hand, the additional question concerning the existence of the word-internal levels of classical LP remains pending, and needs further research.

Phonology versus Phonetics in Loanword Adaptation

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Peperkamp & Dupoux (2002) recently proposed that loanword adaptation is a perceptual process only. In brief, they argue from experimental evidence that vowel epenthesis occurs in ill-formed CC clusters at the level of perception, which takes place outside of the phonology. In this paper, we take position against such a radical approach to loanword adaptation. Our argument is based on patterns of vowel epenthesis in a corpus of 949 English and Afrikaans loanwords in Sesotho, a Bantu language spoken in Lesotho and South Africa that disallows codas and consonant clusters.

First, focusing on word-initial clusters, we observe that in cases where the initial consonant is labial or coronal, the epenthetic vowel has the same place of articulation (POA) as the initial consonant (1a). However, if the initial consonant is velar, the epenthetic vowel is copied from the source vowel following the consonant cluster, as velar consonants cannot contribute POA to the epenthetic site (1b).

(1)   Word-initial clusters
    a)   Labial- and coronal-initial C: POA from initial C
       brief   [bʀif]   [bo̯rife]   'letter'
       tronk   [tʀɔŋk]   [tu̯rɔŋkɔ]   'prison'
    b)   Velar initial C: POA from following vowel
       krip   [kʀɪp]   [kɪr̩pɪ]   'crib, manger'
       glas   [xlɑs]   [xɑlɑsɪ]   'glass'

In word-medial CC clusters, the epenthetic vowel generally comes from the preceding vowel (2a). The vowel /a/, however, fails to copy into the epenthetic site; in this context, the POA of the epenthetic vowel instead comes from one of the consonants of the cluster, or from the vowel to the right of the cluster (2b).

(2)   Word-medial clusters:
    a)   Preceding V ≠ /a/: POA from preceding V
       Germany   [dʒɜːrməni]   [dʒɛrɛmɑnɪ]   'Germany'
       hops   [hɔps]   [hɔpɔsɛ]   'hops'
    b)   Preceding V = /a/: POA from other source (varies between surrounding C or V)
       address   [ædrɛs]   [ɑt̪rɛsɛ]   'address'
       sambreel   [sɑmbʀeːl]   [sɑmpɛrɛlɑ]   'umbrella'

Focusing on the exceptional behavior of the vowel /a/, as can be seen from comparing (1b) and (2b), this vowel will be copied into an epenthetic site only as a last-resort option, in word-initial velar+liquid+/a/ sequences (1b). In all other cases, /a/ copy is superceded by other available POA, even if the general left-to-right directionality is violated. Perception-only approaches to this problem fail to account for this pattern, as /a/, which is the most sonorous vowel (Ladefoged & Maddieson 1996), is predicted to participate in the process as much as less sonorous (hence, less perceptible) vowels. This is obviously not the case in the data under investigation.

Our account builds on two assumptions. The first is the theory of contrastive specification (e.g. Steriade 1987), under which only features that support a contrast in a given language are specified in phonological representations. The second is an independent requirement that epenthetic vowels in loanwords must optimally acquire POA. In Sesotho, /a/ is the only low vowel. Therefore, it does not have a contrastive POA. Likewise, because the two liquid consonants in Sesotho (/r/, /l/) are coronal, they are not specified for POA. The placelessness of /a/, /r/, and /l/ is independently supported in the data by the fact that /a/ epenthesis is found only in the context of word-initial velar+liquid+/a/ sequences (e.g. *glas* [xlɑs] → [xɑlɑsɪ] 'glass'), i.e. the only context where none of the segments in the sequence can contribute place. In all of the other contexts, /a/ epenthesis is blocked, because a POA feature is available in the environment of the epenthetic site (coming from either the neighboring vowel or consonant). We conclude from these observations that a satisfactory account of loanword adaptation requires a look at the phonological properties of the borrowing language.

Opacity from Contrast: Neutral Segments in Harmony Systems

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It has been well-established (e.g. in multiple papers in Roca 1997) that certain types of derivational opacity cannot be analyzed in basic Optimality Theory (OT; Prince and Smolensky 1993/2002). Many resulting proposed modifications to OT seem to serve few purposes beyond solving the problem of opacity itself (Inkelas and Orgun 1995, Kiparsky 1998, McCarthy 1999, etc.). In an effort to streamline the theory, I propose an analysis of one type of opacity using independently motivated constraints sensitive to the perceptual dispersion of contrasts in a language.

The type of opacity of interest here is the opaque behavior of neutral segments in harmony systems. For example, in Tuyuca nasal harmony, voiceless obstruents are neutral: they do not nasalize, yet they allow nasalization to pass through (Walker 1998). The surface pronunciation of a word like /w̃ati/ 'demon is *w̃ãtĩ*, with nasalization spreading through [t]; *w̃ati (with no harmony at all), *w̃ãti (with harmony blocked by [t]) , and *w̃ãtĩ (with harmony affecting /t/ to create an illicit segment [t̃]) are disallowed. If harmonic spreading is strictly local (a widespread view of harmony, advocated in Ní Chiosáin and Padgett 2001, among others), then we must believe that at some point between input and output, neutral segments must undergo harmony, only to be subsequently repaired their original state. This derivationally opaque ordering between harmony and repair is at odds with direct mapping between the input and output, creating a problem for classic OT.

I propose that harmonic spreading need not be strictly local, which means that the behavior of neutral segments can be derivationally transparent. This requires a motivation for harmony systems not based solely on articulatory spreading. I propose that harmony can also be motivated by perceptual enhancement of contrast, which does not require strict locality. Researchers working within Dispersion Theory (DT; Flemming 1995) have convincingly shown that the bifurcation of faithfulness and markedness in standard OT is inadequate, arguing that a family of dispersion constraints is needed to govern the perceptual distinctiveness of contrastive words, ensuring that they are sufficiently perceptually distinct from each other.

In the DT analysis of Tuyuca proposed in this research, the UR /w̃ati/ surfaces as *w̃ãtĩ* because the available options are perceptually worse. Both non-harmonic *w̃ati and harmonically blocked *w̃ãti are 'not nasal enough' because they are below the required threshold for perceptual distinctiveness of nasality in Tuyuca. (Other candidates such as *w̃ãtĩ are uninterestingly ruled out by undominated markedness constraints.)

A testable prediction of this analysis is that for longer words, the demands on perceptually-motivated harmony decrease, allowing normally neutral segments to become harmony blockers near the ends of the harmonic domain. For example, for the hypothetical UR /w̃arirorute/, *w̃ãr̃ĩr̃õr̃ũte would be a predicted output, since there are eight nasal segments out of ten, yielding an output that is 80% nasal, which is greater than the 75% nasality of attested output w̃ãtĩ. This opens up a line of study that can have important consequences for the field, verifying whether harmonic spreading can be driven by perceptual concerns, as advocated in this research, and whether derivational opacity is indeed a problem for classic OT.

Why parameters should be encoded in the software, rather than in the hardware

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This talk is a reply to recent voices that have cast doubt on the universality of final empty Nuclei (FEN). Beyond this issue, I argue more generally that parameters in phonology should not be encoded by restrictions on syllable structure. Rather, variation should be expressed by the computational component of the grammar, which operates on universally invariable syllable structure. This approach develops key concepts of Government Phonology (GP): 1) syllable structure is anchored in the lexicon (rather than a function of a syllabification algorithm); 2) Structure Preservation (i.e. no resyllabification); 3) lateral relations among segments are the true vectors of "on line" phonological activity.

Since Kaye (1990) has proposed that word-final consonants are the Onset of an empty Nucleus, this idea has gained ground. Dell (1995) and Oostendorp (2002) are examples of its implementation outside of GP. Within this particular theory, Kaye (1990) has installed Coda Licensing as a universal principle that rules over all languages: Codas may exist only if they are followed by an Onset. Since word-final consonants are followed by no other segment, they can never be Codas.

Interestingly, the non-existence of word-final Codas is something for which GP is known. By contrast, another genuine tradition that roots in Kaye's proposal and continuously developed in GP ever since has not really found its way into larger circles. That is, Kaye (1990) does not address cross-linguistic variation in terms of a contrasting syllabic inventory (e.g. presence vs. absence of word-final Codas in order to capture the (non-)existence of C-final words). Rather, he invokes a parameter on a lateral relation (FEN are licensed or not).

Further work along these lines by Charette (1992,1998,2003), Harris (1994), Scheer (1998,2001,ms,forth), Rizzolo (2002) and Cyran (2001,2003) has identified (at least) four different nuclear categories: full vowels, schwas (i.e. vowels that alternate with zero), FEN and internal empty Nuclei. I propose that the lateral actorship (i.e. the ability to govern and license) of full vowels is unchallenged, while internal empty Nuclei are laterally disabled in all languages. The lateral activity of the two intermediate categories, schwas and FEN, is subject to language-specific parameterisation.

While accepting the existence of FEN in principle, Piggott (1991,1999,2003) and Rice (2003) argue that there are also languages where words end in a Coda. That is, Coda Licensing is a parameter, rather than a principle. They show that in various languages and for different purposes, word-final consonants do not behave like Onsets. There can be no doubt that this is a true statement. The conclusion that is drawn, however, is only compelling when codahood is equated with "belonging to the constituent 'Coda' ". In CVCV (Lowenstamm 1996, Scheer 1999,ms), constituent structure does not vary at all: segments belong to a monotonous sequence of non-branching Onsets and non-branching Nuclei. As all other syllable-based generalisations, codahood is defined in lateral terms: a consonant "belongs to a Coda" iff it occurs before a governed empty Nucleus. Hence, the Coda-status of a consonant depends on whether the following Nucleus is governed or not. And the various Coda-effects are due to a specific reason: the following Nucleus is unable to support (i.e. license) its Onset. Now recall that the lateral actorship of FEN is parameterised. Therefore, the behaviour of a word-final consonant as a Coda or a non-Coda depends on whether its is licensed or not. This means that Piggott's and Rice's arguments do not bite: there is no problem in accounting for the contrasting behaviour of word-final consonants while maintaining Kaye's Coda Licensing as a universal principle. The only thing that needs to be done is to follow the idea that cross-linguistic variation is due to the parameterisation of lateral forces.

In the talk I review and reanalyse Piggott's and Rice's data accordingly. I also show that nothing needs to be extrasyllabic: so-called (right-margin) extrasyllabic consonants do not behave like true Codas because FEN in the languages at stake are able to license. Finally, I show how a parameterised lateral ability of schwa can account for the two patterns of vowel-zero alternations that are found in natural language.

A hoarse horse, a brewed brood and a greyed grade:
Contrastive, categorical and gradient distinctions in phonology and phonetics

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A phonological/phonetic analysis of a language needs to capture the distinctive, non-predictable, inventory aspects of a sound system and the redundant, predictable ones, and do so in a parsimonious and revealing way. A recurring problem for this task is the location of the boundary between these two apparently clearly distinct aspects of grammar. Drawing the boundary within the non-contrastive phenomena to separate redundant allophonic phonology from phonetics is even more problematic.

The minimal pair test is the best-known objective and scientific basis for establishing contrast. But the minimal pair test is insufficient to define a phonemic inventory, because it does not deal with comparisons of systems across different phonotactic positions (such as syllable-initial and syllable-final). It is also insufficient from any practical and pragmatic viewpoint to deal with the contrastive/non-contrastive distinction in phonology, because languages tend to have quasi-phonemic contrasts which introduce indeterminacy over whether a difference in sound is strictly contrastive or not. I argue that these analytic indeterminacies reflect the real blurriness of fuzziness of the boundaries. I also argue that we need to accept that the contrastive inventory and the phonological system have an indeterminate interpretation, and that instead of crisply interfacing, these aspects of sound systems overlap. Exemplar models provide a better model of these indeterminacies than generative grammars.

I present initial results from an ongoing study of Scottish English that addresses these issues by collecting systematically and lexically exhaustive data for the relevant parts of the system. Specifically, the relatively simple goal of establishing the vowel inventory of Scottish English is considered. The minimal pair test deals with easy parts of the system: *horse* / *hoarse* contrast (in many sociolects). More problematic are the categorical differences in /i/, /u/ and /ai/ due to post-vocalic voicing (and other factors). Before stops, there is very little difference in vowel duration (*neat* = *need*), but before fricatives, there is a very large categorical difference (*Greece* / *grease*). Moreover, vowel duration cues the distinction between pairs like *need* / *kneed*, homophonous in most other varieties of English. In Scottish, the categorical *need* / *kneed* distinction is not strictly phonemic, since the phonetic difference is predictable from the morphological difference. Yet a small family of such "quasi-phonemic" contrasts (a) seem intuitively significant for speakers, (b) have other characteristics of contrastiveness in other phonological environments, (c) have yet more of these in more strongly vernacular varieties and (d) are acquired early. Thus considerations other than the minimal pair test suggests that long and short /i/, /u/ and /ai/ may be part of the vowel inventory of Scottish English. Yet having to choose between phonemic or allophonic status seems to miss the true character of these vowels as being "in-between". Moreover, the same problem exists at the phonetics/ phonology boundary to mid-vowels pairs (such as *greyed* / *grade*). To be forced to decide whether *they* are phonetic or phonological allophones misses the point that they differ in a way which is gradiently less phonemic than brood/brewed distinction. Rather, we need to express decreasing phonemic status and phonetic/phonological overlap.

