The Thirteenth Manchester Phonology Meeting

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ABSTRACTS BOOKLET

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Organised by phonologists at the **University of Edinburgh**, the **University of Newcastle upon Tyne**, 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 in the sessions at the **thirteenth Manchester Phonology Meeting**, held at Hulme Hall, Manchester in May 2005.

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

The abstracts for the **main sessions** are presented first, followed by the abstracts for the **poster session**, and those for the **special session** entitled 'What is a phonological fact?'

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

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

Main sessions

An Optimal Alternative to Iterative Footing

Faisal M. Al-Mohanna
King Saud University, Riyadh
mohannaf@ksu.edu.sa

A number of derivational metrical accounts consider iterative foot construction as a mechanism required to assign primary stress although secondary stresses are not phonetically attested (Halle and Vergaud 1987, Idsardi 1992, Hayes 1995, and others). For example, they argue that the stress pattern in Cairene (Mitchell 1960), which appears to depict no secondary stresses, entails a process of left-to-right trochaic footing. The absence of a stress attracting superheavy ultima or heavy penult demands this exhaustive parsing to locate stress on a designated syllable (the light penult or antepenult, whichever is separated from the first preceding heavy syllable or (if there is none) from the beginning of the word by an even number of syllables). Consequently, Line Conflation had to be developed to eliminate the effects of this intermediate stage, an epiphenomenon of iterative footing, viz. feet whose prominent flanks may not be allowed to percolate into headedness. However, this process of Line Conflation entirely relies on principles of serial derivation, where the output of a certain rule (Foot Construction) is the input to another (Word Layer Construction). This calls for considering other alternatives as the constraint-based framework of OT (Prince and Smolensky 1993/2002, McCarthy and Prince 1993a, b) does not accommodate intermediate stages of derivation.

In an attempt to attain the ultimate effects of Line Conflation within an OT analytical environment, a number of accounts were suggested, the Separability and the Sympathy (opacity) accounts of Crowhurst (1996) and Paul de Lacy (1998), respectively. Nonetheless, the former undermines the widely recognised inextricability of constituents and heads, decomposing footing into two separate processes of syllable parsing and head assignment. And, the latter extends Sympathy Theory allowing it to accommodate markedness constraints as selectors of sympathetic candidates weakening the entire purpose of the theory which endeavours to maintain a certain faithfulness relation between an input and some selected sympathetic candidate representing the intermediate stage in serial derivation.

Building on the assumption that primary and secondary stresses are assigned separately (van der Hulst 1984, 1996,1999, Roca 1986, Goldsmith 1990, McGarrity 2003, and others), the proposed OT account offers an explanation that only allows a maximum of one foot per word, denying the environment of any secondary stress assignment. I will demonstrate that processes of primary stress assignment in languages like Cairene, Seminole/Creek, or even Hindi, that are treated with Line Conflation in derivational accounts, do not require iterative exhaustive footing. Constraint interaction will only optimize those candidate analyses with a single foot that locates a particular syllable, designated for stress eligibility, in a head position. This minimal foot construction is attributed to the interaction between the constraints Lx ≈ Pr (Prince and Smolensky 1993/2002) and *Ft (Paul de lacy 1998), a member of *STRUC constraints (Zoll 1992 *cit* Prince and Smolensky 1993/2002). The former necessitates some sort of prosodic licensing, but the latter militates against prosodic structure, foot structure in particular.

The counting effect implement by iterative footing, however, will be attributed to a constraint interpreting Edge Markedness (Hayes 1995), or more generally the Priority Clause that demands scanning along a string in order to construct a proper foot where possible if the portion of the string being scanned would yield a degenerate foot, interpreted here in terms of binarity (Hayes 1995: 95). Therefore, the portion of the string allowed to intervene between the one foot and a designated edge (the left edge in Cairene for example) should be exhaustively parsable into immediately higher constituents, creating the environment for iterative exhaustive footing that is not executed unless the language requires secondary stressing. The proposed account further enforces the principle of economy as a certain set of constraints motivate primary stress assignment independently of secondary stressing, an option that a language may or may not choose to take.

Phonologically Real But Not Reducible

Irene Appelbaum
Department of Philosophy, University of Montana
irene.appelbaum@umontana.edu

Phonological facts describe real phonological events. Real phonological events are, in some sense, physical events. The difficulty arises when we try to specify precisely in *what* sense. For to the extent that we simply identify phonological events with physical ones, the events are unproblematically real, but not specifically phonological. And to the extent that we identify phonological events and processes independent of physical ones, the events and processes are *ipso facto* phonological, but not necessarily physical. In this latter case, moreover, the phonological processes would be exhibiting non-physical causation. The difficulty, then, is to specify a standard of "phonologically real" which neither reduces phonological events to physical ones nor attributes occult causal powers to them.

The following definition I argue allows us to specify such a standard: *a phonologically real event is one which exhibits causal effects in virtue of properties at the phonological level*. According to this definition, every individual phonological event is a physical event – that is, is token-identical to a physical event -- but as a class, phonological events are not identical to any single type of physical event. In other words, although every phonological event is physically realized, it is not in virtue of its physical realization that it belongs to the class it does. What all members of the phonological class have in common is not their particular physical realization, but a higher-level – i.e., phonological -- property. For example, all instances of the English phoneme /b/ are physically – or phonetically – realized. Every token utterance of a /b/ is realized by some phone, but what all instances of /b/ have in come is the role they play in distinguishing English words, not their minute physical realization.

Since a single phonetic segment may be perceived as different phonemes depending on lexical context (Ganong 1984) and a host of other factors, if we pick out phonological classes on the basis of phonetic or physical properties we end up with the wrong class of entities. What all members of the class /b/ have in common is their role in distinguishing lexical items; this property is a functional one not in the first instance a physical one. So phonological events such as the production of phonemes, are real because there are causal effects – e.g. correctly distinguishing lexical items -- in virtue of properties that are not reducible to properties at the physical or phonetic levels.

Nonetheless, acknowledging such higher-level phonological causation does not require us to posit any extra-physical causal powers. This is so because any particular instance of e.g. a /b/ being produced is a physically realized event; if it were not there would be no phonological effects. But it does not have its effect in virtue of the particular realization; any physical implementation that successfully distinguishes /b/ from /p/ will do. This is not to deny that there are severe constraints on which physical implementations will successfully function as a /b/. But these constraints are not so severe as to make phonological events reducible to physical ones.

Opacity in phonologically conditioned suppletion

Raúl Aranovich[a], Sharon Inkelas[b], Orhan Orgun[a], and Ronald Sprouse[b]
[a]University of California, Davis and [b]University of California, Berkeley

One advantage of Optimality Theory (Prince & Smolensky 1993) over rule-based theories of phonology is its focus on output wellformedness. Mester (1994) and Kager (1996) extend output-orientedness beyond phonology, arguing that the distribution of phonologically conditioned suppletive allomorphs is driven by output optimization. We address a class of cases of suppletive allomorphy which pose a challenge to this view, cases in which the phonological conditions on allomorph selection are rendered opaque by phonological alternations. In our case studies from Turkish and Spanish, suppletive allomorph selection is optimized at the input level but, due to the obscuring effects of phonological alternations, is not optimal in output. Our paper brings together two independent strands of work in Optimality Theory, namely opacity and suppletive allomorphy.

Case #1: Turkish. The Turkish third person possessive suffix has two allomorphs, /I/ and /sI/, whose vowels undergo vowel harmony (Lewis 1967). /-I/ attaches to consonant-final forms (***bedel*** ‘price’, ***bedel-i*** ‘its price’), /-sI/ to vowel-final forms (***fire*** ‘attrition’, ***fire-si*** ‘its attrition’). This distribution appears to optimize syllable structure, avoiding closed syllables (which violate NoCoda) and vowel hiatus (banned by *V.V). However, allomorph selection interacts opaquely with productive intervocalic velar deletion. ***gedik*** ‘gap’, when combined with vowel-initial suffixes such as /-I/, loses its /k/, resulting in surface hiatus: ***gedi-i*** ‘its gap’. Since compliance with *V.V is the motivation for choosing /-sI/ over /-I/ for vowel-final forms, the selection of /-I/ in ***gedi-i*** is opaque. What is being optimized is *input* representation, not output. Input /gedik-i/ is phonotactically superior to input /gedik-si/, despite the fact that its resulting output, ***gedi-i***, is inferior to other candidates, e.g. the non-occurring ****gedi-si***.

Case #2: Spanish. The suppletive allomorphy of nominalizing ***-ez/-eza*** in Spanish is phonologically conditioned (Lang 1990): in surface terms, ***eza*** occurs with monosyllabic bases (1a), ***ez*** with bases that are disyllabic or longer (1b):

(1)	a.	vil-eza	‘vile’	(vil)	b.	rigid-ez	‘stiff’	(rígido)
		franqu-eza	‘truthful’	(franco)		estupid-ez	‘stupid’	(estúpido)

This distribution of allomorphs can be seen as output-optimizing on the assumption that Spanish words are optimally trisyllabic or larger; ***eza*** is used when needed to achieve trisyllabicity; the more economical ***ez*** is selected otherwise. What introduces opacity into this picture is disyllabic consonant-final adjectives. These combine with ***eza***, not ***ez***, in contrast to the forms in (1b):

(2)	gentil-eza	*gentil-ez	‘gentle’	(gentil)
	real-eza	*real-ez	‘royal, regal’	(real)

Forms like these show that allomorph selection is based not on surface but on *input* syllable count. The inputs in (1b), which take ***-ez***, are trisyllabic or longer already (***rigido, estúpido***), while the inputs in (1a), which take ***-eza***, are monosyllabic or disyllabic (***vil, franco***), as are the input adjectives in (2). The correct input generalization is that inputs optimally consist of two binary feet; /gentil-eza/ and /franco-eza / (→ ***franqueza***) are both more optimal, from this perspective, than */gentil-ez/ or */franco-ez/. Syncope of the pre-suffix vowel renders the allomorphy opaque, but when inputs only are considered, it is transparent and optimizing (the fact that the final vowel is included in the input is in line with recent views such as those espoused by Flemming, Kirchner, and Steriade, according to which lexical representations are richer and closer to surface word forms than previously assumed).

Analyzing patterns like this, which are determined on the basis of the input level of representation, requires a version of Optimality Theory in which reference can be made to input representations. The literature on opacity offers several such models, notably Sympathy Theory (McCarthy 1999) and Enriched Input Theory (Sprouse 1997). Our findings do, however, cast doubt on Kiparsky’s (2000) approach to opacity, which requires all instances of opacity to result from stratal interactions. In Turkish and Spanish, there is no evidence to suggest that velar deletion or prosodic size evaluation take place at a later stratum than the one on which allomorphy is determined.

German Fricatives and the Issue of Laryngeal Features: An OT Analysis

Jill Beckman & Catherine Ringen; University of Iowa; jill-beckman@uiowa.edu, catherine-ringen@uiowa.edu

In the phonological literature, the assumption that the same laryngeal features are involved in both stop and fricative contrasts within a given language has, with very few exceptions, been unquestioned. Jessen & Ringen (2002) and Iverson & Salmons (2003), among others, claim that German stops contrast in [spread], not [voice] (as is usually assumed). What, then, is the feature of contrast for German fricatives? Iverson & Salmons suggest that it is the same as for stops: German fricatives contrast in the feature [spread]. The purpose of this paper is to show that, for German, the facts do not support the assumption that the stops and fricatives have identical laryngeal specifications as claimed by Iverson & Salmons; rather, different features are involved in the two-way stop and fricative contrasts.

As is well-known, German word-initial stops are always voiceless (unless preceded by a word that ends in a voiced sonorant). This is mysterious on the [voice] analysis, but follows straightforwardly on the [spread] analysis: word-initial stops are voiceless because *all* stops are voiceless unless between sonorants. The voicing of single intersonorant non-[spread] stops (and no others) has a clear phonetic explanation: stops without glottal spreading can be (passively) voiced when they occur between sonorants, even without any active voicing gestures on the part of the speaker (Westbury 1983, Westbury & Keating 1986). Lastly, the fact that all word-medial stops in clusters are voiceless, including those in onsets, is difficult to understand on the [voice] analysis, but is expected on the [spread] analysis because, as noted, all stops are voiceless unless between sonorants.

Unlike stops, fricatives in German clearly contrast for voice both in intervocalic position, where passive voicing might be implicated, and in word-initial position, where it is unclear what phonetic constraint could be responsible: ***w****ir* [v] 'we', ***v****ier* [f] 'four', ***S****iel* [z], 'sluice', ***S****eal* [s] 'seal'; as well as between vowels *Grä****s****-er* [z] 'grass PL', *Fü****ß****-e* [s] 'foot PL', *akti****v****-e* [v] 'active FEM, NOM SG', *Hö****f****-e* [f] 'courtyard PL' (although word-initial [s] only occurs in loanwords).

In their analysis of German stops, Jessen & Ringen motivate constraints (a) requiring that input and output correspondents have the same specification for [spread] (ID[sg]) and (b) prohibiting voiced spread glottis stops (*voi/sg). Given that stops in German are all voiceless (unless between sonorants), then the voicelessness of fricatives in clusters preceding stops (e.g., *kur*[v]*en* 'curve inf.' vs. *kur*[f]*te* '1sg & 3sg past') can be accounted for by the interaction of the constraints assumed in Jessen & Ringen with two additional, independently motivated constraints: (a) ID-preson-f, requiring that presonorant fricatives retain their input voice specification on output correspondents (c.f. Padgett 1995, Lombardi 1999, and Beckman 1998 for variations on presonorant faithfulness, and Jun 1995 for manner-sensitive faithfulness), and (b) FRIC-SG, requiring that fricatives be [sg] (Vaux 1998) (1). The addition of these constraints will also account for the voicelessness of word-final fricatives in German (2).

