The Fourteenth Manchester Phonology Meeting

ABSTRACTS BOOKLET

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

This booklet contains the abstracts for all the papers presented at the **fourteenth Manchester Phonology Meeting**, held at Hulme Hall, Manchester, in May 2006.

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

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

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 sessions, which will be held in the **bar area**. The opening and closing addresses and the special session will be held in the Old Dining Hall. The parallel sessions for the oral papers will be held in the Old Dining Hall and the Seminar Room.

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

Oral papers

Colloquial Finnish: Truncation Patterns Motivated by Prosody

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The phonology of Colloquial Finnish as it is spoken in the Helsinki area differs from Standard Finnish in several ways. One of the more distinctive characteristics of the colloquial dialect is that patterns of segment deletion apply across varying phonological environments and lexical categories. Although deletions of both word-final and word-internal segments occur, usually resulting in forms that are shorter than standard forms by one or more syllables, morphological information is never deleted. With the exception of vowel coalescence (Anttila, to appear), the phonological alternations of Colloquial Finnish have not been accounted for in a unified analysis. The current proposal recognizes truncation in Colloquial Finnish as involving ***the coordination of prosodic, morphological and phonological information*** to determine the optimal shortened forms. By applying Optimality Theoretic prosodic constraints (Prince and Smolensky, 1993, McCarthy and Prince, 1993) at the level of the phrase, ***a unified account of truncation patterns*** is presented in terms of different constraint rankings for Standard and Colloquial Finnish.

Previous analyses show that Standard Finnish prosodic structure is based on the moraic trochee, allowing metrical structure to vary between binary and ternary rhythm (Hanson and Kiparsky, 1996). Prosodic cliticization of function words with lexical words (as in Selkirk, Elizabeth, 1995) and a bimoraic minimality requirement which allows two function words to form a foot (Kiparsky, 1996) are shown in the current analysis to be the primary prosodic structures of the Colloquial dialect. Following Benua (1997), truncated forms are evaluated with Output-to-Output constraints for correspondence between the truncated form and the full word. The constraint ranking for Colloquial Finnish differs significantly from Standard Finnish in that several Markedness constraints are ranked above MAX-segment, resulting in deletions. However, the undominated Faithfulness constraint MPARSE ("Parse morpheme," McCarthy, 2005) prevents the loss of morphological information in both Standard and Colloquial Finnish.

The need for prosodic constraints to apply at the phrasal level is motivated when standard word forms do not in themselves appear to violate any of the active Markedness constraints, yet they are shortened. It is shown that the re-ranking of constraints such as FOOT-BINARITY and *CLASH, together with the footing of function words with lexical words or other function words, can account for the seemingly unlikely truncation of universally favored CVCV structures, as for the pronoun *sinä,* 'you' in the phrase in (1).

(1)	Standard:	→	Colloquial:
	[Túle-t-ko sínä mín-un kánssa(ni)]		[Túu-k sä mú-n kaa]
	(Tú.let.ko)(**sí.nä**)(mí.nun)(káns.sa.ni)		(Túuk.**sä**)(mún)(káa)
	Come-2nd-Q you me-GEN with		
	Will you come with me?		

This striking adherence to binary rhythm is the defining characteristic of Colloquial Finnish and the motivator for a range of alternations. Interactions between constraints produce Colloquial forms in which certain segments are deleted, and others are preserved, altered, or spread. Thus, this analysis presents ***a case in which prosodic constraints applying at the phrasal level determine the output of truncated word forms***.

Why eatees are not E.T.'s: Blocking of aspiration by output-output constraints

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One of the best-known facts about English phonology is that aspiration is predictable: voiceless stops are aspirated at the beginning of a word or stressed syllable, and unaspirated elsewhere. Aspiration is automatic and exceptionless, and when stress moves, aspiration is adjusted accordingly: *acc*[ʰ]*úse ~ àccusátion*, *mércury ~ merc*[ʰ]*úrial*. Importantly, however, word-final stops do not aspirate before stressed vowels: *soak úp*, not **soak*[ʰ]*úp*. The failure of aspiration across word boundaries is generally attributed to a combination of two forces (Selkirk 1984): (1) English does not resyllabify across certain morphological boundaries, and (2) aspiration applies only within the syllable. Thus, *soak up* is syllabified [soʊk.ʌp], and since the [k] is not within the stressed syllable, it remains unaspirated.

Less well-known is the fact that some word-internal stressed vowels also fail to trigger aspiration, at least for many American English speakers. This happens when certain stressed suffixes, such as *-ée*, attach to verbs ending in voiceless stops: *escà*[p]*ée*, not **escà*[pʰ]*ée*. Although attested examples are rare, nonce forms show that the pattern is productive (*sòa*[k]*ée*, *attàc*[k]*ée*, *bèe*[p]*ée*), with similar suffixes showing the same pattern (*Yà*[p]*ése*, *Trù*[k]*ése*). Acoustic analysis of such forms confirms that they have short VOT equivalent to stops before stressless *-er* (*sóaker*, *béeper*), and long closure duration equivalent to word-final stops (*sòak éach*, *bèep éach*). Thus, affixes like *-ée* truly fail to trigger aspiration.

A possible move would be to posit that *-ée* and *-ése* block resyllabification, just as word boundaries do. Such an analysis is fundamentally inadequate, though, for three reasons. First, there is no morphological reason why these suffixes should involve stronger boundaries than other, prosodically equivalent suffixes. Comparing *-ée* and *-éer*, for example, we see that both attract stress and cause morphological truncation (*evacu-ée*, *volunt-éer*); however, only *-ée* resists aspiration, while *-éer* triggers it as expected (*chario*[tʰ]*éer*, *pamphle*[tʰ]*éer*, *sonne*[tʰ]*éer*). Second, even if we stipulated that *-ée* involves a stronger boundary, additional data reveals that this would still be insufficient: in fact, there are two cases where *-ée* does show the expected aspiration. One is when the base has undergone truncation (attested *ampu*[tʰ]*ée*, nonce *regurgi*[tʰ]*ée*). The other is when the base ends in clusters /nt/, /lt/, /rt/ (attested *appoint*[tʰ]*ée*, *deport*[tʰ]*ée*, nonce *assaul*[tʰ]*ée*). Here, the stop acts as an onset to the *-ée* suffix—thus, we cannot say that *-ée* always blocks resyllabification. Lastly, the boundary before *-ée* is unlike a word boundary in that it does not condition flapping: *èat éach* [ˈiːɾʌp] but *èatée* *[ˈiːɾíː]. Taken together, these facts suggest that stipulating a syllabification cannot predict the details of when *-ée* blocks aspiration

I propose that these facts are better explained if the realization of stem-final stops is determined not by syllabification, but by an O-O faithfulness constraint demanding that stops before productively derived boundaries must closely resemble their phonetic realization in isolated verb forms. The fact that *-éer* allows aspiration follows straightforwardly from the fact that it is unproductive, while *-ée*, *-ése*, and word concatenation are all productive, to varying degrees. Among cases of *-ée* affixation, stem-final stops in truncated forms correspond to aspirated stops in the base form of the verb (*ámpu*[tʰ]*àte*), while /t/ in clusters is at least optionally released in isolation (*appoint*$^{(h)}$, *assault*$^{(h)}$), but simple word-final /t/ rarely is (**eat*$^{(h)}$). Thus, what unifies these cases is the availability of aspirated or released realizations in isolation forms. Finally, although the difference between pre-tonic flapping word-medially vs. across word boundary is more difficult to explain, several possible lines of explanation are explored.

A chicken-and-egg situation? Setting lexical marks in interaction with the grammar

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One problem in phonological first language acquisition is that the learner has to learn the grammar of a language and concurrently learn the phonological underlying forms. But determining the underlying form of a word implies knowing the grammar of the language, and determining the grammar implies knowing the underlying forms. For instance in languages with lexical stress, learners have to realize that stress is not assigned by the grammar, but that underlying forms have to be specified for stress. Still, the assumptions about the underlying forms will influence the assumptions about the grammar, and vice versa.

This paper explores how lexical stress in Modern Greek can be acquired in interaction with the grammar, couched in an Optimality Theoretic framework (Prince & Smolensky 1993). The basis for this is a proposal of Tesar et al. (2003) about how a language learner uses inconsistency detection and surgery to set specifications for stress in the lexicon. In the model of Tesar et al. the learner will modify the constraint ranking first to account for the data (by using Biased Constraint Demotion, Prince & Tesar 1999; see also Hayes 1999), and if that is not efficient, modify the lexicon. The learner keeps alternating between modifying the grammar and modifying the lexicon until all inconsistencies are resolved. The lexicon is modified by specifying stress in a rather straightforward way, i.e. morphemes can either have a lexical stress on a certain syllable or not. Modern Greek complicates the case in that it not only employs lexically stressed and unstressed morphemes, but also pre- and post-stressing morphemes. Roots in Modern Greek can be unstressed like in *anθrop-* 'human', stressed like in *ɣóndol-* 'gondola', and post-stressing like in *aɣor→* 'market'. Inflectional suffixes can be unstressed, e.g. *-a*, stressed, e.g. *-ón*, and pre-stressing, e.g. *←u*. This has the consequence that the learner does not know whether a syllable is stressed by a) the grammar, b) a lexical specification within the morpheme itself or c) a lexical specification of another morpheme preceding or following it. Revithiadou (1998) proposed for Modern Greek that the lexical marks for stress in Modern Greek have the form of partial foot structure (Idsardi 1992). In Revithiadou's account, stressed morphemes like *ɣóndol-* have a mark for a foot head, denoted with an opening parenthesis *(ɣondol-*, while pre-stressing morphemes like *←u* are marked for being the weak part of the foot, denoted with a closing parenthesis *-u)*. The grammar then builds trochaic feet on basis of the lexical marks. For instance *(ɣondol-* becomes *(ɣóndo)la* when inflected, and *-u)* surfaces as pre-stressing if attached to an unstressed root *anθrop-*: *an(θrópu)*. Deviating from Revithiadou's (1998) approach, who treats post-stressing roots as carrying a floating accent, it is assumed here that post-stressing roots are marked for a foot head being right-aligned with the root-final syllable: *aɣor(-* (see Idsardi 1992 for a similar approach to Russian stress). This unifies the analysis of stressed, pre- and post-stressing morphemes in Modern Greek, but poses some additional challenges for the learner. S/he not only has to detect the lexical foot parts, but has to decide to what edge of the foot part has to be aligned with which edge of the syllable. In the case of e.g. *(ɣondol-*, s/he would have to align the foot specification to the left edge of the first syllable. In the case of the pre-stressing suffix *-u)* and the post-stressing root *aɣor(-* s/he would have to align the specification to the right of the final syllable.

The paper at hand explores how exactly lexical stress in Modern Greek should be specified, what faithfulness constraints access these specifications and how a child learning Greek can set these specifications and concurrently learn the appropriate ranking. The model of Tesar et al. (2003) is extended to accommodate the Greek data, and it is investigated in how far inconsistency detection and surgery is compatible with other constraint reranking strategies like the Gradual Learning Algorithm (Boersma 1997).

The phonetic substance of prominence level: the case of stress and accent in Catalan

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Work by Slujter & collaborators (1996a, 1996b, 1997), and Beckman & collaborators (1986, 1988, 1994, 1997) was among the first to examine the acoustic correlates of stress independently from accent. Slujter & collaborators (1996a, 1996b, 1997) modelled metrical prominence as a two-dimensional scale with two levels in each dimension (accented and unaccented syllables and, within each, stressed and unstressed syllables). They found that even in deaccented contexts, stressed syllables can still be distinguished acoustically (1996a) and perceptually (1997). Differences in duration (stressed syllables are longer) and in spectral balance (stressed syllables show an increase in intensity affecting the higher regions of the spectrum) were found to be strong correlates of stress, regardless of the presence or absence of an accent, while overall intensity was a cue of accent rather than of stress. Their results were confirmed in American English (Turk & Sawusch 1997), in British English (1999), and in Spanish (Ortega-Llebaria & Prieto 2005). On the other hand, Beckman & collaborators (1997) modelled prominence as a one-dimensional scale with three levels, namely stressed-accented, stressed, and unstressed (Hayes 1983, Selkirk 1984) but failed to find consistent phonetic correlates of stress in American English, and this led them to argue that stress is not a consistent cross-linguistic phonetic property. Turk & collaborators (1997, 1999) found confirmation for the durational effects of stress, but they also found that duration interacted strongly with accent, so that the effects of accent extended to the entire word. It remains an empirical question whether different levels of prominence are indeed cued by a separate set of phonetic correlates, which correlates are these, and how do they interact.

This study addresses these empirical questions in Catalan, a language with lexical stress and phonemic vowel reduction as Dutch and English. Earlier work on Catalan has examined the phonetic correlates of stress exclusively in accented contexts, therefore suffering from covariation with accent (Recasens 1986). The first goal is to investigate whether we find systematic phonetic differences between stressed and unstressed syllables in terms of duration, spectral balance, vowel quality, vowel pitch, and intensity. If these are found, this would represent further evidence of the phonetic reality of the lower level of prominence, stress. The second goal is to investigate whether accentual prominence is cued by phonetic correlates different from those of stress, and also whether the presence of an accent amplifies the acoustic cues present in the stress dimension. Our experimental design follows that of Slujter et al (1996a, 1996b, 1997) in that we have four experimental conditions: [+accent, +stress], [+accent, -stress], [-accent, +stress], [-accent, -stress]. The accent contrast is provided by minimal pairs of apposition and right-dislocated phrases such as ***M'agrada la protagonista, la Mimi*** 'I like the protagonist, Mimi' (***accented***) vs. ***Vol ser la protagonista, la Mimi*** '(S)he wants to be the protagonist, Mimi' (***deaccented***). The stress contrast is provided by minimal-pairs with ultimate and penultimate stress (***Mimi*** and ***Mimí***). The corpus is formed by 576 target sentences, read by six female native speakers of Central Catalan.

Our results confirm findings by Slujter et al (1996a, 1996b, 1997) in that stress differences are cued by robust and systematic acoustic cues. The basic phonetic difference between stressed and accented syllables is one of spectral balance: stressed syllables show an increase in intensity affecting the higher regions of the spectrum. Other phonetic cues traditionally associated with stress, such as pitch excursion, intensity, duration, and vowel reduction (Fry 1955, 1958, 1965; Lehiste 1970) are shown to be associated also with accent, which makes them inadequate indicators of the stress-accent difference. The conclusion is that different levels of prominence are indeed signalled by separate sets of acoustic cues. We discuss these results and the implications for models of metrical prominence.

The phonetics structures of endangered Mexican languages project: Consequences of fieldwork phonetics for phonological theory.

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In this talk I report the results of the first stage of the project investigating the phonetic structures of the indigenous languages of Mexico through field collection of data and laboratory analysis of recordings and other materials at UC Berkeley in collaboration with Professor Ian Maddieson. Following the techniques and methodologies for field phonetics and the analytical frameworks for describing the sounds of the world's languages established in previous research by Peter Ladefoged and Ian Maddieson (1996), a number of targeted Mexican languages that are in imminent danger of extinction are being investigated. Each language is being documented by recording word lists which illustrate all the segmental and prosodic properties used in the language and used to make quantitative acoustic analyses of the segmental properties of the languages. In addition, a variety of articulatory and aerodynamic investigative techniques are being adapted for use in the field situation to obtain data on the speech production mechanisms used. Analyses of three particular targeted languages, Mixe, Oaxaca Chontal, and Yalalag Zapotec are reported in this paper. The results obtained thus far show that there are properties of these languages which can inform and extend our understanding of the sound patterns of language in significant way. In particular, the properties of Mixe vowels systems indicate that claims of Dispersion Focalization Theory (Schwartz et al 1997) should be modified. Oaxaca Chontal glottalized sonorants present evidence against the universal tendencies regarding their realization as pre-glottalized in the syllable onset, and post-glottalized in the coda (Um 2001), as the most typical realization of glottalized approximants is as a laryngealized segment. Yalalag Zapotec phonation types provide insights on the functional motivation and extend the typology of modal and nonmodal phonation distribution in a vowel. Theoretical, methodological as well as practical issues will be further discussed.

Phonetic Variation and Phonological Theory: German Fricative Voicing

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This paper reports on the results of an experiment designed to test the different predictions of two phonological analyses of German fricative voicing: coda devoicing and positional faithfulness. The results exhibit so much variation that, at first glance, neither analysis seems to enjoy an advantage. We argue, however, that in spite of the considerable variation in our results, these findings support only one of the two competing accounts.

Jessen & Ringen (2002) argue that the contrast in German *stops* is one of [spread] vs. no laryngeal specification. Hence, there *is* no syllable-final devoicing of stops: all stops are voiceless unless (variably) voiced by passive voicing when between sonorants. Unlike stops, however, German fricatives *do* contrast for voicing in word-initial position (***w**ir* [v] 'we', ***v**ier* [f] 'four'), and there is a clear voice contrast in intervocalic position as well (*Gräs-er* [z] 'grass PL', *Füß-e* [s] 'foot PL'). Hence, it might be suggested that although there is no coda devoicing of stops in German, there is coda devoicing of fricatives (*Gra**s*** [s] 'grass SG').

An analysis that bans [voice] on obstruents in coda position and one that preserves [voice] in presonorant position make similar predictions about devoicing of fricatives: both accounts predict the devoicing of /z/ in *verlo**s**te* [s] 'raffle 1SG/3SG PAST' < verlo/z+t/e (*cf. verlosen* [z], INF). Specifically, the underlyingly voiced fricative is devoiced by the coda devoicing analysis because it is in a coda, and by the positional faithfulness account because it is not in presonorant position. However, the two accounts differ crucially when an underlying voiced fricative occurs before a sonorant consonant, as in *gru**s**lig* 'spooky' (*cf. gru**s**eln* [z] 'to spook') and *fa**s**rig* 'fibrous' (*cf. Fa**s**er* [z] 'fiber'), because [zl] and [zr] are not possible onsets. Here, if speakers produce [z] rather than [s], we have evidence that there is no coda devoicing because the syllabification must be *gru*[z.l]*ig*, *fa*[z.r]*ig*. In contrast, the voiced pronunciation is predicted by an analysis with presonorant faithfulness to voicing.

36 native speakers of Standard German were recorded in a sound-treated room. Subjects read a list of sentences, some containing words with the relevant structure (*fasrig*, etc.). Acoustic examination revealed variability across speakers and target words in the phonetic realization of the relevant phonologically voiced fricatives: In words like in *gru**s**lig* 'spooky' and *fa**s**rig* 'fibrous', the fricative was sometimes voiced (sometimes with a following syllabic sonorant consonant) and sometimes voiceless.

We argue that the output with the syllabic sonorant is the result of unranked constraints and is consistent with either the positional faithfulness or coda devoicing account. However, when the sonorant consonant is not syllabic, the variation can only be understood in the positional faithfulness analysis as variable (phonetic) failure to achieve voicing in segments in which voicing is difficult. There is no comparable explanation available for the coda devoicing analysis. Specifically, in words like *gruslig,* in the coda devoicing analysis, the feature [voice] should not surface because the fricative occurs in coda position. However, it might be claimed that the coda fricative could still be (variably) voiced, as it is in our data, due to variable voicing of fricatives between sonorants, which occurs in the phonetics. But such an alternative account would not work. When the control items (e.g. *wä**ss**rig* 'full of water') were examined acoustically, it turned out that the /s/ fricatives in these words are systematically voiceless. If phonetic voicing of fricatives between sonorants occurs, it should also apply in words like *wässrig.* The different phonological category of fricatives in words like *gruslig* (voiced) and *wässrig* (voiceless) cannot be responsible since, in the coda devoicing analysis, the alveolar fricatives in both words would be left without a [voice] specification. It might seem possible, with coda devoicing, to assume FRIC-SG (Fricatives are [spread], Vaux 1998), in order to prevent the non-alternating voiceless fricatives from being subject to passive voicing. This analysis derives a [spread] fricative in *wassrig,* making it immune to passive voice, as desired, assuming that phonetic passive voicing occurs only with non-[sg] obstruents. However, with a voiced input as in *gru*/z/*l*+*ig*, no voiced variant can be derived.

Cross-linguistic Challenges for the Prosodic Hierarchy: Evidence from Word Domains

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Since the early 1980s, generative theories of phonology have been characterized by a growing awareness of the relevance of domains in the application of phonological rules. In Prosodic Phonology, the various available phonological domains are modeled as a prosodic hierarchy including the syllable (σ), the foot (Σ), the phonological word (ω), the clitic group (C), the phonological phrase (Φ), the intonational phrase (I) and the phonological utterance (U) (Nespor & Vogel 1986). Although not all proposed domains are uncontroversial (see Booij 1996 and Peperkamp 1997 for a critique of the clitic group), the generally claimed universality of the prosodic hierarchy has rarely been critically appraised or even tested against cross-linguistic data.

This paper will report on findings of a typological database project on word domains in the AUTOTYP framework (www.uni-leipzig.de/~autotyp). The cross-linguistic evidence collected so far challenges crucial aspects of the proposed prosodic hierarchy. First, the theory predicts more phonological structure or domains than is actually evidenced in languages. Such a situation is attested for Vietnamese (Thompson 1965), a language in which the domains of the syllable, the intonational phrase and the phonological utterance can easily be motivated by phonotactic structure and the distribution of tone (σ), intonation contours and pauses (I), and terminal intonations (U), respectively. Reduplications and compounds are, like phrases, characterized by a stress pattern of alternating weak and strong stresses. Although this phonological process may motivate another prosodic domain (presumably the phonological phrase (Φ), Thomas 1962), it does not suffice to postulate the four levels that are intermediate between the syllable and the intonation phrase predicted by the prosodic hierarchy. Second, if the phonological rules of a language reference more than the above-proposed prosodic levels, the theory predicts less structure than is actually attested in the language. An example for this situation can be found in Chukchi (Dunn 1999), a language in which at least six nonisomorphic word domains can be motivated on the basis of phonological rules referencing morphological structures comprising the stem. Vowel deletion in hiatus, for example, applies in a domain which includes the stem, the prefixed part of circumfixes and prefixes. Vowel glottalisation, on the other hand, applies in a domain consisting of the stem, the suffixed part of circumfixes, suffixes and enclitics:

Vowel deletion: (prefix/circumfix-stem)ω-suffix/circumfix=enclitic
Vowel glottalisation: prefix/circumfix-(stem-suffix/circumfix=enclitic)ω

Note that unlike the cases of multiple phonological word domains within a morphological word which have been discussed in the literature, e.g. [(prefix)ω (stem-suffix)ω], the two phonological word domains of Chukchi overlap since they both include the stem. Note further that the two domains violate proper bracketing (in the sense of Itô & Mester 1992) so that they cannot be analyzed as recursive occurrences of the same domain.

Since such deviations from the predictions of the prosodic hierarchy seem to be the norm rather than the exception, we advocate an alternative approach: prosodic domains should not be considered as something that exists independently of given rules or constraints and that is merely 'evidenced' by these rules or constraints. Instead, prosodic domains are intrinsic and highly specified properties of individual rules or constraints, and it is an empirical task to find out whether rules or constraints share domains in a language or across languages. As pointed out by Inkelas & Zec (1995), it is far from self-evident that prosodic domains should converge on a small universal list like the one enshrined in the prosodic hierarchy.

The acquisition and evolution of faithfulness rankings

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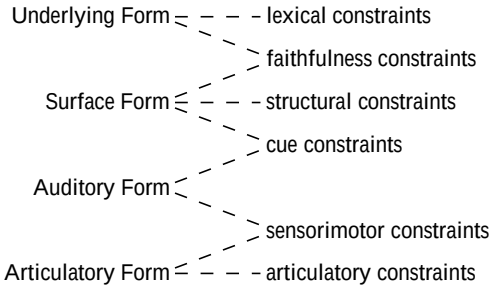
Type of presentation: talk, not poster.

Many different types of fixed rankings of faithfulness constraints have been proposed, and the universality of these rankings has variably been ascribed to innateness or to the influence of extralinguistic knowledge or explicit linguistic knowledge. Thus, Steriade (1995, 2001) proposes a fixed ranking of faithfulness as a function of cue audibility, informed by extralinguistic knowledge of the auditory distance between phonological candidates (*licensing by cue*). Beckman (1998) proposes a fixed ranking of faithfulness as an innate function of the phonological context (*positional faithfulness*). Boersma (1998) proposes two kinds of fixed rankings: first, a fixed ranking of faithfulness as a function of confusability, informed by explicit linguistic knowledge of confusion probabilities (*probabilistic faithfulness*); second, a fixed ranking of faithfulness as a function of frequency of occurrence, claimed to emerge from the workings of an unspecified learning algorithm (*specification strength*). In this talk I show that in all of these cases, the rankings come about as an epiphenomenon of learning, either in a single learner or in a succession of generations of learners.

The required model of grammar (Boersma 2005) combines two phonological representations (underlying and surface) and two phonetic representations (auditory and articulatory):



The representations are themselves evaluated by lexical, structural, and articulatory constraints, and relations between representations are evaluated by faithfulness constraints, cue constraints, and sensorimotor constraints. The listener's task is the process of *comprehension*, i.e. a mapping from a given auditory form to a phonological surface form (*perception*) and from there on to the underlying form (*recognition*). The rankings of cue and faithfulness constraints come about in two gradual learning algorithms, namely *lexicon-driven learning of perception* and *message-driven learning of recognition*.

Computer simulations show that even if generation 1 has all faithfulness constraints top-ranked, we need assume no more than a fixed background (or transmission) noise to ensure that the learners of generation 2 will rank faithfulness by both average cue reliability (e.g. slightly higher for plosives than for nasals) and by frequency (e.g. slightly higher for labials than for coronals). Depending on how finely grained the faithfulness constraints themselves are contextualized, one will also find licensing by cue and/or positional faithfulness (e.g. faithfulness ranked higher for onsets than for codas), leading to the well-known observed triple asymmetries (by place, manner, and position) in nasal place assimilation. These findings show that non-goal-oriented mechanisms (theoretically required by e.g. Ohala and Blevins) can account for seemingly goal-oriented phenomena (which are observed facts).

Modelling, formality and the phonology–phonetics interface

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In the last few years, the connexion between phonology and phonetics has become a particularly lively topic. Some of the debate concerns the re-examination of old problems such as sound change: many see a particular defect in classical phonological theories that they do not adequately model, let alone explain, the way in which sounds change, whereas the basically Neogrammarian accounts of sound change equally do not adequately explain how phonetic change is re-phonologized.

Another point of contention, recently brought to the fore by Port and Leary (2005), is whether formal systems, as understood in late 20th century linguistics, can provide a reasonable model of phonology. Reducing the argument to a somewhat caricatured nub, it is: "formal phonology is discrete, but speech is continuous – therefore formal phonology cannot accurately model speech production". Even more briefly: discrete and continuous time don't mix.

This is not a problem unique to linguistics – it has also occurred in the development of both the theory of computation and the practical modelling of systems with computational models. As Port and Leary repeatedly emphasize, the classical computer is in abstract a discrete digital device (though they curiously do not remark that every real computer is actually a continuous analogue device). Such was the model of computation from Turing onwards, while continuous modelling was the realm of applied mathematicians wielding differential equations.

However, over the last couple of decades, an enormous amount of work has been done on combining the powerful toolboxes of classical automata and computation with the more 'realistic' real-time models, resulting in an entire field of 'hybrid systems'. This work is no less 'formal' than classical work; as well as producing beautiful theorems, it enables the formal modelling of many realistic real-time systems. Real time is not the only continuous metric brought into the computational fold; probabilistic and stochastic systems are equally studied.