The representation of complexity and Dutch /r/ variation

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Rhotics, or /r/ sounds, show a great deal of variation across the world's languages. The situation in Dutch is striking in that virtually all known rhotics occur as allophones of its one rhotic phoneme. A feature representation of /r/ in Dutch in terms of Element Theory (Kaye et al 1985, Harris and Lindsey 1995) can take one of two directions. As has been suggested for English (e.g. Harris 1994) and Chinese (Kaye 2000), /r/ can be thought of as almost empty, i.e. consisting of only one element (e.g. the 'low' element |A| or the neutral element); this would leave the phonetic interpretation relatively open. Alternatively, /r/ can be said to consist of a relatively large number of elements, as has been suggested by Scheer (1999) and, specifically for Dutch, Van der Torre (2003), which may in turn give rise to many possible variants.

I will show that the second option, as implemented by Van der Torre (2003), is able to account for the large number of /r/ variants found in Dutch. A survey of Standard Dutch in urban communities in the Netherlands and Flanders will serve to illustrate how the suppression of one or several of the elements that make up /r/ leads to the variety of realisations in different contexts. These variants, ranging from fricatives to vowels, should therefore be seen as constituting reductions of this highly complex sound. Note that 'reduction' in this sense does *not* denote a step upward on the sonority scale, the traditional notion of lenition. Instead, it is on a par with what Schiller (1999) calls the reduction variants of German /ʀ/: all forms that are (phonetically) simpler than the complex uvular trill.

In addition to being well-suited for the description of /r/ variation in Dutch, the approach to the representation of /r/ in Dutch outlined above clears up a persistent issue within Element Theory. Whereas for the representation of vowels within Element Theory internal complexity is consistently the inverse of cross-linguistic frequency (a 'markedness' effect), this is not the case with consonants. Instead, complexity in consonants is linked to the sonority hierarchy: the least sonorous sounds have the most complex representations. This leads to a situation in which the most frequently occurring consonants, oral stops, are represented as most complex.

In Van der Torre (2003), however, the sonorant consonants have the most complex representation; both obstruents and vowels, though opposites in terms of sonority, are representationally simpler. Liquids in particular are viewed as at the top of this complexity scale, as they consist of four elements (including two resonance elements) each. This is more in accordance with cross-linguistic frequency of phoneme classes. Under this approach, phonetic complexity is equated with phonological complexity, which, as I will show, serves to explain the variation found with Dutch /r/.

Harris, John (1994). *English sound structure*, Oxford: Blackwell.
Harris, John and Geoff Lindsey (1995). "The elements of phonological representation", in: J. Durand and F. Katamba (eds.), *Frontiers of Phonology*, 34-79. Harlow, Essex: Longman.
Kaye, Jonathan (2000). A Users' Guide to Government Phonology. Ms., University of Ulster.
Kaye, J., J. Lowenstamm & J.-R. Vergnaud (1985). "The internal structure of phonological elements: a theory of charm and government", *Phonology Yearbook* 2. 303–328.
Scheer, Tobias (1999). "A theory of consonantal interaction". *Folia Linguistica* 32, 201-237.
Schiller, Niels O. (1999), "The phonetic variation of German /r/", in: M. Butt & N. Fuhrhop (eds.), *Variation und Stabilität in der Wortstruktur*, 261-287. Hildesheim: Olms.
Torre, Erik-Jan van der (2003). *Dutch sonorants*: *The role of place of articulation in phonotactics*, Utrecht: LOT.

Base-Identity and the Noun-Verb Asymmetry in Nivkh

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Morphologically complex words often exhibit phonological similarities with their morphologically related base forms which they are derived from. In a number of cases, these similarities yield a marked phonological pattern given the general rules or phonotactics of the language (Kenstowicz 1996, Burzio 1997, 2002 etc.). In Optimality-Theory (OT), similarity between existing words is captured by Output-to-Output (OO) correspondence constraints (Burzio 1996, 2002, Kenstowicz 1996, 1997, Benua 1997, Ito and Mester 1997, Steriade 2000 etc.). The marked phonological pattern arises when similarity between words takes priority over the canonical phonology of the language. OT expresses this situation by ranking OO-correspondence constraints above phonological markedness constraints. OO-correspondence constraints evaluate the output candidates and select the one which is most similar to the base.

The languages in East Asia provide an interesting test for this generalization. Languages as Korean or Japanese show a systematic difference in the composition of verbs and nouns; while verbal stems always surface with a morphological extension, nominal stems may surface without such an extension. This means that complex words formed from a nominal stem always have an independently occurring base to which they phonologically should conform, whereas verbal derivatives lack such a base and hence should not show such conformity. This prediction is borne out in Korean in which derivatives of nominal and verbal stems are subject to different phonology (Kenstowicz 1996). In this paper, I discuss another language of East Asia, Nivkh (Paleo-siberian, Russia), which also has an asymmetric composition of nouns and verbs like Korean and Japanese. I will focus on two phonological phenomena, Consonant Alternation and Final Fricative Devoicing and show that both phenomena exhibit asymmetries between nominal and verbal phonology. I will discuss each case in detail and argue that Base-Identity is the driving force of these asymmetries.

Consonant alternation is a cyclic process which targets the initial obstruent of a morphosyntactic constituent within a certain syntactic domain and consists of spirantization and hardening. Spirantization changes the initial plosive to a homorganic fricative when it is preceded either by a vowel, glide or a plosive: *co* 'fish' *pynx* 'soup' > *co [v]ynx* 'fish soup', *peq* 'chicken' > *peq [v]ynx* 'chicken soup'. But when preceded by a fricative or a nasal, the initial plosive remains intact: *cxyf* 'bear' > *cxyf pynx* 'bear soup', *Rum* '(a name)' *tyf* 'house' > *Rum tyf* 'Rum's house'. Hardening targets the initial fricative of a transitive verb and changes it to a homorganic plosive when preceded by a fricative or nasal: *cxyf* 'bear' *Xa-* 'to shoot' > *cxyf [q]a-* 'to shoot a bear', *qan* 'dog' *vo-* 'keep' > *qan [b]o-* 'to keep a dog'. Nouns, however, never undergo hardening: *tulf* 'winter' *vo* 'village' > *tulf vo*, **tulf [b]o* 'winter village'. While previous works simply stated the exceptional behavior of nouns as such, I will propose an alternative analysis which derives such exceptional behavior from the compositional asymmetry between nouns and verbs.

The second phenomenon is Final Fricative Devoicing, which forces the final fricative in an Intonational Phrase to surface as voiceless. Fricative-final nominal and verbal stems exhibit an interesting asymmetry with respect to this restriction when a suffix follows; while verbal stems always end in a voiced fricative, nominal stems always end in a voiceless fricative. Again, it is the nominal stem which exhibits exceptional behavior since its final fricative appears exclusively as voiceless, even though it is not the last segment in the Intonational Phrase and hence no longer the target of Final Fricative Devoicing. I will argue that the asymmetric behavior of nominal and verbal stems in both Consonant Alternation and Final Fricative Devoicing to be due to their different morpho-lexical composition; while nominal stems may surface in isolation, verbal stems should always be accompanied by a morphological extension. I conclude that this asymmetry is an instance of Base-Identity, a cross-linguistically observed generalization in which an independently occuring base form forces its derivatives to be similar as possible, at the cost of the canonical phonology of the language. This analysis is superior to previous works in which the exceptional behavior of nominal stems were simply stipulated as such.

The emergence of symmetry/dispersion in a self-organized phonology
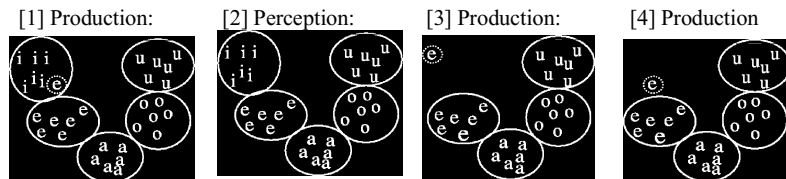Daniel Silverman

The symmetry/dispersion of phonological contrasts in the acoustic/auditory space has long been noted by phoneticians and phonologists. Eschewing any functional influences on phonological inventories, early generativists assumed that symmetry may be a by-product of lexical feature co-occurrence restrictions. Both Martinet (1952) and Hayes (1999) have attributed dispersion to a cognitive pressure towards symmetry. Sapir (1925) seems to suggest something similar, asserting that speakers can "feel in [their] bones" when a sound is symmetrically "placed" in its system, and cannot do so with elements that are placed asymmetrically." Kingston (2002) offers a speaker-based teleological account, concluding that "speakers must be altruistic." Taking inspiration from the models proposed by Liljencrants and Lindblom (1972), Labov (1994), De Boer (1999), and M. Liberman (2002), I propose to shift the locus of the mechanism driving systemic symmetry from the speaker to the listener, from the synchronic to the diachronic, from the teleological to the evolutionary, and from design to emergence. I explore the symmetry of vowel systems as a case study, though the results readily translate to the other symmetrical components of the sound system.

Imagine a standard five-vowel system. In speech, words with stray vowel tokens—those that fall within the phonetic space occupied by another vowel—might be confusing, hence ignored, by the listener (see the stray e, in [1]). Consequently, these confusing tokens may not be pooled with the vowel quality which is normally employed for that particular word. Since learners can only match their variation to their *perceptions* of speakers' productions, and not to speakers' productions directly, they might consequently conclude that the variation in the speech signal is *not as extensive* as it actually is. This results in categories consisting of distinct pools of tokens with fairly sizeable phonetic buffer regions separating them [2]. So, due to the misperception of stray tokens, the categories achieve equidistance, i.e., become dispersed.

But among complex interacting systems, imbalance is always a potential development. So imagine a situation in which contrastive categories, for one historical reason or another, are not fully dispersed in the perceptual space. One category may increase its phonetic distance from another since no third category is present to provide a limiting counterforce. We may imagine a hypothetical four-vowel system, lacking [i] (an illustrative, though admittedly unlikely system). A stray e-token that is very [i]-like may well induce confusion on the part of listeners, since it is so different from the vowel qualities that they are used to, as in [3]. Such tokens will probably be thrown away—filtered out—regarded as funny speech errors. However, a token of an e-word that is only marginally [i]-like might not induce confusion at all, but on the contrary, might be better at communicating the intended message to listeners, since this e-token is actually further dispersed from the other vowels of the system ([a,o,u]), though not outlandishly distinct from other [e]s, as in [4]. In this system, since tokens which marginally drift farther and farther away from some other category are *not* encroaching on a third category, then it's these tokens that are most effective in conveying the meaning intended by speakers. Due to their unambiguous perception, they may subsequently be produced more often. Over time, the whole pool of tokens may gradually drift farther away from the other categories, and a more symmetrical four-vowel system might emerge. The result is that the system will evolve towards a symmetrical dispersion of its categories, again with ample buffer regions among its members.

Through occasionally misunderstanding speakers' semantic intentions, the system may passively evolve to a more dispersed and symmetrical state. This sort of system may be viewed as both self-organizing, and self-sustaining. It's self-organizing because its structural properties are a consequence of its use, requiring no outside monitor, guide, or force, to affect its organization. It's self-sustaining because, by its very use, it repairs and maintains itself.

[1] Production:　[2] Perception:　[3] Production:　[4] Production

Richness of the Base, Lexicon Optimization and Underlying Representations in OT

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The talk addresses some very basic assumptions in standard Optimality Theory (OT) (Prince and Smolensky 1993, McCarthy and Prince 1995); namely, it discusses the consequences of the principle of the Richness of the Base (ROTB), Lexicon Optimization (LO) with respect to underlying representations.We will try to show how the above notions lead to an irreconcilable contradiction concerning UR's.

We will start with the original claim that there are no restrictions or constraints on underlying representations in OT. As a result of this, any language may have any kind of segment or structure in the Lexicon and it will be the language particular ranking of the universal constraint set CON that determines the segment inventory of the particular language. However, many linguists have suggested that ROTB is just an inconvenience which may be quite irrelevant. If we want to keep to the original assumption that ROTB is a principle present in the grammar, then we should set up CON so that it should produce possible output forms independent of the inputs. It does not mean that all input forms should yield existing forms but it does mean that all output forms should be well-formed.

The next problem to be addressed is that of Lexicon Optimization. LO only works on single forms and hence Inkelas (1994) suggested an alternation sensitive version (ASLO), which takes into consideration all the possible contexts of a form and determines the underlying representation on the basis of the sum of violations by the output forms in all the possible environments. Inkelas claims that the application of ASLO will yield underspecified inputs whenever there is a surface alternation. However, this is only true if we assume that faithfulness constraints are not violated by the filling in of a binary feature. On the other hand, if we assume the opposite, as many do, then inputs will be fully specified but it will always be the structure occurring in the majority of the environments that will be posited as underlying. A significant consequence of this is the fact that in the case of **x** alternating with **y**, it is very much possible that both of them will be found underlyingly.