(1)

kur/v+t^{sg}/+*e*	*voi/sg	ID-preson-f	FRIC-[sg]	ID[sg]	*voi	*sg
☞ *kur*[f^{sg}t^{sg}]*e*				*		**
kur[vd]*e*			*!	*	**	
kur[vt^{sg}]*e*			*!		*	*
kur[v^{sg}t^{sg}]*e*	*!			*	*	**
kur/v/+en	*voi/sg	ID-preson-f	FRIC-[sg]	ID[sg]	*voi	*sg
kur[f^{sg}]*en*		*!		*		*
☞ *kur*[v]*en*			*		*	
kur[f]*en*		*!	*			
kur[v^{sg}]*en*	*!			*	*	*

(2)

Gra/z/	*voi/sg	ID-preson-f	FRIC-[sg]	ID[sg]	*voi	*sg
☞ *Gra*[s^{sg}]				*		*
Gra[z]			*!		*	
Gra[z^{sg}]	*!			*	*	*
Gra[s]			*!			

Rice (1994) and Tsuchida, Cohn & Kumada (2000) argue for analyses of Athapaskan and English, respectively, in which the stops contrast for [spread], but the contrast in fricatives involves [voice]. German is apparently another language in which the feature of contrast in stops is [spread], but not [voice]; contra Iverson & Salmons (2003), [voice] *is* specified in the fricatives. As we have shown, well-motivated OT constraints provide a straightforward analysis of this system.

'Pharyngeal' and 'Pharyngealisation' in the Caucasian Languages: Phonological Correlates vs Phonetic Realisations

Alex Bellem, SOAS
alex@bellem-hussein.demon.co.uk

The indigenous Caucasian languages are renowned for their wide use of secondary articulations (labialisation, palatalisation, pharyngealisation), which leads to an abundance of contrastive consonants (e.g. 81 in Ubykh, 83 in Abaza [Colarusso, 1975, 1992, 1994]), and a remarkable array of uvulars and pharyngeals. Both phonetically and phonologically, the so-called 'pharyngealised' segments in Caucasian languages are said to differ from those in Arabic (for Caucasian there are many reports of epiglottopharyngeals; pharyngeals often have lowering and fronting effects on vowels, etc). Typologically, Caucasian languages appear to be rather unusual, for these reasons among others.

This paper addresses the above issues from a theoretical angle, seeking to account for 'anomalies' within an existing framework, rather than resorting to inventing new categories. My claim centres on what is meant by 'pharyngealisation' in reference to Caucasian languages (specifically, the Nakh-Daghestanian and Abkhaz-Adyghan groups), and I make appeal to monovalent elements, looking at the phonological behaviour of pharyngealised vowels, pharyngeals and pharyngealised consonants.

Previous western work on the phonological correlates of 'pharyngeal(isation)' has mostly focused on Semitic and Interior Salish languages, to the exclusion of Caucasian languages, with a couple of notable exceptions. Much of the relevant work on Caucasian languages in general is either descriptive or focuses on phonetic analyses, although there has been some work published in Russian on prosodic pharyngealisation (Kibrik & Kodzasov, 1990). Work in English analysing pharyngealisation as prosodic has not detailed how it works within a phonological framework (Nichols, 1994, 1997; Kodzasov, 1987; Kibrik, 1994). Bessell (1992) deals briefly with the phonetics of Caucasian epiglottopharyngeals and pharyngealised uvulars, but her (feature-geometric) phonological analysis of Arabic and Interior Salish omits Caucasian. Colarusso (1988, 1994) characterises Abkhaz-Adyghan sound systems in terms of binary features, but in so doing must resort to features that many languages make no use of whatsoever, which creates problems in terms of over-generation and predictability, and also fails to capture phonological natural classes accurately or to predict phonological behaviour (such as the correlation between epiglottopharyngealisation and vowel centralising, whereby /a/ → [æ], /i/ → [e], /u/ → [ø]). Moreover, it is then hard to highlight both the similarity and the difference between Arabic and the Caucasian languages in relation to pharyngeals and 'pharyngealisation'.

This paper seeks to show how pharyngeals in a representative sample of Caucasian languages are phonologically represented. From this, I develop an account of 'pharyngealisation', accounting for both vowels and consonants (including the retroflex consonants reported for languages like Adyghe and Abaza, and the typologically unusual 'pharyngealised' uvulars and pharyngeals), which lends itself to both prosodic and segmental interpretations. My argument centres crucially on the unusual interaction of the elements A and I in consonantal representations, reminiscent of Trubetskoy's (1931) insightful description of this phenomenon as 'emphatic palatalisation'. I argue that 'epiglottal' is the phonetic realisation of what is phonologically 'low back' and 'palatal' (A and I) and that the typologically unusual combination of the resonance elements is what allows many Caucasian languages to have such 'well-stocked' consonantal inventories.

I show not only how Caucasian 'pharyngealisation' differs from that of Arabic (for which Bellem, 2001, uses the A element) but also how they are related. The paper demonstrates how articulatory phonetic labels can be phonologically misleading.

Cryptosonorants in Biaspectual Phonology

Sylvia Blaho & Patrik Bye
CASTL Tromsø
sylvia.blaho@hum.uit.no/patrik.bye@hum.uit.no

One problem which to date remains unaddressed in Optimality Theory involves **cryptosegments**, which show a discrepancy between phonetic realization and phonological patterning. This talk addresses **cryptosonorants**, which are phonetically obstruents, but display the phonological patterning of sonorants. Such cases have received considerable attention in representational frameworks (e.g. Hall 2003), but they have so far been neglected in OT.

We propose to subsume these under the rubric of phonological opacity and provide an analysis in terms of **biaspectual phonology** (BP) and **autosegmental spans** (McCarthy 2004). BP resurrects the venerable idea, due to process morphophonemics Postal (1968); Kiparsky (1973), that the function of the phonology is to map lexical (systematic phonetic) representations to discrete phonetic representations. Although lexical and discrete phonetic representations are made of the same stuff, much work in the 70's and 80's accepted the idea that lexical representations may have properties, such as underspecification, which distinguished them from discrete phonetic representations. In short, not everything that is relevant for phonetic interpretation is relevant for lexical recognition, and vice versa. In BP, the phonological grammar is reconceptualised as the interface between a phonetic interpretation system Φ and a lexical recognition system Λ in a way which permits recovery of these insights in OT. Exactly as in standard OT, the grammar returns a *unique* structural description of an input from a rich base. In BP, however, Φ and Λ may 'see' different aspects of the same representation since every node, feature and association line is tagged for its visibility to Λ and Φ. Markedness constraints are reformulated as requiring the *invisibility* of elements to one or both Φ and Λ, while faithfulness constraints require visibility of input material to one or both of these systems.

We apply this conception of phonology to the behaviour of cryptosonorants in selected Eastern European languages. In these languages, the general pattern of voicing assimilation (VA) is regressive and iterative, but cryptosonorants show various deviations from this pattern: they either (i) undergo both regressive and progressive VA (Czech / /), (ii) undergo regressive VA but don't trigger it (in Czech, Slovak, Serbo-Croatian, etc.), (iii) trigger VA but don't undergo it ( ), or (iv) are transparent to VA (Polish).

In this talk, we concentrate on Czech / /, which, despite being an obstruent, undergoes both progressive and regressive VA, against the general pattern for obstruents. Our analysis relies on three constraint types: **OBSPAN**, requiring that consecutive obstruents form a span for [voice], **OBSPAND-HD-R**, requiring that [voice] spans be right-headed, and **SP-HD-IDENT[VOICE]**, requiring that span heads be faithful to their input specification for [voice]. If undominated, these three constraints result in a regressive, iterative pattern of VA.

Since cryptosonorants are visible as sonorants to Λ but as obstruents to Φ, we analyse their irregular behaviour as follows. **OBSPAN**$_\phi$ ensures that a cryptosonorant and an adjacent obstruent have the same [voice] specification at Φ, while **OBSPAND-HD-R**$^\lambda$ and **SP-HD**$^\lambda$**-IDENT[VOICE]**$^\lambda_\phi$ make sure that the voicing specification of the Φ span is determined by the input value of the obstruent, not the cryptosonorant.

In the last part of the talk we compare the BP account with Sympathy Theory (McCarthy 1999) as well as McCarthy's most recent contribution to the literature on phonological opacity (McCarthy 2005), Candidate Chains Theory (CCT). We show that both Sympathy and CCT run into problems in dealing with opaquely distributed allophones. Richness of the Base requires that the grammar secure the right result regardless which allophone appears in the input. Sympathy is crucially dependent on the 'right' input, and CCT cannot generate the desired candidate let alone optimise it. We show how BP circumvents these problems.

A dependency analysis of voicing in English

Bert Botma, University of Leiden,
E.D.Botma@let.leidenuniv.nl

Norval Smith, University of Amsterdam,
nsmith@uva.nl

From time to time discussion takes place regarding the correct phonological representation of the English "voicing" distinction in obstruents. Occasionally the suggestion is made that since the most frequent initial and final pronunciation of "voiced" stops is actually a lax voiceless stop, while initial "voiceless" stops are aspirated, the basic opposition might rather be one of aspiration rather than voicing.

However, this demonstrates an unhealthy preoccupation with onsets, since "voiceless"stops in codas are not aspirated but in general preglottalized. And of course we mustn't forget that whatever account is given for stops also has to fit for fricatives.

A significant recent article by Herbert Stahlke in Word 2004 has provided a large amount of relevant narrowly transcribed data, which requires to be taken into account in any attempt to provide an improved account of the "voicing" distinction in English. This is important as there are a significant number of other languages whose obstruents have been characterized in terms of tense/lax rather than voiceless/voiced.

Stahlke provides an analysis of the English opposition in terms of the Halle laryngeal features [stiff vocal cords], [slack vocal cords], [constricted glottis], and [spread glottis]. We will attempt a reanalysis in Dependency Phonology elements, in terms of H, L, and ?.

Gradient phonotactics in Muna and Optimality Theory

Andries Coetzee, University of Michigan
Joe Pater, University of Massachusetts, Amherst

In this paper we present and analyze data on the consonantal place co-occurrence restrictions of the Austronesian language Muna, which in interesting ways resemble, and differ from, those found in the Arabic verbal roots (Greenberg 1950, McCarthy 1988, 1994, Padgett 1995, Frisch, Pierrehumbert and Broe 2004). As in Arabic, homorganic consonants tend not to co-occur within roots, and the degree of under-representation of a homorganic pair of consonants negatively correlates with their featural similarity. In Arabic and other languages with documented place co-occurrence restrictions, including the Austronesian language Javanese (Uhlenbeck 1949, Mester 1986), similarity is primarily defined by sonorancy. In Muna, however, it is voicing that plays the dominant role. This is counter to the claim that OCP-Place constraints are universally insensitive to voicing (Padgett 1995), and also presents a challenge to the similarity metric of Frisch *et al*. (2004).

Our analysis of the Muna place co-occurrence uses an expanded set of relativized OCP-Place constraints. As Frisch *et al.* (2004) point out in their discussion of similar facts in Arabic, the main analytic challenge is to capture the gradience in the degree to which these constraints are obeyed in the lexicon. Taking the case of Muna, some constraints hold absolutely, like the constraint against multiple voiced dorsals, OCP-DOR-[VCE]; no roots of the form **gaŋa* occur. Some hold of all but a few words, like the constraint against multiple voiced labials OCP-LAB-[VCE]; only a few roots like *bama* occur. Some constraints admit many exceptions, but fewer than would be expected if the consonants were subject to no restriction. There are a number of roots like *dana* that violate the constraint against multiple voiced coronals OCP-COR-[VCE], but these are still statistically underrepresented. We propose that native speakers' knowledge of the relative strength of these constraints can be expressed by ranking: OCP-DOR-[VCE] >> OCP-LAB-[VCE] >> OCP-COR-[VCE]. In addition, we show that a learner can rank these non-conflicting constraints if new rankings are initially lexically specific. With this one assumption, Prince and Tesar's (2004) Biased Constraint Demotion Algorithm automatically ranks the markedness constraints according to their frequency of violation.

We also present an analysis of Muna in terms of Frisch *et al.*'s (2004) similarity metric. As predicted, the rates of co-occurrence, calculated as Observed/Expected frequency, do negatively correlate with similarity values. However, there are systematic mismatches between similarity and observed co-occurrence. First, the strength of the voicing effect is unexpected. To deal with this, alongside the dominance of sonority in Arabic, the similarity metric would seem to need to weight features in a language-specific fashion, which considerably weakens the theory. In addition, coronals co-occur much less frequently in Muna than predicted by the similarity metric. The similarity metric relates the relatively free co-occurrence of coronals in Arabic to the large size of its coronal inventory. In Muna, however, the coronal inventory is only slightly larger than that of the labials. This suggests that there is more to coronal unmarkedness than inventory size. In sum, the advantages that Frisch *et al.* (2004) claim for their account over an OCP-based one are mitigated by its failure to predict the Muna patterns, and also by the ability of ranking to express knowledge of gradient well-formedness.