Furthermore, there is another extension of classical computation with obvious application to phonological–phonetic processing. Namely, concurrency: the formal modelling of parallel or distributed processing. This is traditionally discrete, but can also be combined with real time. Concurrency underlies the ideas of autosegmental phonology, or even just feature bundles, and appears in simple form in the formal autosegmental model of Bird and Ellison (1994); it is also explicit in the overlappings of gestural phonology.

In this presentation, I argue that by drawing on the range of models developed elsewhere, we may be able to progress towards many desiderata of phonological theory: a formal, discrete notion of phonology that yet acknowledges the individuality of cognitive categories; a process of transformation from phonology to real-time articulatory events; the re-analysis of perceptual events into cognitive categories; and the closing of the loop by changing phonological systems. Moreover, such models may be developed at many levels of abstraction, related by well understood (and formal) 'refinement relations', thereby possibly providing a plausible means of abstracting from individual, cognitive phonology to the traditional phonology of the last century.

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On two types of phonological information

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The term INFORMATION can be used in two different senses to characterise the relation between phonology and the speech signal. In an information-theoretic sense, it can refer to the functional load of sound contrasts: the more words a given contrast serves to distinguish, the more informative it is. Call this distal information: contrasts are not in and of themselves present in speech signals but only achieve informative force through being interpreted by background knowledge of what is contrastive in a listener-talker's language. Acoustic events that occur in the speech signal itself can also be described as informative, in that they point to or 'cue' distally interpreted contrasts. Call this proximal information.

The categories of traditional feature theory are primarily designed to code contrasts, i.e. distal information. However, according to more recent thinking, phonological contrastivity is not captured by means of pre-given categories but is rather an emergent effect of the way the grammar-lexicon cuts up a multidimensional phonetic space defined quite independently of any notion of contrast. In practice, this space is often assumed to be more or less unconstrained, encompassing any phonetic value that can be identified by impressionistic or instrumental means. We argue that the space is more constrained than this: the only phonetic properties that can potentially be harnessed by phonological grammar are those the listener-talker draws on to extract proximal information from speech signals.

How do listener-talkers extract proximal information from speech signals? To answer this question, we start with the definition of speech as a linguistically void carrier signal modulated by linguistically significant acoustic events. The carrier consists of a typically periodic wave lacking spectral peaks – the acoustic effect produced by a neutrally open vocal tract. Properties of the carrier reveal details about the speaker – their identity, attitude and location. It is the modulations that bear phonologically relevant, proximal information. In order to decode a linguistic message, the listener winnows information from the speech signal through a process of 'demodulation'.

Demodulation may be modelled using a 'modulogram'. Given a recorded speech signal, acoustic properties characteristic of the speaker's organism, environment and attitude are extracted from the signal. These properties are used to synthesise a speech carrier, which is then removed from the original signal by demodulation in the frequency domain. The residue, which contains the linguistically relevant information of the original signal, is visually displayed in a modulogram.

We explore some of the empirical consequences of abandoning traditional phonological features in favour of features defined solely in terms of proximal information. Traditional feature theory encodes certain properties associated with the carrier signal (such as periodicity and continuancy in vowels) that have no place in a model dedicated to proximal information. On the other hand, traditional theory ignores certain properties that are proximally informative (such as the noise burst in plosives). We illustrate these differences in approach by comparing how they treat segmental reduction and lenition.

VOWEL HARMONY AND DISHARMONY: A PARADIGMATIC VIEW

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The study of vowel harmony (VH) has given rise to a vast literature in the last decades, much of it related to issues such as neutrality, transparency and opacity, focusing, therefore, on syntagmatic properties of VH. VH may be seen as the spreading of a feature over the relevant domain. However, as Archangeli & Pulleyblank (1994) point out, vowel harmony systems rarely if ever show this "canonical" pattern of harmony. That is, VH languages always exhibit vowel disharmony in some contexts, even though their vowel inventories would make it possible for them to have VH in those contexts. This is what is discussed in Kiparsky & Pajusalu (2003), where a typology of vowel harmony and disharmony is proposed.

Paradigmatic data, however, have not been systematically analysed with regard to vowel harmony and disharmony. The purpose of the present paper is to start to redress the balance by investigating vowel harmony in Hungarian and Finnish, taking into account data from their derivational paradigms, i.e., by considering all words derived from the same root. To simplify matters, only monosyllabic roots will be focused on.

Finnish and Hungarian are two of the most familiar examples of languages which exhibit front/back VH. Both are suffixing languages with stem-controlled VH (Baković 2000), yielding what might be described as left-to-right harmony. As a result, Hungarian has examples such as *hús* 'meat' and *húsból* 'out of meat', as compared with *tűz* 'fire' and *tűzből* 'out of fire'. Finnish examples include *tuo* 'that' and *tuolla*, 'there (lit. at that)' as compared with *työ* 'work' and *työllä* 'at work'. The first pair in each language has only back vowels, whereas the second pair contains only front vowels. Crucially, which of the allomorphs of the suffixes is used is something determined by the root, which does not alternate.

Both languages have so-called neutral vowels, which are phonetically front but have no corresponding vowels in the back vowel set. As a result, they may cooccur with back vowels, so constituting instances of vowel disharmony. We thus have examples like Finnish *iso* 'large' and *elo* 'life', and Hungarian *hívó* 'caller' and *vívó* 'fencing'. Examples such as these seem superficially identical, but a look at the derivational paradigms of these roots reveals they are different. Hungarian roots with neutral vowels are either systematically harmonic (the great majority) or systematically disharmonic (a few tens of roots). Finnish roots with neutral vowels, on the other hand, very often have mixed derivational paradigms, i.e., some of their derivatives are harmonic, whereas others are disharmonic.

1) Finnish "oscillating" roots (whenever suffixes have round Vs, they turn up as back Vs):

leipä 'bread'	elo 'life'	pitkä 'long'
leipomo 'bakery'	elää 'to live'	pituinen 'in length'
leipuri 'baker'	elämä 'life'	pituus 'length'
leivos 'pastry'	eläin 'animal'	pidetä 'lengthen'

2)

Consistently harmonic Hungarian roots.	Consistently disharmonic Hung. roots.
ért 'understand'	bír 'possess; bear'
értő 'understanding (Adj)'	bíró 'possessing (Adj)'
értés 'understanding (N)'	bírás 'possession'
érthet 'can understand'	bírhat 'can bear'
érthetetlen 'incomprehensible'	(ki)bírhatatlan 'unbearable'

Even if explaining this phenomenon turns out not to necessitate paradigm-related constraints such as proposed in McCarthy (2002), considering paradigms reveals previously unnoticed facts, which must be accounted for. In the analysis proposed here, the Hungarian pattern is derived from the high ranking of the root-specification, whether it demands harmony or disharmony, whereas the Finnish pattern is the result of ranking identity of features between root and affixes below the constraint that demands avoidance of front rounded vowels.

Opacity in Cypriot Greek: A Declarative Approach

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Phonological opacity (Kiparsky 1971, 1973) occurs when the conditioning environment of a phonological process is eliminated in the surface representation, which, as a result, renders the process in question obscure. Opacity is a hot topic in phonological theory and, according to Bye (2003: 1) "[…] is perhaps proving to be the central point of empirical contention in debates concerning the relative merits of Optimality Theory (OT) and Derivational (rule-based) Theory (DT)."

Cypriot Greek (CG) exhibits both surface-true and surface-apparent opacity. Until now, opacity in CG has been accounted for by *transformational* models of phonology. In particular, it has been accounted for by Newton's (1970) derivational, rule-based approach and Malikouti-Drachman's (1999, 2000) Sympathy Theory (ST) (McCarthy 1998) approach. Coutsougera (2002) argued that revised ST (McCarthy, 1999) failed to yield desired results in the surface-apparent CG data and that, in general, both original and revised ST failed to account for opacity in CG in a satisfactory and insightful manner. Furthermore, ST proves to be too costly for OT (Prince & Smolensky 1993) as it was specifically devised to handle opacity - an area that the output-orientated OT proved incapable to handle - while its acquisition by children appears to pose equally serious problems.

The present paper intends to show that Declarative Phonology (DP), as proposed by Scobbie (1991, 1993), Bird (1995) and Scobbie, Coleman & Bird (1996), provides a coherent and more insightful analysis of opacity through operations such as *disjunction* and *unification*. DP is a monostratal, non-transformational, structure-building model of phonology in which formal descriptions are seen to act as constraints on the form of linguistic objects. As a result, a well-formed representation is not the output of a phonological rule but a form which conforms to a set of constraints. Precisely due to its monostrataliasm "[…] in DP, literal opacity is an impossibility" Bye (2003: 3).

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An Auditory Approach to Phonological Prominence

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In this paper, I argue that phonological prominence such as sonority and stress cannot be fully understood without reference to auditory factors such as the human auditory system's greater sensitivity to certain frequencies. This hypothesis predicts that speech sounds concentrating energy in these high-sensitivity areas will show increased phonological prominence. I present both phonetic and phonological evidence in support of this claim.

I begin with an auditory examination of the phonological sonority hierarchy. As shown most recently by Parker (2002) sonority and intensity are clearly linked. However, instrumental measurements of intensity do not translate straightforwardly into the phonological sonority hierarchy. Especially for vowels, the intensity patterns expected based on phonological sonority show up as tendencies (as in Fry 1979) or are in fact reversed (as in Parker 2002 for English). It has been pointed out by several authors that things fall more into line when sonority is viewed as a multivariate phenomenon, simultaneously involving intensity, duration, airflow, and possibly other factors. I present evidence that sonority is better accounted for if vowel measurements are made not for objective intensity (decibels) but perceived loudness. Measurements are presented for 10 American English monophthongs. Loudness was measured in Praat by first creating cochleagrams for each vowel token, then extracting multiple excitation slices across the vowel. These can then be queried for loudness in sones, a standard perceptually-based loudness scale based on psychoacoustic scaling procedures. Results show that loudness offers a good basis for the vocalic sonority hierarchy. The location of vowel formants can make two vowels with the same objective intensity differ in loudness. Furthermore, replication of the sonority hierarchy pattern using synthetic vowel tokens with average American English formant values suggests that vowel sonority differences have an auditory basis. This contrasts with traditional views that vowel sonority has a primarily articulatory basis (i.e. that a more open vocal tract for lower vowels causes less damping or that greater jaw opening for lower vowels increases duration).

The auditory approach is also supported by phonological evidence concerning stress placement. Although stressed syllables are intuitively described as louder than unstressed ones, objectively verifying this has proven elusive. Work by Sluijter (1995) and Sluijter and van Heuven (1996) show that spectral balance (distribution of intensity across the spectrum) is a better correlate of stress, with stressed syllables possessing more energy in mid-frequency regions. They hypothesize that this is enacted by increasing vocal effort, which increases glottal spectral tilt. This, combined with the auditory view of sonority, provides an explanation for two stress phenomena: In some languages, stress seeks out high-sonority vowels, with both high-sonority attraction and low-sonority repulsion attested (Kenstowicz 1994, de Lacy 2002). The auditory approach predicts this pattern: both sonority and stress concentrate a vowel's energy in mid frequencies. In languages such as Mam, Kamchadal, and Munda, syllables closed by a glottal stop count as heavier than other closed syllables. Assuming that vowels before glottal stop are allophonically glottalized, glottal stress attraction is also auditorily grounded because glottalization increases spectral tilt (Gordon and Ladefoged 2001). Although strong glottalization causes a severe intensity dip, slight glottalization (or "tense" voice) can affect spectral balance in a way that increases perceived loudness.

Explanation in Phonetics and Phonology: Understanding Dorsey's Law in Hocank (Winnebago)

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Generally, phonological explanations are formal while phonetic explanations are functional. Consider a language like Kambera (Blevins 2004,156) where a vowel epenthesizes after a word-final consonant. A phonological explanation would reference a constraint against word-final consonants (or a rule of final-vowel insertion). The phonetic explanation given by Blevins suggests that the hyperarticulation of a word-final consonant allows its release to be misperceived as a vowel. The phonological explanation is formal since it references only the language system; the phonetic explanation is functional since it goes outside the language system proper referencing perception. a general cognitive ability. While functional and formal explanations are usually viewed as competing, they sometimes can work in tandem. A particularly interesting case demonstrating this is Dorsey's Law in Hocank (Siouan). Dorsey's Law is a synchronic process whereby a vowel is epenthesized into a sequence of a stop followed by a sonorant consonant; the epenthetic vowel is a copy of the vowel following the sonorant. Examples are given in (1) (Miner 1979, 1992, 1993); the epenthetic vowel is underlined.

1. a. /hipres/ - [hip<u>e</u>res] 'know' b. /krepnã/ - [k<u>e</u>rep<u>ã</u>nã] 'unit of ten' c. [sgaa] 'white'

As seen in (1a-b), the epenthetic vowel splits up underlying obstruent-sonorant sequences. A plausible phonetic account of this is mentioned by Blevins (2004,156). She suggests that the audible release of the obstruent before the sonorant is misperceived as a vowel; the misperceived release is colored by the post-sonorant vowel probably because of anticipatory articulation of vowel gestures. The vowel arising due to this misperception becomes phonologized since it counts for stress placement and can be stressed (Halle & Vergnaud 1987). While such a phonetic account is insightful, it is superficial since it cannot answer the question as to why epenthesis happens in Hocank, as opposed to English where it does not happen. In this paper we maintain that there is internal pressure from within the Hocank phonological system that prevents obstruent-sonorant consonant clusters from surfacing. Specifically, Baertsch (2002) and Davis & Baertsch (2005) show a formal relationship between onset clusters and clusters in syllable contact (ie. clusters over a syllable boundary) whereby the onset clusters must be a subset of the mirror-image clusters allowed in syllable contact. That is, if a language like English has [kr] as a possible onset (eg. "cry") then it must have [rk] occuring over a syllable boundary (eg. "arcade"). Since Hocank does not permit sonorant consonants to surface in the coda, there is then internal pressure within the phonology for them not to surface as a second member of an onset. Thus, the release of the obstruent consonant before the sonorant in Hocank is susceptible to be misperceived as a vowel given the internal pressure not to have a sonorant surfacing as a second member of an onset. In sum, the occurrence of Dorsey's Law in Hocank can only be understood with reference to both the formal phonology and the phonetics; neither alone is sufficient as an explanation for it.

On the typological rarity of some Tupi vowel systems

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The absence of the high back vowel in the phonemic inventory of several Tupi languages is a typological rarity and therefore requires careful investigation to explain why this basic vowel is missing. Tupi languages are however not unique for this feature. Crothers (1978) reports five languages where such systems can be found. Maddieson (1984) and Lindblom (1986) have noted that a system / i, a, o, ɛ, ɨ /, although rare, exists in the worlds' languages. The latter system is comparable to what is found in Tupi.

Making hypotheses about universals shaping vowels systems Lindblom (1986) derives vowel systems from a numerical model taking into account maximal and sufficient contrasts. Comparing the results of the derived optimal systems of his model with vowel categories from the typology of Crothers (1978) he shows that the predictions of his model are in good agreement for five vowels systems both for the prediction in terms of loudness, density (L-prediction) and auditory filter (F-prediction) when one type of 5 vowel system is taken into consideration, i.e. [i,ɛ,a,ɔ,u] (C_1 in Lindblom's tables). However in Crothers' typology there is a second type of system that can be observed [i,ɛ,a,ɨ,o] (C_2 in Lindblom's tables). Following Lindblom's proposition we believe that even if the C_2 system is not as frequent as the C_1 system it fits perfectly the predictions of the model when the criterion of sufficient contrast is introduced. Therefore Tupi languages with similar vowel systems provide a good example of this realization in languages.

McDonough, Ladefoged and George (1993) have discussed acoustic data from Navajo vowels, showing that its 4 quality vowel system (where length and nasality are distinctive) also lacks /u/. In Navajo, however, there is a slightly higher realization of short /o/ when compared to short /e/ (virtually no difference was found in the height of the mid long vowels). In Tupi languages, however, one sees no rising of the vowel /o/ above the level of the mid front vowel /e/, as might have been expected by a theory that predicts necessary compensatory effects to fill in the gap in the system. Another point of comparison that could be made between Tupi languages and Navajo is that in both one finds a wider variance (little overlapping) in mid back vowels than in front vowels. McDonough, Ladefoged and George (1993) argue that this increase in variance in back vowels cannot be seen as a compensatory effect. They consider that, in a parallel with Japanese, the Navajo system is skewed, with front vowels showing overlapping and back vowels showing no overlapping in the F1/F2 dimensions.

We claim that the rarity of systems without /u/ does not constitute a counterexample to the dispersion theory. The principle of sufficient contrast, which defines the dispersion theory, requires enough distance between vowels in a system, and skewed systems perfectly meet that requirement. In addition, experimental data and models show that it is possible to understand why languages like those in the Tupi family and Navajo have a wider distribution of back vowels when compared to front vowels

Opacity as a Matter of Representation

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Opacity – defined by McCarthy (1999) as phonological generalizations which are not surface-true or surface-apparent – is a recognized problem for Optimality Theory, as it appears to be inherently derivational. It has typically been addressed either by proposing new types of correspondence which formalize opacity in a way compatible with non-derivational OT (McCarthy 1999, 2002; Ito & Mester 1997, 2003; Goldrick 2000) or by admitting limited serialism into OT (Kiparsky 2000; Rubach 2003; Bermudez-Otero, forthcoming). What is often forgotten is that opacity can simply be a feature of a particular analysis of a particular problem, so that adopting a different set of generalizations or representations can make an apparently opaque process transparent. This is shown in Green's (2005) reanalysis of Tiberian Hebrew epenthesis (opaque in McCarthy 1999), Harris's (1997) reanalysis of German Spitznamen (opaque in Ito & Mester 1997), or Downing's (2005) reanalysis of pre-NC compensatory lengthening in Bantu languages (opaque in Goldrick 2000).

In this paper, I reanalyze a set of processes related to vowel coalescence that have been argued to be opaque, and show that opacity is a feature of the particular analyses, not of the processes. The data in (1) illustrates the problem. Liphola (2001) shows that in Shimakonde, as in many Bantu languages, vowel hiatus across the prefix+Root boundary is resolved by coalescence, accompanied by lengthening: a+i,e > ee ; a+u,o > oo. Note that some coalesced mid vowels (1c, d) are followed by [+high] vowels and others by [-high] (1a). Some coalesced mid vowels (1a,b) reduce to [a], while others (1c, d) do not (accents mark tone):

(1) Shimakonde vowel coalescence, harmony and reduction (Liphola 2001: 178)

		Input	*Coalesced*	*Reduced*	
(a)	/a+e/	/vand**á+e**p-íl-a/	vand**eé**p-eél-a ~ va-ndaáp-eél-a		'they will harvest for'
(b)	/a+o/	/vand**á+o**n-ána/	vand**oó**n-aán-a ~ va-ndaán-aán-a		'they will see each other'
(c)	/a+i/	/vand**á+i**tík-a/	vand**eé**tiík-a ~ *va-ndaátiík-a		'they will respond'
(d)	/a+u/	/vand**á+u**kúl-a/	vand**oó**kuúl-a ~ *va-ndaákuúl-a		'they will dig'

This data seem to illustrate multiple forms of opacity. As Goldrick (2000) shows, if you assume that only one vocalic Root node survives coalescence, the long vowel that results from coalescence is opaque. There is no motivation in the output for projecting two moras, one for each input vowel. Liphola (2001) argues that vowel harmony and reduction in coalesced stems are also opaque. Suffixes harmonize to the input height of the Root-initial vowel. Vowel reduction affects only input mid vowels, not ones derived by coalescence.

These opacity effects vanish, however, if one makes different representational assumptions. Coalescence is only opaque if it involves deletion of a vocalic Root node, as Goldrick (2000) assumes. If it involves deletion of all features below the Root node, leaving the Root node behind to project a mora, it is not opaque. Vowel harmony and reduction in coalesced stems ceases to be opaque, if one adopts the Element theory of vowel representation familiar from work like Goldsmith (1985), Harris (1990 etc.). In this theory, the corner vowels – A, I, U – are primitive elements. Underived mid vowels are combinations of these primitives, a head and a dependent A: e = I, A; o = U, A. Mid vowels resulting from coalescing a [high] and [low] vowel are represented as the fusion of two input heads: e = I, A; o = U, A. If harmony and reduction crucially involve the licensing of (mid) vowels with dependent elements, the inertness of these coalesced mid vowels falls out transparently from the representation: they have no dependent element to license.

To sum up, while opacity is without a doubt a real issue for OT, a coherent approach can only be developed if we first determine which phenomena are truly inherently opaque and which are made opaque by the representational assumptions that drive a particular analysis.

Time-course of adaptation to regional and foreign accents

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The study of accent perception and recognition offers not only a privileged insight of the phonological and prosodic representations used in speech perception, but also the methods used by our language processing device to cope with variability. Investigating the stages of adaptation to accents, Girard, Floccia and Goslin (2004) showed that the presentation of an unfamiliar regional accent initially induces a 30 ms cost in word identification, and a 150 ms cost in the case of a foreign accent. Clarke and Garrett (2004) showed that the costs associated with the processing of foreign accents only returned to baseline levels after the presentation of four to five two-second sentences, signifying that full adaptation had been achieved. In the present study we investigate whether this time-course also holds for regional accents, and also whether this adaptation process can transfer across speakers of the same accent.

Thirty three participants originating from the south-west of the UK took part in a lexical decision task for targets placed at the end of carrier sentences, where they had to decide as quickly as possible if the last item was a word (like "puppet") or a pseudo-word (like "gamlet"). All participants were first presented with a baseline block (B1) of sentences uttered by speaker with a 'local' (Plymouthian) accent. This block was then followed by two blocks of new sentences whose accent varied according to the experimental condition. In the foreign accent condition the second block (B2) was produced by a French speaker, followed by the final block (B3) produced by another French speaker. In the regional accent condition B2 was produced by an Irish speaker, with B3 by another Irish speaker. Finally, in the control condition B2 and B3 were produced by two new 'local' speakers (also Plymouthian). The order of presentation for the B2 and B3 blocks was counterbalanced across participants.

We found that the very first presentations of the foreign and the regional accents after the baseline block produced increased reaction times of 161 ms and 95 ms respectively when compared to the control condition. After the presentation of three sentences, less than twelve seconds of signal, there was no longer any significant difference in reaction times between the conditions, indicating that adaptation had taken place. This result replicates the foreign accent findings of Clarke and Garrett (2004) and also extends our findings to regional accent adaptation. We also found that the moment of speaker change within a given accent did not elicit any significant delay, showing that the accent adaptation can transfer and generalise across speakers whatever the quality of the accent or its perceptual distance from the native speech style.

These results suggest that the speech perception system is sensitive to variations due to unfamiliar accents, and that the rapid time-course of adaptation reveals an efficient learning mechanism used for different speech styles. Additionally, our findings indicate that the phonological and prosodic representations stored when processing an unfamiliar accent are sufficiently abstract to resist to within-accent speaker changes. These results are discussed in light of Norris, McQueen & Cutler's (2003) recent accounts for perceptual learning.

An acoustic comparison of lexical and epenthetic vowels in Lebanese

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In Lebanese Arabic, a vowel traditionally transcribed as [i] is inserted between consonants that would otherwise form an illicit or dispreferred coda cluster, as in /mɪtl/ [ˈmɪt̬il] 'like'. Lexical [i] can occur in the same position, as in /ʔitil/ [ˈʔitil] 'he got killed'. While lexical [i] can bear stress, epenthetic [i] repels stress, as in [ˈmɪt̬ilna] 'like us'. To our knowledge, no phonetic difference between lexical and epenthetic [i] has been reported (e.g., Haddad 1984).

Experiment We recorded 8 speakers reading a word list containing 23 near-minimal pairs of epenthetic and lexical vowels, produced in a frame sentence. Test pairs were matched for stress, consonantal context, preceding vowel, and pharyngeality of the word-initial consonant. The list was presented in consonantal Arabic script, so neither the epenthetic nor the lexical vowels were present in the stimuli.

We measured acoustic properties of underlying and epenthetic tokens of [i] and performed an ANOVA with underlying status and subject as the independent variables. The second formant showed a main effect of underlying status, with epenthetic vowels being more retracted (mean difference 82 Hz, $F = 18.7$, $p < .001$). Vowel duration was shorter for the epenthetic vowels (mean difference 9 ms, $F = 13.5$, $p < .001$). First formant, third formant, and intensity were not significantly different. The second formant ANOVA also revealed an interaction with the subject variable ($F = 3.6$, $p < .001$). Four subjects showed considerable retraction of the epenthetic vowels, while 4 showed virtually no difference between lexical and epenthetic vowels. For 3 subjects, subsequent paired t-tests failed to show statistically significant differences between the vowels on any of the measures.

Theoretical implications These results show that for many speakers, epenthesis does not fully neutralize underlying vowel-zero contrasts, contrary to traditional descriptions. Phonological theory must provide some formal means for distinguishing epenthetic and lexical vowels in the representation that is made available to phonetic implementation: perhaps correspondence indices, or a structural distinction such as epenthetic vowels being non-moraic (Piggott 1995).

While the speakers had diverse phonetic realisations of epenthesis, they had a uniform stress-epenthesis interaction: speakers who did not shorten or retract the epenthetic vowels had the same stress grammar as the speakers who did. We conclude that phonetic reduction of epenthetic vowels is not a precondition for a grammar that avoids stressing epenthetic vowels. Hence, phonological theory must provide a way to explain stress-epenthesis interactions that does not appeal solely to phonetics. [oral or poster]

Reconciling accent distribution and the 'unity of pitch phonology' in Egyptian Arabic.

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This paper presents a formal analysis of rich pitch accent distribution in spoken Egyptian Arabic (EA) whereby the surface position of pitch accents reflects the distribution of prosodic constituent heads. This type of analysis is not new, having been proposed in general terms as a means of capturing cross-linguistic variation in the prosodic reflexes of focus (Ladd 1996), as well as the insertion and re-positioning of pitch accents in specific languages: accent distribution is argued to be sensitive to (Major) Phonological Phrase (MaP) boundaries in French & European Portuguese (Post 2000;Frota 2000), and to a (Minor) Phonological Phrase (MiP) constituent in English (Selkirk 2000). What is novel here is that in EA the prosodic domain relevant to the distribution of pitch accents appears to be at a different level of the prosodic hierarchy again: in EA a pitch accent is observed on every Prosodic Word (PWd). The analysis is couched in the autosegmental-metrical (AM) framework of intonation (Ladd 1996), and formalised in Optimality Theory (Prince & Smolensky 1993).

Evidence for EA pitch accent distribution is presented from auditory transcription (with reference to F0 track & spectrogram using Praat 4.2) of a corpus of spoken data in a range of different speech styles and contexts, from elicited read speech in focus contexts to spontaneous telephone conversation. A pitch accent is observed on 97% of content words: 60 content words were unaccented out of a total 1741 in the corpus (e.g.: the adverbial modifier /Tuul/ is unaccented, as in a. and b. below; an acute accent [á] indicates accentuation):

(1) Variant productions of a 4~5 PWd sentence in a read narrative context:

a.	l([gúHa]	[káan])	(Tul	[9úmr-uh])	([9áayiš]	[f-il-ʔariyáaf]$_{PWd}$)$_{MiP}$ l$_{MaP}$
b.	l([gúHa])	(ken	Tul	[9úmr-uh])	([9áayiš]	[f-il-ʔariyáaf]$_{PWd}$)$_{MiP}$ l$_{MaP}$
	Goha	was	all	life-his	living	in-the-country

Evidence from sparse prosodic phrasing in the corpus indicates that neither MaP nor MiP act as the domain of pitch accent distribution in EA. A detailed survey of the accentuation of content vs. function words in the corpus however reveals that unaccented words are also unstressed: they undergo unstressed vowel shortening (Watson 2002). Occasionally however function words are 'promoted' to PWd status, and are both stressed and accented (compare accented [káan]~unaccented [ken] in a.~b. above). The domain of pitch accent distribution in EA is argued therefore to be the PWd.