For instance, as it has been shown by Siptár and Szentgyörgyi (to appear), Hungarian [h], [ɦ], and [x] will all occur as underlying segments in the language as there are nonalternating forms with all of the above segments, and also when there is alternation, sometimes one, sometimes another will be found in the UR: words like [dox]~[doɦoʃ]~[doxnɔk] 'musty smell'~'with a musty smell'~'dat.' Will have a /x/ in the UR, while H-deleting stems like [tʃɛ]~[tʃɛɦɛk]~[tʃɛnɛk] will have underlying /ɦ/. Besides, there are words having underlying voiceless glottal /h/, too. As a result, the segments that are normally considered to be allophones of the same phoneme will have independent underlying status. It suggests then that one of the following must be true:

(i) faithfulness constraint are NOT violated by feature filling and thus, alternating segments will be represented by underspecified underlying segments,

(ii) ROTB must be discarded and there MUST be constraints referring exclusively to UR's,

(iii) we are forced into a situation where the notion of 'phoneme' will only be a descriptive term and UR's will have no special status with respect to alternations,

(iv) there are no underlying representations, and CON consists of markedness and OO-faithfulness constraints.

As we have argued against the first three, the last one must necessarily be the case as also argued for by Burzio (1996) and Padgett (2001).

Weight and Sonority in Albanian Word Stress

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Albanian word stress has often been considered a refuge of idiosyncrasies (cf. e.g Dodi and Gjinari, 1983; Maynard, 1997). In this talk, we show that the position of stress in Albanian word stems is almost fully systematic and follows from a small number of optimality-theoretic constraints, especially constraints referring to syllable weight (Féry, 1998) and to vowel sonority (de Lacy, 2002). Empirically, the study is based on the quantitative evaluation of an electronic lexicon of ca. 17000 polysyllabic Albanian stems that we have annotated with stress information. It is thus the most extensive empirical study on the stress system of the language conducted so far. Statistical evaluation of the data demonstrates that stress assignment is oriented in crucial respects to the right stem edge and sensitive to a ternary scale of phonological weight. Thus, in 72.61% of the stems, stress is closer to the right edge, but only in 16.75% to the left edge (where distance is counted by the number of intervening syllables). Similar results obtain if not stem tokens but stem types according to different phonological criteria are evaluated. That syllable weight is a decisive factor for stress assignment becomes clear from the fact that only 46.9% of the stems ending in a light syllable (e.g. **ho**.le, 'swing', example words are written in Standard Albanian orthography except for the schwa, stressed syllables are marked by boldface), but 93.8% of those ending in a heavy (e.g. ka.**cek**, 'tube') and 99.6% of those ending in a superheavy syllable (she.**gert**, 'apprentice') have final stress. Stressing of open final syllables can be predicted by the sonority of the nuclear vowels. However, in contrast to the sonority hierarchies for vowels proposed in Kenstowicz (1996) and de Lacy (2002), Albanian treats high vowels as more sonorous than mid vowels. Thus, the high and low vowels a (78.3%), i (93.6%) and u (66.7%) tend to be stressed (qer.**shi**, 'cherry') while the mid vowels e (29.1%) and o (7.9%) tend to be unstressed (**ba**.bo, midwife; percentages refer to the percentage of stems ending in the respective vowel which are stressed). Stems with a final schwa syllable have penultimate stress even if the final syllable is (super-)heavy (**a**.f rt, 'close'). Our OT-analysis makes use of the following constraints: (1) alignment of stress to the right edge of stems, (2) weight-to-stress constraints which require heavy ($\mathbf{WSP}(\mu\mu)$) and superheavy syllables ($\mathbf{WSP}(\mu\mu\mu)$) to be stressed, (3) a constraint against stressing adverbial suffixes which are normally unstressed (*X $_{\acute{\sigma}}]_{adv}$), and (4) the fixed ranking of markedness constraints in (1), which encodes the markedness of stressing syllables with less sonorous vowels:

(1)   * $_{\acute{\sigma}}$ ≫   *[-high-low] $_{\acute{\sigma}}$ ≫   *[+high] $_{\acute{\sigma}}$, *[+low] $_{\acute{\sigma}}$

$\mathbf{WSP}(\mu\mu\mu)$ must be ranked below *X $_{\acute{\sigma}}]_{adv}$ because derived adverbs ending in a superheavy syllable have final stress (na.ty-.**risht**, 'naturally'), in contrast to derived adverbs ending in light or heavy syllables (**fa**.las, 'for free'). At the same time, all WSP constraints must be below * $_{\acute{\sigma}}$ but above the other constraints in (1) since final schwa syllables are always unstressed while there is no effect of vowel sonority for (super-)heavy final syllables. Finally, we have implemented a small Python script which computes the stress assignment predicted by various alternative analyses and the described ranking of constraints for the stems in our electronic lexicon and compares the results with the manual stress annotations. It turns out that the optimality-theoretic analysis we propose predicts the correct stress position for ca. 98% of the stems and is superior to the alternative approaches.

One hand or two: How ASL and BSL restructure fingerspelling in loans

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Lexical borrowing takes a variety of forms in signed languages, including mouthing, fingerspelling, and initialised signs (Sutton-Spence, 1994; Battison, 1978; Boyes Braem, 2001). This paper focuses on the last two of these, their structural relationship to each other, their influence on handshape inventories and their implications for theories of sign phonology. Signed language provides a unique perspective on lexical borrowing because the that is being borrowed from is often of a different modality (i.e. spoken rather than signed).

Although the United States and Great Britain share a common spoken language, the languages of the Deaf communities, American Sign Language and British Sign Language (henceforth ASL and BSL), are unrelated and have distinct lexicons and grammars. Another difference between ASL and BSL is the structure of the fingerspelling systems: ASL fingerspelling is one-handed, while BSL fingerspelling is two-handed. Fingerspelling is used to represent written words from the ambient spoken language. Each distinct configuration of the hand(s) corresponds to a written letter, and the letters are produced serially, but with movement overlap and coarticulation (Wilcox, 1992; Akamatsu, 1985). So even though ASL and BSL borrow mostly from the same language (i.e. English), they do so in remarkably different ways, because of the way in which words are borrowed. ASL fingerspelling relies primarily on contrasting handshapes, whereas BSL fingerspelling relies on both handshape and location on the non-dominant hand, to differentiate one fingerspelled letter from another.

Both fingerspelling systems use only a limited number of contrastive locations and movements compared to signs from the native lexicons: ASL and BSL fingerspelling are both relatively fixed in space and neither uses locations on the body or large movements to differentiate letters. The BSL fingerspelling system does not require more handshapes than its native lexicon because with two hands a larger number of formations with basic handshapes are possible. However, because ASL fingerspelling uses only one hand and very few locations and movements, it requires more possible values for handshape than its native lexicon. Consequently, a larger proportion of the handshapes in ASL fingerspelling (e.g. R and T) are physiologically difficult to produce (Mandel, 1979; Ann, 1996). Because multiple parameters are used to differentiate one sign from another in the native lexicon, these signs have proportionally more handshapes that are easy to produce (Ann, 1996, 1993). For example, handshapes with all the fingers flexed or extended, which are easily acquired and produced by humans (Schieber, 1996; Brooks, 1986), are extremely common in the native lexicons of ASL and BSL.

Initialised signs represent an intermediate form between fingerspelling and native signs; their structure is influenced by the structure of both sign and fingerspelling. These signs are produced by combining (usually the first) fingerspelled letter from a corresponding English word with one or more other phonological parameters. Because in BSL fingerspelling the two hands make contact, added locations on the body cannot be used to create new signs, due to phonological restrictions on the number of locations per sign (Brentari, 1998; Sandler, 1989). Consequently, because BSL fingerspelling uses both handshape and location, BSL initialised signs are often nearly identical in form to the fingerspelled letter. In contrast, initialised signs in ASL use handshapes from the fingerspelling system which can combine with many different movements and locations without masking the identity of the letter. This pattern of initialisation in the two languages indicates that signs which have developed from fingerspelled forms cannot violate phonological rules governing native signs, but can nonetheless recruit forms (i.e. handshapes) that are less common in the native lexicon. The larger handshape inventory of the ASL fingerspelling system thus leads to a much larger proportion of initialised signs in ASL than in BSL.

Epenthetic Vowel Quality in Loanwords:
Empirical and Formal Issues

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There are very few extensive empirical studies on the quality of epenthetic vowels in loanwords. A usual claim is that a default vowel is inserted; processes of vowel harmony or vowel copy and of assimilation to the preceding consonant (most notably in the shape of labial attraction) are also reported. There are, however, very few in-depth studies of this phenomenon.

Consequently, there are only few studies on the formal processes of vowel epenthesis. Only default vowel insertion as a purported major epenthetic process has received significant attention, described in a number of phonological frameworks as epenthesis of an underspecified, unmarked or perceptually not salient vowel.

This paper will take a fresh look at vowel epenthesis from both an empirical and a formal perspective. The in-depth statistical exploration of loanword corpora from a number of different languages (Shona, Sranan, Samoan, Kinyarwanda) will demonstrate that patterns of epenthesis are considerably more complex than hitherto assumed. I will discuss data especially from Shona and Sranan which show that vowel harmony, consonantal assimilation and default epenthesis interact in a highly complex but constrained fashion. In Shona, for example, the choice of the epenthetic vowel depends on three decisive factors, (a) the place of articulation of the preceding consonant, (b) its manner and (c) the quality of adjacent vowels. An adjacent consonant is more likely to spread the less marked its place of articulation is; spreading of [coronal] is less marked than spreading of [labial], which is less marked than spreading of [dorsal]. Vocalic spreading is constrained similarly; front vowels spread more easily than back vowels, high vowels spread more easily than mid or low vowels. In addition, vocalic spreading is more likely the less sonorant the intervening consonant is. Vowel harmony is found across plosives significantly more often than across fricatives and sonorants, in this order. Data from other languages show that the Shona pattern is not sui generis but that comparable complexity is attested crosslinguistically.

Formally, I will use an autosegmental model of Optimality Theory to account for these patterns. Spreading is prohibited by a constraint against multiple linkage, *MULTIPLE. Default insertion is prohibited by the correspondence constraint DEP. A constraint *SKIP militates against non-local linkage, while the constraint *LINK(C,V) penalizes linkage between consonants and vowels. While these constraints already generate a basic typology of epenthesis types, they can also be parameterized further as scalar constraints on types of multiple linkage. So *SKIP can be split up along a sonority parameter, while *MULTIPLE and *LINK(C,V) can be crossed with the universal markedness scale for places of articulation. The interaction of these scales yields the complex patterns of epenthesis found in the data as the interplay of consonantal and vocalic spreading with default feature insertion, constrained by markedness and transparency effects.

I will argue that the complexity of the observed patterns calls for an abstract phonological approach to vowel epenthesis. While a model of autosegmental OT can handle the data in a straightforward and principled manner, perception-based models (see e.g. Kenstowicz 2003) will ultimately fail to do so, as a comparison between the two models will show.

Evidence for phonetic adaptation of loanwords

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When borrowed by a language, words of foreign origin mostly do not preserve their original shape but get adapted to the sound system of the borrowing language. The process of loanword adaptation has been analyzed within both rule-based and constraint-based frameworks. All these approaches assume that specific rules or rankings of constraints are needed to model the transaction from the initial representation of foreign sound to its final representation in the native lexicon. Some of these approaches postulate that adaptation is entirely made in production on the basis of faithfully perceived foreign sounds (Jacobs & Gussenhoven, 2000; Paradis & LaCharité, 1997), others suppose that initial adaptation is made during perception and then finalized during production of a new loanword (Silverman, 1992; Yip, 1993; Kenstowicz, 2001). The latter models, however, do not propose independent criteria as to which adaptations take place in perception and which in production.

Recent experimental data show that perception of non-native sounds and sound patterns by adults is not faithful. That is, listeners have difficulties perceiving nonnative sounds as well as nonnative phonotactic and suprasegmental structures (Werker et Tees, 1984; Hallé *et al.,* 1998; Dupoux et *al.,* 1997; Dupoux *et al.,* 1999). Using experimental data from perception studies, Peperkamp & Dupoux (2003) bring up some striking similarities between loanword adaptations and difficulties in foreign speech perception attested in adult speakers. They thus raise the hypothesis that all loanword adaptations take place in perception. Possible mechanisms of perceptional adaptation of nonnative sounds were proposed by Best (1995), Hancin-Bhatt (1994), Brown (2000) and Brannen (2000). More specifically, Brannen shows that adaptation can be made on the basis of phonetic and auditory differences between L1 and L2 sounds.