Phonetic Duration of English Homophones: An Investigation of Lexical Frequency Effects

Abby Cohn, Johanna Brugman, Clifford Crawford, Andrew Joseph, Cornell University, acc4@cornell.edu

A traditional generative view of phonology assumes a single abstract underlying representation for each lexical item. Under this view, observed differences in the realization of a given form (in terms of reduction, coarticulation, duration, etc.) in different utterances must follow from factors conditioning the production of those utterances. It has been claimed, however, that such models are overly simplistic and cannot account for the range of subphonemic detail argued to play a role in the production, perception, and representation of lexical entries. Such detail can be encoded within an exemplar model, in which individual instances of a particular form are stored and can, consequently, affect the long-term representation of lexical items. In this paper, we investigate the predictions made by these models by considering related claims made by Bybee (2001) and Jurafsky et al. (2001), which together predict that the effects of (token) frequency on phonetic duration are such that more frequent lexical items should have shorter durations. The best evidence in support of this claim comes from cases where frequency differences correlate with the difference between function and content words. It is well known that function words show more reduced and variable realization than content words (as discussed, for example, by Jurafksky et al. 2001 and Lavoie 2002). The question is whether this correlation holds more generally: If we control for the distinction between content and function words, will we still find an effect?

Our study investigates the phonetic durations of heterographic pairs of homophonous English nouns that differ in token frequency. Fourteen such pairs were grouped into three categories based on the magnitude of the frequency difference between the members of each pair, as determined by relative frequencies in five large corpora. This included Large Difference pairs (e.g., *time ~ thyme, way ~whey*), Medium Difference pairs (e.g., *pain ~ pane, gate, gait*), and Little or No Difference pairs (e.g., *son ~ sun, peace~ piece*). Results reported here are for four native speakers of American English who participated in two experiments. In the first experiment, the speakers were recorded reading four repetitions of a randomized list of the target words in a frame sentence. In the second experiment, a subset of these words was read in composed sentences with controlled prosodic structures. The phonetic duration of each target word was then measured in Praat, and the ratio more frequent/less frequent was calculated for each repetition of each pair. Statistical analysis was done with a mixed model of repeated measures. If the Bybee/Jurafsky hypothesis is correct and greater frequency leads to shorter duration, then these ratios should systematically fall below 1 for the Large Difference and Medium Difference pairs, while those for the Little or No Difference group should be approximately 1.

No systematic differences were found for individual speakers or across speakers in either the frame sentences or the composed sentences. The lack of positive correlation between duration and token frequency calls into question the hypothesis being tested, namely that greater frequency leads to shorter duration, as well as the implication that differences between function and content words follow from differences in frequency. In discussing these results, we consider other studies on homophones and duration (e.g., Whalen ms and Guion 1995) and the implication of these results for issues of the lexicon and speech processing. Our study supports the conclusion that at least one aspect of lexical representation is coarse-grained (e.g. Pierrehumbert 2003, Beckman 2003), corresponding roughly to what is thought of as a phonemic representation. Our results, taken in light of previous studies, underline the need for a better understanding of the locus of frequency effects in both the lexicon and speech production.

THE MECHANICS OF BACKNESS AGREEMENT: IMPLICATIONS FROM TWO ASYMMETRIES IN OLD CHURCH SLAVIC PALATALIZATIONS

Marta Domagała, University of Warsaw *m.domagala@uw.edu.pl*

Slavic languages display a wide and complex range of backness assimilation phenomena which resist analysis in terms of a simple backness spreading operation. One source of the difficulty are the differences in the palatalizing power of front vowels of different heights. For example, Ukrainian has palatalization before *i*/*j* only, Russian before both *i*/*j* and *e*, and Slovak palatalizes consonants before all front vowels, including *æ*. To account for this discrepancy, Rubach (2000, 2002, 2003) employs a team of constraints commanding backness agreement before glides, high vowels, mid vowels and low vowels separately: Pal-*j*, Pal-*i*, Pal-*e*, Pal-*æ*. Their ranking is universally fixed: Pal-*j* ➤ Pal-*i* ➤ Pal-*e* ➤ Pal-*æ*, thereby expressing an implicational generalization: the presence of palatalization before *j* implies palatalization before *i*, palatalization before *i* implies palatalization before *e*, etc.

Rubach's system has two drawbacks. First, it overgenerates by predicting an asymmetry in the behaviour of *e* vs. *æ* with respect to palatalization. Whereas such an asymmetry between high and non-high vowels is cross-linguistically common, languages that have obligatory palatalization before *i* and *e* do not seem to vary w.r.t. the involvement of *æ*. Second, it does not explain why the relative ranking of palatalization constraints should be correlated with the height of the triggering vowel.

This presentation discusses an alternative approach to palatalization, based on conclusions drawn from two asymmetries in the application of palatalization in Old Church Slavic (OCS). The two asymmetries concern (i) the input, namely, the susceptibility of velar vs. non-velar consonants to palatalization, and (ii) the context, specifically, the ability of vowels to exert palatalizing influence depending on their height. In OCS, velars underwent palatalization before all front vocoids (First Velar Palatalization), but only *j* influenced all consonants regardless of their place of articulation (Iotation). First, it is demonstrated that the observed asymmetries follow naturally, if we assume Halle & Sagey's (1986) model of feature geometry, where the vocalic height and backness features are dependents of the Dorsal node and non-terminal nodes are recognized as actors in phonological processes. Neither vowel place theories, such as Clements (1991), Hume (1992), Clements & Hume (1995) nor Revised Articulator Theory of Halle (1995) and Halle, Vaux & Wolfe (2000), are able to predict palatalization patterns encountered in OCS. Second, spreading of [-back] is enforced by the general palatalization constraint SHARE$_{[-back]}$. Third, the decision whether to palatalize a consonant at all and whether the context should be limited to a subset of front vowels is delegated to (i) the internal structure of segments involved, and (ii) restrictions on feature combinations. It is argued that velars are particularly susceptible to the palatalizing influence of all front vowels due to the fact that they possess a Dorsal node, where [-back] can dock. In contrast, non-velar consonants cannot accept [-back] on account of lacking a Dorsal node necessary to support [-back]. This effect is achieved by prohibiting the addition of nodes to the representation: a language can palatalize non-velar consonants, but only at the price of enriching the target segment's internal structure. Spreading of the whole Dorsal node from non-high vowels is blocked by the feature co-occurrence constraint *[+cons, -high].

The presented theory is superior to Rubach's in that it derives the observed asymmetries from some universal principles. It is more restrictive, since it explains and predicts the lack of variation w.r.t. the involvement of low vowels in palatalization: palatalization by *e* always implies palatalization by *æ*. Further, the restriction on internal structure enrichment has typological implications for backness agreement processes: it correctly predicts that the least costly is palatalization of velars, and that the most common triggers of palatalization are high front vocoids.

French Schwa: a Comparative Perspective

Jacques Durand (jdurand@univ-tlse2.fr) Julien Eychenne (eychenn@univ-tlse2.fr)
ERSS (CNRS & Toulouse-Le Mirail)

Abstract

French schwa is a phenomenon that has been extensively studied from a broad range of theoretical frameworks (see Martinet 1972, Dell 1973/1985, Anderson 1982, Hyman 1985, Tranel 1987, Charette 1991, Oostendorp 1995, Scheer 1999 *inter alia*). However, cross-dialectal variation has not been paid much attention to, and still remains poorly understood. This paper is an attempt to fill this gap, by comparing 3 dialects of French (2 Southern accents and a Northern one). We will focus here on word-final and word-initial positions. The analysis is framed in Optimality Theory (Prince & Smolensky 1993, McCarthy & Prince 1993, 1995, McCarthy 2002).

After sketching the methodological background for collecting and sampling the data, we describe the 3 corpora: 1 corpus of « traditional » Southern French from Languedoc; 1 corpus from Pays Basque and 1 corpus of Northern French (Vendée). The data were collected in the project « Phonologie du français contemporain (PFC): usages, variation et structure » (see Durand & Lyche 2003 for an overview). Overlooking phonetic details and fine-grained variation, striking differences can be stated as follows:

	word-initial syllable	word-final syllable		
	mẹner 'to lead'	*mènẹ* '(I) lead'	*mer* 'sea'	*mèrẹ* 'mother'
Languedoc	mø̰ne	mɛnə̰	mɛr	mɛrə̰
Pays basque	mø̰ne ~ mne	mɛn ~ mɛnə̰	mɛr	mɛr ~ mɛrə̰
Vendée	mne ~ mœ̰ne	mɛn	mɛr	mɛr

Final schwa is lexical in Languedoc (see Durand 1976, Durand et al. 1987) and quite stable (though it can be deleted by young speakers, in some contexts); it tends to be deleted in Pays basque (high rate of deletion, with noticeable variation across speakers); and is not lexical anymore in Vendée (no minimal pair *mer* ~ *mère*, see Durand & Eychenne 2004). Schwa in initial position always surfaces in Languedoc; it can be deleted in Pays basque (though it usually is not); and it is generally deleted in Vendée, unless otherwise required by well-formedness and prosodic constraints. Our hypothesis is the following: Vendée French favors syllabic and prosodic markedness constraints, while Languedoc French highly values faithfulness to schwa. Pays basque is shown to present an intermediate (typological) stage. Our analysis crucially involves faithfulness constraints to schwa: MAX-IO(Schwa) « no schwa deletion », DEP-IO(Schwa) « no schwa epenthesis » ; and a markedness that penalizes schwa: *Schwa « no schwa ». The following skeletal rankings are developed :

- Languedoc : DEP(Schwa) >> Markedness >> MAX(Schwa) >> *Schwa
- Pays basque : Markedness, DEP(Schwa) >> *Schwa, MAX(Schwa)
- Vendée : Markedness >> *Schwa >> DEP(Schwa), MAX(Schwa)

We provide ranking arguments to support this analysis, and we demonstrate that these grammars are consistent with the results for both initial and final position in our corpora. The paper concludes by discussing harmony in the grammar (*i.e.* the elimination of schwa in the inputs *via* lexicon optimization), as well as some remaining issues.

Pierre Encrevé, EPHESS, Pierre.Encreve@ehess.fr
Tobias Scheer, CNRS 6039, Université de Nice, scheer@unice.fr

Autosegmental association is not automatic

The classical autosegmental analysis of liaison (typically French, but also English: a[n] apple vs. a[ø] coffee) supposes that the association of floating consonants is automatic as soon as some constituent is available (the /-t/ of *petit* floats lexically and hooks on the empty onset of following V-initial words). We intend to show that this assumption is wrong: association of floating consonants in French is subjected to an explicit order that involves a choice.

The non-automaticity of association follows from the existence of liaison without enchaînement (Encrevé 1988). This variety of liaison is optional and characteristic for journalistic and political speech. The floating consonant is phonetically realised, but separated from the beginning of the following V-initial word by a clearly marked pause. The obvious analysis, then, is that it "stays home", i.e. does not wander into the onset of the following word. This is also confirmed by the optional realisation of a glottal stop in this onset: *un peti[t] ?enfant* [liaison without enchaînement].

If this is true, however, the floating consonant must associate to skeletal material that is *lexically* present in its home-word: we know from the behaviour of other floating melodic items that skeletal slots do not fall from heaven. For example, there is no case on record where a floating tone, "wanting" to parachute, creates an "association pressure" that leads to the appearance of an appropriate tone-bearing unit. Floating consonants thus face "their own" constituent in the lexicon just as much as all other segments – except that they are not associated. When a V-initial word follows, then, the speaker makes a choice: either he "decides" to associate the floating consonant to the onset of the following word, or to its home constituent. Since enchaînement and non-enchaînement are a matter of style, association may be said to be under social control here. One may object that this kind of "narrow variation" must not be managed by grammar. We present socio-linguistic arguments in favour of the view that speakers know this kind of variation, which is part of their (passive) competence. Not only linguistic invariants are part of what a speaker knows about his language – he also knows what is a (sociologically conditioned) option and what is not.

Besides this specific view on competence, we present an argument that is unsuspected of narrow socio-linguistic action. It is well known that h-aspiré words in French sometimes appear with a glottal stop (Dell 1985:186): *une grosse housse* may come out as either [gros ?us] or [grosə us] with an epenthetic schwa (non-h-aspiré words do not behave like that: *une grosse ourse* can only be pronounced [gros uχs], not *[gros ?uχs] or - except in Midi French - *[grosə uχs]). Schwa and the glottal stop together, i.e. [grosə ?us], is impossible (outside of emphasis, whose agent is the glottal stop in French). Also, the glottal stop may not appear after V-final words (again: except in emphatic speech): *[la ?us]. The overall context in which the glottal stop appears is thus "post-consonantal", a position that is known for making its host strong (Pagliano 2003). Now there IS a configuration where the glottal stop can appear intervocalically (and in non-emphatic speech): this is when the preceding word ends in an *unpronounced* floating consonant. A masculine h-aspiré word such as *hublot* will inhibit liaison and thus produce *un gros hublot* [gro yblo]. But here, [gro ?yblo] is possible (and non-emphatic). By contrast, if the preceding word is phonetically V-final as well but unlike *gros* does not end in a floating consonant, the glottal stop is banned: *le hublot* [lə yblo], *[lə ?yblo].