Selkirk (2004;2005) has suggested that the relation between phonological tone and prosodic prominence (varying across constituents of the prosodic hierarchy) can be formalised via a pair of inherently ranked fixed hierarchies of positive markedness constraints. These regulate association of tone to prosodic prominence (T→P), and of prosodic prominence to tone (P→T), respectively. Specifically it is proposed here that in EA pitch accents are found on every PWd because a P→T constraint requiring the head of every PWd to be associated with tone outranks the faithfulness constraint mitigating against insertion of (postlexical) tone: PWD:T >> DEP$_{TONE}$. Interaction with interface constraints on the mapping of lexical words to PWds (Selkirk 1996) explains why in general only content words bear a pitch accent in EA: PWD:T, LEXWD:PWD >> DEP$_{TONE}$. Variable interaction with prosodic well-formedness constraints accounts for 'promotion' of some function words to PWd status: BINMIP/NOLAPSE >> LEXWD:PWD. The analysis is compared to other potential formalisms such as negative markedness constraints (deLacy 2002;2004) or a language-specific explanation whereby the phonetic correlates of word-stress in EA would obligatorily include pitch. It is argued that a key advantage of using tone~prominence positive markedness constraints is the ability to directly encode the facts of EA within the "unity of pitch phonology" across languages (Ladd 1996:147): tones of any origin (lexical or postlexical), whether sparsely or densely distributed, are subject to the same constraints.

The non-deletability of laryngeal L

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Limburgian dialects have a tonal contrast on long stressed vowels: some words have a level high tone and this tone contrasts with a falling tone.

(1) the tonal contrast (and its non-interaction with Voice)

falling tone		level high tone		
páàter	'father (religious)'	kááter	'tomcat'	voiceless intervocalic consonant
káàde	'quay'	vááder	'father'	voiced intervocalic consonant

Not only do these examples illustrate the tonal contrast, they also show that the laryngeal status of an intervocalic consonant does not influence the preceding tone; after a *long* vowel both tones can be followed by a voiceless, or by a voiced intervocalic consonant. Phonologically, the level high tone is a single H linked to the two moras of the stressed syllable. The falling tone is phonologically a sequence of HL. This will be motivated with essential facts of the intonational phonology.

After a *short* vowel (where tones are not contrastive) the postvocalic consonant does influence the tone; if the consonant is voiced the word behaves as if there were a falling tone; if it is voiceless the word behaves as if there were a level high tone.

(2) predictable tone and its interaction with Voice

falling tone		level high tone		
does not exist (pace opacity)		ták	'branch, PLUR.)'	voiceless intervocalic consonant
tàge	'to quarrel'	*does not exist*		voiced intervocalic consonant

Although these tones are not audible, they can be motivated by the phonology of question intonation. In a question the behaviour of the two word types given in (2) is identical to the behaviour of the two word types given in (1). Specifically, words like *tàge* pattern with words like *páàter* and *káàde*; words like *ták* pattern with words like *kááter* and *vááder*.

Following van der Hulst (1985) and van Oostendorp (1995, 2003) I assume that after *short* vowels intervocalic consonants are geminates. The facts of (1) and (2) can now be explained in terms of the following hypotheses. Firstly, Voice does not exist, and should be replaced by L on the laryngeal node. Secondly, laryngeal L is represented on a separate tier from tonal L. Thirdly, the tones of one and the same mora should not contradict each other (i.e. laryngeal L excludes H on the same mora).

The second hypothesis explains why an intervocalic consonant following a long vowel does not interact with the preceding tone. If laryngeal and tonal L where the same object, in intonation a word like *vááder* would behave as if it carry a falling tone (one H linked to both moras of the long vowel, followed by laryngeal = tonal L; i.e. we would have the sequence HL of the falling tone). This is an incorrect result; in words of this type we should have just H, nothing else. The third hypothesis explains the behaviour of an intervocalic consonant following a short vowel. Being a geminate it is (also) located in a stressed syllable. In this position laryngeal L should not be contradicted by the tone on the same mora. We thus get *tàge*, with a phonological low tone on the velar, both at the laryngeal and the tonal level.

Interestingly, segments that lose an underlying laryngeal L specification, due to some devoicing process, behave *as if the laryngeal L is still present* (in question intonation these words behave like words with a falling tone on a long vowel). An example is given in (3).

(3) tùpke 'little bucket'

To explain facts like this I propose that laryngeal L is not really deleted by devoicing processes. In the spirit of Goldrick (2000), but also Brockhaus (1992) I propose that laryngeal L is just *not pronounced* in environments where it cannot be licensed (e.g. the coda position). Since it is still there phonologically, it is able to influence the tone of its mora in the stressed syllable; this tone must be L, because it cannot contradict the (inaudible) laryngeal L.

Supportive Contrast

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In segmental phonology, feature distributions are characterised by reference to certain basic patterns, like *assimilation* and *full contrast*. These two in particular have been applied in practical description, and theoretical phonology has sought to explain them. Here, another basic pattern intermediate between assimilation and full contrast is defined and is termed *supportive contrast*. It is argued that recognizing it as a basic pattern on par with assimilation etc. is both helpful for practical description and insightful theoretically.

Supportive contrast is contrast of a distinctive feature *only* by spreading. That is more than assimilation in that it is lexically contrastive whether (and how far) a feature spreads (1a,b). It is less than full constrast in that a value other than the default value cannot appear but by spreading (1c,d). An example is a language in which nasalised vowels occur, and contrast with oral vowels, *only next to nasals* (1).

(1) Vowel nasalisation in Rejang (Coady and McGinn 1982: 443 f.; McGinn ²1982):
a. [ʤa**məw**] "meeting, party" c. [su**pəw**] "broom"
b. [ʤa**mə͂w**] "guava fruit" d. impossible: ∗[sa**pə͂w**]

Supportive contrast as a pattern **has been predicted by work in theoretical phonology** aimed at explaining assimilation (Beckman 1995; 1997; 1998: §2.3) — **apparently inadvertently so,** for that prediction is not pointed out, nor is the pattern characterised, within that work itself. Astonishingly, it turns out that **supportive contrast has been robustly attested; only, it has never been recognised as a coherent phenomenon.**

Generative theoretical phonology has considered progress deriving the phenomenon of assimilation from *licensing* (Steriade 1995) of some sort. Assimilation-as-licensing has been formalised in Optimality Theory by Beckman (*op. cit.*): In OT, if avoiding the positive value of a given feature has priority over avoiding the negative value, the negative value will occur *other things being equal* and e.g. be default ("*unmarked*"). Now, assuming it is not values but "+" and "−" autosegments that are avoided, spreading has the advantage of not adding a "+" but helping avoid a "−". Depending on the relative priority given to preserving feature values from the input, which can be different by position, this theoretically derives *assimilation* as a pattern. Otherwise, this system produces full contrast, complete lack of contrast, assimilation, — and supportive contrast.

While theorists appear to be embarrassed at predicting supportive contrast to be a possible pattern, examples can readily be found in the literature — not by the name of *supportive contrast*, to be sure, and predominantly with different analyses. Those alternative analyses differ on a case by case basis. They will here be compared with analysis as supportive contrast for data from Classical Mongolian, East Tarakiri Izɔn, Hungarian, Japanese, Rejang, Tiv, and Warlpiri, arguing that analysis as supportive contrast is more adequate.

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Velars lack a place of articulation: empirical evidence, theoretical considerations

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While ample empirical evidence presents itself for the view that velars lack a phonologically relevant place of articulation, to defend this view also faces the problem of refuting the arguments for coronal unmarkedness. The purpose of this paper is twofold then: 1, to present further evidence, now mainly from Asian languages, that velars behave as if they had no specified place since they (a) allow other features (or 'elements' in government phonology) such as palatality, labiality to 'overwrite' them; (b) are more prone to vocalization (deletion) and lenition in general than other classes of consonants; (c) are often results of lenitions. 2, to support the position theoretically that to assume velars to be 'empty' for place of articulation results in a uniform account of velar phenomena across languages, and also to show that the arguments for coronal unmarkedness are wrong and lack empirical support. This view also results in linguistic typologies, which proposals of coronal unmarkedness fail to achieve.

The empirical data feature some simple cases of velar palatalizations; crucially, parallel palatalizations of coronals do not occur in the same languages. A number of velar phenomena from Tai languages will also be presented: velars, but not coronals, reducing to a glottal stop in certain cases and to zero in others (Li 1977). It is found in a significantly large number of Asian languages (Tai, Mandarin and Cantonese varieties) that labio-velars turn into plain labials – as exemplified by /xw/ > /f/ and /kw/ > /p/ changes – either as synchronic variation (Kunming Chinese; Gui 2001) or as historical developments (Tai based on Li 1977, Cantonese on Pulleyblank 1997). While such transformations are also known from Indo-European languages (eg Latin /kw/ > Romanian /p/), the large number of (non-areal) examples from Asian languages provides considerable credibility and importance for these data. It is necessary to point out that coronals do not show similar changes in these languages. It will be concluded that the most economical way to account for the above phenomena is to assume that velars do not have a place of articulation and allow other place features on occasion to occupy their lexically empty, but 'active' place tier (cf Backley–Takahashi 1998).

The theoretical discussion involves markedness, epenthesis, representation of segments. Markedness: It is claimed in this paper that for markedness relations, only implications matter, not any other considerations such as frequency and variety, contra Paradis–Prunet (1991) who claim that coronals are unmarked because they are varied and numerous anyway. In my view, as discussed in earlier papers, unmarkedness in this case does not have anything to do with a lack of place specifications. If coronals are unmarked indeed, it is decided in terms of implications. In addition, the present analysis can account for the differential implicational scale: t>k>p, but d>b>g. Epenthesis: Although it is also claimed that coronals tend to be inserted in cases of epentheses (P–P 1991, Scheer 1998), all cases that are cited are not insertions in fact. Notice that I do not wish to claim this status for velars. Quite the contrary: a C with a place specification can only feature in epentheses like -m.r- > -mbr- (all places take part!). Otherwise it is glottals that appear: coronals have no special status. As for the representation of segments, it is far from common practice across the various theories to treat coronals as 'placeless' (apart from underspecification theories, of course). Other features 'underlying' coronals readily present themselves: palatality (cf Kenstowicz 1994: Ch. 9), A-element (Backley 1993), R-element (Harris 1994), {linguality} (dependency phonology), etc. It will be shown that representing velars as 'empty' results in more economical segmental representations, and, importantly, it is capable of accounting for velar phenomena in a uniform manner.

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Tonal contrasts and loans in Scandinavian

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Scandinavian languages are well-known for their lexical tonal contrast, where two distinct pitch contours (known as Accent 1 and 2) can distinguish segmentally identical words; cf. Swedish tank-en$_1$ •tank-INF•, tanke-n$_2$ •thought-INF•. The physical F0 shape and even the alignment of these contours can differ radically across dialects. Traditional analyses of the phonological distribution of these tonal accents assume that Accent 1 is the default accent, whereas Accent 2 is the lexically specified accent on words and morphemes. Suffixes or prefixes bearing Accent 2 will, then, align the tonal element to the stressed syllable of the word they attach to (grip-a$_2$ INF > gripa$_2$ •seize•) (cf. Riad 1998).

There are, however, intriguing exceptions to this claim. One class of exceptions comes from special semantic categories, like days of the week, names of berries, names of countries etc. which should be Accent 2 but are invariably Accent 1. Another class of exceptions involve prefixes which enforce Accent 1 although they attach to word forms which are normally Accent 2 (gripa$_2$, but be-gripa$_1$ •comprehend•). Thus, an opposing view entertained by us is that only Accent 1 can be lexically specified and Accent 2 is always assigned by default, minimally requiring a disyllabic trochee to manifest itself. Under our view, Accent-1 morphemes dominate in accent assignment in all heteromorphemic forms; be$_1$-grip-a > begripa$_1$. These assumptions not only eliminate exceptions and account for all the data in the individual languages, they also account for the synchronic differences between standard Swedish and Norwegian (Lahiri et al. 2005). For instance, although all monosyllabic words surface with Accent 1 (since a disyllabic domain is a must for Accent 2), we have shown that an underlying lexical contrast may exist such that some monosyllabic words are specified for Accent 1 and some are not (cf. Wetterlin 2006). Evidence comes from affixed words, compounds and clitics.

However, given that a large number of Accent 1 words are loans (verbs like begripa as well as nouns), and loans are usually absorbed into the default phonological pattern, one may ask why a specified accent is assigned to loans. Further, the proponents of specified Accent 2 have suggested that the fact that forms like begripa$_1$ are exceptions (since the Accent 2 bearing infinitive -a does not trigger Accent 2 on the verb) it is because they were earlier Accent 2, but have later changed to Accent 1. Our goals in this paper are the following:

- We will provide comprehensive evidence from both Swedish and Norwegian showing how the overall synchronic phonological system works within our model.
- We will show that assigning Accent 1 to certain loans was not based on unusual principles. Rather, this followed the general phonological principles of the languages concerned.
- The synchronic system of 18th century Swedish shows that Accent 1 and 2 words were clearly different both in suffixed as well as prefixed words. Our evidence comes from a poetic manual and rhymed verses of Anders Nicander (1737). There is no reason to believe that the tonal make-up of verbs like begripa$_1$ were any different than they are now.
- Based on synchronic analyses (present day Scandinavian and 18th century Swedish) and other historical data (loans from Middle High German), we offer an explanation of phonological restructuring giving rise to dialectal differences with respect to lexical tonal specifications.

Resolving hiatus in Turkish: An underspecification account

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In this paper, I examine the ways in which heterosyllabic vowel sequences ([V_1.V_2]) are formed within and across words in Turkish and describe various hiatus resolution strategies with special focus on vowel assimilation (VA; e.g., /aər/ → [aar]). VA holds under the following conditions: First, both V_1 and V_2 must agree in frontness and rounding (e.g., /tauk/→ *[taak] •chicken•; /şair/→ *[şaar] •poet•). Second, V_1 must be low and V_2 must be high, since low vowels do not assimilate to high vowels (e.g., /sər/→ *[sər] •fits•). Third, although [e.i] sequences satisfy all the above conditions, they fail to undergo VA (e.g., /meil/→ *[meel] •slope•). Across-words, however, the direction of assimilation is reversed. This time V_1 assimilates to V_2, but the two vowels do not have to share the same frontness and roundness features (e.g., /ne+oldu/ (what+happened) → [nooldu] •what happened?•). As in the case of within-word VA, only low vowels can be triggers for VA across words (e.g., /ne iyi/ (what+good) → *[niiyi] •how good!•, but /yirmi/+/altə/ → [yirmaaltə] •twenty-six•).

I propose a formal analysis of VA based on the premises of autosegmental phonology and underspecification, which favors representational economy with minimal assumptions about lexical representations. Accordingly, underlying representations can contain only those features that are necessary for the expression of lexical contrasts and phonological patterns in a given language (cf. Clements 2001). As such, the effects of VA are related to other phonological patterns of Turkish such as vowel harmony. It is shown that, within words, the Articulator (A) features of vowel sequences must be shared, and only [Low] can spread, the sequence [e.i] constituting an exception. The height restriction on VA also holds for across words, where [High] cannot spread to [Low]. These restrictions and the exceptionality of [e.i] are straightforwardly accounted for through the underspecification of vowels for [Coronal] and [High]. Since high vowels have no specification for Tongue Height (TH), they cannot be triggers of vowel assimilation. As both vowels in [e.i] are coronal and no A feature is shared, [i] cannot be assimilated to [e]. I argue that the correspondence between A and TH features is crucial not only for VA but also for vowel harmony in Turkish, where [Labial] cannot spread to low vowels. This suggests a feature organization where A and TH nodes must be distinguished. Finally, I discuss the implications of this analysis for other hiatus resolution mechanisms such as glide insertion and vowel epenthesis. Specifically, I argue that epenthetic glides ([y, w, ɯ]), which applies when VA cannot apply, are the non-moraic realizations of a high sonorant underspecified for TH. Likewise, high vowels are inserted to resolve illicit consonant clusters (e.g., ***tiren*** •train•). Accordingly, both epenthetic consonants and glides are argued to be the syllabically conditioned variants of a placeless sonorant to avoid independently identical sequences. As such, the underspecification analysis provides a unified account for both VA and (glide and vowel) epenthesis in Turkish.

Italian palatalization: into the phonology or into the lexicon?

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Standard Italian displays a range of palatalization processes, which have on the one hand many exceptions and on the other hand seem to be restricted to certain lexical classes. In this talk, I address the question in how far these patterns are synchronically active and should be phonologically analysed and in how far speakers rely on lexically stored allomorphs. I argue that certain subsets have to be analysed as synchronically active, and that the restriction of a phonological pattern to a paradigm or a lexical class can be handled in Optimality Theory by lexically indexed constraints (Pater 2000, Pater & Coetzee 2005). I reject an account in terms of prespecification/underspecification in individual lexical entries (Inkelas 2000, Inkelas, Orgun & Zoll 1997) in this case for two reasons. First, this predicts arbitrary distribution of exceptional morphemes across different lexical sets. Second, the notion of prespecification entails a decision on the nature of the involved feature as either binary or unary. Opting for a unary feature as responsible for palatalization in Italian for reasons sketched below I have to exclude the prespecification account and provide an analysis in terms of indexed constraints.

Many inflected Italian nouns show the alternations in (1a), with [tʃ] before /i/ at a morpheme boundary and [k] before other vowels. In many cases the process does not apply (1b). Verbs display two distinct patterns, palatalization triggered by following /i/ and /e/ (2a), and non-application of palatalization in the face of a potential trigger (2c).

(1)	a.	amiko, amitʃi, amike	'friend$_N$/pl./fem.pl.'
	b.	kwoko, kwoki	'cook$_N$/pl.'
(2)	a.	diridʒere, dirigo, diridʒi, diridʒe	'direct$_V$ inf./1/2/3sg.'
	b.	kwotʃere, kwotʃo, kwotʃi, kwotʃe	'cook$_V$ inf./1/2/3sg.'
	b'.	*tokere, toko, toki, toke	unattested
	c.	legare, legi, lega, lego	'tie$_V$ inf./1/2/3sg.'
	d.	komintʃare, komintʃo, komintʃi, komintʃa	'begin$_V$ inf./1/2/3sg.'

For nouns, the most plausible solution is to regard the pattern as a historical remnant of a formerly active phonological process to be analysed by means of lexically listed allomorphs to distinguish the underapplication cases from the palatalization cases in (1). Experimental evidence supports an analysis of the nominal forms as lexicalized (Celata & Bertinetto 2003).

However, in the verbal patterns we see unconditional application and blocking depending on the verb class (i.e., *-ere* and *-are*, respectively, compare 2a with 2c). This seems to call for a co-phonology approach with a different grammar for *-ere* verbs than for *-are* verbs. The difference is handled here within one ranking, in which the palatalization constraint has to be fixed below faithfulness and the same palatalization constraint indexed with the *-ere* class ranks above faithfulness.

The data in (2b,b') support an analysis with a unary feature [coronal] which yields the affricates in combination with [dorsal]. If an *-ere* stem ends in a [dorsal] consonant, [coronal] spreads to it from the following front vowel (2a). If a consonant has both features lexically we don't expect backing next to a back vowel (2b; **kwoko* 'I cook').

Since /e/ in nouns does not trigger palatalization (1a) as opposed to /e/ in verbs (2a), this could be a different type of palatalization than in *-ere* verbs. In verbal affixes, both /i/ and /e/ have to be specified as [coronal], while /e/ in the feminine plural suffix could simply lack this feature. This option still does not explain the mixed behaviour of nouns. Listed allomorphs are thus necessary (/amik, amitʃi/). If we assume listed allomorphs for nouns one wonders why we do not find any among the *-are* verbs. This consistent lack of allomorphy in *-are* verbs is owed to highly ranked paradigmatic uniformity constraints (McCarthy 2003).

To summarise, there are three distinct subpatterns here, categorical application (*-ere* verbs), categorical nonapplication (*-are* verbs) and idiosyncratic (non)application (nouns). The aim of the paper is to argue for the synchronically active status of the palatalization pattern in *-ere* verbs and to integrate the three different patterns into one grammar.

What determines the distribution of consonant clusters in English?, and: Should phonology care? new evidence from word formation

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It is a wellknown fact that the set of consonant clusters attested in English words does not comprise all clusters that could occur according to standard sonority-based models (cf., e.g., Hammond 1999). However, the factors which motivate the attested set as well as the more principled question of whether phonological theory should account for consonant phonotactics at all, are still much debated. Empirically, the investigation of cluster phonotactics is generally hampered by the fact that relevant data are hard to come by: Sets of pertinent data are often small, and we frequently lack phonological or morphological data that show us the behaviour of clusters in alternations.

The aim of this paper is twofold: First of all, I will introduce a new resource of evidence for English: monosyllabic truncated personal names (e.g. *Al*, *Alf* < *Alfred*) and disyllabic *y*-suffixed hypocoristics (e.g. *Ally*, *Alfy* < *Alfred*). The investigation of the structural properties of English truncated personal names in Lappe (2005) has shown that consonant clusters are subject to systematic variability. This variability concerns the chances of survival of postvocalic clusters (e.g. [lf] in *Alfred*) in monosyllabic truncated names (e.g. *Alf, Al*) and *y*-suffixed hypocoristics (e.g. *Alfy, Ally*). A statistic analysis of several hundreds of cluster data reveals that chances of cluster survival significantly differ according to the type of cluster concerned. Furthermore, the chances of survival of word-final consonant clusters in monosyllabic truncated names and word-medial clusters in disyllabic *y*-suffixed hypocoristics are found to exhibit important similarities, but also substantial differences. Thus, for example, [lt] in a name like *Walter* has equal chances of surviving in a monosyllabic truncated name (*Walt* or *Wal*) and an *y*-suffixed hypocoristic (*Walty* or *Wally*). By contrast, [ld] in a name like *Walden* is unlikely to survive in a monosyllabic truncated name (*Wal* rather than *Wald*), but has good chances of surviving in an *y*-suffixed hypocoristic (*Waldy* or *Wally*). On the basis of the systematic nature of cluster preservation in truncation, I will argue that cluster phonotactics is indeed a phenomenon that falls into the realm of phonological theory, and that variability of cluster preservation in truncation provides us with a unique window onto the factors which determine cluster markedness in English.

The second aim of this paper is to use the truncatory data to test current hypotheses about the nature of cluster phonotactics in English. Specifically, I will focus on two different dimensions. The first dimension concerns the role of the syllable in phonotactic restrictions. Proposals in the literature range from accounts which consider classic syllable structure - onset, nucleus, coda - the domain for cluster restrictions to those claiming that phonotactic restrictions are purely sequential in nature. The behaviour of consonant clusters in truncation shows that both types of restriction must exist. The second dimension to be considered concerns the level of abstractness of the factors that influence cluster preservation. Whereas traditionally phonological principles like homorganicity, agreement of laryngeal features, or sonority differential between the consonants involved are held responsible (cf., e.g., Côté 2000, 2004), there is a growing body of evidence that frequency of occurrence of a particular cluster in the lexicon of the language has a decisive influence on phonotactic phenomena (cf., e.g., Frisch 1996, Hay, Pierrehumbert & Beckman 2003). The analysis of cluster data from the CELEX lexical database and their comparison with the cluster effects encountered in truncation supports this position for English. Finally, we will discuss in detail in how far lexical frequency and more abstract phonological factors differ in their predictions concerning the occurrence and preservation of different types of cluster.

Reassessing constraints on complex rhymes in English:
The true status of the coronal obstruents

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The phonotactics of English impose an upper limit of three segments in the syllable rhyme. In general, the Sonority Sequencing Principle (SSP) strictly governs the sequences of permissible segments to fill these three positions. Exceptions to these assumptions involve the coronal obstruents [t, d, θ, s, z] which violate these restrictions in two ways: by combining with a preceding stop or fricative in violation of the SSP: ***depth, elapse, rags, fact, kept***. They also violate the length restriction as the fourth segment in the coda: ***child*** [aɪld], ***faint*** [eɪnt], ***joint*** [ɔɪnt], ***clowns*** [awnz], ***tenths*** [ɛnθs]. In an effort to account for these exceptions it has been proposed that the coronal obstruents receive a special structural status allowing them to be joined to the otherwise well-formed syllable as an appendix (Halle & Vergnaud 1980) or to a higher-order constituent such as the prosodic word (Booij & Rubach 1984). Other approaches disassociate the coronals from the preceding syllable altogether simply licensing them at the edge of the word (Ito 1986) or assigning them as onsets to syllables with an empty nucleus (Kaye 1990b) or null vowel (Burzio 1988). None of these theoretical accounts has led to consensus among phonologists as to the proper treatment of these exceptional rhymes in English.

This paper reports on an acoustical study demonstrating that four-segment rhymes are exceedingly rare in naturally spoken English: with the exception of [s], coronal obstruents failed to phonetically surface as the fourth segment in the English rhyme, surfacing only in pre-vocalic (arguably onset) position. The results suggest that the length restriction of a three-segment coda is an accurate constraint on English syllable structure.

Productions of codas appearing to be in violation of the three-segment restriction were extracted from digitized recordings of the guided conversations of ten monolingual English speakers and submitted to acoustic analysis using Praat signal analysis software. Subjects were lead through a guided conversation resulting in multiple spontaneous productions of the target words in a wide variety of phonetic contexts. Spectrographic analysis reveals that coronal obstruents in violation of the three-segment length restriction on the English rhyme failed to surface in pre-consonantal position unless the resulting sequence of consonants was characterized by a rise in sonority, often taking the shape of permissible English onsets. In a separate study, subjects were recorded producing stop-final target words in isolation using careful speech paired with words without the exceptional coronal obstruent (i.e. ***paint*** vs. ***pain***, ***wild*** vs. ***while***). Acoustic and auditory inspection showed the pairs to be homophonous, except for the duration of the third member of the rhyme, which tended to be longer in words without a final stop. Cases in which final [t] or [d] surfaced were characterized by notably strong release bursts often followed by vowel-like formant structure suggesting that their syllabic affiliation is not with the preceding coda segments.

The study succeeds in providing instrumentally verifiable evidence in support of a three-segment restriction on English rhymes. In addition, a sound phonetic explanation is provided for cases which seem to remain problematic (i.e., final [t] or [d]; the special status of [s]) attributing their seemingly exceptional distribution to general phonotactic principles such as sonority sequencing.

Phonology and sociophonetics of lenition in Liverpool English (Scouse)

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The paper concerns the sociophonetic and phonological analysis of the lenition process occurring in the variety of English spoken in Liverpool, known as ***Scouse*** (Knowles (1974, 1978). In ***Scouse***, lenition can affect virtually all stops, although some of them seem to undergo the process more frequently. The result is audible affrication or frication of the segments. The different stages of this phonological weakening can be represented in so-called lenition trajectories (cf. Lass 1984), indicating the loss of strength passing from the plain stop to a possible final deletion. A factor which appears to influence the frequency of stop lenition is the place of articulation: in line with the so-called 'coronal syndrome' (cf. Kenstowicz 1994), the voiceless coronal stop seems to be the most affected phoneme.