In order to further test the hypothesis that loanword adaptations are phonetically minimal transformations that take place in perception, we examine a case of intralanguage adaptation where a language borrows the same segment from two different languages. Data from Japanese show that French and English words ending with [n] receive different adaptations. Thus, the English word *screen* [skɹiːn] becomes [sɯkɯɾiːN], ending with a final moraic nasal, while the French word *piscine* [pisin] becomes [pisin:u], ending with a final epenthetic vowel (Shinohara, 1997). We examine if these adaptations are reflected by the way in which Japanese listeners perceive word-final [n] in French and English words. Ten adult native speakers of Japanese with low proficiency level in English and no previous knowledge of French performed a forced choice task. We used monosyllabic CVn nonwords recorded by native speakers of French and English. The results show that the French but not the English stimuli were perceived as ending in an epenthetic vowel in the great majority of cases. These results are in accordance with our acoustic analysis, showing that word-finally French [n] is longer than English [n] and often gets a vocalic release. Hence, small phonetic differences in the realization of wordfinal [n] in French and English trigger differences in perception that are reflected in the loanword adaptations.

The role of features, gestures, and frequency in consonantal lenition:
Evidence from Gorgia Toscana

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This paper examines the phonological, articulatory, and functional factors contributing to the consonantal lenition process in Florentine Italian known as Gorgia Toscana (GT). Results of acoustic analysis on elicited speech show a significant asymmetry in lenition presence and extent among the consonants involved. This asymmetry is best explained by a combined theory of phonological and gestural conditioning, without reference to lexical frequency.

GT is a process occurring in several of the Tuscan dialects of Italian, described by Vogel (1997) as the variable phenomenon responsible for the pronunciation of [p, t, k] as [ɸ, θ, x/h/ Ø] between sonorants. The majority of GT data observed by Giannelli and Savoia (1979/1980), Lepschy and Lepschy (1977), and Bafile (1997) involve the velar obstruent /k/: this consonant appears to be both (1) more prone to weakening, and (2), prone to more radical weakening than /p/ or /t/. Typical examples of GT effects are in (1).

(1)   a. la casa   [la kaza] → [la xaza / la haza / la aza]   'the house'
        b. la torta   [la tɔrta] → [la θɔrta]   'the cake'
        c. la palla   [la pal:a] → [la ɸal:a]   'the ball'

The current study tests the hypothesis that consonant place of articulation is the primary conditioner of lenition within the natural class of voiceless stops in GT. Close analysis of speech confirms this hypothesis, in concordance with previous observations. The greatest effects on lenition were induced by one of the consonants, the velar /k/, with no hierarchical effects found within the group [p,t,k]. /k/ lenited approximately 80% of the time, compared with a 50% rate for both the labial and alveolar, and was more prone to approximantization than the other consonants. Pearson 2-tailed correlations of frequency and lenition (using DeMauro's (1993) corpus) exhibited a significant underline negative correlation, contradicting the predictions of the usage-based models in Bybee (2001) and Pierrehumbert (2001). Further tests noted minor effects of rate and vowel place on lenition.

Traditional rule-based approaches to lenition that target only abstract features fail to capture the observed asymmetry and gradience in GT. Viewing GT as a coarticulation process (based on similarity of tongue gestures in the production of /k/ and surrounding vowels), the articulatory phonology framework of Browman and Goldstein (1992) adequately explains both consonant preference and gradience in lenition extent. This second approach, however, makes incorrect predictions: any process that requires identical gestures fails to explain why GT occurs at all when gestures are dissimilar, or why GT occurs only with voiceless stops in central Italian, while a similar process occurs with the class of voiced stops in Spanish.

The data therefore present an interesting dilemma: although we can likely rule out the functionalist model's role of lexical frequency in Gorgia Toscana, it is not possible for either a purely phonological or a purely phonetic framework to account for the observed patterns. While convincing arguments exist for the necessity of both frameworks to account for independent processes (Zsiga 1997) a conflation of theories that appeal to phonological and articulatory factors within a single process is a departure from the norm, but such a conflation is exactly what seems to be required to explain the data in this study.

Catalan stress is iambic

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Abstract

Lexical stress in Catalan is free but is subject to important limitations. There is a three-syllable right-edge stress window, and a word with a heavy penult may not have proparoxytone stress. Most recent work on Catalan has claimed that its stress pattern is fundamentally trochaic (i.e. TROCHEE » IAMB). I argue that, if the basic stress pattern of Catalan is taken as iambic (IAMB » TROCHEE), and if we acknowledge the prosodic category *colon* (κ) standing above *foot* in the prosodic hierarchy (Green 1997) in the constraint ALIGNHEADκR, the above-mentioned limitations fall out automatically. A Weight-to-Stress constraint is uncontroversially active. The salience in the lexicon of words of trochaic shape, such as ˈ*taules* 'tables' or ˈ*ferro* 'iron' is a consequence of the fact that in all nouns and adjectives stress is required to fall on the stem and is excluded from inflectional affixes such as –*es* (F.PL) or –*o* (M.SG).

REFERENCE
Green, Antony Dubach (1997) The Prosodic Structure of Irish, Scots Gaelic, and Manx, (PhD Dissertation, Cornell University). ROA 196-0597

Russian Palatalization and Opacity in Optimality Theory
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In Russian, most consonants contrast in palatalization (*rat* 'glad' vs. *r^{j}at* 'row'). In addition, [i] alternates allophonically with [ɨ] to agree in backness with the preceding consonant: *p^{j}ir* 'feast', vs. *pɨl* 'fervor'. Velars, however, differ from other consonants in not occurring before [ɨ], but only before [i], where they undergo palatalization: *k^{j}ira* (a name) vs.*kɨ.* This generalization and its underlying process $kɨ \rightarrow k^j i$ are referred to as 'Post Velar Fronting' (PVF).

Padgett (2003) relates PVF to another process: First Velar Mutation (1stV) which turns velars to palato-alveolars before front vowels: $k^j i \rightarrow č^j i$. His account runs as follows:

(1) a. PVF $kɨ \rightarrow k^j i$ occurs to enhance perceptual distance as [ɨ] is too close to both [i] and [u] in 'color' (roughly: second formant); [k] palatalizes by backness agreement.

    b. The same process is blocked with other consonants: $pɨ \rightarrow *p^j i$, by a constraint *MERGE, as sequences [p^{j}i] exist independently in the language.

    c. *MERGE does not block PVF $kɨ \rightarrow k^j i$ because sequences [k^{j}i] have been eliminated by 1stV: $k^j i \rightarrow č^j i$.

To express this in a synchronic grammar, however, one must find a way to capture the counterfeeding relation between 1stV (k^{j}i ⇒ č^{j}i) and PVF (kɨ ⇒ k^{j}i) – a case of 'Opacity', notoriously beyond the reach of standard Optimality Theory (Prince and Smolensky 1993). Padgett appeals to 'Lexical Phonology and Morphology OT' (LPMOT; Kiparsky 2000 and others) treating 1stV as 'lexical' and PVF 'post-lexical'.

While this account is successful, it enriches the OT machinery in two ways: the derivations of LPMOT, and *MERGE. The latter is especially problematic because it is massively redundant with regular faithfulness. For instance, non nasalization in French [kan] (city of Cannes) vs. the possible nasalization in English [kæ̃n] (can) follows from *MERGE given that French, but not English, has contrastive vowel nasalization. However, it also follows independently just from the higher ranked IDENT(nas) in French, needed to express the contrast in the first place: IDENT(nas) >> *V[+nas], English having the opposite ranking.

I argue that a superior analysis of PVF and its counterfeeding relation to 1stV is provided by the theory of Targeted Constraints (TCs) of Wilson (2000, 2001) (see also Burzio 2000, 2001), which can deal with Opacity effects within OT without derivations. Simplifying slightly, PVF receives the analysis in (T1) below, where '⇒' identifies the TC, and I abstract away from the palatalization (k^j/ č^j). The crucial property of TCs is that they only compare candidates that differ by the offending 'weak' element and no more, here candidates (a, b), ignoring (c) altogether. With the rest of the grammar favoring faithful (a) and the top-ranked TC asserting (b) over (a), (b) wins, despite the fact that it violates 1stV. On the other hand input /ki/ will correctly undergo 1stV (counterfeeding), as shown in (T2). Here, the rest of the grammar favors candidate (c), which is therefore the winner, as the TC merely expresses a relation between two losing candidates.

The proposed analysis proves superior in that it has only one extension of OT instead of two: TCs. Furthermore, TCs enjoy independent motivation, as a formalization of the same effects of (insufficient) perceptual distance that Padgett's analysis also appeals to: (1a), unlike the derivations of LPMOT.

(T1) Post Velar Fronting

	/kɨ/	⇒*WEAK COLOR	IDENT-V	1stVELAR	IDENT-k
a.	kɨ	*			
b. ☞	ki	b ≻ a	*	*	
c.	či		*		*

(T2) First Velar

	/ki/	⇒*WEAK COLOR	IDENT-V	1stVELAR	IDENT-k
a.	kɨ	*	*		
b. ☞	ki	b ≻ a		*	
c.	či				*

Poster session

Asymmetries in the behavior of English high vowels/glides
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Sonority Sequencing identifies low-sonority segments as very good onsets and high-sonority segments as very good nuclei. As a result, we might expect to find some segments in the phonemic inventory of any language restricted to onset or nuclear position. Such is the case with English. Obstruents are never parsed as nuclei and non-high vowels are never parsed as onsets. Setting aside these extremes, however, we find that most of the segments of English can fill more than one syllable position. High vowels and glides are one such group. They are found in all syllable positions (nucleus, onset, coda, second segment of an onset cluster), whether that position favors high or low sonority. In this paper I identify several asymmetries in the patterning of front vs. back high vowels/glides (and some cases where the two groups pattern together), proposing an analysis that accounts for the asymmetries as due to a sonority difference (/u/ is less sonorous than /i/). The analysis treats the high vowels and their corresponding glides as featurally identical underlyingly (at least in monomorphs), and assumes the surface ATR distinction to be underlyingly a length distinction.

For example, underlying consonant-high vowel-vowel sequences have different surface structures depending on the quality of the glide/high vowel and of the following vowel. There are three potential surface structures for such a sequence and all three structures surface in English: (1) Parsing the consonant and high vowel as a consonant-glide onset followed by a simple vowel (e.g. *Twin* /tuin/ and *queen* /kuiin/ surface as complex onsets ([tʊ̯] and [kʊ̯]) followed by nuclear [ɪ] and [i], respectively.); (2) parsing the consonant as an onset followed by a glide-initial diphthong ([ɪ̯u] as in *cute*); and (3) parsing the initial consonant as an onset, the high vowel as peak, and the second vowel as the peak of a second syllable (e.g. *kiosk* /kiask/, which could potentially be parsed as an onset cluster plus simple vowel on parallel with *twin* and in conformity with minimal distance constraints on onset clusters, but is instead parsed as [ki.ask].). Here, this distribution results from a preference for parsing the more sonorous /i/ in nuclear position while preferring a margin parse for /u/.

As a second example, consider the behavior of the two high vowels in word-initial position. While we might expect that the typological preference for low sonority onsets would result in similar treatment of the two segments, we see an asymmetry here as well. Homorganic sequences of underlying initial high round/back vowels (/uu/) easily surface as an onset glide plus a nuclear high round/back vowel ([wʊ]), but the same cannot be said for sequences of underlying initial high front vowels (/ii/), which more commonly surface as [i]. Compare, for instance, *wool, wood, woosh, would, wolf, woman* etc. with *each, eagle, ease, east, eat, eaves, eel*, etc. This distribution also results from the preference for a nuclear parse of /i/ (even at the expense of the ONSET constraint) vs. the preference to parse /u/ in the margin. Of course, that is not to say that it is impossible to find [ɪ̯] in the syllable margins. Indeed, underlying sequences of /iii/ (and /uuu/) leave us little choice if we wish to retain all of the underlying segments and we see this in words such as *yeast* and *yield* (and *wound, womb, woo,* etc.). We also do find the occasional initial [ɪ̯ɪ] (*yip* and *yin*) and correspondingly the occasional [u] (*ooh, oops, oomph, ouzo*). And of course a margin parse of both /i/ and /u/ is the norm when followed by non-homorganic vowels (*yet, young, use, wet, will,* etc.)

The vowel/glide distribution facts given here as well as other vowel/glide phenomena examined in this paper result from the interaction of constraints that point toward an inventory in which /i/ (and more sonorous segments) are peak-preferring while /u/ (and less sonorous sonorants) must be coerced into peak position (some more willingly than others). This consigns /u/ (and less sonorous segments) to margin-preferring status and /i/ as a coercible margin.