This means that the glottal stop in [gro ?yblo] can appear (in the initial onset of *hublot*) because it stands in post-consonantal position – even if the consonant in question, the floating /-s/ of *gros*, is phonetically absent. Syllable structure is not calculated on the grounds of melodic items, but in regard of syllabic material. It must therefore be concluded that *gros* [gro] ends in a consonantal *position* even when no consonant is heard. This is precisely what we have claimed earlier on the grounds of liaison without enchaînement.

Our overall result, then, is the idea that much floating melodic material associates to syllabic constituents only upon explicit order. This order may have different origins: morphology, style or phonology. In the former case, association is an actual morpheme: this is the typical situation in Semitic templatic morphology where the identity of a template is the existence of an order (e.g. "associate C_2 to an additional position (= geminate it)!"), but also the case of the French feminine of adjectives: masc. *il est gros* [gro] vs. fem *elle est grosse* [gros]: "associate the floating consonant!"). Sociology (or style) commands in liaison without enchaînement, while phonological rule alone regulates vowel-zero alternations: these may be viewed as lexically floating melodies that are associated to their "home constituent" in a certain phonological configuration (we expose this view on the matter in greater detail).

Stress and constituency in Wari'

Daniel L. Everett
University of Manchester
dan.everett@manchester.ac.uk

In the Chapakuran language, Wari', of the Brazilian Amazon, stress placement is determined by both word and phrase structure. In general, stress can be understood as in (1):

(1) *Wari' stress rule* (Everett & Kern 1997, 416): 'Within the sentence, the final syllables of major lexical categories are stressed. Primary stress in the sentence normally falls on the final syllable of the verb, with final-syllable stress on other lexical categories interpreted as secondary stress.'

Examples are (stressed syllable in italics, words in []s):

(2) **[*Quep*][na *-in*] [*xirim*][*te*] [*pane*] [*ta*]**.
do 3s:rp/p -3n house father:1s rem:past emph
'My father made a house long ago.'

(3) **[*Ten*] [*ta*] [*wao'*]**.
weave pass:3stype of basket
'Baskets are woven.'

(4) **[*Mi'*] [non *-on*] [*con*] [*hwam*] [hwiji*ma*]' [*mon*] [tara*ma'*].**
give 3p:rp/p -3pm prep:3sm fish children coll man
'The men gave the children fish.'

However, in what Everett (2005b) refers to as NUCLEI, from Role and Reference Grammar (Van Valin and La Polla 1997), stress goes on the last syllable of constituents which are demonstrably not words. So in (5) stress goes on the last syllable of what is labeled NUC, the clausal predicational head.

(5) **[$_{NUC}$Hwara' 'opa tara *ma'*]**
big(sg) strength-1s(strong) 3s:rf that:prox:hearer
[*hun*] [panxi *-ta'*]?
hwe -on
2p:rp/p-3sm child -1s
'Do you think my son is strong?' (lit: 'Do you (think) of my son, "He is probably strong"?')

Stress on the NUC is further supported by stress on periphrastic pronouns (Everett 2005a), where pronouns that are neither fully words nor phrases are stressed on their final syllable:

(6) [$_{NUC}$**caram pacara pane**] '3 plural long absent'

The conclusion that must be drawn from the Wari' stress pattern is that prosodic rules may take as input constituents which are not recognized in standard X'-theoretic terms, because NUC in the above examples is neither a word nor a phrase, in either the predicate of what Everett (2005b) calls 'Intentional State Constructions', nor in periphrastic pronouns. Since the predicates of constructions like (5) are not morphological units at any level of analysis and since periphrastic pronouns like (6) are neither completely morphological nor syntactic (but 'mixed categories', Goldberg (2003)), stress placement provides strong evidence for construction-based, non-endocentric morphosyntactic units, improving our understanding both of the nature of morphosyntax, but also of the importance of allowing stress access to units which are neither properly postlexical (since stress does not otherwise apply to phrases) nor lexical (since stress is not limited to words), showing that lexical vs. postlexical are insufficient to properly partition phonological space because they are based on X'-theoretic syntax, rather than a more semantically motivated conceptualization, e.g. Role and Reference Grammar.

From Features to Segments: What is necessary to make corpora more useful for phonological enquiries

Anja Geumann
Department of Computer Science
University College Dublin, Belfield, Dublin 4, Ireland
anja.geumann@ucd.ie

A survey of speech corpora currently available reveals a low amount of data that are phonetically annotated at a fine level of detail. This is of course not a surprise since the effort required to get fine-grained annotation is considerable.

Mainly two alternative models to annotate speech in fine detail seem conceivable. The first would make use of a very detailed description on the segmental level, using a predefined or unlimited number of diacritics in a detailed IPA-style transcription defining start and end point of these units. The problem with this type of annotation seems to be that if unlimited the number of symbols and diacritics gets easily out of hand. Alternatively you can limit the number of symbols and have again drawbacks not unlike those of a broad transcription, by having to identify a larger space of time that is characterised as one single static unit.

An alternative approach is obtaining a multi-tiered feature annotation by some way of automatic annotation, either based on acoustics (Lahiri/Reetz 2002) or purely statistically (HTK/HMM) (e.g. King/Taylor/Frankel/Richmond 2000, Kirchhoff 2000, Koreman/ Andreeva 2000). Acoustic correlates of features have been described in the literature (e.g. Stevens 1980, 1998). The first detailed description of distinctive features (Jakobson/Fant/Halle 1952) assumed that they had identifiable counterparts.

Initially, feature-based annotation addresses only the recognition of acoustic events. It leaves out the mapping of a number of these to segments or higher-level units. However, an open issue in the use of features is how to interpret their asynchronicity and how to map them onto segments or syllables.

The aim of this paper is to discuss the actual need for corpora that have been annotated with phonetic features as e.g. *labial*, *voiced* or *strident*. We will leave the problems with the actual implementation apart, but claim that some alignment is provided (Kanokphara/Carson-Berndsen 2005). Questions that will be focused on in this contribution are the nature of the feature to segment mapping. Alternatively, the syllable might be considered a better framework to organize and interpret feature annotations. It is assumed that features provide a good compromise between fine-grained description and manageable number of units. However their limitations have to be addressed as well.

Resisting syncope

Dafna Graf
Universiteit Leiden / ULCL
D.Graf@let.leidenuniv.nl

Martin Krämer
Universitetet i Tromsø / CASTL
martin.kraemer@hum.uit.no

Syncope, or vowel deletion, is a process that involves an unfaithful mapping of an input into the output. As many past studies have shown, syncope may be blocked under certain conditions. An analysis of syncope needs to identify the conditions that enforce an unfaithful mapping, but also has to account for blocking effects. We address these issues examining a pattern termed 'differential syncope', in which certain vowels are immune to deletion regardless of their position in syllable or foot structure (Gouskova 2003:179 and references there).

In Modern Hebrew (MH) vowels get deleted if an affixed form would otherwise exceed the requirement on words to be maximally disyllabic (1a). In these cases the language tolerates otherwise banned word-initial consonant clusters. Syncope is blocked if the vowel that is in deletion position is a *high vowel* (1b). In Georgian, a morphologically controlled syncope in noun stems targets the low vowels *a* and *e* but does not apply to the high vowels *i* and *u*. Lebanese Arabic displays a syncope pattern that, conversely, targets the high vowel *i* but skips the low vowels *a* and *e*. From a sonority based perspective of syllable structure the Arab Vernacular pattern is expected (Gouskova 2003), whereas the MH /Georgian pattern is not. High vowels are generally regarded as less sonorant than mid and low vowels and as such make worse syllable nuclei than these. In Prince and Smolensky (1993) and subsequent OT-literature, this markedness scale is usually translated into a fixed hierarchy of markedness constraints, or a stringency relation (Kenstowicz 1994, de Lacy 2002): nuc/a » nuc/e,o » nuc/i,u or, likewise *Nuc/i,u ; *Nuc/i,u,e,o ; *Nuc/i,u,e,o,a.

In this paper we show that the MH/Georgian pattern is not at all surprising by comparing differential syncope patterns with patterns of vowel reduction as studied in Russian, Portuguese and other languages (Crosswhite 2001, 2004, Nesset 2002). In English, for example, vowel reduction is a gradual process that can culminate in the deletion of the vowel in weak position (2). The result of reduction is the set of *i*, *u* and schwa. Russian displays two patterns of reduction in unstressed positions, resulting in *i*, *u*, *a* in pretonic syllables and *i*, *u* and schwa in all other positions. The reduced inventory consists of the same vowels that block syncope in the MH/Georgian pattern. We treat syncope in a parallel fashion to 'extreme' vowel reduction (Crosswhite 2004), and propose a unified account of these phenomena by extending Crosswhite's analysis of reduction to the deletion patterns. Under this perspective *reduction* emerges if faithfulness to vocalic segments (MAX-V) is high-ranked, while markedness constraints on unprominent nuclei outrank featural faithfulness (IDENT[F], see 3a). *Deletion* emerges if the ranking of IDENT[F] and MAX-V is reversed (3b). The markedness constraints triggering reduction and deletion militate against highly sonorous vowels in unprominent positions, as proposed by Crosswhite. Under ranking (3b) it is better to delete a vowel and violate MAX-V to satisfy markedness than to change features in violation of identity. The proposed analysis renders apparent word binarity in MH, previously accounted for by a disyllabicity requirement on Hebrew stems (Bat-El 1994, Ussishkin 2000), to be an effect of foot binarity and markedness constraints on unfooted nuclei.

(1) *Hebrew Syncope pattern*

a. k**a**car + im → k_carim '*short ~ PL.*'
b. t**i**nok + ot → tinokot '*baby ~ PL.*'

(2) *British English syncope*

[ɪkˈstɹɔːdnɹɪ ɹɪˈdʌkʃn] 'extraordinary reduction'

(3) *Schematic rankings*

a. Reduction: MAX-V » *UNSTRESSED/a,e,o » IDENT[F] » *UNSTRESSED/i,u
b. Deletion: IDENT[F] » *UNSTRESSED/a,e,o » MAX-V » *UNSTRESSED/i,u

Underspeci┌cation: Surface Neutralization and Acquisition

Mark Hale, Concordia University, hale1@alcor.concordia.ca
Madelyn Kissock, Oakland University, kissock@oakland.edu

This paper discusses several cases of phonetic underspeci┌cation, how such underspeci┌cation should be represented, and how it can be acquired given certain assumptions about phonological computation in Optimality Theory. We begin by presenting two cases of underspeci┌cation, one for consonants from Russian, and one for vowels from Marshallese. Keating (1988) argues that Russian [x], in the case where no context rules apply, consists of a phonological feature bundle with no speci┌cation for the feature [back]. Therefore, the following two instances of [x] are crucially different with respect to speci┌cation in the output of the phonology: [axi] has a fully-speci┌ed feature bundle (fully fronted fricative; context rule ┌lled in [-back]), whereas [ixa] is underspeci┌ed (transient fricative, gradual transition throught its duration from the [back] values of the adjacent sounds ([-back] to [+back]). In Marshallese, vowels differ from one another only along the height and ATR dimensions (Hale, 2000; Bender 1968). The surface variants of a vowel which we will (for convenience only) designate as [i], are: [i, , u, , , , , ,]. As Choi (1992) demonstrated, there is a smooth transition between the back and round features of the left and right 'half' of a 'tied' Marshallese vowel in every instance (where the 'tie' is indicated by the underscore diacritic). Both these cases are interesting in that some of their physical realizations will be indistinct from those of their fully-speci┌ed correspondents in other languages. For example, in the appropriate context, the Marshallese [u] is a steady-state realization of [u], identical to English [u]. However, the featural representation for Marshallese [u] is crucially different from English [u], since the latter is fully-speci┌ed for [round] and [back] and the former has no such features. We will use the term 'neutralization' to refer to cases of this type (surface identity but representational distinctness) whether within a language or cross-linguistically (Hale, Kissock, and Reiss 2002).

These cases and others like them prompt several questions. The ┌rst is how such underspeci┌ed representations should be considered with respect to markedness constraints in an OT grammar. As factual matter, the usual arguments offered in support of markedness constraints are typological in nature. In these cases, however, it is completely unclear what one would look at to determine markedness. Many of the Marshallese vowels are super┌cially highly marked, such as , but are featurally indistinct from less marked physical realizations such as [u]. (This *phonetic* underspeci┌cation is distinct from the *phonological* underspeci┌cation as discussed in Steriade 1995)

These cases also pose problems for learnability. Under current Optimality Theoretic assumptions about acquisition of the grammar, all Markedness constraints outrank all Faithfullness constraints (M >> F) at the initial state (McCarthy, 2002; Tesar and Smolensky, 2000; *inter alia*). The process of acquisition is one of Constraint Demotion, where certain Markedness constraints are demoted depending upon the input that the acquirer receives. If we consider, again, the case of the Marshallese [u] but now in an acquisition context, the acquirer would be forced to demote Markedness constraints that mitigate against [back] and [round] and Faith [back] and [round] would end up higher ranked. This would result in winning candidates ultimately having the same featural representation in Marshallese as in English – exactly the wrong result. Moreover, since M >> F initially, and reranking is only a process of constraint *demotion*, there is no way for the acquirer to rectify this error, once made.