Since up to now the acoustic aspects of ***Scouse*** lenition have not been analyzed in depth, the present paper can represent the first detailed acoustic study on the topic. As a matter of fact, the phonological study by Honeybone (2001) was based on auditory analysis, whereas the investigation by Sangster (2001) focused on some acoustic aspects of the lenition with reference to the alveolar stops only; on the other hand, Watson's (2002) experimental analysis was restricted to the realization of final /t/, although in some recent contributions by him (abstracts downloaded from the web) all underlying plosives of Liverpool English have been investigated.

Our study is based on a ***corpus*** of spontaneous speech produced by six speakers. The target phonemes (all stops) were considered in different syllable positions and in different prosodic contexts. The analysis allowed an accurate distinction of the different allophones produced by the speakers, with a good correspondence with the interpretative grid already traced by Honeybone (2001). A special point of interest in our work can be found in the analysis concerning the voiced alveolar stop, which undergoes lenition quite often in our data: with reference to the slit fricative already in use for its voiceless counterpart, a new transcription for the lenited allophones of /d/ is proposed.

In general, lenition turns out to be a very active phonological process, since it has been found in all speakers; moreover, it seems to be spreading to formerly not affected stops.

As far as the phonological analysis is concerned, the theoretical model assumed is ***Government Phonology***, which permits to present a coherent picture of the lenition process.

The various segments are represented as combinations of 'elements'; in the case of segments composed by the same elements, the crucial reference to the notion of 'head' allows to keep the different phonetic outputs distinct.

Lenition turns out to be a progressive loss of elements: affricates are less complex than stops, since, the number of elements being equal, the former segments do not have any head; fricatives, which loose the element of occlusion, are still less complex; hence, at the ultimate point of this weakening scale there is the deletion of the segment, normally an underlying coronal consonant. The phonological process appears to be prosodically constrained too: the weakest outputs are favoured in unstressed syllable and in intervocalic position.

Some sociolinguistic aspects of the lenition process occurring in Liverpool English are also taken into account; in particular, we deal with the relation between gender and lenition as well as a possible correlation between lenition and the typical ***Scouse*** intonation.

Issues in the theory of lexical tone: on the phonological modelling of the tones of Tamang, in light of a comparison with level tones (Naxi) and pitch-plus-voice-quality tones (Vietnamese)

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Introduction: The lexical tones of the Bodic language group (Sino-Tibetan family), and of the Tamang language in particular, raise a challenge for theories of tone, and for prosodic phonology: (i) their domain is the phonological word (whether monosyllabic or polysyllabic), not the syllable or the mora; (ii) their phonetic realisation is highly variable, and involves F_0 and voice quality characteristics of the syllable rhyme as well as characteristics of the syllable-initial consonants (as described in earlier studies by the first author). In an effort to refine on the phonological characterisation of these tones, a cross-linguistic experiment was set up, comparing the pitch and voice quality characteristics of the Tamang tones with similar data from Naxi, a language which possesses a relatively simple system of level tones (where the use of voice quality is not phonological), and from Vietnamese, which possesses tones that combine pitch and voice quality specifications.

Method: Experimental data were collected in the field from 5 Tamang speakers (143 monosyllabic CV and disyllabic CVCV words, illustrating the 4 tones), 5 Naxi speakers and 4 Vietnamese speakers, using electroglottography to obtain indications on voice quality.

Results: *Cross-language differences in variability* and *language-specific patterns of least variability* emerge. In the speech of the five Tamang subjects, one of the four tones (tone 3, which is low-rising) departs significantly from the other three by a breathy voice quality (sporadically accompanied by voicing of the initial consonant; voicing is not contrastive in Tamang). The four Tamang tones are highly variable in terms of F_0, as well as in terms of open quotient; the ranges of variation of the four tones overlap. By contrast, in our Vietnamese data, the F_0 and voice quality of each tone are more tightly controlled. In Naxi (where tones do not carry a voice quality specification), the F_0 standard deviation is limited, whereas voice quality varies according to speaker-specific strategies.

Discussion: One of the options open for the phonological modelling of the Tamang tone system is to consider it as a scalar system of four tones from highest to lowest. Under this view, voice quality could be considered as a secondary feature of the tones (variation on the 'non-tonic' syllable of a disyllabic phonological word could also be viewed as a coarticulatory consequence of a syllabic tone). It appears, however, that the 'secondary' characteristics of the Tamang tones are best analysed as *features* of these tones. This synchronic observation is in keeping with the historical origin of these tones in segmental material at the beginning and the end of words. Proposals for a characterisation of tone in terms of multiple correlates (a *template* representation, rather than an analysis into distinctive features) are put forward in light of diachronic dynamics, on the one hand, and synchronic realisation, on the other. The implications are discussed in a debate with some current theories of tone and of linguistic typology.

Looking Beyond Harmony: a more complete picture of Hungarian vowels

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Arguably, the most famous phonological phenomenon in Hungarian is vowel harmony. However, the vowel system of this language is actually more interesting than the typical harmony analysis would suggest. The language has complex interactions among its phonetic, phonological and morphological components that non-trivially impact on harmony. Unfortunately, these interactions are rarely discussed, and the result is a variety of myopic accounts of one phenomenon (i.e. harmony) that do not straightforwardly extend to other aspects of the Hungarian grammatical system. In this talk, I will provide a fairly complete description of the Hungarian vowel system and propose a unified, representational analysis of the inventory, of harmony, and of other related phenomena using recent advances in featural/representational theory and "contrast-driven" phonology (e.g. Dresher, *et al* 2004).

Hungarian has a rather complex surface vowel inventory. There are 14 "stable" vowels that have contrastive length in some environments but displaying active length alternations in others (i.e. [i~i:, y~y:, u~u:, ɛ~e:, œ~ø:, ɔ~o:, ɒ~a:]). High vowel length pairs differ only in quantity, while non-high vowel pairs differ in both quantity and quality. In addition, the language uses vowel epenthesis to repair syllable structure violations that result from morpheme concatenation and an "unstable" vowel, which is similar to the Slavic 'yer'. This "unstable" vowel is clearly there in the underlying representation of some stems and suffixes, but it only surfaces in final and/or closed syllables. The harmony system is such that suffixes with [i, i:] and some suffixes with [e:, o:, a:, u, ɔ, ɒ] never show surface harmony effects, some suffix vowels participate in a front-back harmony triggered by the preceding vowel, e.g. [-unk~-ynk, -u:~-y:, -o:~-ø:, -nɒk~-nɛk, -na:~-ne:], while other suffix vowels (including epenthetic and "unstable") participate in a ternary back-front-front/round alternation, e.g. [-ɔk~-ɛk~-œk]. This ternary system interacts with morphology in that there is a set of "lowering stems" that cause lowering of the back vowel and a lack of rounding in front/round contexts, e.g. [-ɒk~-ɛk~*-œk~*-ɔk]. Interestingly, the unrounded front vowels in Hungarian are Janus-faced in that some morphemes with these vowels in the final syllable always take harmonizing suffixes that are back (e.g. [hi:d-nɒk]), other morphemes always take harmonizing suffixes that are front (e.g. [vi:z-nɛk]), and other morphemes take harmonizing suffixes that are front or back depending on the speaker (e.g. [pɒpi:r-nɛk]~[pɒpi:r-nɒk]).

I will examine and analyze this system using the Parallel Structures Model of feature geometry (Morén 2003, 2006), which assumes that every segment composed of a combination of features entails the presence of a set of segments composed of single features. This ensures that segment inventories are economical and implies that the relationship between phonological features and phonetic implementation is not as transparent as is usually assumed. When applied to Hungarian, the vowel inventory and harmony behavior fall out quite naturally. The four main claims are: 1) Vowels participating in ternary harmony are either epenthetic or "unstable". They are analyzed as empty root nodes that gain place features from the preceding vowel. The "unstable" vowel is seen as contrastive, but subject to deletion in non-final open syllables. 2) Harmony in this language involves the V-place features [cor] and [lab]. V-place[cor] spreads rightward to all available vowels. V-place[lab] spreads rightward only to empty root nodes. 3) Following the analysis of Kàlòng by Paulian (1986), Hyman (2002) and Morén (2006), the "schizophrenic" behavior of unrounded front vowels in Hungarian is explained by positing a many-to-one mapping from phonological vowels to phonetic realizations (i.e. /i, I/=[i], /i:, I:/=[i:], /e, E/=[ɛ] and /e:, E:/=[e:]), where some "front" vowels are V-place[cor] and others are placeless. 4) "Lowering stems" select lexical allomorphs containing low vowels when available (e.g. /-Vk/, /-ak/$_{\text{lower}}$ versus /-hVz/).

Semantically Vacuous Double Affixation: *a PF Interface Effect*

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Current work within the Minimalist Program (Chomsky 1995) strives to give an explanatory account of the Language Faculty, focusing on its' 'perfection' as a mental/conceptual system. Much work strives to explain away certain 'imperfections' in the system by appealing to the workings of the derivational system itself (i.e. Bracketing Paradoxes).

In this paper, it is argued that current theories of linguistic derivation conspire to create a completely superfluous yet nevertheless expected imperfection – semantically vacuous double affixation. I argue that current proposals, including Phase Theory (Chomsky 1999), Morphological Merger (Marantz 1988, and subsequent work), and Late Adjunction (Stepanov 2001, among others) converge to create a derivational system in which such double affixation must occur. Instead of being a problem for current theory, this imperfection gives evidence that we are on the right track.

Consider the following Breton and English data;

(1) a. bag-où 'boats'
boat-pl
b. bag-ig 'small boat'
boat-dim
c. bag-**où**-ig-**où** 'small boats'
boat-pl-dim-pl
(Stump 1989)

(2) a. He is a thrower.
b. He throws up.
c. He is a throw**er** upp**er**.
d. ?He is a throw upper.
e. *He is a thrower up.
f. *He is a throwerer.

In each of the above cases there is semantically vacuous double affixation. Of note is that this double affixation only occurs in the presence of an intermediary affix - here – *up* in English, and –*ig* in Breton.

I argue that this obligatory secondary exponence of the morphemes *-où* and *–er* is purely phonological in nature. The morpho-syntactic properties of these examples give rise to a situation in which the doubled affix is interpreted twice at the PF interface. That this phenomenon is one that needs a phonological account is evidenced by the example in (3).

(3) a. up chucker
b. *upper chucker

As linear order is the only distinction between (2) and (3), it is therefore the determining factor in whether double affixation emerges. As linear order is determined at PF, (1-3, among other examples) are in need of a phonological explanation.

The question to be answered here is the following: How do current linguistic theories conspire to cause this obligatory double affixation? The answer to this question demonstrates two things; firstly, that phonological theory must be informed by morpho-syntactic theory, and secondly, that even a purportedly 'perfect' underlying system will cause systematic, and therefore telling, 'imperfections' in the output.

Final Devoicing as an Argument for Turbid Representations

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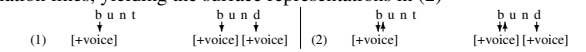
1. The problem. It is a well-known fact that Final Devoicing in languages like German does not always lead to full neutralisation. In work reported by Port and Crawford (1989), for instance, it is shown that German listeners can guess 60 to 70 percent correctly (i.e. not perfectly, but well above chance level) whether they are hearing *Bund* ('league', with a devoiced /d/) or *bunt* ('colorful', with underlying /t/). This obviously poses a puzzle for any theory of phonology-phonetics interaction. It has indeed been claimed by some phoneticians (e.g. Port and Leary 2005) that facts such as this provide an argument against 'formal phonology'. We argue that the facts of German Final Devoicing are, to the contrary, an argument in favour of a fairly abstract view on phonological structure.

2. Theoretical background assumptions. Our analysis is couched in a Containment view of input-output relations. Containment (Prince and Smolensky 1993, P&S, cf. Van Oostendorp 2005) is a principle which disallows deletion. Underlying material which is not pronounced is assumed to be not parsed into higher-order constituents (the phonological word), but still present the phonological structure. The phonetics will apply a principle of Stray Erasure to everything which is not parsed. A kindred approach involves the theory of Turbid Representations (Goldrick 2000, Revithiadou 2005). In this theory, there can be two asymmetric relations between a segment and a feature in principle (see also Zec 1995). Underlyingly, a segment σ *projects* a feature ϕ to which it is associated. However, this feature is only phonetically realised if ϕ establishes a *pronunciation* relation with σ on the surface. Goldrick applies this theory to 'opaque' vowel lengthening before prenasalised segments in Bantu; Revithiadou applies it to lexical stress in Greek and Russian.

3. Final Devoicing and Turbidity. Here, we apply Turbidity Theory to Final Devoicing. Underlyingly, the representations of the words for *bunt* and *Bund* are as in (1) (arrows downwards represent projection, arrows upwards pronunciation). By Containment, Gen cannot add any of these, but it can insert pronunciation lines, yielding the surface representations in (2)



If we assume that phonetic Stray Erasure is not absolute, but gradual, and the phonetics may sometimes interpret projection relations as well as of pronunciation, the statistic facts follow from these abstract relations. Whereas Correspondence Theory does not leave us a choice but delete features absolutely, the more 'abstract' Turbidity Theory seems to get closer to the phonetic facts.

Toward an Unified Analysis of Local Tone Shift and Local Tone Spread Phenomena

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Cassimjee & Kisseberth (1998) (C&K98) proposed an Optimality Theory related framework, Optimal Domains Theory (ODT), that accounts for suprasegmental phenomena, and particularly tone shift and tone spread. ODT theoretically provides two possible analyses of shifting. In the first one, the Sponsor Included but Imperfect Expression (SIIE), a domain 'extends from the sponsor to the targeted mora, but there is a constraint that prevents expression of High tone on any mora except the targeted one' (p. 56). The second analysis, the Sponsor Excluded but Perfect Expression (SEPE), claims that the sponsor is excluded from the domain and that all syllables being inside the latter will parse a High tone. C&K98 only discuss SIIE cases but 'predict that there will be cases where SEPE is needed' (p. 57). This talk will discuss two Bantu languages that belong to this last category: Saghala and Sukuma.

In Saghala, which is spoken in south Kenya, both local tone shift and local tone spread occur – i.e. the tone will be parsed on the two syllables that follow the sponsor (1-a). Sukuma (Batibo, 1991; Goldsmith, 1985, among others), spoken in north-west Tanzania, is problematic for its two-syllable shift (1-b – Goldsmith, 1985).

(1)	a.	/ ítʃi kitanda /	*itʃí kítanda*	'this bed'
		/ itʃilyá kitanda /	*itʃilya kítánda*	'that bed'
	b.	/ kubónanija /	*kubonaníja*	'see simultaneously'
		/ kutónolanija /	*kutonolaníja*	'pluck simultaneously'

I will demonstrate that a SIIE analysis is undone for Saghala, which has to be analysed as a SEPE language which uses a binary domain, and that Sukuma must be analysed as a sponsor excluded language with imperfect expression. Moreover, it will be shown that Sukuma provides strong evidence in favor of the existence of a binary domain.

I will then propose that all local shifting and local spreading phenomena – i.e. all cases where tone shift and tone spread are not determined by any target (e.g. stress) or boundary – can be expressed with a binary domain combined with Sponsor Excluded and Perfect Expression parameters, as is presented in the following table.

Sponsor excluded	–	–	+	+
Perfect Expression	–	+	–	+
Representation	v (v́ v)	v (v́ v́)	v (v v́)	v (v́ v́)
Language	Jita	Gweno	Sukuma	Saghala

Evidence against voicing spread in Kera

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The Chadic language Kera has been used to provide key evidence in the debate over the existence of long-distance C to C voicing spread. Odden (1994), Rose and Walker (2001, 2004) and Uffmann (2003) give examples from Chaha, Ngizim, Ngbaka and Proto-Indo-European where only agreement within the root is involved, but Kera is the one example where prefixal alternations apparently confirm this spreading. Gafos (1998) has argued against many of the claims made about long-distance C to C effects, but he has not covered the case of Kera. Hansson (2004) raises the question as to whether the interaction of voicing and tone plays a role in Kera, but without data to support his hypothesis.

Previous work has relied on IPA transcriptions of Kera consonants. This paper uses instrumental data based on 11 years of field research in Chad, to show that the theoretical claims of long-distance C to C voicing spread in Kera cannot be maintained, and argues instead that the appearance of voice spreading is a side-effect of non-controversial long-distance tone spreading. Tone has a 3-way contrast and the VOT value varies with the tone while not being contrastive in itself. This can give rise to apparent changes in voicing, as in the prefix below:

(1) /k-bɨ̀rwá-ŋ/ [gɨ̀bɨ̀rwáŋ] 'white (pl.)'

The spread of L tone causes the VOT of the k- prefix to shorten, giving rise to the perception of voicing (although the VOT remains positive). Example (2) shows that the VOT of the k-prefix is longer and clearly voiceless before H tone, even though the next obstruent is voiced:

(2) /k-ágày/ [kágày] 'hoe (pl.)' *[gə̀gày]

In (3), the habitual suffix –t differs in VOT according to the following tone. (3b) shows us that long distance voice spreading is not involved:

(3) a. /gə̀l-t-n/ [gə̀ldə̀n] 'searched for me (habitual)'
b. /gə̀l-t-ú/ [gə̀ltú] 'searched for him (habitual)'

Further counterexamples from prefixes, suffixes, proto-Chadic and loans are examined where the voice-spreading account fails. Measurements of VOT and F0 on new data collected in a recent field trip confirm that VOT co-varies with F0 and that all cases of 'voice spreading' could equally be analysed as tone spreading, whereas the reverse is not true.

Uffmann (2003), a proponent of voicing spread, also argues that the fact that most Kera mono-morphemic words agree in voicing is further evidence for voicing spread, but this paper shows with a statistical analysis of over 1000 nouns that 9 % of words disagree in voicing. Uffmann cannot account for these. We compare this result with the number of words which should disagree in voicing if the VOT value is simply co-varying with tone. The percentage of nouns with a combination of L and another tone is also 9 %. As onsets preceding a L tone are generally perceived as voiced, this 9 % is the predicted number of words which will be perceived to have a mismatch in voicing. The fact that these two results agree is strong evidence that the contrastive tone and co-varying VOT theory accounts for the facts better than the long-distance voicing spread theory.

The conclusion of this paper is that Kera cannot be used as key evidence in favour of long-distance C to C voicing spread. As this language is central to the voicing spread argument, this paper therefore raises serious questions about whether long-distance C to C effects do exist.

Phonological effects of Late Lexical Insertion and derivation by phase

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Morphemes sometimes display seemingly apposing phonological properties that are often attributed to arbitrary lexical specification. This paper looks at two competing strategies for avoiding vowels in hiatus in Ojibwa, an Amerindian language of the Algonquian family. Superficially, the choice of strategy seems to reflect arbitrary properties of affixes. However, this paper argues that it is completely predictable, when consideration is given to the word-internal syntax of the language. The two strategies are illustrated in (1). When illicit V-V sequences emerge in word formation, they are repaired by vowel (V-)deletion (1a) or consonant (C-)epenthesis (1b).

(1) a. ogima:-ag [ogima:g] 'leaders, chiefs'
'CHIEF-PLURAL'
b. ni-e:mikwa:n [ni**d**e:mikwa:n] 'my spoon'
'1ST PERSON-SPOON'

In current optimality-theoretic thinking, the first strategy (V-deletion) (or its equivalent) is employed when some constraint against C-epenthesis (DEP-C) is dominant. When the effect of DEP-C is neutralized by arbitrary constraint ranking, C-epenthesis is employed. However, the choice of strategies illustrated in (1) cannot be morpheme-dependent (lexical or otherwise), because the pronominal prefixes that trigger C-epenthesis (1b) may also trigger V-deletion.

(2) a. ni-o:s [no:s] 'my father'
'1ST PERSON-FATHER'
b. ni-o:komis {no:komis} 'my grandmother'
'1ST PERSON-GRANDMOTHER'

The constructions in (2) belong to the set of inalienably possessed nouns; roots like /o:s/ 'father' and /o:komis/ 'grandmother' are uninterpretable without a prefixal morpheme.

Adopting the theory of Distributed Morphology (DM) (Halle & Marantz 1993, 1995) and theory of derivation-by-phase (Chomsky 1999, 2005, Marvin 2002), this paper explains why Ojibwa employs two hiatus-avoiding strategies. A crucial element of the analysis is the claim that the syntax of Ojibwa words provides for a number of phases, and a phase submits a pair of representations to be interpreted by the PF and LF components in tandem (Nissenbaum 2000). In accordance with the DM tenets, PF interpretation (i.e. spell-out) involves vocabulary insertion. The V-deletion strategy is employed at the point of lexical insertion to block the emergence of illicit V-V sequences; the root morpheme and plural suffix in (1a) are inserted in the same phase. C-deletion, in contrast, applies after lexical insertion to repair an illicit V-V sequence that arises after spell-out. Crucially, the pronominal element in a word like (1a) is spelled out in a [Spec, DP) position in a different phase from root *e:mikwa:n* 'spoon', the latter constituting part of an *n*P phase. In contrast, the pronominal element and the following root morpheme in (2) must be spelled out in the same *n*P phase; the semantic interpretation of inalienable possession does not allow for any alternative. Hence, word-structure and not lexical marking on morphemes determines the choice of V-deletion or C-epenthesis as hiatus-avoiding strategies in Ojibwa.

The big take-home message from this paper is that explanation of phonological well-formedness must take word structure into consideration. To the extent that derivation figures in the structure and interpretation of words, an explanatory theory of phonology must then be derivational.

The phonologist and the design of documentary fieldwork: assuming a role in data production from the outset

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Phonology and fieldwork can most often be found interfacing within a methodological virtuous circle: the findings of fieldwork provide input to phonological analysis and theory, which in turn provide insightful questions to take back to the field. In the case of endangered languages, however, this process can be cut off before even a single full cycle has been completed. In light of this, there is an important role to be played by the phonologist in designing fieldwork strategies which ensure (i) that the initial production of data is as rich as possible, even in the absence of input from advanced phonological analysis, and (ii) that such data is delivered in a 'user friendly' format for those who will provide the subsequent theoretical analysis – thereby allowing the virtuous circle to be completed without unnecessary delay. This presentation reports on a recent attempt to implement such ideas within a documentation project carried out with the last speakers of the moribund Australian (non Pama-Nyungan) language, Kayardild.

Already in a highly precarious position, Kayardild is unlikely to survive much longer than five or ten more years. When it ceases to be spoken, the entire Tangkic language family will have become extinct, and while this window of five or so years provides invaluable time for research, it is not long. In response to this, features were built into the design of a documentation project run in 2005 with a view both to practical feasibility and to the production of data in a form as outlined above. Primary among these was the enrichment of interlinear text glosses through the addition of two tiers of prosodic information; secondary was the adoption of a phonologically shrewd approach to vocabulary documentation. Neither of these strategies required any particularly advanced phonological training on the part of the field researcher – that is, they should be relatively easy to incorporate into other projects – and despite their simplicity, they appear to have proven successful.

In the presentation then, I discuss the precise nature of the rhythmic and intonational transcriptions made for Kayardild, outline how they have already proven useful, and comment and how the methods could be extended to other field projects. I also offer some observations on mundane but nevertheless important details which can impact on the effectiveness of phonological/phonetic data collection.

The talk should be of interest to any phonologist in a position to offer advice to fieldworkers on the collection of phonological data – that is, to most of us.

Directionality in Harmony: Evidence from Pulaar

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The purpose of this paper is to present a full analysis of Pulaar (Niger-Congo) [ATR] harmony, which exhibits apparent leftward directionality. The Pulaar vowel inventory is presented in (1) and the data illustrating Pulaar [ATR] harmony are presented in (2). As seen in (2), in Pulaar [ATR] harmony, the [ATR] specification of the word-medial mid vowels (underlined) is determined only by the [ATR] specification of the vowel that follows the word-medial vowels (Paradis 1992).

(1) Pulaar Vowel Invetory: [+ATR] i, u, e, o (no [+ATR] low vowels)
[-ATR] ɛ,ɔ,a (no [-ATR] high vowels)

(2) [ATR] Harmony in Pulaar (Only mid vowels alternate their [ATR] specification in Pulaar.)

a. bin^{n}d-ɔɔ-wɔ (*bin^{n}d-oo-wɔ, *bɪn^{n}d-ɔɔ-wɔ) 'writer (*write*-agentive suffix-noun class)'

b. bar-oo-di (*bar-ɔɔ-di) 'lion (*lion*-agentive suffix-noun class)'

In this paper, I argue that the directionality observed in Pulaar cannot be simply attributed to other phonological effects, such as positional faithfulness (Beckman 1997, 1998), but rather, directionality needs to be specified in the harmony constraint. I present an analysis with the constraint **SPREAD-L [ATR]** (if a feature [+ATR] or [-ATR] is associated with a vowel, the same feature is linked to all the vowels *to the left.* cf. Padgett 1997, 2002, Walker 2000). Finally, I demonstrate that when positional faithfulness is silent, as in the forms in (2), the directionality specified in the harmony constraint guarantees the attested directionality.

It has been generally assumed that directionality can be attributed other phonological effects, and thus, directionality need not be specified in harmony constraints. However, as seen in (3), when the positional faithfulness constraints are fully obeyed, the directionality specified in the harmony constraint selects the candidate with the attested directionality. In (3), two positional faithfulness constraints, **IDENT-FINAL (IDENT-FIN)** (the vowel in the final syllable is identical to its input correspondent) and **IDENT-ROOT** are assumed. However, the candidates (3a) and (3b) both satisfy these positional faithfulness constraints.

(3) **SPREAD-L [ATR]** prefers Leftward (3a) to Rightward (3b)
/bin^{n}d-oo-wɔ/ →[bin^{n}d-ɔɔ-wɔ] (Root: [bin^{n}d-])

/bin^{n}d-oo-wɔ/	*ɪ/ʊ	IDENT-FIN	SPREAD-L [ATR]	IDENT-ROOT	IDENT [ATR]
☞a) bin^{n}d-ɔɔ-wɔ			*		*
b) bin^{n}d-oo-wɔ			**!		
c) bɪn^{n}d-ɔɔ-wɔ	*!			*	**

The difference between (3a) and (3b) is that in (3a), the [-ATR] feature associated with the word-final vowel is not associated with one vowel to the left ([i] in the root) while in (3b), the [-ATR] feature of the word-final vowel is not associated with two vowels to the left ([i] and [o]). As a result, the candidate with a word-medial [-ATR] vowel is selected over candidate (3b). Notice that (3a) and (3b) would tie if a non-directional harmony constraint were assumed. For example, if the constraint is **SPREAD [ATR]**, which requites that the same [ATR] feature is linked to *all* the vowels, both (3a) and (3b) equally violate this spreading constraint.

As seen in (3), when positional faithfulness is silent, it is the directionality specified in the harmony constraint that determines the correct output. This suggests that directionality needs to be specified in the harmony constraint to account for the attested harmony patterns.