Consonantal licensing, conflation and the R tier

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It has often been noted that coronal consonants often appear to exhibit unique behaviour (cf. Paradis & Prunet, 1991). In particular, it seems that in consonant harmony systems, coronality is a crucial factor: either it is the coronals alone that are affected, or it is only the coronals that act as the catalyst (cf. Shaw, 1991; Rennison, 2002; Bellem, 1999). Coronals, according to Harris (1994, 1997), are also particularly prone to lenition (reduction) effects. Nevertheless, the status of the R element in Government Phonology is not especially clear, and Harris & Lindsey (1995) pointed out that it is hard to pin down a clear speech signal pattern for this element, implying that coronals may not best be accounted for with R. Indeed, it was proposed under Revised Element Theory that R and A should be merged into (new) A, coronals thus being characterised by A (teachings of Kaye; Williams, 1998; Ploch, 1993, etc). Other proposals for the elimination of the R element have also been entertained (e.g. Backley, 1993), but treating coronals as a 'default', with no positive characteristic to distinguish them, implies that coronals do not form a natural class, and there would be no way of accounting for the unique status that coronals appear to have in consonantal harmony systems. Notably, however, although the R element is considered one of the resonance (/place) elements, it does not behave like the other resonance elements (A, I, U). These issues will be addressed in the course of this paper.

The background to the paper is as follows. An investigation into Arabic emphatic assimilation (AKA emphasis harmony, pharyngealisation, velarisation, uvularisation, flatting, backing, etc), which has also necessitated looking at other, both Semitic and non-Semitic, languages with related phenomena, has provided clear evidence that it is the element A which characterises emphatics (and gutturals). Moreover, as with other consonant harmony systems, it is the coronals which are crucial to the spread of the emphatic property: although most consonantal segments may become emphatic (in many dialects), it is generally only the coronal emphatics that trigger the harmony. Notably, only palatal consonants may block it.

This paper will attempt to address these matters by considering two (possibly alternative) proposals. Firstly, we will suggest that the A and R elements reside on tiers which may be conflated in many languages, analogously with I and U. We will then investigate the proposal that the R(/A) tier acts as a consonantal tier through which all C melody is licensed. These proposals together would account for certain cross-linguistic facts: 1) apparently non-local consonantal harmony systems and assimilatory processes often appear crucially to hinge on coronality; 2) the licensing of A in consonantal positions seems to be heavily marked; 3) the R element is considered not to play any part in the representation of vowels; 4) coronals appear to be almost the 'default' consonant, yet the evidence (coronals as a natural class, the Harrisian account of lenition phenomena) goes against the proposals that there is no coronal prime. The conflation proposal would also account for cross-linguistic emphatic~pharyngeal variations (such as those found in varieties of Neo-Aramaic); the R-tier licensing proposal would account for Semitic consonantal root systems, OCP effects involving consonants (but not vowels) such as in Kurdish, as well as other issues.

The second part of this paper will set forth the proposal that perhaps the R element does indeed have a part to play in the representation of vowels, other than rhotacised vowels and syllabic *r*: tense-lax distinctions and vowel centralisation may be due to the association of R with nuclear positions. The implications of each of these proposals will then be considered in the light of the other.

Secondary place in feature geometry
submitted as oral paper

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In those theories of phonology where a certain amount of subsegmental structure is assumed, locating place is an issue of answering the following basic questions:

(i) how do we distinguish primary and secondary place?
(ii) how do we distinguish vocalic and consonantal place?
(iii) where do(es) the place node(s) fit in the overall architecture?

The answer we propose to these questions is close to that elaborated in Clements and Hume (1995), but much simpler than it and also fundamentally different with respect to question (iii). We claim that

(i) primary place is identical to consonantal place and secondary place is identical to vocalic place,
(ii) secondary place is a dependent of the filter features/elements (noise, nasality, resonance),
(iii) certain places, e.g. palatality, can only be secondary places even if they are the only place specification of a given segment.

On such assumptions a couple of well known facts can be easily explained, namely:

(i) the secondary place of consonants spreads to vowels more easily than their primary place;
(ii) the secondary place of consonants may be lost in coda position;
(iii) palatal stops in coda positions may lose palatality;
(iv) palatal consonants are rarer than consonants of other places of articulation, but palatal vowels are not rarer than velar vowels;
(v) palatality often spreads from vowels to consonants, but velarity does not;
(vi) palatal consonants, as opposed to labials, coronals and velars, cannot normally have a secondary place of articulation (i.e. another secondary articulation);
(vii) palatal fricatives, as opposed to labials, coronals and velars, appear to be implicationally less dependent on stops.

Abstract for the 12th Manchester Phonology Meeting
The pinball effect in phonology

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The aim of the proposed presentation is to argue against some of the basic tenets of Government Phonology (GP), in particular against **STRICT DIRECTIONALITY** and **STRICT ADJACENCY**. I would like to show that the principles governing the distribution of stressed versus unstressed vocalic positions are not at all different from the principles responsible for the distribution of empty vocalic positions. In the framework of strict CV-phonology (Lowenstamm 1996), I aim at presenting an integrated theory of phonological government by assuming that there is no difference between government causing vowel reduction and government controlling the manifestation of empty vocalic positions. In other words, there is no difference between **METRICAL GOVERNMENT** and **PROPER GOVERNMENT**.

Furthermore, I intend to demonstrate that a wide range of phenomena from languages with no genetic relationship fall naturally out if we are prepared to accept the phenomenon we may term the **PINBALL EFFECT IN PHONOLOGY**. According to this conception of phonological government, governing power originates in the most prominent vocalic position of the domain and proceeds towards recessive vocalic positions, by first targeting the farthest contentful vocalic position within the same stress foot. Governed contentful vocalic positions thus receive licence to govern, and they target the farthest contentful position in the opposite direction, again in the same foot. Only after having integrated all contentful vocalic positions into the metrical hierarchy can government target empty vocalic positions, keeping them silent. All governing relations will be established between vocalic positions, and V-to-C government will only arise by default, as a last resort.

The phonetic manifestation of government will be relative or absolute silence in the case vocalic positions, and relative or absolute loudness in the case of consonantal positions. Data from English and Hungarian will be examined, in particular, the distribution of flapping versus aspiration in General American, English syncope, Hungarian degemination, low vowel lengthening and the behaviour of shortening stems will be shown to receive a uniform explanation in the proposed model.

A distinction between lexical and post-lexical government will also be made and thus the theory of phonological government will be extended beyond the word domain. I will also illustrate how syntactic structure constrains the establishment of governing relations contracted post-lexically.

Phonetics vs. Phonology: The Word-final /s/ Problem in Korean Loanword Adaptation
Stuart Davis Indiana University (davis@indiana.edu) Poster Session

One controversial issue in the current phonetics/phonology debate on loanword adaptation is the role of subphonemic variants in influencing the phonological form of loanwords. On a phonetic view that emphasizes perceptual similarity matching (Steriade 2001, Kenstowicz 2001) between source and target languages subphonemic variants should be able to play a crucial role, but on a largely phonological view (LaCharite and Paradis 2002) they should be mostly irrelevant. This paper considers one of the best documented cases of subphonemic influence in loanword adaptation, namely, the borrowing of English word final [s] as tense [s'] in Korean (where the tense [s'] has the feature [constricted glottis]), and argues for a phonological understanding of the data.

English words ending in a single [s] such as those in (1) are borrowed into Korean with a tense [s'] followed by an epenthetic barred-i. This should be contrasted with the [s] in the word final clusters in (2) which is borrowed as a plain [s] in Korean (followed by an epenthetic barred-i).

(1) bus, gas, juice, peace...   (2) test, disc, toast, mask

The question that arises is why there should be a difference between (1) and (2) given that the instances of English /s/ in (1) and (2) are not made with constricted glottis and so should be more readily borrowed with Korean plain [s] for both (1) and (2). In a careful study Kim and Curtis (2002) argue that the decisive factor in determining how the cases of /s/ in (1) and (2) get borrowed is their subphonemic length difference. They note through acoustic analysis that the word final /s/ in (1) is consistently longer than the /s/ in the final cluster in (2). The difference is clearly subphonemic in English. They also show through acoustic work on Korean that the tense /s'/ is usually durationally longer than the plain /s/. Moreover, they show through their own experimental work and reference to the literature that this length distinction in Korean is subphonemic. Rather, the main acoustic cue to which Korean speakers are sensitive is the high pitch on the vowel following the tense /s'/, not the length. However, given that the English words in (1) and (2) do not have any vowel that follows the /s/, Kim & Curtis conclude that it must be the subphonemic feature of length that determines whether /s/ is borrowed as the somewhat longer tense [s'] in (1) or the somewhat shorter plain [s] as in (2). If this conclusion is correct it would constitute a strong case of subphonemic variants being important in loanword adaptation, especially since Kim & Curtis show that the length on /s/ is a subphonemic feature in both languages.

In this paper I offer a very different and novel interpretation as to why the words in (1) are borrowed with tense [s'] rather than plain [s]. As background, consider the data in (3). ([h] after a stop represents aspiration and [l] represents barred-i.

(3) "coke" borrowed as [khokhl], "rope" borrowed as [rophl]

Here we see that when English word final voiceless stops are understood as having a final realease they must be aspirated when borrowed into Korean (with a following epenthetic barred-i). Note that in this position, the English word-final voiceless stop cannot be borrowed as a plain stop since such a stop would then be voiced in the intervocalic environment created by the epenthetic barred-i; the voiced stop would no longer match the English voiceless stop. Consequently, the release of the word final voiceless stop requires aspiration when borrowed into Korean. Given this, we can view the release of the word-final voiceless fricative in (1) as also requiring a laryngeal feature when borrowed into Korean. However, since Korean /s/ cannot be phonemically aspirated, the release is realized with the laryngeal feature [constricted glottis] instead. (The /s/ in (2) is not tense since it is not in word final position where it would need a laryngeal feature.) This analysis will be supported by two further observations. First, it will be shown that in Korean phonology more generally, /s/ is realized as [s'] in environments where voiceless stops become aspirated. For example, while the deletion of /h/ triggers aspiration on a following voiceless stop (/anh + pak/ --> [amphak] 'inside and outside') it triggers tensification on a following /s/ (/anh + saram/ --> [ans'aram] 'wife', /coh + so/ --> [cos'o] 'like').And second, the borrowing of "dance" and "chance" with a tense /s'/ is unproblematic in our analysis given that the release of the final voiceless consonant requires a laryngeal feature; it is problematic for Kim & Curtis (2002), as they themselves note, since the word-final [s] in the final cluster in "dance" and "chance" is of shorter duration and would be predicted to be a plain [s] on their account. We conclude that the phonology is key to understanding the borrowing of word-final /s/ as tense or plain; the subphonemic length difference is not at issue.

Loanword adaptation in American Hungarian:
A cross-linguistic OT account of initial unstressed syllables

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Hungarian lexical stress invariably falls on the first syllable. In Hungarian used in Hungary (Hungarian Hungarian, or HH) stress is moved to the beginning of the word in every loanword: *tortilla* ['tortiːɒ], *DVD* ['deːveːdeː]. When American Hungarian (or AH, a contact variety used by Hungarian immigrants in the United States) borrows from American English (AmE) either the same happens (as in '*election*) or the initial unstressed syllable is deleted (as in '*lectric*).

This paper anlyzes the phonological adaptation of loanwords from AmE into AH in the Optimality Theory framework and demonstrates that different hierarchies of the same constraints account for the adaptation of English loans in HH vs. AH. This provides further evidence to the fact that AH employs rules which are different from those of HH.

The focus of our investigation being a cross-linguistic case, our analysis differs from standard OT in that the input and the output are from different languages (AmE vs. HH or AH). The core set of constraints comprises one well-formedness constraint and two faithfulness constraints:

Primary Stress: stress is on the first syllable.
Parse Syllables: do not delete syllables.
Stress Faithfulness: the stress should remain on the same syllable.

In HH, the hierarchy is
Primary Stress >> Parse Syllables >> Stress Faithfulness
where the only choice is stress fronting, while in AH it is
Primary Stress >> Parse Syllables, Stress Faithfulness
where stress fronting and the deletion of initial unstressed syllables are both attested.

Loans in AH delete a whole syllable, not just an unstressed vowel: *excuse me* is borrowed as AH [kjuːzmi], not [kskjuːzmi], which is possible in casual AmE but would violate Hungarian phonotactics.

Interestingly, AH [kjuːzmi] has a word-initial stop + [j] cluster that is not found in Hungarian Hungarian words but is quite common in American Hungarian words as in [kjubɛn] 'Cuban,' [bjuːdiful] 'beautiful' or [bjudi sɒlon] 'beauty salon.' The syllable boundaries indicated by the deletion process do not properly coincide with the traditional analyses of Hungarian syllable structure. Papp (1966: 150) and many others claim that branching onsets are only possible wordinitially. (That view is also reflected in Hungarian orthography, which prescribes the hyphenation of *konstrukció* 'construction' as *konst-ruk-ció*.) If this traditional claim was correct then one would not expect forms like AH [kjuːzmi] (or AH [tropɛndɛr] 'interpreter') because then the syllabification of [ɪks'kjuːzmi] would be [ɪksk.juːz.mi] and the deletion of the initial syllable would yield [juːzmi] rather than [kjuːzmi]. Our analysis suggests that the Sonority Sequencing Generalization offers a better account of the AH data, explaining both [kjuːzmi] and the non-occurrence of [kskjuːzmi].