German Glide Formation as the conflict between markedness and faithfulness

T. A. Hall, Indiana University, tahall2@indiana.edu

In German [i] and the palatal glide [j] are in complementary distribution in such a way that [j] surfaces when adjacent to a vowel and [i] elsewhere. The assumption in the literature is that German requires a rule of glide formation (GF) which converts /i/ to [j] in prevocalic position (e.g. Kloeke 1982, Hall 1992, Wiese 1996, Hamann 2003). GF is consistently blocked before /i(ː)/, but the added twist is that German allows for some words with underlying /jiː/ sequences which surface faithfully as [jiː]. It will be argued below that all of these data fall out from the ranking of the four universal constraints DEP-μ » *ji » ONSET » MAX-μ. The significance of the German data lies in the fact that they cannot be accounted for as elegantly with a traditional rule-based approach, nor can they be captured in OT by utilizing constraints which penalize [i] if it occurs as a peak or a margin (Prince & Smolensky 1993).

Pre-vocalic [j] is analyzed as an underlying (moraic) /i/ (e.g. ***Union*** [unjoːn] /unioːn/ 'union') and GF is captured with the ranking ONSET » MAX-μ (see Rosenthall 1994 for other languages). The words in the first column of (1) show that GF is blocked before /iː/, both across morpheme boundaries (in 1a) and in (rare) ones as in (1b), in which /i/ and /iː/ are tautomorphemic.

(1)	a.	lini-ieren	[li.ni.iː.ʀən]	'rule'	Lini-e	[liː.njə]	'line'
		Alli-ierten	[a.li.iː.ɐ.tən]	'allies'	Alli-anz	[aljants]	'alliance'
		Initi-ierung	[i.ni.tsi.iː.ʀʊŋ]	'initiation'	initi-al	[i.ni.tsjaːl]	'initial'
	b.	Shiiten	[ʃi.iːtən]	'Shiites'			

The data in (1) fall out from a perceptually grounded (surface) markedness constraint *ji, which is ranked ahead of ONSET.

The words in (2) illustrate that German permits some surface [jiː] sequences, both word-internally when tautomorphemic (in 3a) and when heteromorphemic (in 3b).

(2)	a.	injiz-ieren	[ɪn.ji.tsiː.ʀən]	'inject'
		projiz-ieren	[pʀo.ji.tsiː.ʀən]	'project'
	b.	taill-ieren	[tal.jiː.ʀən]	'fit at the waist' (cf. Taille [tal.jə] 'waist')

The /j/ in (2) is underlying in any analysis because it contrasts with [i] in the environment C__i, cf. [li.ni.iː.ʀən] vs. [ɪn.ji.tsiː.ʀən]. That [ji(ː)] in (2) is optimal (as opposed to [i.iː]) falls out given the constraint penalizing mora insertion (DEP-μ), which outranks *ji.

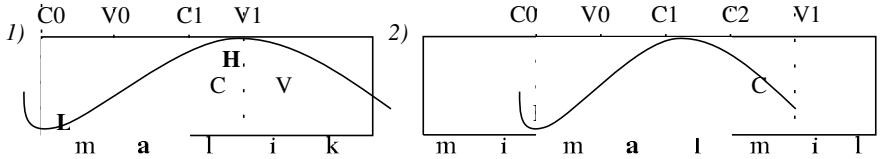
The German data are important because they are awkward in a rule-based treatment, i.e. the process /i/ → [j] / __ V and the filter *ji cannot account for the existence of the words in (2). The German data are also problematic for an alternative OT treatment of GF which sees the change from /i/ to [j] in terms of constraints penalizing [i] if it occurs as a peak or a margin (i.e. *P/i and *M/i respectively; Prince & Smolensky 1993). According to this approach GF requires the ranking ONSET » *M/i and the items in (2) require *P/**i** » ONSET because the winner with [...jiː...] (from /...jiː.../) incurs one violation of *P/**i** and the loser *[...i.iː...] two. The problem is that this ranking incorrectly predicts that the [i.iː] sequence in (1) surfaces as [jiː] because the intended winner with [...i.iː...] (from /...iiː.../) violates*P/**i** twice and the intended loser *[...jiː...] only once.

Pitch accent alignment in light vs. heavy syllables in Cairene Arabic.

Sam Hellmuth (SOAS, University of London) samhellmuth@soas.ac.uk

Building on a significant body of research into the alignment properties of L (valley) and H (peak) turning points in pre-nuclear pitch accents (Prieto et al 1995, Arvaniti et al 1998, Ladd et al 1999), Ladd, Mennen & Schepman (LMS) 2000 investigated alignment of H pitch peaks in phonologically light (CV) vs heavy/long (CVV) syllables in Dutch and found that H falls at the end of the heavy syllable (at the end of the long vowel) but outside a light syllable (in the following consonant). Using parallel methodology, this paper investigates the alignment properties of CA pitch accents in light (CV) vs heavy (CVC) syllables with similar results: H aligns outside a light syllable (before the onset of the following unstressed vowel) but inside a heavy syllable (after the onset of the coda consonant). A phonological analysis of these apparently disparate facts is offered in an autosegmental-metrical framework (Ladd 1996).

Two sets of six target words were placed medially in carrier sentence frames and each sentence read three times by 15 speakers of CA (15 x 3 x 6 = 270 tokens x 2 sets = 540). The stressed syllable of target words were: set 1 - light (CV) target syllables in word-initial position; set 2 - heavy (CVC) syllables in word-medial position (CA stress assignment rules result in no word-medial stressed open (CV) syllables (Watson 2002)). Auditory transcription and labelling was carried out by the author with reference to spectrogram and F0 contour extracted using Praat 4.2. Due to either disfluency or insertion of a phrase boundary after the target, 83 tokens were excluded, leaving a corpus of 457. Pitch events and segmental landmarks in each target word were labelled as shown in 1) & 2) below: C0 (start of consonant of stressed syllable); V0 (start of stressed vowel); C1 (end of stressed vowel); C2 (start of second consonant of intersyllabic cluster); V1 (start of following vowel); L (pitch valley turning point); H (pitch peak). Alignment of the start of the pitch rise is assessed by calculating the position of L relative to C0 and V0, and of the pitch peak by calculating the position of H relative to C1, C2 and V1 (ie L-C0, L-V0, H-C1, H-C2, H-V1).



Comparison of means among these positional variables indicates that in both set 1 and set 2 L is most closely aligned to C0, the onset of the stressed syllable (H_0: L-C0=0; set 1 p = 0.403 set 2 p=0.161; H_0: L-C1=0; p < 0.01 in both sets). This matches the findings of LMS2000 in that L alignment was maintained across syllable types in Dutch. In set 1 H is most closely aligned to V1 (H_0: H-C1=0; p=0.034; all other variables p< 0.01). In set 2 H alignment across all targets is not clear due to difficulty in identifying the internal boundary of the coda cluster in three of the six target words; when these are excluded H alignment is shown to be to C1, the end of the stressed vowel (H_0: H-C1=0; p=0.600; all others p<0.01). Mean values show that in both sets L is aligned just after the onset of the stressed syllable; however in set 1 H is aligned before V1, but in set 2 H is aligned just after C0 (details of within-speaker means will be provided):

Table 1:

mean values (ms):	L-C0	H-C1	H-C2	H-V1
set 1 (N=219)	2.55	35.38	-------	-4.26
set 2 (N=135)	8.71	6.01	133.40	-109.19

Given these facts, following Arvaniti et al (1998), CA rising pitch accents are analysed as bitonal L+H accents in which *both* pitch targets display alignment. The set of segmental landmarks to which H aligns in CA are argued to generalise to the second mora of the head stress foot of the prosodic word. The implications of this analysis for Dutch are explored.

Prosodically conditioned fortition

Darya Kavitskaya
Yale University
darya.kavitskaya@yale.edu

Lenition and fortition processes are loosely associated with the idea of 'strength' and 'weakness' of articulation and are often described as going towards the opposite directions of the same scale, reminiscent but not identical to the sonority scale (1).

(1) plosives > fricatives > approximants > zero
aspirated > plain voiceless > voiced

A considerable amount of work was done in defining and explaining lenition (Kirchner 1998, Lavoie 2001, among others), but not much literature has fortition as its focus. There exist OT analyses unifying lenition and fortition under the idea that both processes are functions of prosodic positions (Bradley 2001): while lenition is weakening in certain prosodic positions (e.g. coda, intervocalically), fortition is strengthening in others (e.g., onset, tonic or word-initial position). Such analyses usually concentrate on synchronic alternations, not taking into account the historical sources of lenition and fortition.

We can identify three types of historical sources for lenition: unconditional sound change, segmental conditioning, and prosodically-dependent weakening. However, I claim that fortition as a sound change is always prosodically conditioned since there is no other phonetic source for it but strengthening at prosodic edges (Fougeron and Keating 1997) and in other strong positions. Whenever the prosodic conditioning is preserved, synchronic fortition alternations occur in strong prosodic positions as well. The examples of domain-initial fortition are as follows: syllable-initial (Argentinian Spanish), foot-initial (Pacific Yupik), and word-initial fortition (Kurdish). Heads of domains are important in fortition alternations as well, accounting for fortition after primary stress (as in Swedish). Certain sound changes can create an appearance of fortition; for example, vowel syncope can be a source of geminates in a language, as in Kapingamarangi, Marshallese, Mussau, Dobel, *etc*. (Blevins 2004), however, every time a purely phonological (non-morphologized) gemination is attested, it is prosodically conditioned.

Burushaski (2) seems to present a counter-example to the above claim, as "fortition prevocalically at the onset of a stressed syllable" (Ultan 1970, based on Lorimer 1935).

(2)

	PAST	PTCPL	
	guʃuginʌs	nu-**k**uʃkin	'to ask for advice'
	bɛlʌs	nu-**p**ɛl	'to put on'

Alternations in (2) present at least two problems. First, there is intervocalic devoicing (strengthening) while cross-linguistically weakening in this environment is a tendency if not a universal. Second, the weak version of a consonant is found in absolute initial position while the strong one is medial.

However, Lorimer (1935: 13) states that "[i]n transitive or causative verbs beginning with -ʌ-, -ʌs-, d-ʌ-, d-ʌs- the accent is normally on the ... prefix or infix." Additionally, as shown in (3), there is devoicing after a voiceless obstruent.

(3)

	CAUSATIVE	
wɛrʌs	ʌs-**p**ɛrʌs	'to get tired'
bʌlas	ɛs-**p**ʌlʌs	'to burn'

I propose the following analysis for the Burushaski facts. The alternations in voicing came to life as voicing assimilation, extended by analogy to stressed affixes, thus creating a plausible environment for fortition.

Finally, if the prosodic conditioning is removed, the environment for fortition is destroyed and the alternation is leveled out. For example, Khelimski (2000) mentions that rhythmic consonant gradation described for Tundra Nenets is crucially dependent on stress. However, during field work in 2004, we have discovered that the Malozemelski dialect of Tundra Nenets has pitch accent rather than stress. Thus, the occurrence of gradation is not predicted in the dialect. Indeed, we have not found foot-dependent fortition alternations in the speech of our informants.

Was Middle English Closed Syllable Shortening a Phonological Change?

László Kristó
Pázmány Péter Catholic University / Eötvös Loránd University
VERNERSLAW@YAHOO.COM

According to traditional English historical linguistic explanations, there was a number of quantitative changes affecting *stressed* vowels in late Old English (OE) and early Middle English (ME). These are: Homorganic Lengthening, Open Syllable Lengthening, Trisyllabic Shortening and Pre-Cluster Shortening. In this presentation, I set out to analyse the last one, formulated traditionally as in (1); the OE/ME forms are given in IPA transcription.

(1) *Pre-Cluster Shortening (PCS):* long stressed vowels shorten before a cluster of two consonants excluding those which (i) cause (homorganic) lengthening, i.e., homorganic sonorant + voiced obstruent clusters, (ii) are syllabifiable as complex onsets.
Examples: OE **'ke:pte** > ME **'keptə** 'kept', OE **'so:fte** > ME **'softə** 'soft', etc.

Allegedly, PCS is a genuine phonological change. In this presentation, I argue that this view is not correct. First, I look at the conditioning environment, based on which I will call the process Closed Syllable Shortening (CSS), following earlier analyses. Second, I set out to examine an important aspect of CSS: morphological conditioning. It has been noted that CSS may fail to apply if the cluster in question straddles a morpheme boundary. Interestingly, it is the most productive concatenations which produce this effect. Ricardo Bermúdez-Otero observes the dependence of CSS on the morphology, and concludes, based on evidence from the early ME text known as the Orrmulum, that CSS became morphologised very early. I wish to take this observation to a further conclusion and argue for the following:

1. CSS did not become morphologised: it had never been a phonological change.
2. CSS is very rare in monomorphemic forms; where it occurs, it almost invariably involves **voiceless fricative + t** clusters.
3. Conceiving of CSS as a phonological change implies that OE tolerated long vowels in closed syllables, but ME did not.
4. Observing the morphological structure of words which undergo CSS, I argue that (3) is incorrect. OE did not generally tolerate superheavy rhymes, either, apart from some exceptions. (Exceptions, however, exist in later English as well.) Instances of long vowels before coda-onset clusters in OE are generally found where the members of the cluster straddle a strong (in more recent, Government Phonology, terms, *analytic*) morphological boundary.
5. The proposal I would like to make is that CSS is a consequence of the fact that a class of morphologically complex words became lexicalised by ME, conforming to monomorphemic words in their phonotactic behaviour. In other words, the shortening reflects the fact that English did not like (at least a certain type of) superheavy rhymes — neither OE, nor ME, nor Modern English.