Tonal Restrictions in Kam: The effects of aspiration, glottalization, and vowel length on lexical tone

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Kam, a Kadai language spoken in southern China, has nine contrastive tones, as exemplified by the following minimal set:

(1) *saw*^{55} 'twist' *saw*^{323} 'stream (v)' *saw*^{53} 'soup'
saw^{11} 'rear (v)' *saw*^{31} 'husband' *saw*^{33} 'create'
saw^{35} 'straw' *saw*^{13} 'grass carp' *saw*^{453} 'egret'

Minimal sets like this are rare, however, due to extensive constraints placed on tone distribution. These constraints are related to three factors: vowel length, aspiration, and glottalization. The tone distribution is summarized in the table below, where unchecked syllables include open syllables and syllables closed with a sonorant, while checked syllables refer to those closed with a stop:

Tone / Onset	55	11	35	323	31	13	53	33	453	Rhyme
Aspirated stop			x			x			x	Unchecked
						x				Checked: V:O
			x							Checked: VO
Unaspirated stop	x	x		x	x		x	x		Unchecked
				x	x					Checked: V:O
	x	x								Checked: VO
Sonorant or fricative	x	x	x	x	x	x	x	x	x	Unchecked
				x	x	x				Checked: V:O
	x	x	x							Checked: VO

I argue first that rising tones [35], [13], and [453] follow only aspirated stops because of a constraint preventing [spread glottis] from being followed by a high contour; these tones, then, are derived from their non-rising counterparts, implying that the Kam system has only six phonological tones. Apparent nine-way contrasts, such as that shown in (1), are argued to result from an underlying distinction between aspirated and unaspirated sonorants and fricatives, which is realized on the surface as a tonal difference. Second, I show that the failure of high register tones [53], [33], and [453] to occur in checked syllables follows from the fact that these final obstruents are all glottalized in Kam. This [constricted glottis] feature shows an OCP-type effect by blocking high register tones. This effect does not apply to tones [55] and [35] because these are underspecified for register, in the sense of Fu 1995. Finally, I propose that the distribution of tones in checked syllables, with tones /11/ and /55/ limited to short vowels and tones /323/ and /31/ limited to long vowels, serves to maximize the perceptual difference among vowels in these environments; I offer preliminary phonetic data to support this idea.

These data are of theoretical interest because theories of tone-consonant interaction are largely limited to the interaction of voicing and tone (Bradshaw 1999, Yip 1995, Bao 1990, Halle and Stevens 1971). Likewise, Zhang (2001) accounts for the failure of contour tones to occur on short vowels but does not account for the failure of level tones to occur on long vowels. I propose that tones and consonants need not share actual features, but that interactions between tonal features and consonantal features follow from phonetically grounded constraints. I further argue that both register and contour are necessary in a model of tone but that these should be represented by the same feature, following Fu (1995).

A representational solution for cyclicity effects: Direct Interface

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Since SPE, the phonological cycle describes the bearing of morphological structure on phonology. English class 1 vs. class 2 effects are a case in point. A well-known example is the stem-final alternation of -mn and -m as in damn [m], damn-ing [m] (class 2) vs. damn-ation [mn] (class 1). The ordinary analysis proposed by Lexical Phonology is derivational: first class 1 affixes are concatenated, then morphological structure is deleted (bracket erasure). In contrast to the output of level one, the result of class 2 affixation at level 2 still bears visible morphological structure, and deletion applying only at this level eliminates n before a bracket.

As for all other apparently serial phenomena, OT has sought to offer a strictly parallel solution (or has simply taken over the serial model, cf. DOT, Stratal OT). The present talk critically reviews the various directions that have been taken (cophonologies, Interface Constraints, OO-correspondence). I then argue 1) that rather than building an extra tool for lexical strata, a non-serial solution comes for free with an adequate theory of the interface, and 2) that the treatment of this phenomenon supposes enriched representations rather than increased computational power. I show that a particular view on inter-modular communication, Direct Interface, combined with the representational environment of CVCV (Lowenstamm 1996), provides a non-derivational account for class 1 vs. class 2 effects.

Direct Interface follows the principle of Indirect Reference that is largely accepted since Prosodic Phonology (Selkirk 1981) and, just as the modular view of grammar (e.g. Jackendoff 2002) where modules do not speak the same language (of the brain), enforces the existence of a Translator's Office. That is, extra-phonological information reaches phonology in the form of the output of a translating process. Obviously, this output cannot be any diacritic (as in SPE): phonology can only interpret phonological objects (it would not occur to any syntactician to operate with bananas). Hence the output is necessarily a truly phonological category, i.e. one that exists in the phonology anyway and in absence of any issue related to the interface (hence the Prosodic Hierarchy *is* a diacritic, if an autosegmental one).

This view on the interface is independent of any specific phonological theory: every theory has its own vocabulary, which will be the output of the translation. Hence different predictions are made, and theories can be assessed according to their behaviour at the interface.

The particular theory that I work in is CVCV, an outgrowth of Government Phonology. At the syllabic level, its only tools are two lateral relations, Government and Licensing. In the particular case of damn, damning vs. damnation, the phonological analysis singles out Licensing as the driving force: the stem-final -n is in coda position (in CVCV, coda consonants are those that occur before a governed empty nucleus, hence dam**ønø**), and we know independently that final empty nuclei (FEN) cannot license in English (lenition such as l-darkening occurs in final codas). N does not drop in internal codas because here it is always homorganic with the following consonant, hence a strong partial geminate (sharing makes us strong). FEN are thus unable to license qua phonology. Class 2 affixes merely follow domestic phonological rule: the stem-final empty nucleus is unable to license because it is governed by the suffixal vowel, and nothing more needs to be said. Class 1 suffixes, however, have the property of being accompanied by interface activity: the stem-final nucleus receives the order "you are a good licensor" even though qua domestic phonological rule it isn't. Interface orders always outrank domestic phonological law. The -n thus being licensed in damønø-ation, it is pronounced.

This kind of interface mechanism where certain affixes come with a phonological instruction (while others are neutral) is in-built: the regular tools of the phonological theory are simply put at use, and no special apparatus is needed. It offers a representational and non-procedural alternative for all cyclic effects that are local, i.e. those that are traditionally called sandhi. Interestingly, non-local effects concerning suprasegmentals such as stress cannot be represented and are hence predicted to be different in kind. This result lends further support to the segregation between segmental and suprasegmental phonology (e.g. McMahon, de Lacy).

Towards a Typology of Linguistic Rhythm

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The typological distinction between stress-timed and syllable-timed languages has traditionally been attributed to the isochrony of stress-feet and syllables, respectively (Pike 1945). The various predictions made by this isochrony hypothesis have been tested by a number of phonetic, psycholinguistic and phonological studies over the last decades. Although most results from phonetic measurement clearly speak against the isochrony hypothesis (see e.g. Roach 1982), psycholinguistic evidence from perception and processing underpins the principled distinctions made in rhythm typology (Ramus, Nespor & Mehler 1999 and Cutler 1999). One way to resolve this apparent contradiction lies in a phonological interpretation of linguistic rhythm which attributes differences across rhythmic types to the clustering of phonological properties in prosody, phonotactics and morphophonology. In prosody, the phonetic correlates of stress, segmental effects of stress, stress placement and tone have been proposed as diagnostics for rhythmic organization. In phonotactics, syllable complexity, length contrasts and syllable divisions supposedly contribute to the rhythmic profile of a language. Finally, the distribution of morphophonological processes such as assimilation, cluster resolution and vowel harmony have been discussed as symptomatic for linguistic rhythm (Auer 1993, 2001).

Drawing data from a variety sample of nineteen genetically unrelated languages, this talk will test ten phonological parameters which have been proposed for the typological study of linguistic rhythm. On the basis of six parameters, we can isolate prototypical representatives of each rhythmic type. Stress-based rhythm is characterized by phonetically strong accent, segmental effects of stress, restricted distribution of tone, high degrees of syllable complexity, the lack of stress-independent length contrasts in consonants and the lack of word-spanning vowel harmony processes. Syllable-based rhythm, on the other hand, exhibits phonetically weak accent, the lack of segmental effects of stress, unrestricted distribution of tone, low degrees of syllable complexity, and allows word-spanning vowel harmony processes. Mora-based rhythm only differs from this cluster in additionally showing stress-independent length contrasts in consonants (Schiering 2005). The cross-linguistic variation evidenced in the sample suggests that linguistic rhythm ought to be conceived as a continuum ranging from prototypical mora-based to prototypical syllable-based to prototypical stress-based phonology. The question of to what extent this synchronic cline may be interpreted as mirroring diachronic change will be addressed in the final part of the talk.

Covert articulation of Scottish English /r/: now you see and hear it, now you don't

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Recent multi-subject, socially-stratified research on Scottish English (specifically in Glasgow), has confirmed the existence of weakly rhotic and derhoticised speech in broadly-spoken vernacular Scots. Coda /r/ sounds "weaker" than onset /r/, or indeed completely deleted. Impressionistic finely transcribed data is supported by acoustic analysis: monophthongal and diphthongal vowels are found rather than rhotic approximants with lowered F3. These facts suggest an ongoing diachronic change towards non-rhoticity, but in any case the situation raises difficult synchronic analytic questions about the relationship between phonology and phonetics.

We will present new ultrasound data to exemplify some of this Scottish variation, which parallels in some ways the data on Dutch presented at MFM by Koen and Scobbie (2005). Among the results we will exemplify categorical and gradient variation in liquid production within speakers, covert articulations, and indexical differences in tongue configuration.

A consonantal segmental /r/ may already be less appropriate as a phonological analysis than the incorporation of extra diphthongs or vowels into the phonological system. On the other hand, the phonological analysis may be relatively unchanged – i.e. there is still a "coda /r/" - but this analysis transfers contrast between /r/ and lack of /r/ at an abstract underlying level to more phonetically-accurate contrasts between various vowels. Typically this is formalised either as categorical allophony of the /r/ instantiated in the phonological component, or as gestural weakening of /r/ with coarticulation in a phonetic component. Additionally, of course, all speakers will not necessarily have the same system, and the issue of whether and how such inter-speaker variation should be represented within an individual's phonological system will also be discussed.

We will compare different frameworks, each of which offers certain advantages, with a view to understanding gradient processes which over time amount to categorical phonologisation and phonological change. In particular, mismatches between acoustic output and underlying articulation suggest that an individual speaker may instantiate that process cognitively, rather than it being only an inter-speaker inter-generational change from a phonetic to a phonological representation.

Deriving Moraic Consonants from Temporal Coordination

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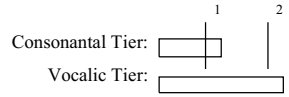
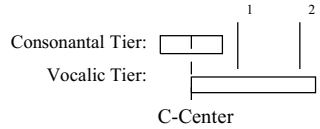
Problem: In Standard Moraic Theory (SMT) (Hayes 1989, 1995), the *weight-by-position* (WBP) rule is said to assign a mora to coda consonants in just those languages in which coda consonants are weight sensitive. The difference between geminate and singleton coda consonants is represented by an additional association line for geminates, by which they are linked to the onset of the following syllable. In languages with weightless codas, WBP is said not to apply (either parametrically or by low constraint ranking). Weight-bearing onsets are problematic for the theory as they require an explanation outside the scope of WBP. Davis (1999) assigns a stray mora to initial geminates to account dually for weight sensitivity and length; however, the presence of languages with weight-bearing initial geminates (Leti) necessitates a formal dissociation between length and weight. Kiparsky (2002) accomplishes this by linking the stray mora to higher level prosodic constituents for languages with weight insensitive initial geminates, using the mora to account for length without affecting syllable weight. A consequence of this proposal is asymmetry between the interpretation of the mora in onset and coda positions. In onset position, a mora represents length. In coda position, a mora represents weight. Other researchers (Hume et. al. 1997, Muller 2001, Curtis 2003) dissociate length and weight by accounting for length with X-slot associations and weight with mora association. For both of these theories, however, consonant weight is not predicted from any independent characteristic of a language.

Proposal: Building on the representational insights of Articulatory Phonology (Browman and Goldstein 1986 et. seq.), we show that consonants are never associated with their own moras but appear to be contributing to weight only when they overlap with a moraic portion of the vowel. In our proposal, moras are only associated with vowels and serve to designate phonological weight for stress assignment and prosodic minimality. By enforcing this restriction, the precise circumstances in which consonants appear to contribute to phonological weight can be derived through identifying the degree of overlap between consonants and vowels across languages and contexts. This is illustrated in (1) by a comparison of word-initial moraic geminates in Trukese (1a) and word-initial non-moraic geminates in Leti (1b). In both representations, the vowel duration, represented by the vocalic tier, is bimoraic and the consonant, represented by the consonantal tier, is long. The only difference between (1a) and (1b) is the timing relation by which the consonantal tier is coordinated with the vocalic tier, a property which can be independently inferred from the nature of these languages' phonotactics. Heterogeneous consonant clusters in Leti imply a timing relation that aligns the vocalic tier with the C-Center (Goldstein 1988, Gafos 2002), or center of the consonantal tier. Trukese, which otherwise lacks consonant clusters, employs a timing pattern which aligns the onset of motion of the vocalic gesture with the onset of motion of the consonantal gesture. Since heterogeneous clusters require the same timing relation as non-moraic geminates, the correlation between the patterning of initial geminates and the availability of clusters follows from the same source: the timing relations employed by the language. Further support for this proposal comes from a typological survey of initial geminates in 28 languages and an analysis of compensatory lengthening.

(1a) **Trukese Pattern:** long C-Tier and a bimoraic V-Tier result in a C:V output



(1b) **Leti Pattern:** long C-Tier and a bimoraic V-Tier result in a C:V: output



Denasalization in Delta Yokuts

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Our records of Delta Yokuts dialects (northern San Joaquin valley, California) are poor, due to all dialects being extinct/extinguished by the early 20th century. However, there is no reason to doubt that their consonant systems were basically identical to those of other better-described Yokuts dialects, such as Yawelmani, and therefore containing three types of stops/affricates (plain, aspirated and ejective, all voiceless), two types of sonorants (plain and glottalized), and a series of voiceless fricatives.

Some Delta Yokuts dialects, e.g. Chalostaca, exhibit denasalization of nasal consonants, resulting in an apparently new fourth type of stop – a voiced series. This is reminiscent of the alternations beween nasals and voiced stops in Wiyot, and other languages northwards to Washington and British Columbia. Various authors have claimed that voiced stops in alternation with nasals are not in fact true obstruents, but are phonologically sonorant (e.g. Stewart 1973 on Cama; Piggott 1992 on S. Barasano; Rice 1993 on Bear Lake Slavey). According to Stewart, nasals represent but one instantiation of a class of sounds that could be more generally characterized as "sonorant stops". Assuming the correctness of this position, we are faced with an analytic choice in the case of Delta Yokuts. Are the denasalized stops here just voiced obstruent stops, or are they actually sonorant stops? In other words, does the denasalization result in a change in manner type within the phonemic system, or is this a purely phonetic (allophonic) matter?

We will discuss the available evidence bearing on this matter in terms of a Dependency Phonology approach.

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Towards a Turbid Theory of Segment Interaction

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Standard Optimality Theory (OT) has yet to find a satisfying solution to two longstanding problems, underspecification and opacity. Underspecification is antagonistic to the tenet of Richness of the Base, which precludes stipulations on inputs. Nonetheless, it proved important in pre-OT days to account for the non-participation of segment classes in phonological interactions, e.g. the non-participation of sonorants in voicing interaction. With the notable exception of Itô, Mester and Padgett (1995), however, no attempts have been made to translate underspecification theory into the OT framework.

Opacity has drawn comparatively more attention as a problem for OT, and a number of solutions have been forwarded, by suggesting additional machinery (e.g. Sympathy Theory) by proposing non-opaque analyses for individual processes (e.g. the analysis of the interaction of assimilation and deletion as coalescence in Pater 1999), or by rejecting opacity as phonologically real (e.g. Sanders 2003). This paper asserts that opacity is a widespread phonological phenomenon. Counterbleeding in particular is assumed to be natural and regular (with Kiparsky 1968), expected much more than bleeding in many contexts, especially cases in which neutralisation counterbleeds a regular alternation on an adjacent segment. Given their naturalness, such opaque processes should therefore be accounted for straightforwardly, without recourse to additional analytic machinery (like special types of constraints or constraint interactions) which is activated for the sole purpose of dealing with opacity.

The model proposed here, a revision and elaboration of Turbidity Theory (Goldrick 1998, 2000; Goldrick and Smolensky 1999), can account for opaque interactions without assuming additional machinery. Central to Turbidity Theory is the notion that phonological elements stand in two types of relation, *projection* and *pronunciation*. We propose that features are projected to tiers by segments. GEN contains a function which builds feature-geometric representations through the projection of features. GEN also contains a function which establishes pronunciation relations, emitting an infinite set of projection-pronunciation relations, which are evaluated by constraints on projections and pronunciations. Each candidate thus is an input/output pair, the two being connected via projection and pronunciation lines. This concept of a candidate also marks a return to Containment Theory: Faithfulness violations are encoded in the representation as non-reciprocal projection/ pronunciation relations. Correspondence Theory is abandoned.

Constraints on projection can trigger underspecification effects by banning features from being projected, thus determining the set of distinctive features in a language. Features which are projected can interact, although they may not be pronounced. In fact, interactions are oblivious to the pronunciation of a feature, which is the source of counterbleeding opacity. We will illustrate these issues with examples of interactions of [voice], providing model analyses. Some languages ban the projection of [voice] (or any laryngeal feature) altogether (e.g. Finnish). Many ban the projection of [voice] on sonorants. Segments which do not project [voice] do not behave phonologically as voiced, although they may be pronounced as voiced, forced by constraints on pronunciation. On the projection level, they are under-specified for [voice]. On the other hand, if a segment projects [voice], this feature is predicted to be phonologically active, regardless of whether it is pronounced. Hence, *t*-flapping counter-bleeds raising in Canadian English (the famous /raɪtr/ → [rəɪɾr] 'writer' map), since stops project [voice] in this language. Similarly, final devoicing counterbleeds raising of /o/ in Polish and vowel lengthening in Austrian German. Counterbleeding is therefore predicted when potentially interacting features are projected, the relevant level of phonological inter-action being neither URs nor SRs but projections. The paper will be concluded by a discussion of the consequences which follow from this approach.

Syllabification patterns in Arabic dialects: A response to Kiparsky 2003

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In the attempt to account for phonological opacity and paradigmatic effects, Kiparsky (2000, 2003) shows that traditional Optimality Theory has had to introduce otherwise unneeded powerful Faithfulness constraints such as Output/Output (O/O) constraints, Paradigm Uniformity constraints and Sympathy constraints. Kiparsky argues that such constraints are rendered unnecessary iff OT's postulate that constraints are evaluated in parallel is abandoned in favour of stratified constraint systems. The alternative stratified approach Kiparsky advocates relates the stratification motivated by opacity and cyclicity to the intrinsic morphological and prosodic constituency of words and phrases, as characterised by the Stem, Word and Postlexical levels of Lexical Morphology and Phonology. This alternative approach is referred to as LMP-OT (Lexical Morphology and Phonology-Optimality Theory). The goal of LMP-OT is to reduce cyclicity to I/O faithfulness and opacity to inter-level constraint masking. Thus, if A is the constraint system of some domain (e.g. stems) and B the constraint system of a larger domain (word level or postlexical), B's markedness constraints can render A opaque. In a paper entitled The syllable and the mora in Arabic (2003), Kiparsky applies this version of OT to syllabification types in Arabic. The application has interesting, far-reaching results; however, consideration of a wider range of material, including material from my own fieldwork, suggests that it oversimplifies the situation of Arabic dialects and that in its present form it cannot account for the full range of Arabic data.

This paper examines Kiparsky's 2003 stratal Optimality Theory analysis of the syllabification patterns of three Arabic dialect types, an analysis which claims to account not only for the epenthesis patterns of the three dialect types, but also for a set of other type-specific syllabification phenomena. An investigation of a range of dialect data, including more detailed consideration of dialects treated by Kiparsky, shows that several dialects either exhibit phenomena characteristic of the 'wrong' dialect type or fail to exhibit phenomena predicted for their type. Two Sudanese dialects resist any categorisation in terms of the typology established by Kiparsky. San'ani, by contrast, appears to be categorisable, but fails to conform fully to its dialect type. These combined facts undermine a theory which assumes the primary difference between the three dialect types to be whether, and at which stratal level/s, unsyllabified consonants are licensed by moras adjoined to the prosodic word. I propose a revised typology which recognises the presence of a fourth, intermediate dialect type and which acknowledges an intermediate status for the mora – not an unlicensed mora, but a mora that dominates two constituents.

The lexical-access/grammar interface: accounting for Tagalog tapping

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Tagalog (Austronesian, Philippines) has a process taking /d/ to [ɾ] intervocalically (Schachter & Otanes 1972). Tapping can be studied in written data, because [d] and [ɾ] are written with different letters. Examination of a written corpus (~20 million words) reveals tapping to be obligatory at the stem-suffix boundary (*lakad+in* → *laka**r**in* 'walk'), forbidden at the stem-stem boundary (*dagli-dagli?* → *dagli-**d**agli?* 'at once'; I argue that such cases cannot be explained as base-reduplicant identity effects), and optional at the prefix-stem boundary (*ma+dumi* → *ma**r**umi* 'dirty' vs. *ma+dilim* → *ma**d**ilim* 'dark'). Variation in prefixed words is conditioned by frequency: words that are more frequent than their bases are more likely to undergo tapping.

Tapping's dependence on morphological structure suggests a role for prosody, along the lines of Peperkamp's (1997) analysis of *s*-voicing in Northern Italian. If tapping applies to a *VdV* sequence uninterrupted by a prosodic-word boundary, then the structures in (1) derive the facts. Peperkamp obtains similar structures for Italian with asymmetrical alignment constraints (McCarthy & Prince 1993). For example, if ALIGN(LexWd,L,PWd,L) is ranked high—but ALIGN (LexWd,R,PWd,R) is ranked low—only the *left* edge of a lexical word projects a prosodic-word boundary, obtaining the asymmetry between (a) and (d) (ignoring (e), for the moment).

(1)

suffixed words	*compounds, compounding reduplication*		*prefixed words*	
(a) p-word / \ stem suffix	(b) p-word p-word | | stem stem	(c) p-word / \ p-word | stem stem	(d) p-word / \ p-word | prefix stem	(e) p-word / \ prefix stem
tapping	*no tapping*		*no tapping*	*tapping*

The frequency effect in prefixed words is similar to Hay's (2003) findings for English complex words. Hay argues that, when a complex word is accessed during processing, two routes compete: in the decomposed route, access to a lexical entry such as *unhappy* is via *un* and *happy*; in the direct route, access is straight to *happy*. If the complex word is more frequent than its parts, the direct route is faster and thus wins (otherwise, the decomposed route wins).

I adopt Hay's view of lexical access and allow the grammar to refer to *accessed units*. When the decomposed route wins, ALIGN(AccessedUnit,L,PWd,L) requires the adjoined structure in (d). When the direct route wins, that constraint is irrelevant and the non-recursive structure in (e) is preferred. Because prefixes in Tagalog are monosyllabic and thus sub-minimal, a structure like (b) is not available for prefixed words. To derive the fact that stem-stem combinations disallow tapping even when we expect the direct route to have won, we still need (low-ranked) ALIGN(LexWd,L,PWd,L) to prefer (c) over a simple structure. (Because a prefix does not form a foot, a mid-ranked constraint requiring every p-word to immediately dominate a foot prefers (e) over (d) for directly-accessed prefixed words.) Suffixed words must have a simple prosodic structure, regardless of access route: suffixes in Tagalog are monosyllabic, so even if the decomposed route wins, the suffix cannot initiate a p-word.

The tapping case is interesting because an apparent influence from processing is subject to traditional elements of phonological grammar, such as minimal foot size and conditions on well-formed prosodic trees. The solution adopted here is to integrate processing and grammar by allowing violable constraints in the grammar to refer directly to outcomes of processing.

Poster papers

The Perception of L2 Stress

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This study is investigates the effect of native language (L1) typological stress properties on the second language (L2) acquisition of primary word stress. Since research on the perception of L2 stress by a larger number of typologically different L1 groups using the same experimental design is virtually non-existent, advanced learners of English from seven typologically different L1 groups (Arabic, Chinese, French, Japanese, Korean, Spanish, Turkish), as well as English native speakers participated in a perception experiment. Novel words of two, three, and four syllables length consisting of only open syllables (CV) were used. Subjects listened to a large number of tokens of various structures and marked the most stressed syllable.

The results indicate that, on the one hand, learners with predictable stress in their L1 (i.e., Arabic, Turkish, French) had problems perceiving the location of stress. On the other hand, learners without word-level stress in their L1 (i.e., Chinese, Japanese, Korean) or with unpredictable L1 stress (Spanish) showed almost perfect perception scores. Thus, it was found that there is a direct connection between typological properties of the L1 and the perceptibility of L2 stress.

Two recent theory-independent typological hierarchical models of stress are considered and discussed: the Stress Deafness Model (SDM) (Peperkamp & Dupoux 2002), which proposes a hierarchy of predictable stress languages regarding the ability to perceive stress, and the Stress Typology Model (Altmann & Vogel 2002), which introduces a typological branching hierarchy including languages with predictable stress, unpredictable stress, and without stress. The current findings are in accordance with the general prediction made by the SDM that L1s with regular stress are less successful regarding the perception of stress. The more specific hierarchy postulated by the SDM, however, cannot be supported. Negative parameter settings in the STM are directly correlated with decreasing success regarding the perception of L2 stress and thus this model must be preferred.

Towards a 'quantal' definition of nasal vowels, on the basis of physiological and acoustical evidence

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The 'quantal theory of speech production' Stevens (1989) encounters new challenges as the investigation is expanded to a broader variety of features. The present proposal builds on a physiological and acoustical investigation of **nasality** to propose that this feature may also be 'quantal' in the sense proposed by Ken Stevens—namely, that a nonlinear relation holds between an articulatory parameter and an acoustic parameter.

Phonetic analysis: The experimental setting combines a measurement of nasal airflow with fiberscopic recording of images of the velopharyngeal port. The French nasal vowels /ɛ̃/, /ɔ̃/ and /ɑ̃/ are produced with an open velopharyngeal port and without a strong constriction in the oral tract, so that egressive air flows out both at the nostrils and at the mouth. The study is based on a corpus of read speech comprising 216 (2 x 108) logatoms containing the French nasal vowels /ɛ̃/, /ɔ̃/ /ɑ̃/ (3 nasal vowels x 9 consonants x 4 vocalic contexts, e.g. /didɔ̃di/, /tatɑ̃ta/), embedded in a carrier sentence, read by two participants, plus a few minutes of spontaneous speech. For each nasal vowel V_t, six temporal measurements were conducted: (i) duration of positive nasal airflow associated with V_t (ii) duration of velum movement (lowering-plus-raising) associated with V_t (iii) time lag between beginning of velum lowering and acoustic onset of V_t (iv) time lag between onset of positive nasal airflow and acoustic onset of V_t (v) time lag between end of positive nasal airflow and acoustic termination of V_t (vi) time lag between end of velar movement and acoustic termination of V_t. Quantitative measurements were also conducted: mean nasal airflow and lowest velum position. A considerably different picture emerges depending on (i) the measurement used (ii) the speaker (iii) the speaking style. Positive nasal airflow typically appears after the acoustic beginning of the vowel, whereas velum lowering begins much earlier (before the acoustic beginning of the vowel). Nasal airflow propagates (longer than velum movement) beyond the acoustic termination of V_t. In spontaneous speech, airflow propagates further and velum movement has more amplitude. Our results show that velum movement tends to be **anticipatory** (as already noted by Passy 1890) whereas nasal airflow is overwhelmingly **perseverating**.