The AH linguistic data that the analysis presented in this paper is based on comes from two corpuses of AH speech (from South Bend, Indiana, cf. Kontra 1990; and from McKeesport, Pennsylvania, cf. Fenyvesi 1995), Bartha's 1993 findings from Detroit, Michigan, and Vázsonyi (1995), a dictionary of AH from the Calumet region in Illinois.

Final obstruent devoicing and neutralisation in German: an articulatory perspective

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(presentation: either form)

Final obstruent devoicing or so called "Auslautverhärtung" in German has been a major issue in phonological debates: it has been explained as feature changing in the SPE tradition, reduction or spreading (Mascaró 1987) and licensing (Lombardi 1991) (for review see Brockhaus 1995). From a phonetical perspective final obstruent devoicing is rather related to the question whether phonologically voiced stops would be produced similar to their voiceless counterparts (= full neutralisation) or some residues could be found (= partial neutralisation). Several phoneticans investigated this issue by means of acoustic data (e.g. Fourakis & Iverson 1984, Port et al. 1981, Port & O'Dell 1985). The results of their studies turned out to be highly dependent on statistical methods, speech corpora, and experimental set-ups, so that both – partial and full neutralisation could be observed. In addition, regional dialectal variations for final obstruent devoicing do occur (Piroth & Janker in press). Since the acoustic and articulatory relationsship is not a 1:1, studying articulatory movements might provide further evidence for the possible differences/similarities of this process. In our previous articulatory investigations (Fuchs 2003, Fuchs & Perrier 2003) we have examined the voicing contrast and its laryngeal and supralaryngeal production mechanisms in alveolar stops. By means of transillumination and fiberoptic endoscopy we analysed glottal abduction movements for 3 German subjects (CG, JD, SF). For two subjects (JD, SF) glottal opening was neither found for /t/ nor for /d/ in the word final position (nonsense words were embedded in a carrier phrase and not spoken in isolation). For the third subject (CG) some small amount of glottal abduction could be observed for /t/, but not for /d/. These differences have been interpreted in agreement with Piroth and Janker (in press) who find partial neutralisation in Bavarian speakers production (our speaker CG grew up close to Lake Constance, a region close to Bavaria in Southern Germany). In a second experiment the supralaryngeal production mechanisms, i.e. tongue tip and jaw movement as well as tongue palatal contact patterns have been recorded by means of Electropalatography (Reading EPG3) and Electromagnetic Articulography (Carstens Medizinelektronik AG 100). Four subjects participated (CG, DF, JD, SF), including the three of the previous experiment. Our results provide evidence that neutralisation was not complete with respect to supralaryngeal production mechanisms. In particular the jaw has a higher position in /t/ at the consonantal target and tongue-jaw coordination can differ as well. The two articulators are highly synchronised in /d/ and less in /t/. For /t/ the jaw still moved when the tongue had already reached its velocity minimum at the consonantal target. However, at the same time results from acoustics showed complete neutralisation in 3 (DF, JD, SF) out of 4 subjects. In order to further verify our previous results we are now analysing data from both experiment with real words in comparison to the results found for the nonsense words. Preliminary results for laryngeal production mechanisms show a trend that in real word data a small amount of glottal abduction is more frequently found for /t/ and for /d/ in comparison to the nonsense word corpus. Concerning supralaryngeal production mechanisms differences in jaw height and tongue jaw co-ordination are reduced. In more natural speech higher interindividual variations are found too.

On the one hand some articulatory differences for /d/ and /t/ are still observed, although there is a rather mixed picture in the more natural corpus where those articulatory dfferences occur. From this perspective it can be concluded that partial neutralisation is common with respect to articulatory production mechanisms. On the other hand acoustic results speak for full neutralisation, except from our south German subject (regional variations) and consequently there might be no perceptual distinction between word final /d/ and /t/. Hence, we suggest that the final obstruent devoicing debate should be discussed as a mismatch between production and perception.

Abstract

What theoretical status does epenthesis have in phonological theory?

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The purpose of this presentation is to look at the nature of epenthesis from a phonological theoretical perspective. My contention is that the term *epenthesis* is far too loose in the 'traditional' terminology. **My intention is to restrict the concept** to phonotactically motivated, that is, *true epentheses* (following Lass 1984) in the first place. However, phonological theories recognizing empty skeletal slots (GP, CV) do not (cannot) assign the concept a theoretical status since these cases will all be regarded as the realization of such an empty slot, and not any *process of insertion* at all. This observation is, however, not particularly emphasized in the literature. **My conclusion is that it is in fact possible and desirable to do away with the concept** as a theoretical term in such theories.

Firstly, some typical, oft-cited examples for epenthesis will be examined. Data come from German, Arabic, Spanish, as well as English (mainly based on Scheer 1998). Some more acute problems with calling all these phenomena epenthesis uniformly will be pointed out. For instance, how much *language history* do we want to allow into the *synchronic phonological description*? It does seem to be the case that these are not *processes* of any kind in the synchronic state of languages. Other questions include: What segments do we have in such positions at all? Do we find patterns in where epenthesis occurs in a string? We do, and this exactly will be the key to narrow down the concept.

Lass (1984) makes a distinction between *phonetically* and *phonotactically motivated* epentheses, calling the former *fake epenthesis*, the latter *true epenthesis*. However, in phonological theories recognizing empty skeletal slots in a string, the concept *epenthesis* cannot be assigned a theoretical status because these cases will be straighforwardly regarded as the realization of an empty, but lexically given, slot. This means that phonotactically motivated epentheses will be relegated to phonological representations, that is, they are no processes of any kind, but simple well-formedness constraints on a string (much like the rest of the phonotactics of the language). There is then no need to recognize epenthesis as a separate term in these theories.

References:

Durand, Jacques. 1990. *Generative and Non-Linear Phonology*. Longman, Harlow.
Harris, John and Geoff Lindsey. 1995. The elements of phonological representations. In: Durand and Katamba 1995:34-79.
Lass, Roger. 1984. *Phonology: An introduction to basic concepts*. CUP, Cambridge.
Scheer, Tobias. 1998. A theory of consonantal interaction. *Folia Linguistica XXXII/3-4*:201-237. Mouton de Gruyter, Berlin.

Heavy syllables and violations to vowel harmony in recent loans in Hungarian

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The phonological behaviour of loanwords in different languages has been investigated for a long time: it has been pointed out that the lexicon of certain languages is divided into several layers in which different restrictions hold. The observations show that unassimilated loanwords very often exhibit violations to native restrictions, whereas assimilated ones tend to conform to these constraints. This fact suggests that the scope of certain restrictions fails to cover the peripheral stratum or strata of the lexicon. In other words, unassimilated words are allowed to override native restrictions.

Are we therefore to say that loanword adaptation works in this way in all languages? In my presentation I would like to demonstrate that Hungarian seems to behave unusually in terms of adaptation in that – in some cases at least – the "possibilities" admitted on the periphery are *more restricted* than in the native stratum. The foreign vocabulary of the language contains a number of monosyllabic words – mostly of German or English origin – in which light syllables are forbidden, although in the core vocabulary of Hungarian both light and heavy syllables are well-formed. A couple of examples can be seen below:

> German *Witz* 'joke' > Hung. *vicc* [vits:] 'joke'
>
> English *shock* > Hung. *sokk* [ʃok:]
>
> English *stress* > Hung. *stressz* [ʃtres:]

What makes the problem even more complicated is that these syllables contain geminated consonants, which are not present in the source language(s). (This points to the fact that "Faithfulness to the source language form" is a relatively low-ranked constraint in this case.) I will illustrate another aspect of the phenomenon as well. Some foreign elements of the above-mentioned type seem to disobey the rules of Hungarian palatal harmony – when they receive a verbal suffix. This phenomenon is often referred to as antiharmony. Data gathered from the most recent loans suggest that there is some correlation between the antiharmonic behaviour of certain words and the requirement demanding heavy syllables. I would like to show that one foreign factor apparently attracts another: in these loanwords, the lack of palatal harmony almost always implies the presence of a heavy syllable.

References
Nádasdy, Ádám 1989. Consonant length in recent borrowings into Hungarian. *Acta Linguistica Hungarica* **39**: 195–213.
Törkenczy, Miklós 1989. Does the onset branch in Hungarian? *Acta Linguistica Hungarica* **39**: 273–292.

The Big Picture on Palatalization in Czech

This talk presents a novel analysis of palatalizing suffixes in Czech, one of the most phonologically under-studied Slavic languages. I will show that two factors interact in Czech palatalization: markedness constraints on permissible palatal clusters, and floating features on individual morphemes.

Traditionally, three types of palatalization have been identified in Slavic languages: Dental (e.g. /t/ →[c]), First Velar (e.g. /k/ → [tʃ]), and Second Velar (e.g. /k/ → [ts]) (e.g. de Bray 1951). However, a fuller array of suffixes shows several different patterns:

(1)   Patterns of interaction of palatalization paradigms

		-ɔviː	-aːr	-niː	-ka	-ɪn	-jɛ	-skiː	-ʃiː
		Exemplar Suffix							
Change in PoA	Labial						+ j		
	Alveolar					palatal	palatal		
	s, z								Ø, Ø
	Ts		tʃ		tʃ				t
	Post-alveolar								Ø
	Palatal								
	K			tʃ	tʃ	tʃ	ts	t	t
	g, x, ɦ			ʒ, ʃ, ʒ	ʒ, ʃ, ʒ	ʒ, ʃ, ʒ	z, ʃ, z	ʒ, ʃ, ʒ	Ø, Ø, Ø

The chart in (1) shows that beyond accounting for the three traditional types of palatalization, their distribution in relation to one another and to non-palatalizing segments also merits consideration. My talk will show that the four paradigmatic changes in place of articulation – Dental Palatalization, First and Second Velar Palatalization, as well as the anteriority switch of the strident stop /ts/ to [tʃ] – can be attributed to different features, some of which are necessarily floating. These features can be linked individually onto a given suffix, yielding different permutations of the four palatalization paradigms, as in (1).

For example, the different suffixes undergoing First Velar Palatalization ([-niː], [-ka], and [-ɪn] above) must share some common features compelling assibilation and change of PoA in each of them; this phenomenon can be attributed to floating [+strident] and [coronal] features on the suffix. These features also interact with faithfulness restrictions so that both continuancy and anteriority identities are preserved (e.g. /k/ → [tʃ], *[ts], *[ʃ]).

The fact that First Velar Palatalization can occur in conjunction with different processes – for example, it acts alone with [-niː], and is found in tandem with strident anteriority switching and Dental Palatalization with [–ka] and [-ɪn] respectively – shows that the features compelling different palatalization processes are all separate and independent. That is, a process such as First Velar Palatalization does not imply the presence or absence of any other palatalizing process.

Thus an analysis of Slavic palatalization must not only account for the processes themselves, but also for their distributions. Patterns which do not follow the paradigms can be shown to fall out from the emergence of other phonological processes. For example, Czech's ban on geminate consonants leads to the deletion of post-alveolar stridents before the suffix [-ʃiː].

Phonological processes in enclaves:
the impact of source-language constraints

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The paper discusses phonological processes in the language of Russian enclaves in East Siberia. The enclaves in question (to date only two communities in the polar area of Yakutia, on lower Indigirka and lower Kolyma) emerged in the 17th century as a result of Russian colonization of the Far North. In the course of time they developed varieties that were the result of merging 17th and centuries Russian with Tungusic and Paleo-Siberian elements.

A special consideration is given to the rise vowel harmony processes in the varieties in question that were most likely initiated by sustained contacts with the neighbouring Yukagir and Even languages. In accordance with the two types of harmonic relations in the source-languages (palatal harmony and labial harmony) Russian vowels could receive respective markers. Both types of harmonic relations may be interpreted as dominant-recessive, i.e. the harmonic value of a dominant vowel determines the quality of other vowels without a correspondence to morpheme boundaries.

Here we will discuss the interaction of the innovative constraints and old (original) phonological rules. As an example the interaction between the distinction of rounded – non-rounded phonemes (original feature) and labial assimilation (in all probability a feature of non-genetic origin) may be considered. It may be assumed that the regressively operating labial assimilation replaced the distinction of rounded and non-rounded phonemes in pre-tonic and ante-pre-tonic syllables. In other words, formerly distinguished phonemes /o/ and /a/ are neutralised in [o] before rounded vowels and a non-rounded vowel will stands for the two phonemes in case there is a non-rounded vowel in the stressed syllable.

Contrary to labial assimilation palatal assimilation operates progressively, the first vowel in this case is a dominant one. Fronting of vowels may be observed if a vowel of the first syllable is specified as a front one, i.e. received a marker "+front" in terms of harmonic processes. The questions to be discussed in this section are the assigning harmonic values to vowels, vowel and consonant alternations with respect to harmony process.