In my presentation, I will elaborate on the proposal I have put forward and provide various pieces of evidence for it. I will also pay attention to some exceptions, either apparent or real. The conclusion is that CSS is, at best, a genuine phonological change in but a small subset of the formerly supposed instances; but in general, it is best viewed as a "side effect" of the lexicalisation of affected (morphologically complex) forms.

Vowel length in Scottish English: new data from the alignment of accent peaks

Bob Ladd, Edinburgh University (bob@ling.ed.ac.uk)

Vowel length in Standard Scottish English (SSE) has been a topic of considerable discussion in the literature since the early 1980s. At least three properties of SSE make vowel length interestingly problematical: **first**, three short/long distinctions present in many other British varieties of English (*Sam/psalm, cot/caught,* and *look/Luke*) are generally absent in SSE; **second**, the audible allophonic differences of vowel duration conditioned by the voicing of coda consonants in other varieties (e.g. *seed* with long allophone and *seat* with short) are conditioned differently in SSE, with the long allophone occurring before voiced fricatives and /r/ and in open syllables (or before morpheme boundaries); **third**, these "allophonic" length differences give rise to quasi-phonemic contrasts for at least some vowels before past tense /-d/ (e.g. *side* with shorter vowel and *sighed* with longer vowel) and sporadically in specific lexical items (e.g. *Bible,* often with shorter vowel, vs. *libel,* often with longer vowel).

Work on Dutch (Ladd, Mennen and Schepman 2000 in *JASA*, Schepman, Lickley and Ladd forthcoming in *JPhon*) has shown that vowel length affects the **alignment** of accentual pitch peaks relative to accented vowels. Specifically, nuclear (phrase-final) accents tend to be aligned earlier with short vowels than with long vowels, whereas prenuclear accents (those followed by another accent in the same phrase) are aligned later with short vowels than with long vowels. Our work finds similar vowel-length and accent-position effects in RP English. The reason for these effects is not entirely clear but they appear to be due partly to differences of syllable structure and partly to "low-level" phonetic pressure (e.g. there is less time to complete a pitch rise and fall with a short vowel than with a long one). Whatever the reason, the existence of these effects on peak alignment gives us a new way of investigating vowel length in SSE.

The paper will report on several experiments based on recordings by SSE speakers reading materials similar to those on which the Dutch and RP conclusions are based. Analysis of the data is not yet complete, but at least the following conclusions seem justified by what we have found so far:

a. the most important factor in determining vowel *duration* in SSE is vowel *height*: low vowels are longer than mid vowels which are longer than high vowels. Unlike in RP, the members of pairs like /i - ɪ/ or /e - ɛ/ are not distinguished by duration even though their phonological "length" may be different.

b. notwithstanding point a., there appear to be small but consistent differences of peak alignment between the "short" and "long" members of pairs like /i - ɪ/, similar to those found in RP and Dutch. On the other hand, there do *not* appear to be differences of peak alignment between the allophonically short and allophonically long versions of "the same" vowel phoneme, e.g. the vowels of *line* and *lied.*

c. a preliminary classification based on peak alignment suggests that the vowels of *bit, bet, cot, but,* and *boot* count as phonologically "short" and those of *beat, bait, bite,* and *boat* count as "long"; the evidence for the vowel of *bat* is unclear.

Epenthetic stops, aspiration and segmental status: how not to do phonetics or phonology.

Ken Lodge (k.lodge@uea.ac.uk)
University of East Anglia, Norwich.

In this paper I shall consider the relationship between phonetics and phonology in the light of two commonly occurring phenomena in spoken language: epenthetic stops and aspiration. I will limit myself to one instance of each, and consider suggested phonological treatments of them: so-called epenthetic stops in English in words such as *prince, tense*, and pre- and postaspiration in Icelandic, as in [k^{h}viht], *hvítt*, "white", the neuter form of the adjective, analyzed as *hvít + t* (compare the feminine form [k^{h}vɪt], *hvít*). In so doing I will elaborate on my misgivings regarding the treatment of this kind of stop epenthesis as anything other than retiming of articulatory parameters, and consider what kind of justification there might be for considering postaspiration non-segmental, but preaspiration some kind of segmental alternation. In addition I shall question the assumption that segments are the appropriate way to represent not only phonological entities but also phonetic detail. The particular questions I shall pose are: why is an epenthetic stop (in English) more segment-like than aspiration of voiceless stops in the onset of a stressed syllable; why is preaspiration (in Icelandic) to be considered segmental when postaspiration is not; and, if we are to decide on such matters, what are the appropriate criteria to be appealled to?

I shall argue that there must be a strict dividing line between phonetics and phonology, that phonetics certainly is not segmental and phonological structure does not have to be, and that an underspecified, declarative phonology with anisomorphic feature attachment can treat such phenomena more appropriately than a purely segmental account. It will also be emphasized that the criteria for deciding on phonological relationships are functional and language-specific, rather than phonetic and universal.

How abstract are children's representations – evidence from Polish

Beata Lukaszewicz and Monika Opalinska

Focusing on the acquisition of Polish, the paper challenges the view shaped on the basis of acquisition of such languages as English that, in general, children's underlying representations are based directly on adult surface forms (Smith 1973) and/or that the child stores different renditions of a single morpheme as separate items (Jones 1991). Unlike English, Polish abounds in regular alternation patterns reflected in high-frequency morphemes to which children are exposed from the earliest stages of development. Given that studies of the acquisition of rich morphophonological systems are practically non-existent (see Vihman 1996: 6), this provides us with a rare opportunity to investigate and enhance our understanding of the acquisition of abstract adult-like structures.

The analysis of data from three normally-developing Polish–speaking children (3;0-4;5) shows that the children's representations, even though sometimes not fully accurate, can be argued to be essentially adult-like in the sense that they are based on alternations. (The data come from longitudinal bi-weekly recordings of spontaneous speech.) We show that abstract underlying representations are uncovered in an intricate interplay between adult-like and child-specific processes within an individual grammar, in surface opacity, and in different phonological behaviour of segments that do not contrast in surface terms. Alternations exhibited by the three systems under investigation do not necessarily mimic the adult surface patterns: although regular phonological processes of Polish, such as Surface Palatalisation, Final Devoicing and Voice Assimilation, are fully acquired, their effects may be obliterated by child-specific assimilation, reduction and substitution processes. We analyse a number of such phenomena, in each case providing several independent arguments for adult-like representations. This allows us to conclude that children are capable of working out abstract representations that go beyond the adult surface structure.

Danish Stød and Eastern Norwegian Pitch Accent: The Myth of Lexical Tones

Bruce Morén
CASTL, University of Tromsø
bruce.moren@hum.uit.no

There has been a lot of work done on Scandinavian tones (pitch accent and stød) over the years - descriptions go back at least to the mid 1700s. Interesting, other than a general agreement that there is something called Accent 1 and Accent 2 that can be realized in quite different ways in different dialects, and that the difference between these two accents is lexical in nature, there is very little else that researchers agree on. The purpose of this talk is to look at the facts regarding Danish stød and E. Norwegian pitch accent and to show that not only are these phenomena nearly identical, but that neither is the result of lexical tone specification (despite claims to the contrary). Further, the phonetic variation among speakers for a given "toneme" (i.e. stød/Accent1 or non-stød/Accent2) comes from differences in low-level phonetic implementation and restrictions on combinations of phonological tones within particular domains.

The basic claim advanced in this talk is simple: Danish and E. Norwegian tones are completely predictable from prosodic and morphological context. Forms that are described as having "stød" or "Accent 1" have a low tone aligned to the right edge of a morphological (Danish) or prosodic (E. Norwegian) domain that is realized on the head syllable of a foot. All other forms (i.e. non-stød or Accent 2) have either no low boundary tone or a boundary tone that is associated with a non-head syllable.

The talk is organized as follows: I begin with a brief description of Scandinavian Pitch Accent and the general claims made about it in the literature, and then move on to the distribution of tones in Danish stød dialects. When the data have been carefully organized by number of morphemes, number of syllables, and number of moras, the distribution of tones is clear and unmistakable - 1) high tones align with the head syllables of feet, 2) low tones align with the right edges of morphological stems, and 3) only one tone is allowed per mora. When the head syllable of a foot is bimoraic and happens to end a morphological stem, the low boundary tone is realized as a ballistic glottal gesture commonly referred to as stød.

I then present pitch track data for 7 speakers of 5 dialects of E. Norwegian and discuss the significant variation found in the realization of Accent 1 and Accent 2 among these speakers - particularly with respect to the presence or absence of a "lexical" high tone for Accent 2. Remarkably, the only consistencies across speakers are that all forms end in a high boundary tone, Accent1 invariably has a low trough toward the end of the stressed syllable, and Accent 2 invariably has a low trough toward the beginning of the post-stressed syllable. Following the boundary-tone analysis of Danish stød already presented, I suggest that Accent 1 in E. Norwegian results from a low right-edge foot-boundary tone associated with the head syllable of a foot (i.e. there is a monosyllabic foot), while Accent 2 results from a low right-edge foot-boundary tone associated with a non-head syllable (i.e. there is a bisyllabic foot). Interestingly, affix-conditioned pitch accent alternations are shown to result from morphological effects on foot structure, not from the underlying tonal specification of particular affixes.

This talk is important because it challenges traditional assumptions regarding the lexical nature of pitch accent in Scandinavian, unifies Danish stød with E. Norwegian pitch accent, and shows that careful consideration of phonetics, phonology and morphology are all necessary when addressing tonal phenomena in Scandinavia.

Phonetic naturalness and phonological learnability

Geoffrey Stewart Morrison
University of Alberta

This paper reports on a series of experiments which tested the hypothesis that phonetically natural phonological patterns are easier to learn than phonetically unnatural patterns. Phonetically-based approaches to phonology (see Hayes & Steriade, 2004) claim that constraints penalising articulatory effort and perceptual confusion are major driving forces in phonology. There is, however, a debate as to whether phonetically-natural patterns are due to active synchronic constraints or whether they are a vestige of diachronic change. Hale & Reiss (2000), and Blevins & Garrett (2004) argue that although articulatory and perceptual factors may influence diachronic change, patterns observed in the output of an individual's synchronic phonological system are due to the existence of these patterns in the input. Under a formalist/diachronic hypothesis, the learnability of phonological patterns is governed by constraints on phonology as an abstract computational system, and phonological patterns of equal formal complexity are equally easy or difficult to learn whether they be phonetically natural or phonetically unnatural. In contrast, Kirchner (2001) argues that since functional phonetic constraints are necessary to account for allophonic variation, and the same constraints can also account for phonemic variation, there is no need to posit a distinct abstract phonological system for the latter. Under a functionalist-synchronic hypothesis, phonetically-natural phonological patterns are easier to learn than phonetically-unnatural patterns.

The functional constraint tested in the present study is an articulatory constraint resulting in an alternation in which, in phonetically-natural patterns, a continuant (approximant / fricative) appears between two relatively low vowels, and a non-continuant (plosive) appears between two relatively high vowels. To make a plosive closure between two relatively low vowels the jaw or tongue must be displaced and returned a greater distance than between two relatively high vowels. The greater displacement requires a greater articulatory effort. The two natural patterns tested were [aβa, abe, abi, iba, ibe, ibi] and [aβa, aβe, abi, iba, ibe, ibi], and the unnatural pattern was [aba, aβe, abi, iba, ibe, ibi]. In training phases, participants were taught a series of prefixes and roots via pictures and aural presentations. In testing phases, participants orally produced novel combinations of the roots and prefixes in response to picture stimuli. Results indicated that it was easier to learn to produce a non-continuant in the more phonetically-natural [a_a] context than the less phonetically-natural [a_e] context, and that this was due to phonological learning rather than a purely phonetic output effect. However, it could be argued that this is due to a difference in formal complexity rather than phonetic naturalness. For the second group [a_e] was a natural context for a non-continuant, and for the third group it was an unnatural context. However, the results indicated that it was not easier for the second group to learn to produce a non-continuant in this context. The results were therefore consistent with the formalist/diachronic hypothesis that phonetically-natural and phonetically-unnatural phonological patterns are equally easy to learn.

References

Blevins, J., & Garrett A. (2004) The evolution of metathesis. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically based phonology* (pp. 117–156). Cambridge, UK: Cambridge University Press.

Hale, M., & Reiss C. (2000). Substance abuse and dysfunctionalism: Current trends in phonology. *Linguistic Inquiry, 31*, 157-169.

Hayes, B., & Steriade, D. (2004). Introduction: The phonetic basis of phonological markedness. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically based phonology* (pp. 1–33). Cambridge, UK: Cambridge University Press.

Kirchner, R. (2001). [Review of A. McMahon (2000) *Change, chance, and optimality*]. *Phonology, 18*, 427-433.