Discussion: The present research confirms that the timing of velar movement varies across speaker (as was shown by Vaissière (1988)) and shows a similar difference for airflow. Thus, a negative finding is that there is no prototypical articulation for nasal vowels. Also, it is known that there is no linear relationship between nasal airflow and velar movement, as a third parameter comes into play: the proportion of nasal airflow depends on the impedance of the oral tract Baken (1987). On the other hand, the results may open into a quantal characterisation of nasality: physiologically, nasality is best achieved by a *combination of velum lowering and constriction within the oral tract*; acoustically, this combination has a considerable acoustic effect, perturbing the predictable relationship between formant frequency and formant amplitude Fant (1960), a characteristic which arguably has considerable perceptual relevance. From a methodological point of view, this research (currently in the early stages of phonological modelling) illustrates the modifications undergone by 'quantal theory' as its scope expands.

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Neural correlates to a three way contrast of duration in speech and non-speech stimuli

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Linguists and cognitive neuroscientists alike have been interested in the way in which the brain processes temporal properties in and outside of language. Evidence accumulated thus far concerning the processing of durational contrasts in languages that have contrastive length has yielded contradictory results. A series of studies have indicated that processing of the temporal properties of speech is modulated by language experience so that a contrast in length produces different brain activation in native speakers of languages in which the feature is phonemic as compared to speakers of languages in which the contrast is non-phonemic (Gandour et al 2002; Jaramillo et al., 2000). Furthermore, these studies have also shown that both native and non-native speakers do not process differently non-speech stimuli contrasting in duration.

Estonian has been of great interest due to its rare characteristic of contrasting three degrees of vowel and consonant durations (Engstrand and Krull, 1994; Lehiste, 1968, 1997, Krull and Traunmüller, 2000; Eek 1980a, b; Traunmüller and Krull, 2003). Such a remarkable property allows us to explore the neural processing of durational contrasts in speech and non-speech stimuli. An electroencephalographic study was performed to investigate the patterns of brain activation by looking at the mismatch negativity component of the auditory event-related potential. A series of pseudo-words and the equivalent non-linguistic stimuli representing the three-way contrast were presented to natives speakers of Estonian and the brain responses were recorded. Overall, the results showed that durational contrasts in linguistic stimuli elicit stronger responses in the left temporal cortex, whereas the non-linguistic stimuli showed a bilateral and symmetrical pattern or a negligible left hemisphere activation. The results lend partial support to a left hemisphere specialization substrate for linguistic functions. However, the results also show a bilateral response to speech, which indicates that the physical properties of the acoustic stimuli (i.e. spectral and temporal) also determine the patterns of lateralization and processing.

MWUs and the prosodic hierarchy : a case study

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Elaborating on Selkirk's assumption ("We have suggested that the hierarchy for English includes at least the following categories: 1.10 Intonational phrase (IP) Phonological phrase (PhP) prosodic word (Wd) foot (Ft) syllable (Syl)"; Selkirk 1982: 26), we wish to investigate a possible candidate for intermediate levels.

Genitives can be late-stressed or early-stressed. Compounds and phrases share the same possible alternations which could be said to be semantically governed (evidence and corpora based on Mauroux 2002). Our claim is that shifts in prominence for Multi Word Units govern this hierarchical level and provide boundaries for this phonological domain. Regardless of their morphological or lexicological status, our claim is that these prominence alternations point to the limits of a phonological domain whose status we wish to investigate.

Within the prosodic hierarchy delineated in Nespor & Vogel 1986, we suggest that this type of unit is a good candidate for English on the evidence of the following facts :

1. the non-reduction in compounds is absolute and is a clue to this phonological domain.

2. In early stressed compounds whose second element is plurisyllabic (noted in Wells 1990 by a tertiary stress), levels of (prosodic) prominence have to be assigned to (morphological) elements discriminately and hierarchically.

3. Recursivity in compounding allows for a unit variable in size whose limits need to be defined.

The poster will detail the results of a corpus-based analysis of the phonological processes associated to the occurrences of two series of MWUs. We have focused on the prosodic behaviour of a limited set of MWUs in context in a Radio 4 programme. In one of them, *detective diseases*, the noun "disease" is used in initial and final position and offers contrasting contexts for sequences such as *Legionnaires' disease*, *disease detective*, *West Nile disease* and *infectious disease*. A PRAAT analysis of prominence shifts and acoustic correlates will display these potential alternations and evidence for the boundaries of the units.

This reassessment of the prosodic hierarchy paves the way for an "enunciative" prosodic hierarchy in English compatible with enunciative linguistics as developed in France in the wake of Antoine Culioli (*contra* Carr 1993 's critique of the phonological utterance).

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Title: St'át'imcets glottalised resonants: phonetic variability and theoretical implications
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Phonological models differ in the importance they place on phonetic variability. Within generative models such as Optimality Theory (McCarthy & Prince, 1993), variability is minimized, and allophonic variation is assumed to be more or less categorical. Within usage-based models such as Exemplar Dynamics (Pierrehumbert, 2001), variability is highlighted, with phonemic categories viewed as clouds of variable pronunciations, or *exemplars* (see Figure 1 below). The goal of this paper is to broaden the empirical basis on which these competing models can be evaluated by considering the pronunciation of glottalised resonants (hereafter GRs) in St'át'imcets, a Northern Interior Salish language spoken by approximately 50 people in British Columbia, Canada. Results support Pierrehumbert's Exemplar Dynamics, which predicts precisely the kind of increased phonetic variability observed in St'át'imcets.

As other Salish languages, St'át'imcets has an extremely rich consonant inventory, including the following GRs: /m̓ n̓ y̓ w̓ l̓ ẓ ʕ̓ ʕ̓ʷ/, all of which have non-glottalised counterparts. These sounds are rare word-initially, but otherwise occur freely across syllabic positions. Acoustic studies of GRs (Bird & Caldecott, 2004a; 2004b; 2005) have shown a surprising amount of variability along two dimensions: (a) the timing between the oral and the laryngeal/glottal gesture (pre-, post-, or mid-glottalised) and the realisation of the laryngeal/glottal gesture (full glottal closure vs. laryngealisation). Factors found to influence the production of GRs include stress, syllable position, sonority of the GR (e.g. [m̓] vs. [ẓ]), and individual speaker. In addition though, much of the variability seems unpredictable.

In this paper, it is argued that the high degree of variability found in the production of St'át'imcets GRs is exactly what is predicted by Exemplar Dynamics. Within this model, phonemic categories consist of clouds of exemplars that are perceived by the listener during ongoing language use. These clouds provide the basis for pronunciation, which proceeds as follows: (a) select a category to be produced, (b) take a (random) selection from the exemplar cloud for that category, (c) average the *n* neighbours of that selection to get a production target, and (d) produce the target with some random error (Pierrehumbert, 2003). Figure 1 shows that this model of production predicts limited variability in a healthy language situation, in which the phonetic output is the result of averaging over a relatively large number of exemplars. On the other hand, substantial variability is predicted in an endangered language situation, because much fewer exemplars are available over which to average (as a consequence of infrequent language use):

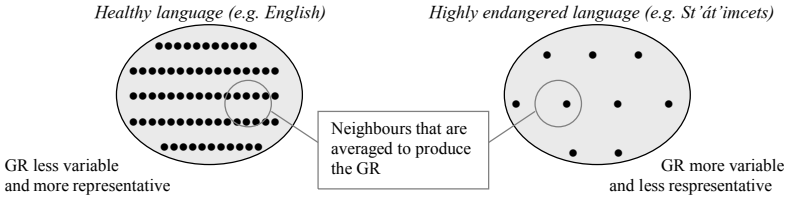

Figure 1. Speech production in a healthy vs. endangered language situation

Being a usage-based model, Exemplar Dynamics accounts particularly well for increased variability associated with infrequent language use, such as that exhibited by St'át'imcets GRs.

A three-way comparison in perceptual development: monolingual children vs. simultaneous bilingual children vs. adult L2 learners

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Our objective is to show the perceptual development of the Dutch /a:/-/A/ contrast in monolingual Dutch children, bilingual Dutch-Portuguese children, and adult learners of Dutch who have Portuguese as their native language. Crucially, this contrast involves spectral and durational cues, and it is not found (phonemically) in Portuguese.

To this end, an XAB categorization experiment was conducted on one hundred participants who were divided into four groups: the three groups of learners mentioned above and a control group of adult Dutch listeners. The learners also performed a vocabulary test and completed a background questionnaire.

Our results indicate that bilingualism does not affect the categorization of L1 sounds. This claim is supported by the fact that both groups of children proved to behave similarly to Dutch monolingual adults who use temporal and spectral information when identifying the vowels. However, the individual results show that some children in both groups fail to comply with the adult target. Importantly, the results of the vocabulary test and the data from the questionnaire suggest that this individual variation is related to age and vocabulary size.

Regarding the L2 learners, they were divided into two proficiency groups on the basis of the vocabulary test and questionnaire. The perception results show that both groups differ significantly from the children and Dutch adults. Additionally, the two L2 groups were found to differ significantly from one another, suggesting that there is perceptual development in L2 acquisition and that this development correlates with language proficiency.

During the presentation, we will provide a reconstruction of the different developmental paths for the learners. Furthermore, we will discuss the implications of our findings for the two following issues in current SLA research: i) whether bilinguals and L2 learners possess one or two linguistic systems, and ii) whether current models of perceptual development are explanatorily adequate.

Fascinating fossils: the curious case of t-to-r in West Yorkshire

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Wells (1982) describes a connected speech process found in many varieties of northern English whereby /t/ is realised as [r] when it occurs between vowels (e.g shu[r] up *shut up)*. Research on t-to-r has primarily focused on its manifestation in Tyneside and Liverpool Varieties of English (Carr (1991), Docherty et al (1997), Honeybone (2001) and Watson (2002)). All the evidence in this literature indicates that t-to-r in contemporary varieties of northern English is restricted to a small number of words, typically function words. The present paper will add to this existing work with data from West Yorkshire which help to refine our understanding of this phenomenon. Furthermore the paper will examine historical data which strongly suggests what type of phenomenon t-to-r was when it was fully productive. It will also consider factors which may have triggered the decline of this process. Finally, following Bybee (2003) the paper will tentatively explore why the residue of t-to-r remains in the small number of words noted.

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The influence of phonemic vowel length on the voicing effect

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This study explores the influence of phonemic vowel length on the realization of the voicing effect, i.e., the phonetic process by which vowels tend to be longer before voiced obstruents than before voiceless ones. The aim of this paper is to experimentally test whether the presence of phonemic vowel length in a language attenuates the degree of the voicing effect. In general, the experimental results contribute to the understanding of the influence of phonemic contrasts on phonetic realization and point to the role of minimal contrast in the phonological representation.

The literature on the voicing effect has identified a number of factors that influence the degree of this effect. These include word size, inherent vowel duration, place of articulation and syllabic affiliation of the obstruent, stress, speech rate, and position of the word in the utterance (Hussein 1994). Furthermore, there is another group of language-specific factors: the voicing contrast precise realization (Kohler 1984), the language rhythm (Port et al. 1980) and the presence of phonemic vowel length (Keating 1985). The hypothesis about the influence of phonemic vowel length has been previously discussed but there appear to be no published reports of experiments to test this claim.

To test the hypothesis that the presence of phonemic vowel length attenuates the voicing effect, it is necessary to isolate phonemic vowel length from other possible conditioning factors. This can be done by testing a language where length is contrastive for a subset of its vowel qualities, i.e., a language that has some *unpaired* vowel for the long-short contrast. The prediction is that the vowel without a short/long counterpart will exhibit a stronger voicing effect than vowels part of a long/short contrast. Lithuanian shows such an asymmetrical system. Lithuanian mid vowels lack a contrast for duration; they are always long. Morphological alternations support the long/short relationship within the high and low vowels.

Table I. Lithuanian vowel inventory

	Front	Back
High	/ɪ/ /iː/	/ʊ/ /uː/
Mid	**/eː/**	**/oː/**
Low	/ɛ/ /æː/	/a/ /ɑː/

Thus, the hypothesis is that the voicing effect will be greater for /eː, oː/ than for the other vowels. This reflects the idea that the presence of phonemic vowel length attenuates the voicing effect. Acoustic data from native speakers of Lithuanian was collected. The stimuli consisted of bisyllabic non-sense words of the shape $CV_1C_1C_2V$, where V_1 could be any of the Lithuanian vowels and the sequence C_1C_2 was either /kʃ/ or /gʒ/. The results show that the difference in vowel duration before voiced obstruents and before voiceless ones, i.e., the voicing effect, is greatest for /eː/ and /oː/ ($p<.05$), compared to the other vowels.

Our experiment concludes that the vowels unpaired for length (/eː, oː/) are more impacted by the voicing effect. Vowels with a long/short counterpart are influenced to a lesser degree. This supports the hypothesis that the presence of phonemic vowel length attenuates the voicing effect. More generally, this conclusion provides evidence for the influence of phonemic contrast on phonetic realization, previously discussed in relation to coarticulation (Manuel 1999) and the cues to stress (Berinstein 1978). Furthermore, the asymmetrical Lithuanian system suggests the importance of minimal contrast in the phonological representation. If a vowel differs from another vowel only in length, then it minimally contrasts for length. Our experiment shows that vowels minimally contrastive for length behave differently from vowels that do not minimally contrast for length (i.e. /eː, oː/).

Syntagmatic and paradigmatic contrast in the realization of postvocalic and intervocalic alveolo-palatal fricatives in Western Catalan

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1. Introduction. One of the distinguishing features between Western (WC) and Eastern Catalan (EC) dialects is the realization of postvocalic and intervocalic alveolopalatal fricatives (APFr): in EC, APFr are typically pronounced as such (cf. *caixa* [káʃə] 'box'), while in WC a palatal glide (Gl) generally precedes the fricative (cf. [kájʃa]). The palatal Gl is almost always compulsory when the voiceless (VL) alveolo-palatal Fr comes into play, but it is not in the case of the voiced (VD) APFr: indeed, this sound is subjected to a large amount of variation that depends on the dialect, the phonetic environment and on extralinguistic factors, such as orthography and speaker's literacy. **2. Goal.** The purpose of this paper is to explore the articulatory and the perceptual conditions that determine the realization of these consonants and to formalize them within the OT framework, in its version of CT. **3. Surveys and results.** Two surveys were carried out in order to study the productive and the perceptual behavior of WC speakers. **3.1. The production survey.** This stage consisted of a one-answer-only question used to determine variation in the pronunciation of intervocalic and postvocalic APFr in 50 lexical forms: 25 words with VD APFr and 25, with VL APFr. The lexical entries contained formal differences such as the quality of the flanking V, the number of syllables of the word or the position of the stress in relation to the sequence. **3.2. The perception survey**. The goal of this part of the investigation was *a*) to determine the subjects' ability to identify the GlFr/Fr contrast in the words, and *b*) to analyze the connotations associated to both pronunciations. **3.3. Statistical treatment of the data**. The data obtained in both surveys was analyzed with Goldvarb 2001. **3.4. Main results**. In the VLF, there is a high percentage of solutions with the palatal Gl, which can be slightly disfavored by a preceding [u]. The solutions with a palatal Gl in VD Fr are favored *a*) when the stress affects the syllable with the Fr and, particularly, when it affects the syllable with the (potential) Gl; *b*) when the following V is [a], [ɛ] and, above all, [ɔ]; and they are clearly disfavored when the preceding V is high or mid-high (except for [e]). The study of the speakers' subjectivity demonstrates parallelisms between the data from production and from perception. This corpus will be enlarged for the purpose of the present paper. **4. Discussion of the data and proposal of analysis. 4.1. The indeterminacy of the UR.** Following ROTB (Prince & Smolensky 1993, McCarthy 1999) and departing from the fact that the realization with or without Gl is not contrastive in the variety, for forms such as *caixa* (potentially realized as [káʃa] or [kájʃa]) and *boja* 'fool' (potentially realized as [bɔ́ʒa] or [bɔ́jʒa]), can be postulated either an underlying representation with a single segment (i.e. /ʃ/, /ʒ/) or with two segments (i.e. /jʃ/, /jʒ/). In the first case, a process of split is expected; in the second case, on the contrary, a process of fusion or deletion is predicted. **4.2. Motivations. 4.2.1. Syntagmatic and paradigmatic contrast.** It is a well-known fact that the perceptibility of segments increases to the extent that they contrast with adjacent ones, as well as the fact that «sound differences that are relatively imperceptible tend not to be used contrastively in language» (Hume&Johnson 2001). Indeed, the poor syntagmatic contrast between the palatal Gl and the VD APFr (which share voicing and major PA) explains that the first generally fails to emerge. On the contrary, the stronger syntagmatic contrast between the palatal Gl and the VL APFr (which disagree in voicing) explains the preservation of the underlying Gl or, alternatively, its emergence due to a process of split, although it complicates the syllabic structure (i.e. it implies a violation of NO-CODA). The vocalic environment also plays a role in the emergence of the palatal Gl (especially in the VD correlate) as far as it is clearly favored by a following mid-low V or a low V and disfavored by preceding high and mid-high V. These are instances of syntagmatic contrast between adjacent or nearby segments. The exposed syntagmatic contrast effects will be formalized resorting to positional faithfulness constraints, along with the lines of Côté (2001). On the other hand, the emergence of the Gl can also be interpreted as a strategy to enhance the palatal character of the Fr and, consequently, to improve the contrast between this segment and the alveolar counterpart. Such paradigmatic contrast effects will be accounted for resorting to the Dispersion Theory of Contrast (Flemming 1995, 2004). In order to properly implement this model, acoustic analysis of the data will be required. **4.2.2. The stress.** The realization of [j] before the VD Fr is particularly noticeable when the stress affects the syllable with the Fr or the (potential) Gl. This is interpreted as an instance of positional faithfulness.

A template for Turkish

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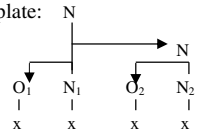
Although templates are well-known as a feature of Semitic phonology, Goh (1997) analysed Beijing Mandarin using a "Minimal Phonological String" i.e. a template, composed of two non-branching Onset Nucleus pairs whose initial nucleus is head. A constraint on the weaker second ON pair of the template requires that only one of these positions may be interpreted, yielding two types of Beijing Mandarin word, CVC e.g. [kan] 'dry' and CVV e.g. [pi:] 'pen'.

(1) The template:



Turkish is an agglutinative language. It is proposed here that similar four-position templates combine hierarchically and interact with each other in various ways. The use of such a template to build words longer than the typical CVC stem, e.g. durağın, which is composed of three templates dur + ak + ın 'stop (noun)(genitive)', can help us explain many aspects of Turkish phonology, including k-zero alternation and vowel-zero alternation.

(2)a. k-zero:	bebek	'baby'	bebeğin	[bebein]	'baby (genitive)'
	durak	'stop'	durağın	[durain]	'stop (genitive)'
b. vowel-zero:	fikir	'thought'	fikrin	[fikrin]	'thought (genitive)'
	beyin	'brain'	beynin	[beynin]	'brain (genitive)'

These apparently unrelated phenomena are treated here as instantiations of the phonological Empty Category Principle (Kaye, Lowenstamm & Vergnaud 1990; Kaye 1990, Kaye 1995), whereby an empty position must be interpreted unless it is licensed to be silent. [k] is assumed here to be the interpretation of an empty onset in Turkish, whilst alternating vowels are assumed to be interpretations of an empty nucleus. However, the phonological ECP alone cannot explain the Turkish data, since not all vowel-initial suffixes trigger k-zero alternation e.g. [gerek~gerein] 'need (genitive)' but [gerek~gerekir] 'be necessary (aorist'). On the other hand, one suffix may trigger vowel-zero alternation only in certain words e.g. [ilim~ilmin] 'knowledge (gen)' but not in others e.g. [bilim~bilimin] 'science (gen)'. These apparent inconsistencies can be explained by structural differences in the component templates of words and suffixes. It is proposed that the initial onset of some templates lacks a skeletal point, allowing the nuclear head of its template to interact with constituents of an adjacent template and to license an empty position to be silent.

The Turkish template hypothesis has implications for Government Phonological theory.
(i) Templates constitute domains, but how does the final empty nucleus get silenced? Given the constraint on the second ON pair of a template such that only O_2 or N_2 may be interpreted, template-final consonants are automatically followed by a silent nucleus, so do we really need the domain-final parameter of the ECP?
(ii) Concatenation of domains implies morphology, but are templates concatenated cyclically or not according to Kaye's (1995) definitions? Historical evidence for morphology can be found in many cases where a word is of Turkic origin. Should we assume pseudo-morphology for the remaining words, or should we treat the template merely as another constituent?

Does syllable priming reduce the prevalence of tip-of-the-tongue?

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Recently there has been a great deal of interest in a new theoretical account of the tip-of-the-tongue which indicates that the locus of the failure leading to this state is phonological rather than lexical, as had been the prevailing view. The transmission deficit (TD) hypothesis (MacKay & Burke, 1990) is built upon the framework of Node Structure Theory (MacKay, 1987) and states that TOTs are caused by a weakening of connections between lexical and phonological nodes due to infrequent or non-recent use. These weakened connections reduce the amount of priming transmitted to phonological nodes, leading to activation failure and halting word retrieval.

Previous research have shown that activating the missing phonology after a TOT state using partial phonological primes can significantly improve resolution rates (James & Burke, 2000). Additional studies (White & Abrams, 2002; Abrams, White & Eitel, 2003) have investigated the role of specific phonological components in priming TOT resolution, comparing the priming initial letters and phonemes, and also syllables in first, middle, and final word position. They found that only initial syllable priming caused a significant improvement in TOT resolution, concluding that the initial syllable is a critical component for word retrieval. Although these studies offer unequivocal support for the sequential left-to-right activation of phonological nodes, the role of the syllable as an intermediary between lexical and phoneme nodes, also postulated under NST, remains open to question. It is possible that the syllabic priming effects seen in previous research were not due to priming of syllabic nodes, but that of their composite phonemes. In this case the differences in priming would reflect the increase in phonemic overlap between target and prime.

In our study we address this ambiguity by comparing the prevalence of TOT between conditions where the phonemic overlap between prime and target remains constant, but the initial syllable of the prime corresponds to a match or mismatch with the target. For example, the target name 'Sally' would be primed with either 'salad', which has the same initial CV syllable as the target, or 'salvage' which has an initial CVC syllable. If the locus of the priming effects seen in previous research was syllabic we would expect that the effect of syllabically matched priming condition to be significantly greater than that of the mismatched condition, where only the phoneme nodes are primed and not the syllabic node. To test this hypothesis we asked 172 participants to indicate whether a particular phoneme could be found in the first name of 56 celebrities identified from pictures. After this decision they were also asked if they knew the first name of the celebrity, or if the name was on the tip of their tongue, and then asked to indicate the profession and name of the person from a list of alternatives. Three priming conditions were counterbalanced across participants using the masked priming paradigm, where syllabically matched, mismatched, or unrelated prime words were presented immediately prior to the presentation of the picture. We found that the frequency of objective TOT (those that indicated a TOT and subsequently correctly identified the profession and name of the person) was significantly less in the related priming conditions (syllabically matched: 3.38% of responses, mismatched: 3.18%) than the unrelated condition (3.99%). However, there was no significant difference between the syllabically matched and mismatched conditions. These disparities were also noted in the reaction time data from the phoneme detection task, whilst priming was found to have no significant effect on the frequency of responses where the participant indicated they knew the celebrity.

These results show that phonemic priming can significantly reduce the prevalence of TOT, in support of the TD hypothesis, however they do not indicate the presence of a syllabic intermediary phonological unit as postulated in NST.

Root-and-No-Pattern Morphology

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In this paper I suggest a hybrid model of the morphology of Hebrew, a Semitic language (Graf, *diss. to appear*). The proposal entails that Semitic morphology must recognize two types of complex structures: base-embedding and root-embedding, and consequently can operate upon either the consonantal root or a fully specified base (which might be a free word or a stem). The choice of the input for a morphological operation is not arbitrary, but grounded in a structured lexical entry, implemented within the model of Sign-Based-Morphology (SBM: Orgun 1996). The model follows current accounts of Semitic morphology by dispensing with templates and assigning their function to the phonological grammar (Bat-El 2003 Ussishkin 2005, McCarthy 1997).

The motivation for assuming two types of complex words, and thus by extension for assuming two types of input, is driven by the 'complexity problem': morphological complexity is evident both phonologically and syntacto-semantically in derived words, where we can assume a base for a derivation (see (1)). This is the type of *base-embedding words*. More interestingly, a Semitic lexicon typically consists of words that are morphologically related, but do not manifest the morphological relation 'derived-from', since there is neither syntacto-semantic nor phonological evidence for a *base*. The morphological relation between such words is structurally based: they share a consonantal root, and contain a prosodic pattern that is otherwise recurrent in the language. This is the type of *root-embedding words* (see (2)).

(1) Base-words

a. dov '*bear*' dub-on '*bear-dim.*'
b. kacar '*short-m.*' kcar-a '*short-fem.*'
c. niʃek *'he kissed (with smn.)'* hitnaʃek *'he kissed*
e. biʃel *'he cooked'* buʃal '*he/it was cooked*'

(2) Root-words in the semantic field around the concept 'grow'

Bold face indicates affixes

a. gadal *'he grew (up)*'
b. gidel '*he grew smth.*'
c. gidul '*crop, tumour*'
d. gadol '*big'*
e. **mi**gdal '*tower'*

Patterns have a crucial function in the recognition of root-words, but in accordance with work on Generalized Template Theory (McCarthy&Prince1995) patterns (i.e. prosodic tempaltes) are not considered to be morphemes. The prosodic function of the pattern is taken over by an Optimality-Theory grammar, which generates a language-specific wellformed prosodic structure, while the segmental content of the pattern is considered to be a *complex affix,* formalized as an ordered set of vowels (cf. (2c) as composed of the root *g.d.l.* and the affix *{i,u}*). The proposed lexical and morphological representations are implemented in the Sign-Based-Morphology model (SBM:Orgun 1996), where words are represented as complex constructions, reflecting their morphological structure. The distinction between the two categories of complex structures, base-embedding ('derived') and root-embedding ('non-derived'), is accounted for by implementing different types of constructions: the *base-type* is represented as a complex construction, which entails a daughter node that is a full sign with regard to syntacto-semantic and phonological information (i.e., base). The *root-type* entails only non-full signs: the affixal information, which lacks semantic information, and the consonantal root, which lacks syntactic information.

By putting together a morphological representational architecture it is possible to formalize different complex structure-types w.r.t their inner structure, and crucially refer to all properties of a complex morphological structure: its phonology, its semantic and its syntactic function.

The hybrid nature of voiced labiodentals (especially in German)

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In a number of languages, labiodental voiced fricatives show variation in their phonological class by sharing behavior both with fricatives and glides. In addition, voiced fricatives often vary in their phonetic correlates from fricative-like characteristics in some contexts (such as devoicing and strong friction noise in post-obstruent position) to glide-like properties in others (such as no friction noise intervocalically). Kiparsky (1985) and Lulich (2004) among others illustrated this for Russian /v/, and Kiss and Bárkányi (2005) for Hungarian /v/. Based on such findings, Padgett (to appear) proposes the phonological feature [wide] to be able to differentiate between narrow approximants, wide approximants and glides, with the assumption that a more phonetically based representation can account for the observed variation.

The present study investigates the voiced labiodental fricative /v/ in German, which shows a similar hybrid nature as Russian and Hungarian /v/. This sound groups phonologically with other obstruents by undergoing final devoicing. At the same time, it behaves like a glide with respect to phonotactic restrictions by occurring after obstruents in onset position. Phonetically, the results of an acoustic comparison of German and Dutch /v/ in different contexts (initially and word-medially in post-sonorant and post-obstruent position) show that German /v/ has less friction and is shorter, and has thus a more glide-like realization than its Dutch counterpart.