The research is based on a recently collected audio data (approximately 110 hours of digital recordings from both communities) including spontaneous and prepared texts. The latter are specially designed programs (one of which is based on the *Questionnaire* to the *Dialectological Atlas of the Russian Language*) with the focus on phonological and prosodic features. Speech of various generations was recorded that allowed tracing diachronic processes in the phonological systems in question

A Phonetically-Based Optimality-Theoretic Analysis of Cantonese Loanwords:
Realization of Laryngeal Features of English Obstruents

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The purpose of this paper is to provide a phonetically-based account of Cantonese loanwords under the framework of Optimality Theory (henceforth OT) (Prince & Smolensky 1993; McCarthy & Prince 1993, 1995). The phonetic forms of loanwords are rarely identical to the corresponding original words of a source language. For example, the laryngeal feature values of English obstruents are not always maintained when they are borrowed into Cantonese, which can be summarized as follows: [pʰ]ie → [pʰay]; s[t]ick → [sitik˺]; [g]ame, [k]ame → [kem]; num[b]er → [lampa]; cu[t˺], cu[tʼ] → [kʰɐt˺]; sala[d˺], sala[dˈ], sala[t˺], sala[tʼ] → [salöt˺] (Silverman 1992; Yip 1993). Note that the phonetic or acoustic output of an English word-final voiced stop may be voiced unreleased [˺], voiced released [ˈ], voiceless unreleased, or voiceless released, whereas in Cantonese, it always becomes voiceless unreleased. I provide a phonetically-based analysis of English loanwords in Cantonese, based on the acoustic properties of English and Cantonese stops.

Although previous research on Cantonese loanwords (Silverman 1992; Yip 1993) claims that acoustic or perceptual factors play a role in loanword phonology, the explanation of how they work is insufficient. For instance, following Silverman (1992), Yip (1993) assumes that the featural changes shown above are automatically made at the "Perceptual Level". She simply states that English voiced stops are mapped to voiceless unaspirated ones in Cantonese at the "Perceptual Level" since only aspiration is contrastive in Cantonese. According to her logic, the possibility cannot be eliminated that they become voiceless aspirated in Cantonese. Thus, an in-depth discussion of which acoustic or articulatory properties are similar between English voiced and Cantonese voiceless unaspirated stops should be provided. From the viewpoint of the parallelism of OT, Yip's account is problematic in two aspects: first, it postulates two derivational levels, "Perceptual" and "Operative"; second, the OT grammar is effective only in the latter. That is, the former where the changes of laryngeal features are made is separated from the interaction of constraints.

I propose a phonetically-based OT account of English loanwords in Cantonese, explaining the roles of acoustic factors, e.g., VOT and the strength of release. That is, the realization patterns of laryngeal features of English obstruents in Cantonese are captured by the interaction of markedness constraints prohibiting elements which require articulatory effort, e.g., *VCDOBS (No obstruents must be voiced) (Hayes 1996), with faithfulness constraints requiring an input to be preserved in the output. Since the phonetic outputs of a source language—English acoustic outputs—become the (acoustic) inputs to a borrowing language (Silverman 1992), I employ faithfulness constraints evaluating the English acoustic outputs, e.g., MAX[+long VOT] ([+long VOT] in the input must be preserved in the output) (Lee 2001). Specifically, based on their VOT values, I categorize English and Cantonese voiceless aspirated stops into a voiceless strong release, which is acoustically the most prominent, English and Cantonese voiceless unaspirated stops into a somewhat prominent voiceless weak release, and English voiced stops into a much less prominent voiced release, formally represented by MAX[+positive/+long VOT], MAX[+positive/-long VOT], and MAX[-positive/-long VOT], respectively. These faithfulness constraints play a key role in capturing perceptual similarities in release prominence of English and Cantonese stops and in avoiding a drastic change between them. I show that there are no intermediate levels between English acoustic outputs and their equivalents in Cantonese and that a language-specific constraint hierarchy determines many-to-one mappings between them.

Some evidence for phonological degemination in the *Orrmulum*
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The *Orrmulum* is a crucial text for the investigation of early Middle English phonology. Its peculiar spelling is testimony to important sound changes from Old English to Middle English, such as Closed Syllable Shortening and Homorganic Cluster Lengthening. What the large majority of proposed explanations for Orrm's double consonant graphs fail to acknowledge, is that this orthographic innovation is a crown witness of a drastic change at the prosodic level. As Murray (2000) suggests, it is the phonologisation of a syllable cut prosody which explains the breakdown of the Old English quantity system. This talk presents some supporting evidence for Murray's analysis. In particular, it is shown that phonological degemination must have taken place prior to the *Orrmulum.*

Double consonant graphs are only found in syllable codas after short vowels. However, only intervocally minimal pairs like <sunne> 'sun' vs. <sune> 'son' can be found, which constitutes the central problem in interpreting Orrm's innovative spelling. Most analyses have posited the continuing existence of the phonological contrast between geminate vs. single consonants accounting for these minimal pairs. I will argue that this assumption is untenable for a number of reasons. First of all, if double consonant graphs in intervocalic position always denote the same phonological property this presupposes a number of unlikely sound changes in cases where proposed geminates are not etymological. For instance it is unclear how OE *rīpan* should acquire not only a geminate consonant but also a short vowel in the first syllable which is suggested by Orrm's spelling <rippenn>. Secondly, there are doublets like <sunne>, alongside <sune>, both meaning 'sun', which is very hard to explain from the perspective of phonological geminates. Thirdly, there are cases where triple consonant graphs are used, sometimes interchangeably with double consonant graphs, such as <seofennnaht>, <orrraþ> vs. <orraþ>. This would either mean a triple graph is equivalent to a double graph or that words like <seofennnaht> contain a phonological geminate plus a single consonant.. Both interpretations are highly problematic. Additionally, the existence of a phonological geminate in compounds like <unnorne> (OE *unorne*) cannot be posited.

According to the evidence presented, the minimal pair of <sune> and <sunne> cannot be distinguished on the basis of geminate vs. single consonant. Rather, the phonological system must have changed to account for the phenomena just mentioned. The incipient phonologisation of syllable cut advanced by Murray (2000) interprets the double consonant graphs as an indication for abruptly cut syllables. I will conclude that this is an adequate analysis of the data found in the *Orrmulum* and its underlying phonological system. Moreover, Murray's approach is also instructive for similar phenomena occurring in other Germanic languages in connection with the breakdown of phonological quantity.

References:

Murray, R., W., (2000), "Syllable Cut Prosody in Early Middle English", *Language* 76,3: 617-654

The Role of Prosody in Parsing Ambiguous Sentences

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This paper aims to assess the contribution of prosody to the parsing of syntactically ambiguous sentences. Based on Marslen-Wilson et al's experiment in 1992 on 'Prosodic effects on minimal attachment', my experiment details a cross-modal naming task to test whether listeners will be able to use their prior knowledge of the prosodic characteristics associated with syntactically ambiguous constructions to differentiate between them given only the first two words of sentences such as:

    (1) Packing cases are always newsworthy

    (2) Packing cases is always newsworthy

In the first sentence, the words Packing and cases form a phrasal collocation meaning 'travelling cases'. In the second, however, they form a verb phrase representing the act of packing. Research on the subject to date, including Marslen-Wilson et al (1992), has either provided adequate syntactic information for the listener to recognise ambiguity but inadequate prosodic information to resolve it or employed off-line tests of comprehension. However, as according to Marslen-Wilson et al (1992: 84), off-line tasks are more pertinent to charting the final stage of processing when the listener has constructed a unified representation of the input. In incorporating controls for both these limitations, my experiment was able to show that prosodic cues are able to guide initial parsing of input. More importantly – in testing the parsing of stimuli from sentences such as (1) and (2) above which do not provide any syntactic preferences to the parser prior to the presentation of adequate prosodic cues – my experiment was able to establish the possibility of prosodic cues guiding initial parsing in the absence of putative syntactic parsing predilections suggested in earlier research (Frazier: 1979, 1987). Further, I tested the ability of more specific prosodic cues such as differences in word duration, pitch accent f_0 values and the placement of the nuclear accent of the ambiguous word pairs to guide parsing, and was able to suggest that the difference in pitch was a possible motivator of parsing preferences.

This research also examines the ongoing theoretical debate between the proponents of different variants of the serial and parallel processing models of speech processing. Despite extensive research none of the alternatives have been able to substantiate their premises with conclusive experimental evidence. Does prosodic input have the same status as syntactic input in structure assignment? A further theoretical objective of this paper is to suggest a model of speech processing that acknowledges the possibility of exclusively prosodic initial analysis, while at the same time incorporating alternative yet simultaneous pathways for solely syntactically or prosodically motivate initial parsing of speech stimulus.

References:

Frazier, L. 1979. *On Comprehending sentences: Syntactic Parsing Strategies*, Indiana University Linguistics Club, Bloomington.

Frazier, L. 1987. 'Sentence processing: a tutorial review', in *Attention and Performance XII: The Psychology of Reading*; ed. M. Cotlheart, Erlbaum.

Marslen-Wilson, W.D., Tyler, L.K., Warren, P., Grenier, P. & Lee, C.S. 1992. 'Prosodic effects in minimal attachment', *Quarterly Journal of Experimental Psychology*, vol. 45A, pp. 73-87.

Reduplication of Recent (and Future) Loanwords in Kisukuma

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The introduction of Optimality Theory (OT) in 1993 sparked an interest in prosodic morphology and reduplication in particular. One group of languages that has significantly benefited from this interest is Bantu – a group of 500+ languages spoken in Africa south of the Sahara (Downing 1997, 1999, 2000; Odden 1996; Steriade 1997, 1999; Hyman et al. 1998; Inkelas and Zoll 1999, among others). The results of this research seems to point to the generalization that reduplication in Bantu languages (and probably everywhere else) is a morphological process that can be accounted for morphosyntactically without referring to the base-reduplicant correspondences (Hyman, et al. 1998). In Inkelas and Zoll's model (1999), reduplication is viewed as morphological doubling. None of these studies, however, have attempted to account for reduplication in recent loans in Bantu languages.

In this paper I discuss the factors that determine the shape of the reduplicant in Kisukuma – a Bantu language spoken in Tanzania. By using the Lexical Conservatism model (Steriade 1997, 1999), I demonstrate that the morphological view of reduplication propounded in the previous studies is applicable only in reduplication of the native words and assimilated loans. In recent loans, however, the morphology is opaque and morphological constraints cannot be evaluated. The shape of the reduplicant is therefore determined by phonological constraints. Based on this observation, I show that it is possible to predict the shape of the reduplicant in Kisukuma future loans.

REFERENCES

Downing, L. J. 1997. "Morphological correspondence in Kinande reduplication". *Proceedings of the Twenty-third Annual Meeting of the Berkeley Linguistics Society.*

_____, 1999. "Verbal reduplication in three Bantu languages" In René Kager, Harry van der Hulst, and Wim Zonneveld, *The Prosody-Morphology Interface*, Cambridge: Cambridge University Press.

_____, 2000. "Morphological and prosodic constraints on Kinande verbal reduplication". *Phonology* 17:1-38.

Hyman, L. et al. 1998. Morphosyntactic Correspondence in Bantu Reduplication. TREND, Berkeley.

Inkelas, S. and Cherry Zoll. 1999. Reduplication as double stem selection. Paper presented at Phonology 2000 Sympoium, Harvard and MIT.

Odden, D. 1996. "Patterns of reduplication in Kikerewe". *OSU Working Papers in Linguistics* 48, 111-149.

Steriade, D. 1997. Lexical Conservatism and its analysis. Ms. UCLA.

Steriade, D. 1999. Lexical conservatism and the notion base of affixation. Ms. UCLA.

A contextual explanation for asymmetries in binary stress systems (paper presentation)

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Hyde (2002) states that predictions concerning iambic-trochaic asymmetries, i.e. trochaic patterns which do not have attested iambic counterparts or vice versa, are problematic in standard approaches to metrical systems. In contrast to Hyde it is argued in this paper that iambic-trochaic asymmetries in weight-insensitive systems cannot be accounted for by an investigation of wordlists, because some of the problems only occur in the sentential context. Instead, the iambic-trochaic asymmetries are analysed by 1) taking sentence rhythm into consideration and 2) by including limits of human anticipation (cf. e.g. Baddeley 1994, Miller 1956). Pintupi (initial accent and secondary accents on every odd-numbered syllable counting from left to right on with the exception of word final syllables: ό̀σὸσὸσσ) and its non-attested rhythmical mirror image (ultimate stress and secondary accents on odd-numbered syllables counting from right to left with the exception of initial syllables: σσὸσὸσό́) serve as an example for illustration.

1) <u>Sentence rhythm in Pintupi</u>:
Binary stress systems are in many frameworks considered ideal manifestations of rhythm. However, Pintupi shows ternary patterns: In words with an odd number of syllables, a ternary foot evolves at the right word edge (Hansen/Hansen 1969: 162–163). Since stress clash is dispreferred in weight-insensitive binary stress systems, a final ternary foot in words with odd syllable number prevents stress clash between words:
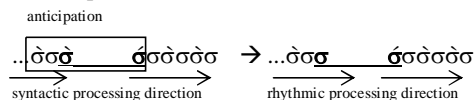
The data demonstrate that Pintupi feet are sensitive to the domain of the sentence. The stress clash problem is manageable by the speakers, because in order to detect whether to stress the final syllable or not, they only have to plan a few syllables in advance, syntactic processing and rhythmic processing running in the same direction.