Morphologically-controlled phonology:
the spell-out of lexical categories within words

Heather Newell & Glyne Piggott
McGill University
heather.newell@mail.mcgill.ca
glyne.piggott@mcgill.ca

There is general agreement that words have an internal syntax that regulates their morphological make-up. It is also generally acknowledged that phonological patterns appear to be controlled by a specific morpheme or groups of morphemes. However, in conventional phonological thinking, the role of word internal syntax in the exercise of such control is often underestimated. More common is the tendency to appeal to diacritic features in the lexical representation of morphemes as the source of the dependency of phonology on morphology. For example, Alderete (2001) proposes to derive differences in the realization of stress on root morphemes in Cupeño to a lexical contrast between roots that bear the diacritic feature [+accent] and those that do not. However, Newell (2004) argue convincingly that the difference in stress behaviour follows from the position a root may occupy in word structure; the phonology of stress assignment in Cupeño is controlled by the word-internal syntax. The present paper provides additional evidence that word-internal syntax can play a crucial role in the determination of phonological well-formedness. It looks at contexts where V-initial (i.e. onsetless) syllables are tolerated in Ojibwa in violation of an otherwise robust requirement that syllables must have onsets (i.e. vowels are preceded by consonants). V-initial syllables occur word-initially (1a), between a tense morpheme and a verb stem (1b), between a preverbal modifier and a verb stem (1c) or between a tense morpheme and a preverbal modifier (1d). (The relevant contexts are in boldface.)

(1) a. **a:**gamose: 'he walks in snowshoes'
b. gi:-**a:**gamose: 'he walked in snowshoes'
c. nid-ini-**a:**gamose: 'I walk there in snowshoes'
d. ni-gi:-**i**ni-**a:**gamose: 'I walked there in snowshoes'

We argue that the contexts in which V-initial syllables are tolerated can be unified as the left edges of lexical categories that are internal to words.

A well motivated analysis of Ojibwa words (cf. Brittain 2003; Piggott 1985) postulates that verbs and nouns, which obviously contain the categories *v*P and *n*P, respectively, may also contain a member of the adjective/adverb category *a*P. Crucially, these combinations (i.e. [*a*P-*v*P], [*a*P-*n*P]) constitute single prosodic words. V-initial syllables are tolerated at the beginning of a word-initial or a word-internal lexical category. This paper attributes the tolerance for onsetless syllables to the way morphemes are spelled out by the PF component of the grammar. Phonology treats each lexical category as a phase (Marvin 2002, Newell 2004). We argue that the spell-out of each phase takes the forms of a set of phonological constituents that includes segments, syllables and feet but not prosodic words. Hence, the sub-domains that tolerate V-initial syllables in Ojibwa cannot be prosodic words. We propose as a universal requirement on the spell-out of a phase that its edges are unambiguously identified in the phonology. In other words, a recoverability condition is imposed on phase spell-out that acts as a constraint on the phonological realization of words. In our analysis, there is a functional basis for the emergence of V-initial syllable but is grounded in the word-internal syntax.

WHOSE PHONOLOGICAL FACT?
PROSODIC PHRASING IN MULTI-ACTION TURNS.

Richard Ogden & Traci Curl
Department of Language & Linguistic Science, University of York, YORK YO10 5DD, England
rao1@york.ac.uk

Although language is generally conceived of as residing in the minds of individuals, talk happens in interaction with others. As a result, language must handle tasks such as turn-taking and the mutual accomplishment of social activities. Talk also unfolds in time (cf. Kempson, Meyer-Viol, Gabbay 2001; Clark 2002), and thus conversationalists must attend to and make use of this temporality, for instance in the felicitous placement of incoming talk.

Much research into prosodic phrasing has concentrated on syntactic or semantic factors to determine phrase boundaries (e.g. Selkirk 1984, Steedman 2001). A third factor that has been shown to be important in locating phrase boundaries is that of constituent length. (See Frazier, Clifton & Carlson 2004).

From an interactional perspective, phrasing is closely connected with turn-taking. Ford & Thompson (1996) shown that transition relevance points are most likely to occur at places which are possibly complete pragmatically, syntactically and prosodically. Selting (2000) shows the complexity of the relation between turn construction units, and syntactic and prosodic phrasing. Work on interaction assumes that speakers use talk to achieve goals on a number of levels. These include social actions (such as making assessments, requests, offers, complaints, etc); indexicals (such as marking oneself as a member of a particular group, or as having particular kinds of knowledge); or they might relate to the tasks associated with turn-taking, such as projecting a possible completion point, launching a new topic, etc. In order to understand the phonological construction of turns at talk in conversation, we need to understand the relationship between action and turn construction.

In this paper, we look at how speakers of English construct turns which convey two actions, exemplified by the sequence [request] + [account for the request]. We examine the simultaneous organisation of syntactic and prosodic resources within these multi-action turns, and show how the participants in the conversation orient to a number of interactionally and phonetically salient properties. Our work shows that speakers manipulate the placement of phrase boundaries and pauses in constructing such multi-action turns in order to achieve particular interactional effects. For instance, an account may be responsive to a failure by the coparticipant to respond to the request, when a response was made relevant by a phrase boundary. Or, conversely, when it is an interactionally delicate matter to make a request, an account may be strongly projected in the request itself, and the speaker making the request may withold from the recipient an opportunity to come in immediately on completion of the request. These two circumstances lead to different prosodic phrasings for the syntactic structures which convey the [request] + [account].

The paper demonstrates participants' ability to orient to a number of concurrent factors in the unfolding of talk, such as sequence management, syntax, phrasing, and pausing. An analytic account of the moment-by-moment unfolding of talk which is based on participant orientation (rather than native speakers' *post hoc* intuitions) raises some provocative questions about what a 'phonological fact' might be.

Probability distribution, prosodic structure and early word production: An analysis of truncation in child Japanese

MITSUHIKO OTA
University of Edinburgh
<mits@ling.ed.ac.uk>

Recent research in phonological acquisition has revealed a close relation between the course of prosodic development and the probability distributions of different prosodic structures in the child's ambient linguistic environment. For instance, the acquisition order of syllable types in child Dutch production (CV → CVC → V/VC) corresponds to the frequencies of syllable types in child-directed speech (Levelt, Schiller, and Levelt 1999/2000). Input frequency is also reflected in crosslinguistic differences of prosodic development. For example, children begin to produce trisyllabic words without truncation relatively earlier in languages that have more multisyllabic words (Vihman 1991, Gennari and Demuth 1997, Sarinainen-Makkonen 2000). These observations suggest that language learners expand their inventories of 'well-formed' prosodic structures from the most frequently observed to the less frequently encountered (e.g., Levelt and Van de Vijver 2000, Demuth and Johnson 2003). A key aspect of this claim is that children are keeping track of the occurrences of different *phonological structures*. However, correlations between probability distributions and phonological structures in children's production can also emerge spuriously from lexical familiarity. That is, children may simply become better at producing frequently heard *words*; a trend that can give rise to an apparent input-and-structure connection. To show that frequency effects on children's early production are mediated by structural rather than lexical variables, we need to demonstrate that the effects generalize across lexical items with the same prosodic structure, independently of the frequency of individual words.

To this end, this study investigated the relationship between the rate of truncation in child Japanese (i.e., omission of syllables from the target adult word) and the probabilistic distributions of the relevant prosodic structures and lexical items in child-directed speech. It was assumed that truncation rates are inverse manifestations of either the well-formedness or lexical accessibility of the target word. The data consisted of an 83,000-word sample of spontaneous speech of three Japanese-speaking children (age 1;5-2;4) and their mothers, extracted from Miyata's (1992, 1995) corpus. The phonological structure of the target word was analyzed along three prosodic dimensions: the number of syllables, the weight of each syllable, and the presence/location of pitch accent. A regression analysis on the truncation rate of each word was conducted using three predictor variables in the mother's speech: the type frequency of words with the same prosodic structure, the token frequency of words with the same prosodic structure, and the token frequency of the same word.

The results showed that the likelihood of truncation could be predicted by the token frequency of words that share the same prosodic structure with the target word, but not by the type frequency of the structure or the token frequency of the same word. Thus, truncation in early word production reflects frequency input information which has been abstracted into detailed prosodic structures. But unlike adults and older children whose knowledge of phonological well-formedness tends to mirror type frequencies of structures (Munson 2001, Hay, Pierrehumbert, and Beckman 2003), children at this stage of development appear to be relying on token statistics. The implication of this finding is that 1- to 2-year-old children are making phonological generalizations using structural variables that correspond to those postulated for adult phonology (e.g., syllables, moras), but through a different manner of induction (i.e., token vs. type statistics).

MAX-BR and feature copying in Malagasy reduplication
Bill Palmer, University of Surrey, bill.palmer@surrey.ac.uk

Superficially, reduplication in Malagasy appears to display considerable variation. Stress is typically assigned to the penultimate syllable, and in such forms the final two syllables of the base are copied, as in (1). However, a few forms display final syllable stress, in which case only that syllable is reduplicated, as in (2), while in others stress is assigned to the antepenultimate syllable, with reduplication copying only the antepenultimate and penultimate syllables, as in (3). This third pattern displays a number of further effects: the initial syllable onset of the second participant may undergo fortition (as in (3)) or fortition and prenasalisation (as in (4)); or the onset of the final syllable may also copy if the root is vowel-initial (as in (5)).

(1)	hadíno	'forget'	→	hadìnodíno	'forget a bit'
(2)	lèhibé	'big'	→	lèhibèbé	'biggish'
(3)	fántat^{r}a	'known'	→	fàntapántat^{r}a	'slightly known'
(4)	vélona	'alive'	→	vèlo^{m}bélona	'sort of alive'
(5)	áloka	'shade'	→	àlokáloka	'somewhat shady'

This paper argues that reduplication in Malagasy can only be fully understood in the context of an analysis of the language's prosodic structure. The paper follows Palmer (2004) in arguing that stress in Malagasy is not phonemic as previously claimed, but is uniformly assigned to the moraic trochee, with the head foot aligned to the right margin. It argues that forms with apparent antepenultimate stress actually involve an underlying root-final consonant supported on the surface by a weightless epenthetic vowel, satisfying MAX-IO without violating an undominated NO-CODA constraint, but violating DEP-IO, which is ranked below MAX-IO in the language.

The paper follows Palmer (2004) and Hannahs (f.c.) in arguing that reduplication copies a complete foot, not varying numbers of syllables as claimed by Keenan & Polinsky (1998) (K&P). Integrating the above stress analysis, the paper argues that the reduplicated foot is bimoraic, not bisyllabic as claimed by Hannahs. In (1) a bisyllabic bimoraic foot is copied; in (2) the copied foot is a single bimoraic syllable; and in (3) the reduplicated antepenultimate and penultimate syllables copy the base's bimoraic foot, the base-final syllable being weightless.

The paper then argues that the further effects in (3), (4) and (5) result from a set of MAX-BR constraints. A constraint limiting weightless vowels to word-final position prevents copying of the base-final epenthetic vowel. In (3) the exposed base third syllable onset consonant cannot be copied because it would violate NO-CODA. However, in (5) the consonant surfaces as an onset, satisfying MAX-BR without violating NO-CODA. In (3) and (4) MAX-BR constraints are satisfied by copying as many features of the third syllable onset as possible. In (3) fortition occurs as a result of a constraint MAX-[-cont]-BR which copies the non-continuant status of the base consonant, while (4) displays the result of a MAX-[nasal]-BR constraint copying the nasal status of the base-final consonant if the following onset is eligible for prenasalisation.

This analysis also bears on K&P's claim that reduplication in Malagasy is right-copying and therefore counter-evidence to McCarthy & Prince's (1995) proposal that reduplicant-base identity universally outranks reduplicant-input identity. The paper argues that the present analysis instead demonstrates left-copying, and therefore in fact supports McCarthy & Prince.

The tone-bearing unit in Limburgian Dutch

Jörg Peters
Radboud University Nijmegen
j.peters@let.ru.nl

Limburgian dialects are known as having a lexical tone distinction, which is comparable to the distinction between Accent 1 and Accent 2 in Swedish and Norwegian. Traditional accounts characterize the lexical tone distinction of Limburgian dialects uniformly as the distinction between *stoottoon* ('push tone') for Accent 1 and *sleeptoon* ('dragging tone') for Accent 2 (e.g. Grootaers 1908, Leenen 1915). The present paper argues that the tonal systems of Limburgian dialects are less homogeneous than the traditional terminology might suggest. This lack of homogeneity becomes manifest in the use of tone-bearing units (TBUs). While East-Limburgian dialects associate tones to sonorant moras, West-Limburgian dialects associate tones to larger units such as the rhyme or the syllable.

Two observations support a moraic analysis for East-Limburgian dialects. First, the tonal contrast is restricted to syllables containing at least two sonorant moras. It is neither present on syllables with a single sonorant mora nor on syllables whose second mora is ambisyllabic (Hermans 1985, 1994, Gussenhoven & van der Vliet 1999, Gussenhoven 2000). Second, the number of moras restricts the number of tones occurring on the accented syllable. In nuclear non-final position, Accent 1 is realized with a steep fall starting on the first half of the bimoraic rhyme and reaching low level on the second half, which can be represented by a sequence of a high (H) and a low (L) tone associating to the two sonorant moras. Accent 2 is realized with a high plateau or a rise from mid to high level and a more gradual fall after the accented syllable, which can be accounted for by the tonal sequence HHL, where the high tones but not the low tone associate to the available moras. Monomoraic syllables, in contrast, are realized with a pitch peak and a gradual fall afterwards, which suggests a HL sequence with H associating to the only available mora. Thus, both in Accent-2 syllables and in monomoraic syllables, the non-steep fall can be reduced to the fact that no second mora is available for the L tone to associate. In Accent-2 syllables it is blocked by the second high tone. In monomoraic syllables the only available mora is occupied by the single high tone (cf. Gussenhoven & van der Vliet 1999, Gussenhoven 2000).