Besides presenting these results, the present study illustrates that an account of these findings with phonetically more detailed phonological representations as proposed by Padgett has several drawbacks. Instead, a phonological model is applied that evaluates abstract phonological representations and concrete phonetic structures in parallel. This model allows for the correlation of several positional variants to one underlying phonological representation (by means of a perception grammar) without the loss of abstractness, and for minimal phonological representations by language-specific features, as illustrated for the labiodentals in German and Dutch.

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Syllable structure in the postlexical domain in Japanese: a view from vowel devoicing

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Prosodic structure has been a subject of a great deal of discussion in phonology, but the prosodic structure for the postlexical level has perhaps received relatively less attention than for the lexical level. This paper sheds light on postlexical aspects of prosodic structure and investigates the question of what is permissible structure there, specifically the question of whether the prosodic structure in the post-lexical domain differs from that found in the lexical domain. The language on focus is Japanese (Tokyo dialect). The paper specifically focuses on the syllable level.

The syllable is well-defended for Japanese in the literature (e.g., Kubozono 1995). In the lexicon and throughout the lexical phonology, the well-formed syllable shape is (C)(j)V(N/Q) (N denotes moraic nasal and Q the first half of geminate; contrast in vowel length is omitted here). However, when we look at the surface forms of the language, we oftentimes find somewhat different forms from what we expect from the above shape. One such instance is apparent (obstruent) consonant clusters created by a post-lexical process called High Vowel Devoicing (hereafter HVD), whereby high vowels *i, u* become voiceless between voiceless obstruents or between a voiceless obstruent and a pause. Among others, Kondo (1997, 2000, 2005) analyses HVD as involving deletion of the vowel, with resyllabification of the onset consonant. This proposal calls for a radical structural change in the post-lexical domain, since the proposed onsets and codas are *not* permitted in the lexicon or in the lexical phonology of the language. Is this structural change necessary? How should the apparent consonant clusters be analyzed? I investigate this question both from the perspectives of production and perception of speakers and from the perspective of learnability.

In terms of production and perception, I test the hypothesis that desyllabification and resyllabification are present (as Kondo proposes) by examining whether there is tonal neutralization after HVD in a minimal pair such as /hu'kiN/ (accent on the first syllable; apostrophe denotes accent) 'nearby' and /huki'N/ 'cleaning cloth' (accent on the second syllable). If desyllabification (of the first syllable) is present, with resyllabification to the following syllable, these words would neutralize to have accent on the middle vowel, with the apparent consonant cluster here in the onset ([ɸkiĩ]). Although Kondo claims that her analysis matches the phonetic manifestation of the accent on the devoiceable syllable in that accent is phonetically realized on the following syllable if the vowel is devoiced (e.g., Sugito 1996, Sugito & Hirose 1988), she does not raise the question of the possible consequence of her proposal, i.e., whether or not the structural change indeed results in neutralization (i.e., a loss of contrast) with a form with the accent on an adjacent syllable. In my speech, a comparison of words such as those above indicates that devoicing does not carry with it a neutralization of the tone–the accent is displaced from the devoiced vowel but does not 'shift' to the following syllable. Assuming that accent is carried by the syllable (Shibatani 1990), this suggests that the syllable unit is not lost.

From the learnability perspective, given the postlexical structure as input, the learner's task is to construct the grammar of his/her language. If we believe in a model in which mental representation corresponds to the surface forms unless there is evidence otherwise, a structural change in syllabification in the postlexical domain is not expected. A discrepancy between the structures in the lexical and postlexical domains such as a new contrast for onsets and codas would require a complicated learning process. Instead, the apparent cluster in a form such as [ɸk] in /hukiN/ serves as a cue to syllabification, signalling to the learner that a syllable with a devoiced vowel is present.

I conclude that the structural change in postlexical domain is unnecessary for the syllable in Japanese and the syllable structure is the same in this domain and in the lexical domain.

Incongruent Speech Data: Its Potential in Phonological Fieldwork

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As laboratory instruments have evolved, phonetic fieldwork is now possible for at low cost for linguists. One can carry on a laptop computer software for capture storage and spectral analysis of speech data, add audio-visual records as *avi files, recharge its batteries using solar cells, and interface it to robust and portable laboratory instruments for glottoscopy, palatography and airflow studies (P.Ladefoged, 2003). The phonetics laboratory in a backpack has arrived! As this type of facility matures and gets cheaper, software artefacts have further evolved to the point where laboratory phonology can also take to the field: we outline class of psycholinguistic and phonological investigations that can be run from a laptop furnished with video input and stereoscopic I/O. The class relies on the creation of incongruent speech data by editing of stereoscopic recordings of speech from native speakers of an under-researched language or dialect. Two types of incongruence have figured in recent psycholinguistic investigations: dichotic, which presents different speech signals to left and right ear; and audiovisual, which presents audiovisual signals with the screen video of a speaker temporally aligned with audio having different speech content. Human response to both types of incongruence involves perceptual fusion, yielding information about the lexical access and encoding mechanisms involved in language cognition.

The classic dichotic experiment focuses on syllable migration effects: if a native English speaker receives non-words 'cas.dop' in the left ear aligned with 'beth.kit' in the right ear, there is a high probability of the fusion percept 'casket' being reported…provided that the syllable breaks in the two channels are aligned. The fragments that migrate from the two audio channels into the percept channel are arguably empirical syllables of the perceiver's language: experiments locating empirical syllable boundaries in this way have been developed (S.Mattys & J.F.Melhorn 2004). The classic audiovisual fusion experiment involves the McGurk effect – essentially sited in the subsegmental tier of cognitive representation (H.MacDonald and J.McGurk 1978). For example audio 'bun' aligned with visual 'gun' evokes the fusion percept 'done' in up to 50% of English-speaking participants. Empirical fusion rates in a group are significantly different for incongruent coda segments, incongruent onset segments, and – in languages where germination is contrastive – incongruent geminates. These statistically significant differences can be exploited to perform empirical syllabification in the field (A.N.Ali & M.Ingleby 2005), and similar possibilities exist for segmental dichotic fusion (anticipated by Cutting, 1976).

We contrast such incongruent data experiments with the older congruent-data priming and masking experiments (e.g. L.Ferrand, J.Segui & J. Grainger 1976; Ferrand & Segui 2002), and discuss how in the field one might test hypotheses about whether or not a language has a CV phonology. Given that some theorists have claimed universality for CV constituent structure, such data-gathering and rigorous testing of hypotheses is not only of interest to the field worker, but also bears on basic issues in phonological representation. With the latter in mind, we also describe phonological representations of fusion phenomena: some operating suprasegmentally in the case of migration, others subsegmentally in the case of McGurk fusion. The subsegmental processes can be modelled in element phonology, in much the same way that coarticulation has been modelled. Nasal assimilation in 'input' (respectively 'income' involves the migration of a labial (resp. velar) element into segment 'n' from the following plosive. Likewise, an audio 'gnat' aligned with a visual 'bat' involves migration of nasal manner elements and labial place elements to produce the fusion percept 'mat'. This is reflected in the fact that about 65% of participants appear to pick up the nasal manner of articulation from the audio signal and the labial place of articulation from the visible lip gesture.

Faithfulness and identity in Luganda Reduplication

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It is generally agreed that reduplication—in particular partial reduplication—poses many interesting questions concerning the interface between phonology and morphology. Normally, both phonological and morphological factors play a role in determining the identity of the reduplicant (cf. (Marantz (1982), Kiparsky (1986), McCarthy & Prince (1986)). The nature of interaction is often complex and the shape of the reduplicant is arrived at by reconciling phonological requirements such as minimal word status with a pre-specified bi-moraic foot structure, maximizing CV syllable structure, etc. with purely morphological considerations about the nature of bases (Urbanczyk (1996), McCarthy & Prince (1993, 1995).

A particularly fertile research ground for investigating the problem of the identity of reduplicants has been the Bantu language sub-family whose members have rich morphology and make extensive use of reduplication. Typically, in Bantu the base that is used as the input for the reduplicant is subject to a variety of morphological constraints, e.g. in verbs it is usually the verb stem consisting of the verb root and suffixes but excluding any prefixes (Downing (1997, Hyman et al. 1998, Odden 1996). Interestingly, while often the patterns of reduplication found in one Bantu language are broadly similar to those found in other members of the group, there are many local variations peculiar to each language which reflect different rankings of the same (or very similar) constraints.

This paper examines the peculiarities of reduplication, which is pervasive in Luganda, being involved in a variety of important phonological alternations (e.g. [y]/zero alternation and nasal mutation in stem initial position, as well as word final vowel shortening). Reduplication is also widespread across the lexicon, being attested in different word classes namely, idiophones, nouns, adjectives and above all verbs. The delimitation of what is included in the stem for the purposes of reduplication in each of these word classes provides a fascinating picture of the interface between phonology and morphology.

Similarity Avoidance in Bengali Fixed-Segment Reduplication

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Many languages employ reduplication processes in which one segment of the reduplicant is fixed. In Common East Bengali, /t/ is normally the initial consonant in reduplicants of this type (/gaɹi-taɹi/ 'cars, *etc.*'). However, when the base itself begins with /t/, speakers prefer alternative fixed segments, such as /f/ or /m/ (not */tægɹa-tægɹa/, but /tægɹa-mægɹa/ 'cross-eyed *etc.*'). Speakers also variably avoid /t/ when the base begins with certain other consonants, apparently those that are similar to /t/ (not ??/tʰoŋga toŋga/, but /tʰoŋga foŋga/ 'bags, *etc.*'). If avoidance of similarity between the initial consonants of base and reduplicant is indeed at work, on what basis is similarity judged?

Thirty speakers of Common East Bengali were asked to reduplicate 60 commonly-used native Bengali words (presented auditorily), and later to judge the acceptability of various fixed segments for each stimulus (presented visually). Results indicate that bases beginning with consonants similar to /t/ (*e.g.* /tʰ/ or /d/) take reduplicants with /t/ far less often than bases beginning with consonants dissimilar to /t/ (*e.g.* /p/ or /l/).

To determine the similarity of a consonant to /t/, speakers could be accessing language-specific measures of consonant similarity–by observing the patterns in their lexicon–or they could be using a more universal measure of similarity, based on the phonological features of each consonant. A language-specific model of consonant similarity can be derived from consonant cooccurrence rates in the lexicon, assuming that similar consonants tend not to cooccur within a root (Frisch, Pierrehumbert & Broe 2004). However, the study results do not correlate with consonant cooccurrence restrictions in the Bengali lexicon [$p > 0.81$, $R^2 = .004$]. In Coetzee and Pater's (2005) model, language-specific rankings of universal relativized OCP constraints determine consonant compatibility. This model is somewhat successful, if rankings are fitted to the results [$p < 0.01$, $R^2 = .717$]. An even more universal measure of similarity, which derives only from the phoneme inventory (Frisch *et al.*: similarity depends on number of shared natural classes), has moderate success [$p < 0.01$, $R^2 = .584$].

The current study explores a simple model in which similarity is determined by the weighted sum of shared features, as in (1). This requires assigning a weight to each feature. In the current study, it appears that speakers weight features such as [voice] and [distributed] more heavily than features such as [lateral] or [nasal]. If feature weights are fitted to the results, this method is more successful than those above in modeling the observed reduplication patterns [$p < 0.01$, $R^2 = .855$]. What is striking about this result is that the feature weights are not drawn from the lexicon–these weights are a poor model of consonant cooccurrence rates within roots–suggesting that static consonant cooccurrence restrictions in the lexicon need not pattern with productive dissimilatory processes such as Common East Bengali fixed-segment reduplication. It is possible that feature weights are simply universal, or, more plausibly, that they follow from the phoneme inventory, with a feature's weight based on its functional load in distinguishing contrasting segments.

$$(1)\ similarity(C_1, C_2) = \exp\left(\sum_{i=1}^{\#f} w_i(1 - \delta_i(C_1, C_2))\right)$$

Where C_1 and C_2 are two consonants; w_i is the weight of feature f_i; $\#f$ is the number of features; $\delta_i(C_1, C_2) = 1$ iff C_1 and C_2 have the same value for feature f_i and 0 otherwise.

Bogus clusters, vowel syncope and syllabic consonants and what they have in common

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This paper aims to explore three apparently unrelated phenomena, i.e. syllabic consonants, vowel syncope and bogus clusters. The analysis is couched in the Strict CV approach (Lowenstamm (1996), Cyran (2003), Scheer (2004)) and is based on the data from two languages: English and German. In the analysis of the relevant facts I adopt the lenition theory known as the Coda Mirror (Ségéral and Scheer (1999)).

In this talk I provide some evidence for the intimate relationship of the three phenomena, which, in consequence, allows me to offer a unified solution for them. Moreover, I offer a solution to two traditional problems, that is, an obligatory 'TR' character of bogus clusters (obstruent plus sonorant) and the ban imposed on such sequences to appear in the word-initial position. I point out that it is a sonorant which plays a key role in both phenomena, i.e. vowel syncope and bogus clusters, and the promised unified solution relies heavily on the ability of certain sonorants to play the syllabic function. Therefore, after a short introduction of the relevant facts concerning syllabic consonants, I look more deeply at the behaviour of sonorants in two seemingly unrelated structures, i.e. vowel syncope and bogus clusters. It is pointed out that vowel syncope results in the consonant sequence resembling a bogus cluster, i.e. a 'TR' sequence. This means both phenomena are related, with the difference that the former, unlike the latter, involves a syncope-prone schwa. Consequently, they are dubbed 'dynamic' and 'static' bogus clusters respectively. Moreover, it becomes evident that although both languages abound in syncope-related and true bogus clusters, their distribution is severely curtailed, that is, they are possible only in the word-internal position. I discuss the only counter-example to this general ban, that is, the word-initial [kn] and [gn] clusters in German, e.g. *Knie* ['kniː] 'knee', *Gnade* ['gnaːdə] 'grace'. If they are true bogus clusters, a prediction which excludes consonant clusters separated by the empty governed nucleus at the left margin due to the presence of the word-initial empty CV unit proves false. As a solution, it is suggested that such clusters have the same trigger as the word-internal bogus clusters, with the difference that the former, contrary to the general tendency, are required to go one step farther and reach the extreme stage which is the Infrasegmental Government relation. This situation is not infrequent as confirmed by some English and German word-internal clusters. As a side-effect, I solve the problematic set of variable forms in German (Vennemann (1968), Brockhaus (1995)). Such forms represent consonant clusters which undergo the general rule of obstruent devoicing in one dialect but which refuse to undergo devoicing in another one, Northern Standard German and Hochlautung respectively. This is crucial to the discussion as the fluctuating obstruent is always the first consonant of the bogus cluster. In this paper I indicate that all the three phenomena, i.e. syllabic consonants, vowel syncope and bogus clusters, have the same origin and stem from the expansionist behaviour of sonorants, which in turn is a reaction of the latter to a positional weakness. The analysis of the phenomena in question contributes to the postulation of the governing-ability scale for different types of nuclei in English. Specifically, it turns out that in English the application of Proper Government is severely restricted. The only nuclei which can be properly governed are those which are lexically empty or hold the left branch of the syllabic consonant. In other words, in English, unlike in Polish, for instance, lexically present nuclei are never properly governed even by the strongest governors, that is, realised vowels. Finally, it is demonstrated that the postulation of the initial empty CV unit at the beginning of the word can predict the ban on the word-initial bogus clusters (both 'dynamic' and 'static'). The latter observation is a direct confirmation of the idea proposed by Lowenstamm (1999) and advocated in Kijak (2005) suggesting that the initial empty CV unit is a phonological object which takes part in syllabification and phonological processes.

A feature-driven loanword adaptation of English and French plosives into Korean: a case of the symbiosis between perception and grammar in loanword phonology

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The present study proposes that the adaptation of English and French plosives into Korean is feature-driven on the basis of the non-native percept of the donor language input, in support of the symbiosis between perception and grammar in loanword phonology (e.g., Kenstowicz & Suchato 2005; Yip 2005). Neither a phonetic (e.g., Silverman 1992; Peperkamp & Dupoux 2003) nor a phonological (e.g., LaCharité & Paradis 2002, 2005) account can explain the adaptation.

Korean plosives have no voicing contrast: they are all voiceless with three-way laryngeal contrast such as lenis, aspirated and fortis. When plosives are borrowed into Korean from languages which have voicing contrast, two types of adaptation occur. As shown in (1), the English voiceless stops /p, t, k/ are all borrowed into the aspirated consonants [p^h, t^h, k^h], no matter where they are put in a word (a) and also after /s/ (b). In contrast, the French voiceless plosives are borrowed into the aspirated [p^h, t^h, k^h] or the fortis [p', t', k'] ones context-freely, as in (2). As for voiced /b, d, g/ in English (3a) and French (3b), they are borrowed into the Korean voiceless lenis plosives [p, t, k]. In particular, the English voiced ones could be borrowed into the fortis [p', t', k'], as in (3a), when emphasized.

(1) a. **t^h**a.i.**p^h**i 'type' **t^h**i.wi.si.**t^h**i 'twist' b. si.**p^h**i.k^hə 'speaker'
p^hɛn.**t^h**i.əm 'pentium' **k^h**əm.**p^h**u.**t^h**ə 'computer' si.**t^h**i.la.i.**k^h**i 'strike'

(2) **p^h**i.leŋ.**t^h**aŋ ~ **p'**i.leŋ.**t'**aŋ 'Printemps (department store)'
k^han.ni ~ **k'**an.ni 'Cannes'

(3) a. **p**ɛg ~ **p'**ɛg 'bag' **t**ɛm ~ **t'**ɛm 'dam' **k**a.si ~ **k'**a.si 'gas'
b. **p**o.li.**t**o 'Bordeaux' **k**i.laŋ 'grand'

When we consider both how the L2 input is perceived by Korean adapters and laryngeal feature specifications of Korean plosives, the two types of voicing-contrast adaptation can be given an account. According to recent phonetic/phonological studies of Korean consonants (H. Kim 2003, 2005; H. Kim, Honda & Maeda 2005; H. Kim, Maeda & Honda 2006), Korean plosives are specified for the features [±tense] and [±spread glottis] (henceforth, [±s.g.]), as in (4). The features are phonetically correlated with oral closure duration ([±tense]) and glottal opening ([±s.g.]).

(4)

	Lenis	Fortis	Aspirated
[tense]	-	+	+
[s.g.]	-	-	+

In addition, English voiceless plosives have aspiration at the beginning of a stressed syllable (e.g., Ladefoged 2001; Odden 2005), whereas French counterparts have (almost) zero VOT (e.g., O'Shaughnessy 1981), and cross-linguistically voiceless sounds tend to be longer than voiced ones (e.g., Catford 1977; Laver1994). Given these, we propose that the voicing contrast in English and French is perceived differently in terms of VOT and duration by Korean adapters and then the feature system in (4) exerts its influence on the L2 form, as follows: (a) when L2 voiceless plosives have a certain amount of VOT, as in English, L2 voicing contrast correlates with the aspirated/non-aspirated opposition in terms of the feature [±s.g.], with the alternation of lenis and fortis ones ([-s.g.]) for English voiced sounds in (3a) further driven by [±tense]; and (b) when L2 voiceless plosives have zero VOT and duration difference, as in French, L2 voicing contrast correlates with the tense /lax opposition in terms of [±tense] in Korean.

In short, the different borrowing of the voicing contrast in English and French plosives results from matching the non-native percept of the L2 input in terms of VOT/duration within the confines of the L1 laryngeal feature specifications. Neither a purely phonetic nor a purely phonological view can account for why French voiceless plosives are adapted into either aspirated or fortis in Korean with voiced ones into lenis, and why English voiceless plosives including those after /s/ are context-freely borrowed into aspirated and voiced ones into lenis or fortis.

On prefixal clitics and cliticky prefixes in Upper German

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Presentation: either oral or poster paper

In many grammars of Swiss German dialects a peculiar allomorphy of the plural and feminine singular definite article in the NOM/ACC is described in terms of its distribution as follows (e.g. Weber (1948:107) on Zurich German): the CV-form *di* (Standard German *die*) occurs before adjectives (1) and nominalized adjectives (2), while the C-form *d* occurs elsewhere, i.e. when directly before a noun (3) and (4).

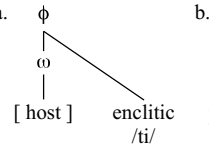
(1) a. ***di*** *guete Sache* 'the good things'
b. ***di*** *waarm Sune* 'the warm sun'
c. ***di*** *schwiizerisch Botschaft* 'the Swiss embassy'

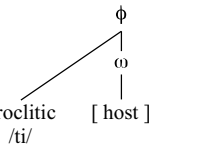
(2) a. ***di*** *Arme* 'the poor ones'
b. ***di*** *Alt* 'the old one' (bawdy for 'wife')

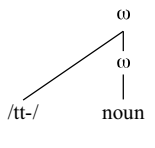
(3) a. ***d*** *Sache* 'the things'
b. ***d*** *Sune* 'the sun'
c. ***d*** *Schwiizer Botschaft* 'the embassy of Switzerland'

(4) a. ***d*** *Armehüüser* 'the poorhouses'
b. ***d*** *Altlascht* 'the legacy'
c. ***d*** *Stromleitig* 'the power supply line'

We want to make two basic claims. First, there is strong evidence that the consonantal form of the determiner is not a clitic as all the other forms in the paradigm but has acquired the morphological status of a prefix (5c). Consisting underlyingly of a geminate /tt/ only, it lacks an (overt) vocalic part, which we argue is a direct result of the strong trochaic pattern in the system, in which initial stress on lexical words – especially on nouns – is still highly predominant. As a prefix, the deteriminer builds a phonological word with its nominal host, and by having lost the vowel, it is possible for the head noun to maintain its initial prominence. In this respect, the determiner has developed like the other prefixes with unstressed and unstressable vowels in open syllables, such as the morpheme /kk/ used to build past participles (Standard German *ge-*).

(5) a. 

b. 

c. 

Second, the forms of the paradigm other than /tt/ are clitics and, as such, associate left whenever there is a host to their left (5a), and only associate right if there is not (5b). We assume the same prosodic structures for prefixes that have kept their vocalic element. Following the traditions of Sievers (1901), Sweet (1904), and Saran (1907), we assume that prosodically strong syllables always start what in modern terminology would be called a phonological phrase. Phonologically weak material to its left is grouped within the preceding phonological phrase, i.e. the preceding prominent syllable, thereby ignoring and possibly violating morphological constituancy (6).

(6)

				]ϕ			]ϕ		]ϕ
De	*Maa*	*cha*	*d*	*Muus*	*i*	*de*	*Schachtle*	*ver-stecke*
det	N	Aux	pfx-	N	prep	det	N	pfx- V
the	man	can	the-	mouse	in	the	box	hide

'the man can hide the mouse in the box'

Phonology between home and field research

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The disconnection of theory from practice might lead to inadequacies in linguistic research in general, and in phonological research, in particular. Yet, the relationship between theory and practice is not a straightforward one.

Two approaches to research in phonology have been practiced: fieldwork and homework. Fieldwork linguistics is both data and practice-driven. The linguist conducts fieldwork to describe authentic data collected from language learners/speakers. In contrast, homework linguists works from home; data and practice might be involved in a way or another through artificial corpus invented by the linguist to make a theoretical point. In this case, 'one may arrive at a grammar by intuition, guess-work, all sorts of partial methodological hints, reliance on past experience, etc.' (Chomsky, 1957: 57).

This paper discusses these two approaches to phonological research, based on conclusions drawn from two case studies. It will report on findings from L3 phonology and others from loanword phonology studies. First of all, Louriz (2004) conducts a fieldwork on primary stress of Moroccan learners of English as a third language to arrive at a model of L3 acquisition. She finds out such results as the undominance of ALIGN-L (FT́,PWd), difference of stress patterns in verbs and nouns, shrinking variation at advanced stages of language learning, and a new type of transfer. Hence, a model for L3 phonology is proposed.These unexpected findings would have been different if the work was done on home work basis. Second, a study of French loans in MA yields several results about the syllable structure of the language. It shows that certain phonological issues can only be explained on the basis of data collected and analyzed in a lab. The study demonstrates that phonetic information can explain the behaviour of consonant deletion and epenthesis manifested in phonological data. I will argue that fieldwork is crucial to come up with findings that are the basis for phonological theory.

However, these two case studies prompt several questions. What are the methodologies followed in each case study? How does direct elicitation and recorded speech complement each other in L3 research? are they necessary in loanword study? How reliable are the two fieldworks? How do they interact with phonological theory? How does OT affect the two fieldworks?

I will address these questions and conclude that theory and practice complement each other. A solid background in linguistic theory is crucial before fieldwork. And fieldwork provides a ground for constructing theory. Therefore, they cannot be disconnected from each other.

Phonetic cues for syllable structure? Evidences from labiovelars in Tuscany.

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This paper will show the results of a phonetic analysis of the voiceless labiovelar segment as it is realised in the East and the Northwest side of Tuscany, precisely in the towns of Livorno and Rosignano Solvay for the north-western coast, and the village of Mercatale Val di Pesa for the eastern part.

As far as Livorno is concerned, it has been maintained that [kw] is often produced as a labiodental fricative [v] in intervocalic position, as it occurs in the noun phrase *le quattro* becoming [leˈvatːro] (four o•clock) (see Giannelli 2000[2]). According to Marotta (1995), this particular phenomenon is triggered by the deletion of the plosive within the labiovelar: once [k] is deleted, the glide [w] reinforces its articulation and becomes a voiced labiodental fricative [v]; it is the onset position - the glide occupies within the syllable - which allows the segment to be strengthened, as shown in the following scheme: (1) [kw] → [hw] → [w]→ [v]. However, it is important to point out that the process development in Rosignano Solvay does not take into account any phase of glide strengthening, because it stops at an earlier stage and no labiodental realisation of the glide occurs.

Labiovelars in intervocalic position are realised in a completely different way in eastern Tuscany: the lenition process takes an opposite direction, since [kw] looses its labial element before the plosive is lenited: (2) [kw] → [k] → [h].

As regards the speakers from the north-western side of Tuscany, the experimental analysis has shown that the sound perceived as a [v] is not a labiodental fricative, but rather the approximant [ʋ]; besides, the lenition process involves a wide range of allophonic realisations all triggered by the weakening of the velar segment [k] which is represented as follows:

3) [kw]→ [xw] → [ʍ]→ [w] → [ʋ] loss of [w] rounding;
→ [ɥ] conservation of [w] rounding.

Considering the results pertinent to the eastern part of Tuscany, two kinds of lenition are possible: the first implies the glide deletion (4), whereas the second affects the plosive segment (5) as it occurs on the north-western coast:

4) [kw]→ [hw] → [ɦw]→ [ɦ] →[ø] *glide- focused lenition;*
5) [kw]→ [xw] →[hw] → [ɣ]→ [w] *plosive- focused lenition.*

The wide range of the labiovelar allophones seems to represent relevant cues for determining the syllable structure of the labiovelar itself: taking into account one of the north-western spirantization output, i.e. the voiceless labiovelar fricative [ʍ], one notices that this segment is derived from the fusion of the two features matrices of /kw/: the fricative [ʍ], shares with [k] the features [+ cons] and [-voiced], whereas [+ lab], [+cont] and [+ round] are the features held in common with [w]. The fact that a fusion between the two segments within the labiovelar is possible, seems to indicate that /k/ and /w/ both belong to the syllable onset.