2) <u>Limits of anticipation in the non-attested Pintupi mirror type</u>
Preventing stress clash in the Pintupi mirror image is cognitively much more complex:
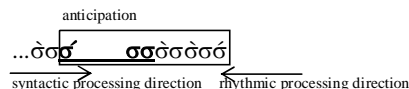
In order to avoid stress clash between words in the Pintupi mirror image, the following word has to be parsed completely from right to left in order to decide whether to stress the second or the third syllable. In addition, the speaker has to violate binarity in words with an odd number of syllables (i.e. not to stress the initial syllable). The longer the word, the more complex the task becomes. Unlike in languages which accept ternary patterns word-internally, the chance to ”misparse” is considerably high in the Pintupi mirror type.

As a consequence, the one-word-sentence as the domain for rhythmic research has to be re-considered. Furthermore, the interaction between sentence rhythm and limits of anticipation might be taken into account.

<u>References</u>

Baddeley, Alan (1994), The magical number seven: still magic after all these years? In: *Psychological Review* 101, 353–356.
Hansen/Hansen (1969), Pintupi phonology. In: *Oceanic Linguistics* 8, 153–170.
Hyde, Bret (2002), A restrictive theory of stress. In: *Phonology* 19, 313–359.
Miller, George A. (1956), The magical number seven, plus or minus two: Some limits on our capacity for processing information. Partial reprint in: *Psychological Review* 101, 343–352.

Germanic and the ruki dialects

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A new relationship is proposed between Germanic, which shows lowering and retraction of vowels before /r/, /w/, /x/, and the ruki dialects of Indo-European: Baltic, Slavic and Indo-Iranian, which have retraction of consonants following /r/, /u/, /k/, /i/. There are two aspects to the relationship: the Germanic segments correspond directly to three of the four ruki segments and the effects on vowels in Germanic and on consonants in the ruki dialects may be attributed to the spread of a common phonological feature, Retracted Tongue-root (RTR).

The Germanic material, which includes

- OE breaking and retraction before /r/, /w/, /x/, /l/: *heard, strawes, eahta, eald*

- OHG monophthongization /ai/ > /e:/ before /r/, /w/ and Germanic /x/: *mēro, spē, zēh*

- Gothic lowering of /i/, /u/ before /r/, /x/, /xʷ/: *airθa, waurms, faihu, dauhtar, gasaihʷan*

- ON lowering of /i/, /u/, monophthongization of /au/, /ai/ before /x/: *rétta, sótt, fló, á,*

has been thoroughly dug over by Vennemann (1972) who struggles to find a common explanation in terms of Chomsky-Halle features.

Vennemann (1974) also treats the ruki phenomena

- Sanskrit retroflexion of /s/, /n/: *kṛṣṇa, śatruṣu, varuṇa, kṣaṇah, agniṣu, pariṇam*

- Russian /s/ > /x/: *verx, sux, (OCS) rēxŭ, tix*

- Lithuanian /s/ > /š/: *viršùs, aũšti, šešì, áiškus*

and includes the Germanic and the ruki sets in a table of natural classes without making an explicit connection.

It may be that /r/ is often RTR but the addition of this feature to the high vowels (making them half-close) and to /k/ (giving phonetic [q]) is claimed as a new dialect marker in Indo-European, evidenced by effects on vowels in Germanic and consonants in the ruki group, and giving a new perspective for the historical phonology of the languages.

On the role of ONSET in stress placement

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This paper is concerned with the interaction of syllabification and stress, in particular with the effect of the OT constraint ONSET on stress placement in the context of V-abutting high vowels. It contributes to the OT analysis of Spanish stress and (partly) syllabification, arguably going beyond predecessors (e.g. Rosenthall 1994, Colina 1995, Morales-Front 1999). It also bears on the general issue of parallel evaluation vs. derivational levels (Harris & Kaisse 1999, McCarthy 2003).

Spanish stress tends to be rightmost (hence ALIGN(FtHd, PW)-R), with the main proviso that the 'word marker' or 'desinence' (the word-final –V(s) suffix descending from the Latin TV+inflection complex: *parabol-a-m* > *palabr-a*) never bears stress (*STR-WM >> ALIGN(FtHd, PW)-R): e.g. *tam(bór-)*, *me(nú-)*, *pa(lábr-a)*, *(tríb-u)* (cf. ***trib-al***). (Undominated TROCH and FT-BINmax are assumed throughout.) A (fairly large) set of forms (but still a minority: not more than 10%) exhibit stem-prefinal stress (*STR-WM, [FT-BINmin]^{marked} >> ALIGN(FtHd, PW)-R): *(timpa)n-o* (cf, unmarked *her(mán-o)*), *(útil)* (cf. *su(tíl)*). In a handful of lexical words (not more than 10), and openly in Germanic imports, the final syllable, although not containing a desinence, is parsed outside the foot ([NONFINAL]$^{marked+}$, [FT-BINmin]^{marked} >> ALIGN(FtHd, PW)-R): *(régi)men-*, *(Mánches)ter-*.

As a result of the foregoing procedure, Spanish stress is confined to a three-syllable window [3σW] at the right edge of the word (Harris 1983, 1995, Roca 1997a, and many others), empirically confirmed by stress such shifts as *sílab-a → silábic-o*, *anécdot-a → anecdótic-o*, *apóstol- → apostólic-o*, etc. However, other shifts are not relatable to a 3σW, e.g. *mé.ri.t-o → me.ri.t-ò.ri-o*, *púr.pu.r-a → pur.pú.re-o*, etc. These shifts correlate with the presence of abutting high vowels in the window, which concomitantly gets narrowed. The appropriate formalisation involves award of stress bearer status to all vowels (to this extent co-extensive with moras) and the ranking of ONSET above both ALIGN(FtHd-St)-R and *V/M (for M = margin, i.e. non-peak): ONSET, FT-BINmin >> *V/M, ALIGN(FtHd-St)-R, hence *(mé.ri.)t-o, me.ri.t(ó.ri)-o*.

This simple analysis also resolves some markedness paradoxes. Forms like *ca.(rá[i]-)* and *(rá.b[i]-)a* would appear to need formal marking for stress (they seemingly require activation of high ranking [FT-BINmin]^{marked}), but nonetheless feel unmarked to the speaker (indeed, they do not carry orthographic accent), in contrast with *a.<h>(í-)* and *algara.(bí-a)*, unmarked according to the procedure (they carry stem-final stress), but marked intuitively (and orthographically). The answer is straightforward: in *ca.rá/i/-* and *rá.b/i/-a* ONSET induces tautosyllabicity, and stress 'migrates' to the preceding vowel, a syllable peak on considerations of sonority: ONSET >> *V/M, ALIGN(FtHd-St)-R, hence *ca.(rái)-*, *(rá.bi)-a* (**rabi-(á)* is ruled out by undominated *STR-WM). On the other hand, intuitively marked *a.<h>í* and *algarabí.-a* in any event need a lexical peak, preserved by a faithfulness constraint MAX-Pk outranking ONSET (cf. Harris & Kaisse 1999, Hualde 1997, Roca 1997b), i.e. MAX-Pk >> ONSET >> *V/M, ALIGN(FtHd-St)-R, hence *a.<h>(í)-*, *algara(bí.-a)*.

Besides accounting for some recalcitrant facts of Spanish, the analysis being offered confirms the reality of syllable and metrical structure intertwining. In particular, ONSET has been shown to interact decisively with the stress procedure, in a manner that is at least awkward to express in the rule-and-derivation paradigm.

Melodic Headedness of U in Relation to Word Accents in the Tokyo and Kyoto Dialects

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This paper offers a phonological analysis of the compatibility between vowel quality and lexical accent in the Tokyo (TD) and Kyoto dialects (KD). This work benefits not only from phonological considerations but also from phonetic analysis. This line of research elucidates the difference in accentual behaviours between the two dialects: in TD, the epenthetic vowel /u/s found in loanwords repel accents, whereas in KD this does not apply at all.

As for native nouns, analyses from these two perspectives converge on the claim that the vowel /a/ attracts lexical accents, while on the other hand /u/ repels lexical accents in TD. In order to test the 'accentability' of all 5 vowels in TD, the ratio is examined for each accented vowel out of the total number of tokens of that vowel. The vowels are extracted from all $(C)V_1(C)V_2$ native nouns found in Sugito (1995), giving a total of 1,026 (513x2=1,026) in all 513 samples. 42% of all /a/s are accented, followed by /i/ (34.8%), whereas only 29.3% of all /u/s are found with accents. Acoustic measurements of vowel duration suggest that the longest vowel (/a/ 72ms) attracts lexical accents most, and the shortest vowel (/u/ 55ms), the least. At the same time, a phonological analysis couched in the theory of Phonological Government (Charette and Goksel (1998), Harris and Lindsey (1995), Kaye, Lowenstamm and Vergnaud (1985, 1990),) provides an account of which vowel tends to attract or repel accents, calling upon the notion of licensing relations holding between Phonological Elements: the headedness of the simplex melodic expressions A and I. The occurrence of the metrical head of a word-domain thus depends upon the quality of the melodic expression occurring in that domain.

In KD again, the ratio is examined for each accented vowel out of the total number of tokens of that vowel. We should take /u/ (45%) as the most popular for accents, followed by /o/ (28%), /a/ (27%), /i/ (17%), and the least /e/ (14%): this suggests that in KD, the simplex melodic expression, U (/u/), should be headed unlike in TD. An acoustic study of all 5 vowels in KD reveals that their durations are generally longer than the TD counterparts, however, especially the duration of /u/ in TD (55ms) contrasts remarkably with that of KD (84ms).

Special session

Phonology and Loanword Adaptation

Speakers (speaking in alphabetical order)

Michael Kenstowicz (MIT, USA)

The Role of Perception in Loanword Adaptation: a Case Study from Thai
In this paper we summarize the major findings of a study of the adaptation of English loanwords into Thai based on a corpus of over 800 items assembled by Suchato (2003). We begin by sketching the three major positions on this question that have emerged in the recent literature. We then look at the adaptations of English /g,z,ʃ,θ,v/ to Thai /k,s,tʃ,t,w/ from the perspective of Steriade's P-Map hypothesis. We then pass on to three major adaptation patterns: mapping of the English two-way voiced vs. voiceless contrast /p/ vs. /b/ to Thai's three-way /ph,p,b/, the treatment of English consonant clusters in the face of Thai's CRVC syllable template, and choosing among Thai's five tones for an F0 contour for the loan.

Carole Paradis (Université Laval, Canada)

The unnatural Cʲu (<Cy) sequence in Russian loanwords: a problem for the perceptual view
LaCharité & Paradis (2000, 2004) and Paradis & LaCharité (1997, 2001, 2003), who support the "phonological view", have already brought numerous arguments against the "perceptual view" as a general explanation for sound adaptation in lexical loanwords. This talk offers a new type of evidence against the perceptual view: the fact that, for phonological reasons, the adaptation of a phoneme of the source language yields in the borrowing language (L1) an unnatural phonotactic sequence. This sequence is /Cʲu/, where a consonant is palatalized before a back vowel (/u/). Yet palatalization systematically occurs before front vowels in Russian, not back vowels. The /Cʲu/ sequence results from the adaptation of the foreign sequence /Cy/ in Russian loanwords from French, German and various languages of the Turkish family. This adaptation does not support the perceptual view, which maintains that loanword adaptations are due to L1 "deafnesses" that reconstruct what is natural to the L1 ear.

Moira Yip (University College London, UK)

The symbiosis between perception and grammar in interlanguage and in loanword phonology
Interlanguage and loanword adaptation are two related consequences of language contact, and loans may often come via the interlanguage, and not directly from L2. The interaction between perception and the grammar is different. With an **interlanguage** there is an attempt to acquire a new grammar, so the percept will initiate changes from L1 grammar. With **loans** there is no desire to change the grammar, so the percept may be unachievable. The result is that (using ✍ to mean 'fairly similar to'), we expect a hierarchy in which the L2 form ✍ IL form ✍ loan form ✍native L1 forms.

    The hearer may fail to perceive the **presence** of a segment or property; a **distinction** between 2 segments; or the **basis** of that distinction. Any of these may result in adaptations of the L2 form. The grammar then imposes further changes, as shown by the fact that different communities with the same L1 may use different adaptation strategies. Contrast preservation plays a role (LaCharite and Paradis). But there are limits to the grammar. Matching stress/tone and word-shape are more important than matching vowel quality, so epenthesis and deletion can never be caused by a vowel quality match. On the other hand matching a salient consonant is more important than conserving word-shape, perhaps because of the greater information-carrying capacity of consonants. Grammar has access to perceptual information, particularly relative salience of acoustic and perhaps visual cues. (Steriade 2001, Shinohara 2004, Yip 2002, Kenstowicz 2003)**.** Data will come mainly from English loans into Cantonese, especially vowel adaptations.