As regards the East side, whenever the labial element is deleted, a different syllable structure has to be considered in which the glide belongs to the syllable nucleus. In this case, though, the interpretation about the syllabic structure of the labiovelar is strongly related to the one of the diphthong [wɔ] which is part of a single nucleus showing the same phonological representation. It has to be added that in Tuscan, however, this diphthong is subjected to a reduction, for we have [ˈɔːmo] instead of [ˈwɔːmo], [ˈfɔːko] for [ˈfwɔːko] but also [ˈkwɔːko] for [ˈkɔːho]. In Florentine, however, the deletion of the glide has been extended also to the sequences kw +V ≠ /ɔ/, explaining why it is possible to have phrases such as [di ˈkwesto] for [di ˈhesto].

***Presentation preference* : ORAL OR POSTER**

Evidence from two Serbo-Croatian language games for final empty nuclei and against the syllable node

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The goal of this talk is to present two Serbo-Croatian language games known as šatrovački and utrovački and to show how their functioning provides insight into the architecture of phonological representations. I show šatrovački calls for the existence of empty nuclei after word-final consonants, and that both utrovački and šatrovački militate against the syllable node as a syllabic constituant.

1. Final empty nuclei

Šatrovački is a Serbo-Croatian (S-C) language game, or ludling, quite comparable to French verlan (e.g. *herbe* 'grass'[ɛʁb] > [bəɛʁ], *bouger* 'to move' [buʒe] > [ʒebu], see among others Bagemihl 1989, Plénat 1992). The basic organising principle of both is usually described as a reversal of syllables.

The data presented come from work with "native" speakers of šatrovački ; they were collected in summer 2004, and the overall corpus contains 194 words.

Relevant evidence for the purpose of the talk comes from S-C CVC inputs. These become systematically bisyllabic in šatrovački through the epenthesis of a schwa that is absent from the input. The choice of schwa is remarkable for this vowel is absent from the vocalic inventory of S-C. The location of its insertion is always the same: a $C_1V_1C_2$ input will come out as $C_2əC_1V_1$, e.g. *led* 'ice' > *d**ə**le*, *beč* 'Vienna' > *č**ə**be*, *vic* 'joke' > *c**ə**vi*.

Different analyses may be thought of to account for these data. After trying these different solutions such as a lexicalist, an epenthetic or an OT driven one, the only possible conclusion is that the FEN (final empty nuclei) are responsible for the insertion of schwa. Among other voices, Government Phonology (e.g. Kaye 1990) holds that consonant-final words ending actually end in an empty nucleus. This nucleus can remain mute when occurring in word-final position, but must be segmentally expressed in morpheme-internal situation. Thus the schwa observed on the surface in šatrovački is nothing but the spell-out of the lexical final empty nucleus, which has been moved from a final to an internal location.

2. The syllable is not a valid constituant

The corpus of utrovački that I have collected contains 120 words. This S-C language game is based on moving and inserting syllables, e.g. words like *radio* 'radio', *kobila* 'female horse', *sunce* 'sun' turn into *udiozaranje*, *ubilazakonje*, *uncezasunje.* An informal description of this process can be: substitute [u] for the first syllable, add *za* [za] 'for' at the end of the word, then finally add the first syllable and attach to it the [-nje] suffix, e.g. ***ko**bila* > ***u**bila* > *ubilaz**a*** > *ubilaza**konje***.

As for šatrovački, the theoritical interest of such data lies in the insight of the architecture of phonological representations. Namely, the data presented suggest that the syllable in its classical meaning doesn't qualify as a constituant: whatever the shape of the first syllable, CV or CVC, the only material that is moved is an Onset/Nucleus pair.

A look back at šatrovački shows that the same holds true for this language game: the coda of the first syllable is never moved.

All this strongly suggests that the syllable doesn't qualify as a constituant, not any more than the rhyme nor the coda. Thus the minimal unit that can be manipulated is a Onset/Nucleus pair. This brings support to theories that got rid of syllables, rhymes and codas (Scheer 2004, Szigetvári 2001, among others) and which make such a prediction.

To umlaut or not to umlaut: feature conflict in production versus perception

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Umlaut in modern German can be described as a morphologically conditioned phonological rule, most productively applied in the diminutive and in the plural of a set of nouns. Among models accounting for the alternation between back and front vowels one can distinguish between affix-based (Lieber, 1980; Wurzel, 1984) and stem-based approaches (Wiese, 1996). Wiese assumes that umlautable stems such as *Stock 'stick'* include a floating [+FRONT] feature which surfaces in the plural *Stöcke 'sticks'*. Underlyingly front stem vowels are specified for frontness; i.e. [+FRONT] connects to the umlauted vowel in *zwölf 'twelve'* as well as the unrounded one in *Stelle 'place'*. In contrast, we assume (Featurally Underspecified Lexicon, Lahiri & Reetz 2002) that neither umlauted nor umlautable stem vowels are specified for CORONAL (i.e. front) or DORSAL (i.e. back). Concrete vowel specifications are shown below.

Singular ~ Plural	Stock ~ Stöcke [ɔ~œ] *'stick'*	Stoff ~ Stoffe [ɔ~ɔ] *'cloth'*	Stöpsel ~ Stöpsel [œ~œ] *'peg'*	zwölf [œ] *'twelve'*	Stelle ~ Stellen [ɛ] *'place'*
LEXICAL V FEATURES	[LAB]	[LAB] [DOR]	[LAB]	[LAB]	[----]

There are several consequences. In perception, *Stock 'stick.SG'* and *Stöcke 'stick.PL'* are mapped onto the same lexical representation *STOCK* where the vowel is only specified for labiality. It is further predicted, that CORONAL extracted from the acoustic signal of the vowel in *St[ɛ]lle, St[œ]psel* will activate *Stock* (since it is underspecified) but not *Stoff* (since DORSAL is specified). In production, the spell-out of the umlauted variant is more marked, in that the default coronal rule (all placeless vowels /e/ /œ/ /ɔ~œ/ => CORONAL) has precedence over a more specific rule assigning DORSAL to all labial vowels in the SINGULAR.

The diachronic scenario in FUL is that when umlaut began as an allophonic process in Old High German and Old English, both LABIAL and DORSAL specification on a back rounded vowel was not necessary. Umlauting meant that LABIAL and LOW vowels which preceded suffixes with high CORONAL /i/ or /j/ were not specified for DORSAL. When umlauted vowels became phonemes, both DORSAL and LABIAL had to be marked in non-alternating words like *Stoff*. Morphologization of umlaut (like the plural) was achieved through the specific ordering of the coronal default rule before the DORSAL fill-in rule in production, a development from a default rule in Old High German to a markedness rule in Modern German. While in German, placeless umlauted and umlautable vowels retained labiality, this feature was lost in English: OE *Þynne, Þing* > Mod. E. *thin, thing*; OHG *dünni, ding* > Mod. G. *dünn, Ding 'thin, thing'*.

Evidence for the synchronic scenario is presented from a series of behavioural experiments. In immediate and delayed auditory priming tasks, umlauted as well as non-umlauted verbs primed their corresponding stems equally well, while umlauted (coronal) forms did not prime dorsal stems of a particular set of verbs. Supporting data are also drawn from a neurolinguistic study, where Event Related Potentials (ERPs) differed as to whether the umlaut ~ non-umlaut opposition was based on alternating stem *Stock* as opposed to non-alternating and specified *Stoff*.

Separate grammars: the shifting nature of second position in Serbo-Croatian

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The Serbo-Croatian use of both syntax and phonology to determine clitic placement has intrigued linguists for decades. Many scholars have proposed entirely synchronic approaches for clitic placement in this language (Anderson, 2000; Bošković, 2001, 2002; Halpern, 1992, 1995; Klavans, 1985; Progovac, 1996; Radanović-Kocić, 1980; Stjepanović, 1999, Schütze, 1994); however, none have been able to account for the optionality between the phonological and syntactic definitions of second position, shown in (1) and (2) respectively.

Taj **je** čovjek voleo Mariju (Halpern, 1992, p. 15)
(1) that be-3rd-SG man loved Maria
'That man loved Maria.'
Taj čovjek **je** voleo Mariju
(2) that man be-3rd-SG loved Maria
'That man loved Maria.'

Interestingly, some of the same scholars who advocate a single cohesive account have also observed that clitic placement is in transition in Serbo-Croatian (Radanović-Kocić, 1988; Rubadeau, 1996; Alexander, 1993). Despite the recognition that this aspect of the language is in a state of change and the inability to account for the phenomenon with a single grammar, a solution which uses multiple active grammars has not been proposed for this puzzle.

I assert that the current state of clitic placement in Serbo-Croatian is produced by two incompatible grammars, precisely what Kroch (1989) predicts for a language in transition. An older grammar which employs a phonological mechanism for clitic position is currently being replaced by a newer one which relies on syntax. Both are active.

The older grammar defines second position prosodically, placing the clitic within NPs (1), and determining placement in verb-initial forms (3) and those with heavy NP shift (4).

Dao **mi je** članak (Schütze, 1994, p. 59)
(3) give me be-3rd-SG article
'He gave me an article.'
U Rio de Zaneiru ostali **su** dve godine (Zec, 1990, p. 375)
(4) In Rio de Janeiro stayed be-3rd-PL two years
'They stayed in Rio de Janeiro for two years.'

(1) and (4) are usually tolerated, but few speakers actually produce these forms, suggesting that this grammar is on the decline. The prosodic placement of clitics in verb initial forms, e.g. (3), persists in all speakers, indicating that prosodic clitic position is fossilized in this context.

The newer syntactically defined grammar determines clitic position in sentences where the clitic follows the second syntactic constituent, as seen in (2), within subordinate clauses such as in (5), and following a relative clause such as in (6).

Milen želi da **ga** vidi (Progovac, 1996)
(5) Milan wants that him sees
'Milan wants to see him.'
Djevojka, koju Ivan voli, **je** fina. (Wilder and Ćavar, 1994, p. 35)
(6) girl who Ivan likes be-3rd-SG pretty
'The girl, that Ivan loves, is pretty.'

This issue raises questions about the very nature of the interaction between phonology and syntax and provides insight into the patterns of language change as this same transition has occurred elsewhere in Slavic (Toman, p.c. 2005; Pancheva, 2005).

Nasal consonants in Tupi and Jê languages

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Several languages from South America such as Karitiana (Storto & Demolin ms), Kaingang (Wiesemann 1972, Wetzels 1995, D'Angelis 1999, D'Angelis and Reis Silva 1999, Salanova 2001) and Maxacali (Callow 1962, Burgess and Ham 1968 and Salanova 2001) show a quite rare process affecting nasal consonants. This is that they can be pre or/and post oralized when preceded or/and followed by oral vowels. This phenomenon that occurs also in other Jê languages spoken in Brazil, such as Apinayé, has rarely been described.

Another process creates an orally released burst at the release of nasals that are followed by nasal vowels in Karitiana. Such segments have been identified before in Zhongshan and Taishan, two Chinese dialects, (Chan 1987) and in Achenese and Rejang, two Austronesian languages, (Durie 1985) and (Coady and McGinn (1982).

The detailed description of these nasals adds to our knowledge of linguistic typology and universals and also to some basic theoretical aspects of phonology.

From observations based on experimental data in Karitiana and acoustic data in some other languages, we hypothesize that the pre- or/and post-oralized nasal allophones (i.e. pre- and post-oralized (medionasals) nasals, pre-oralized, post-oralized, post-stopped-nasal and even fully oral) of these languages are controlled to produce the correct contrasts between segments. The observations and the deductions that one can make from the aerodynamic measurements, as well as their acoustic consequences, seem to support an hypothesis proposed by Kingston (1992), i.e. that articulatory covariation is perceptually motivated and the objects of speech perception are auditory rather than articulatory. The observations made on the phonetic characteristics of the allophones in Karitiana seem to support another hypothesis made by Kingston and Diehl (1994) in which they state that the phonetic interpretation of phonological representations may be controlled as well as automatic. Indeed contextual variations in the realization of the [nasal] feature values in Karitiana suggest an adaptive response to variation because of the demands on the production and perception of the [nasal] feature values between contexts. The covariation between oral and velic closures found with nasal allophones in Karitiana suggest that contrasts between nasal consonants and nasal vowels must be maximal since it seems that the least favorable context in which to identify a nasal vowel is in the context of nasal consonants. These contextual variations account for the controlled aspect of phonological representations, while free variation accounts for the automatic part of phonological representations. The possible variations of the allophones show this clearly. For example, the two possible variations of [b] and [mb] show this automatic aspect of phonological representations.

The data from Tupi and Jê languages suggest that coarticulatory models that do not include language-specific organization of gestures cannot account for the time-varying properties of nasalization.

Another important point to emphasize is that distinctive nasal vowels do not contrast with oral vowels when adjacent to a nasal consonant. This shows the difficulty of distinguishing between intrinsic and contextual nasalization in a nasal context.

'Initial' geminates initially and medially

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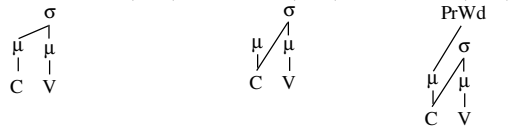
In moraic theory (Hayes 1989; Morén 1999) the distinction between singleton and geminate consonants is one of input moraicity. Singletons are non-moraic /C/, whereas geminates are moraic /C^{μ}/. Medial geminates are syllabified in a coda-onset configuration, where the first half of the geminate is moraic, yielding a so-called 'flopped' structure. Ham (2001) however claims that this structure is not imposed by moraic theory, but by syllabification demands, since $CVC_i^{\mu}.C_iV$ is better than CVC^{μ}:.V (where C_iC_i=C:=geminate). Word-finally though, nothing stops the geminate to syllabify tautosyllabically as CVC^{μ}:#.

I argue that an extension of this idea predicts that we should also find 'syllable-initial geminates' both word-initially and word-medially, and that these should be represented with the 'non-flopped' structure of a moraic onset (1a) [cf. Hajek and Goedemans 2003 (henceforth HG)].

(1) a. Hajek and Goedemans (2003) b. Davis (1999) c. Curtis (2003)



I use this idea to examine initial geminates in Pattani Malay (PM) (Abramson 1986, 1987, 1991, 1999; Yupho 1989; HG) and medial geminates in Marshallese (Abo et al. 1976; Zewen 1977; Hendricks 1999), and show how they support this proposal.

More specifically, PM possesses geminates only word-initially. Normally, the final syllable gets primary stress with all remaining syllables receiving secondary stress, e.g. *pèʔdɔ́h* 'usefulness', *mə̀kèné* 'food', unless they include the vowel /ɪ/ in which case they remain stressless: *sɪdàdú* 'police'. Initial geminates however systematically attract primary stress on the syllables that host them, yielding initial stress, e.g. *mːátɔ̀* 'jewellery', *bːúwɔ̀h* 'to bear fruit', even if they are followed by /ɪ/, e.g. *kːídà* 'to the shop'. To explain initial stress in *kːída* but lack thereof in *sɪdàdu*, I offer a proposal that adopts (1a) and combines weight and vowel quality considerations. This accounts for the full range of data and dispenses with the problematic proposal of HG who - making use of moraic onsets too - prioritize *onset* weight over nucleic weight. Moreover, in Marshallese, data from reduplication and stress suggest that medial geminates are moraic and need to be wholly syllabified in the onset.

Finally, I consider some theoretical implications of this proposal and compare it to alternatives, the most prominent of which are (1b) and (1c). (1b) amounts to leaving the mora of the geminate unaffiliated to any higher prosodic structure, and thus potentially unable to contribute to syllable weight (Kiparsky 2002). This fails, since the mora is obviously computed for weight purposes, as shown in PM and Marshallese. (1c) avoids this difficulty by linking the mora to the PrWd, but also implies that the geminate is unsyllabified, which essentially equates geminates to unsyllabified moraic consonants found in languages such as Bella Coola (Bagemihl 1991, 1998). However, no evidence for the lack of syllabification exists.

The representation of a geminate as a moraic onset (1a) on the other hand is advantageous, since it avoids these syllabification and prosodification issues and is also in line with the idea that onsets may be weightful, as suggested by the data of Pirahã stress (Everett 1988, Gordon 2005), Samothraki Greek compensatory lengthening (Katsanis 1996, Kavitskaya 2002) and Damin Word Minimality (Hale and Nash 1997) among others.

Mid-vowel lowering as complexity constraint on heads

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In Southern French dialects mid vowels are in complementary distribution : one can find the mid-low variants [ɛ], [œ] and [ɔ] in what is descriptively called a closed syllable ([*sɛk*] or [*sɛktær*]) and in an open syllable followed by schwa ([*sɛʃərje*]) whereas the mid high reflexes [*e*] [*ø*] and [*o*] appear elsewhere ([*seʃe*]). This distributional fact is well documented in the literature, authors diverge though as for the correct melodic characterisation of the pattern and the relevant and possibly unified representation of the context.

This poster intends to address two issues. The first concerns the relation between melodic pattern and context. The poster argues for representing the contrast between the mid-low and the mid high sets in terms of [A]-headedness (lowness). This conception goes counter an account in terms of either closed syllable laxing (van Oostendorp 1995) or closed syllable shortening (Rizzolo 2002, Durand & Lyche 2004). The motivation of the laxing account is far from clear : Why would the feature [lax] be required to support branching structures ? Moreover, independent evidence from Southern French (lack of vowel reduction and the absence of phonetic schwa) suggests the elimination of the neutral or centrality element [@] from the inventory thus making impossible the phonological expression of the tense/lax dimension. As far as the length account is concerned, it has several unfortunate predictions, not confirmed by the Southern French data.

The [A]-headedness account coupled with a very restricted representational theory (Head-driven phonology, van der Hulst & Ritter 1999) is shown to be explanatory insofar as a natural link is established between the melodic pattern and the context in which it appears. Namely, a constraint is postulated on the melodic complexity of heads : The element [A] is always head of the melodic expression when its nucleus is the head nucleus of a lexical foot, consisting of a full vowel and *i.* a lexical schwa to its right *ii.* an empty nucleus to its right. The trochaic government relation between a full and a defective vowel establishes a lexical foot, where the governor must be strong *i.e.* [A]-headed. This treatment follows the spirit of a foot based treatment of Selkirk (1978) or the dependency approach of Durand (1987) but it is more restricted i.e. it concerns only the government relation between vocalic positions. Even this restricted stance on the complexity constraint allows to unify all the contexts where mid-low vowels appear, including nasal vowels whose melodic realisation [*ɛ̃ ɔ̃ œ̃*] remained unexplained in previous accounts.

The second contribution of the poster is an attempt to an explanation of apparent counter examples to the pattern. These badly behaved items were collected from a large fieldwork on contemporary spoken French (Durand & Lyche 2003). In some cases, reference to phonological domain structure seems to be explanatory (like the variable pronunciation of compounds like chauffe-eau [*ʃɔfo*] vs. [*ʃofo*]) in others notions of a kind of vowel harmony maison [*mɛzɔ̃*] might be invoked. Paradigm uniformity could be responsible for cases like aveugler [*avœgle*], while cases like loriot [*lɔrjo*] or échelon [*eʃəlɔ̃*] call for *ad hoc* representations or clear exception features at the present stage of the research, if one wants save the generalisation.

Mora or syllable?
Some problems of Nganasan phonology

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Nganasan (Tawgy-Samoyed) — which is an endangered Samoyedic (Uralic) language spoken in Northern Siberia in Russia — has not yet been thoroughly investigated in the phonological literature. This language displays many unique phonological and morphonological features, including the phenomena of vowel harmony and two types of consonant gradation.

In this paper I reanalyse the Nganasan vowel system. First I summarise the notations of vowels as proposed in the literature, then the various types of vowels: short vowels, diphthongs, *ⁱa* and *ᵘa*, and finally long vowels will be dicussed in detail. One question that arises is how many diphthongs there are in Nganasan. The clusters of two different vowels that actually do occur in Nganasan their combinations is 21 (Helimski 1998: 485–486). We can see that these combinations are diverse, too unsystematic and irregular. As we can see many languages of the world have only a few diphthongs (Maddieson 1984: 133).

We should think that earlier "diphthongs" are in fact hiatuses, so we have to assign them to two syllables each. This idea is supported by the phenomenon of consonant gradation. In Nganasan there is the grade alternation of word medial obstruents and their nasal + obstruent clusters: **syllabic gradation (SyG)** consists in the strong grade of a consonant surfacing in the onset of an open syllable, and its weak grade surfacing in the onset of a closed syllable. According to the traditional view, vowel combinations are diphthongs, so the gradational consonants are expected to stay in the weak grade before these sequences, because they belong to the syllable closed by the suffix. But according to the idea developed here these sequences create hiatus, so before it gradational consonants are expected to stay the in strong grade, because the suffix closes the second syllable, which has no onset: *ɟytɨə* 'middle', *ɟytɨəʔ* [Pl] not **ɟyðɨəʔ* [Pl], *kasuə* 'cortex', *kasuəʔ* [Pl] not **kaɟuəʔ* [Pl]

Helimski's subsequent research specified the status of these two vowels: he called *ⁱa* and *ᵘa* diphthongoids (as opposed diphthongs) (Helimski 1989, 1994, 1998: 485).

As we mentioned above, two adjacent vowels (previously analysed as diphthongs) create hiatus. That is fortunate from the viewpoint of *ⁱa* and *ᵘa*, because now they may be sean as the diphthongs of Nganasan as corborated by their morphonological behaviour. Both of them are rising diphthongs (*ⁱa, ᵘa*).

Another question of the Nganasan phonology that arises is whether vowel length is contrastive in this language or not. Earlier researchers have all thought that there are many long vowels in Nganasan. If our claim about vowel sequences above is on the right track, we have to think about long vowels too, that so they are two adjacent nuclei. As we supported our claim above with the help of syllabic gradation, we should try the same here in connection with long vowels: *latəə* 'bone', *latəəʔ* [Pl] not **laðəəʔ* [Pl], *ɲitəə* 'cattle', *ɲitəəʔ* [Pl] not **ɲiðəəʔ* [Pl].

After this section I discuss the constraints that apply to the constituents of the syllable and define the syllable template in Nganasan. Than I give the representation of the syllable, and write about the syllable constraints, and the syllable weight. The last question is that Nganasan really a mora counting language, as P. Hajdú mentioned (Hajdú 1964).

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Statistics is not enough for language acquisition

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We all wonder how children can acquire the specific phonemic categories of their own language. "Thanks to statistics" is now the common answer to this question, and that will be discussed in this paper.

Among others, Anderson et al. (2003) showed that by 8 months, infants had lost the ability to discriminate non-native coronal contrasts while they could still discriminate non-native dorsal contrasts. The authors used these facts as an evidence that infants acquire phonemic categories by using statistics: as coronals are more frequent than dorsals in English, infants will categorize them sooner, and then they won't discriminate non-native coronal contrasts anymore. Thus, Anderson et al. opposed a frequency-based model for L1 acquisition to a markedness-based theory. According to them, the unmarked status of the coronals is irrelevant for their categorization.

On the contrary, although its ultimate causes is poorly understood, markedness is related to a number of diagnostics, usually including frequency. For instance, a often used criterion of markedness is that a given feature is marked if not all language use it in their inventories (Clements, 2005). The aim of this paper is to show the limits of a frequency based model, and to propose a model integrating a number of general interacting principles of inventories structure. Thus, a frequency based model would make incorrect prediction with respect to well established facts, as shown in (1) for the acquisition of French consonants:

(1)

Most frequent consonants (Wioland, 1971)	First acquired consonants (pilot study done by the author)
/ʁ/,/l/,/s/,/t/	/p/,/t/,/m/,/n/

For instance, the frequency based theory will predict that /s/ should appear before /t/, and the Marked Feature Avoidance principle (the number of inventories with sounds bearing marked values of a given feature F is smaller than the number of inventories with sounds bearing unmarked values of F) will predict the opposite, because /s/ bears the marked value [+continuant]. Finally, there are more children's inventories with /t/ than with /s/.

The rather fundamental discrepancies between frequency counts and child language inventories illustrated in (1) suggest that other principles play a role in accounting for the order of acquisition, as shown by data drawn from acquisition in French and Brazilian Portuguese. The first acquired consonants are composed of unmarked features. Then, consonants with marked values are acquired in function of a number of interacting principles which may include: avoidance of marked features combination, feature economy, robustness. The role of frequency can be determined once the role of such interacting factors have been understood: for instance the appearance of /ɲ/ is earlier in Brazilian Portuguese than in French, maybe because of the presence of the high frequency ending /iɲo/ in child directed speech.

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Form of presentation: Poster

Coping with "non-ideal" utterances: Why speakers don't have to be perfect

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Conversational speech might differ considerably from idealized 'perfect' speech but is nevertheless the common input for an everyday listener. A crucial issue in speech perception is whether models assuming abstract lexical representations are capable of dealing with reductions and deletions, or whether they ought to be abandoned for models assuming detailed phonetic representations. In this paper we discuss segment alteration in running speech in German and the consequences of such alteration for perception. Both production and perception results are presented with two competing models in mind: (a) FUL (Featurally Underspecified Lexicon Model, Lahiri & Reetz, 2002) assumes abstract lexical representations where phonetic detail is not part of the lexical entries and not all features are specified (e.g. [CORONAL] has no specification); (b) competing models, such as exemplar-based models (e.g. Johnson, 1997, Pierrehumbert, 2001) where phonetic variation and all detail are stored in the lexicon.

First, we focus on segment reduction which include deletions and assimilations. The research is based on the Kiel corpus on conversational German (IPDS, 1994) consisting of about four hours of recorded dialogues of an appointment making task. A careful examination of the produced pronunciations revealed that the reductions in conversational German are rather predictable and depends on the segment and the probability is connected to its morphological status. For instance, [CORONAL] sounds are more prone to deletion than their non-[CORONAL] counterparts. Beginnings of words are stable, even for vowels, which are more commonly reduced at other places. Function words are more prone to reduction than content words. As to be expected, Schwa is most often deleted; in [ən]-suffixes almost always. This raises the question of its status in the underlying representation. The second most often deleted segment is [t], again the data suggest that [t] as suffix is deleted more often than being part of a stem. As for segment alteration, the assimilations transcribed in the corpus involve both regressive as well as progressive place assimilation. Assimilations are not restricted to the word domain, but do occur also across word-boundaries. As for vowels, they do not alter randomly. For instance, we never find a [HIGH] vowel becoming [LOW], nor *vice versa.*

To examine how these assimilations in production are actually perceived, we performed a perception study which showed that regressive place assimilation on nasal sounds creates complete neutralization of [CORONAL] place information in a [LABIAL] context in conversational German. Listeners do not perceive the underlying place of the segments, despite the graded nature of assimilations. Listeners invariably judged assimilated tokens as if they were "real" [LABIAL] nasal sounds, with respect to both reaction time and number of "correct" responses. Models assuming acoustic detail would run into problems explaining this result: if assimilated tokens occur often they should be stored in the lexicon and retrieved. However, this is not the case.

We will argue that our results support an abstract mental representation which can cope with "imperfect" utterances of speakers. We will maintain that FUL does not only predict the variation that actually occurs, but also explains how this neutralization is resolved and the correct entry is activated in the lexicon.

Special session

Fieldwork and phonological theory

The special session will feature invited talks from the following speakers (in alphabetical order), followed by ample opportunity for discussion

- Dan Everett (University of Manchester)
- Larry Hyman (University of California, Berkeley)
- Keren Rice (University of Toronto)

In light of the sad news of the death of Peter Ladefoged, whose work in both phonological theory and fieldwork, was legendary, the special session will also feature a discussion of his work, led by

- Jacques Durand (Université de Toulouse-Le Mirail)
- Dan Everett (University of Manchester)