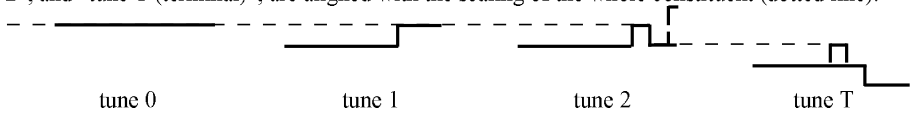
Two observations likewise support a non-moraic analysis for West-Limburgian dialects. First, the tonal contrast is not restricted by the number of sonorant moras. It is attested both on monomoraic syllables and on syllables whose second mora is ambisyllabic (cf. Peters 2004). Second, no more than a single docking-site on the accented syllable is needed to realize the tonal contrast. While Accent 1 is realized with a single high target on the accented syllable and a gradual fall afterwards, Accent 2 is realized with a single low target on the accented syllable and a rising movement that reaches its maximum after the accented syllable (cf. Heijmans 1999, Peters 2004).

The use of different TBUs in East- and West-Limburgian dialects has consequences for the phonological interpretation of the lexical tone distinction. In East-Limburg, Accent 2 contrasts with Accent 1 on bimoraic syllables while monomoraic syllables do not take part in the phonological contrast. In West-Limburg, there is no basis for distinguishing between Accent 1 and the lack of accent. West-Limburgian dialects therefore distinguish between Accent 2 and the lack of accent only. The paper concludes with a discussion of possible reasons for the suggested difference in the interpretation of the lexical tone contrast and of the general role the TBU plays in prosodic typology.

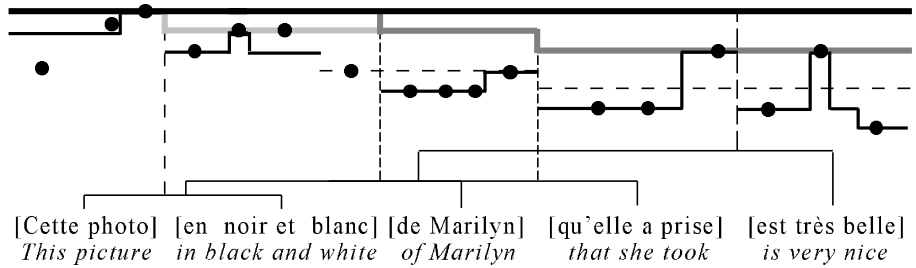
The scaling of high tones in French : a phonological and a cognitive model

Olivier Piot - CNRS UMR 7018, Paris, France - opiot1@yahoo.fr

While the intonational phonology of French, as proposed by Martin (1982), is one of contour shapes and amplitudes, his followers mainly adopted the autosegmental-metric formalism (see for instance Dell, 1984, Mertens, 1987, Di Cristo & Hirst, 1996). This is the case of the present study, although we feel that not all of the richness of Martin's contours has been exploited enough so far. In particular, we wanted to assess whether Martin's [-ample] and [+ample] rising and falling elementary contours could be considered, or not, as upsteps and downsteps. And, if this was to be the case, whether this scaling of high tones could be systematically related to the prosodic structure (PS) of the sentence. Our corpus was composed of 40 sentences. Two native speakers of French (both female) were recorded in an anechoic room, using professional recording devices. The experimenter asked a question matching the sentence considered as an answer. The speaker's task was to answer the question in a natural way. The analysis of the productions of the first speaker, S1, shows that Martin's intonemes can reliably be described as upsteps or downsteps. It also shows that all of S1's 40 utterances can be analyzed using only H tones, except for a few initial and final syllables in the corpus. The analysis of S2's utterances confirmed this analysis, with the difference that S2 produces more low tones. We developed a phonological analysis inspired by Van den Berg et al. (1992) and Truckenbrodt (2002). We define reference lines for the scaling of high tones. Same-level constituents usually have, but may not have, a downstep between them. Drawing the reference line starts with the highest level of the PS, as is represented at the top of the example below. Embedded levels of the PS take the line derived from the levels above them as a reference. This procedure is repeated from the highest to the lowest levels of the PS. In the example below, the grey thick lines are added for the second and third levels of the PS. The scaling of H tones is based on these reference lines, and on a set of patterns for the elementary constituents of the PS. These patterns, called "tune 0", "tune 1", "tune 2", and "tune T (terminal)", are aligned with the scaling of the whole constituent (dotted line):



H tones are basically carried by these elementary tunes, but on a right branched constituent the upstep may jump up to one of the reference lines. To finish, the subsequent tunes may be scaled either from the lowest reference line, or from the preceding pattern (as is the case of the example). Tonal anticipations, as on "de Marilyn", correspond to Martin's falling intonemes.



In addition, a few geometrical rules are proposed. A second model, using a new formalism, is then presented. It provides a simpler account of the data, and can be seen both as a phonological and as a cognitive model. Under the latter view, downsteps and upsteps are considered as the result of processes of constituents' planning, focalization, and integrative elaboration of meaning.

Lax vowels in Dutch: a Government Phonology analysis

Krisztina Polgárdi (University of Szeged), pkriszti@freemail.hu

The distribution of lax and tense vowels in Dutch monomorphemic forms is almost complementary, as shown in (1) and (2). Lax vowels do not occur word-finally (1d) and before a vowel (1c), i.e. they cannot stand at the end of a syllable, except as in (1a). Tense vowels, in contrast, cannot occur in a closed syllable (2b, 2f), except in (2e). Underlying schwa (not shown in the table) behaves like the tense vowels, with some extra restrictions.

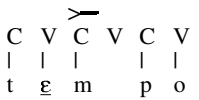
		(1) lax		(2) tense	
internal	(a) _ $CV	kɔ̲fi	‘coffee’	so̲fa	‘id.’
	(b) _ C$CV	tɛ̲mpo	‘tempo’	*	
	(c) _ $V	*		hi̲at	‘hiatus’
final	(d) _ #	*		la̲	‘drawer’
	(e) _ C#	ra̲p	‘quickly’	ra̲p	‘turnip’
	(f) _ CC#	ra̲mp	‘disaster’	*	

These facts have been explained in terms of a length opposition (e.g. Van der Hulst 1984, 1985), where lax vowels are analysed as short, whereas tense vowels as long. In addition, rhymes in Dutch must be required to contain *exactly two* positions, filled either by a long vowel, or by a short vowel followed by a coda consonant. Since “superheavy” rhymes (1f) and (2e) are only allowed word-finally, their final consonant can be assumed to be extrasyllabic (i.e. (VC$C) and (VV$C)), thereby making such rhymes bipositional as well. Tense vowels in closed syllables are then excluded (2b,f), because these would result in tripositional rhymes, while lax vowels in open syllables (1c,d) would give us monopositional rhymes only. In addition, the lax vowel in (1a) must be analysed as one followed by an underlying geminate, in order to make its rhyme bipositional.

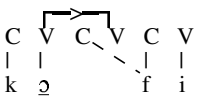
The bipositional rhyme analysis explains the distribution of lax and tense vowels. However, it runs into trouble with stress assignment which treats tense vowels in open syllables as light, and lax vowels in closed syllables as heavy, since it cannot skip over a VC penult, but over a VV penult it can (Van Oostendorp 1995). I will therefore argue against a length-based account and will regard all vowels as short.

I will propose a CV analysis (in terms of Lowenstamm 1996), where “syllable structure” consists of a strict alternation of C and V positions, as a result of which the representation of geminates and consonant clusters contains an empty nucleus. I will utilise trochaic (left-to-right) proper government (following Rowicka 1999). The restriction on lax vowels that they can only occur in “closed” syllables can then be expressed by requiring them to properly govern an empty nucleus to their right (without however being able to spread), as illustrated in (3). Tense vowels, in contrast, cannot properly govern, and therefore they cannot occur in such positions.

(3) (a)



(b)



In fact, lax vowels do not only occur in closed syllables, but also before so-called ‘bogus clusters’, e.g. [tɑrwə] ‘wheat’, [rɪtmə] ‘rhythm’, where the consonants are such that they cannot form either a coda-onset cluster, or a branching onset, therefore they must be separated by an empty nucleus. An advantage of the CV analysis is that only this approach can unify the representations of these two types of contexts.

I will show that this analysis accounts for both the distributional and the stress facts by a very minimalist formalism, utilising only CV-units and proper government. Furthermore, it can explain why in those Dutch dialects (e.g. Tilburg Dutch) where a length distinction exists, only lax vowels can be long. This is because only these can properly govern, but while in the standard dialect they cannot spread, in Tilburg they can actually spread to the governed position.

It is all downhill from here: the Role of Syllable Contact in Romance Languages

Clàudia Pons (Universitat de Barcelona)

1 Goal: The purpose of this paper is to explore, on the basis of a quite extensive set of phenomena drawn from Romance languages, the role and the nature of the SYLLABLE CONTACT constraint in Optimality Theory, along the lines of Gouskova (2003). **2 Data: a) Regressive manner assimilation in Catalan and Occitan.** In Majorcan & Minorcan Catalan, *stops* and *non-sibilant fricatives* assimilate the manner of articulation of the following consonant, except when they are followed by a sibilant segment, in which case they only undergo regressive place assimilation. *Sibilant fricatives* assimilate the manner of articulation of the following lateral, rhotic or glide; in the other contexts, they are preserved, except when they precede another sibilant segment, in which case they undergo a process of manner dissimilation. Nasal segments undergo manner assimilation when followed by a lateral or a glide; otherwise, they preserve their manner specification. Except for some unproductive cases, *lateral*, *rhotic* and *glide* segments never undergo regressive manner assimilation (see Recasens 1991, Bibiloni 1983 and Pons 2004). In Lengadocian Occitan, final stops assimilate the manner of articulation of the following sonorant (See Teulat 1972, Alibèrt 1976, Wheeler 1988). *The emerging generalization is that sonority increase across syllable boundary is leveled out by total assimilation*. **b) Alveolar sibilant rhotacism in Majorcan Catalan, Sardinian and Galician.** In Majorcan Catalan, an optional process of rhotacism of the alveolar sibilant applies when this consonant precedes a non-sibilant voiced obstruent; the alveolar sibilant, on the contrary, remains unaltered when precedes a non-sibilant voiceless obstruent (see Recasens 1991 and Bibiloni 1983). The same phenomena apply in some dialects of Sardinian (see Wagner 1941 and Pittau 1972) and Galician (Dubert 1999), among other Romance languages. Interestingly enough, the process apply in the same phonetic environment as in MaC: basically, preceding a voiced consonant. **c) Sibilant gliding in Occitan**: In some varieties of Occitan, word-final /s/ becomes [j] before consonants other than voiceless stops (see Teulat 1972, Alibèrt 1976, Wheeler 1988). *In these cases (b, c), a decreasing sonority value from sibilant to C is not enough and it has to be augmented by increasing the sonority in the coda*. **d) Consonantal strengthening and internal epenthesis in Catalan.** In most Catalan dialects, a process of affrication applies when an alveolar stop is followed by an alveolar sibilant (Jiménez 1997), and a process of epenthesis applies when a verbal stem ending in a consonant (generally a nasal) is immediately followed by the future or the conditional morpheme. *Here, sonority increase across syllable boundary is reversed through onset strengthening and epenthesis*. **3 Discussion of the data and proposal of analysis:** The general assimilatory behavior of Majorcan & Minorcan Catalan and Lengadocian Occitan can be explained appealing to the interaction between the SYLLABLE CONTACT markedness constraint –which bans coda-onset clusters with an increasing degree of sonority– and the faithfulness constraints that advocate for the preservation of manner specifications of underlying consonants. Indeed: regressive manner assimilation generally applies when the consonant in coda position is less sonorant than the consonant in onset position. The same explanation can be adduced to explain consonantal strengthening and internal epenthesis in Catalan. There are some data, however, that testify that SYLLABLE CONTACT can not be considered a single constraint, but a relational hierarchy against all possible intersyllabic configurations (1) (Gouskova 2003). The processes of rhotacism and gliding listed in (b) and (c) attest that a positive sonority distance in syllabic transitions is not enough, but a certain positive sonority distance is required; hence constraints against decreasing sonority clusters are also required. The relational hierarchy of (1) formalizes, in OT terms, the *Extension of the Syllable Contact Law* (Murray & Vennemann 1983) (2), according to which the optimality of two adjacent heterosyllabic segments increases to the extent that the first outranks the second in sonority. The fact that gliding and rhotacism only apply before a voiced consonant can be easily explained by the activity of the AGREE(voice) constraint.

(1) *Dist -6 » *Dist -5 » *Dist -4 » *Dist -3 » *Dist -2 » *Dist -1 » *Dist 0 » *Dist +1 » *Dist +2 » *Dist +3 » *Dist +4 » *Dist +5 » *Dist +6 (Adapted from Gouskova 2003)

(2) «A syllable contact $A^{S}B$ is the more preferred, the less Consonantal Strength of the offset A and the greater the Consonantal Strength of the onset B»

Nothing is a phonological fact

Curt Rice, University of Tromsø

A morphological process can yield an output which is phonologically infelicitous and which is left unrepaired and thereby unpronounced. These situations result in *gaps* in a morphological paradigm, sometimes called *ineffability* (Pesetsky 1997), or *absolute ungrammaticality* (Ackema and Neeleman 2000; Törkenczy 2002).

One familiar example is the unutterability of monosyllabic, bimorphemic words in Turkish (Ito and Hankamer 1989; Orgun and Sprouse 1999). The well-formed (fragment of a) paradigm *sol*^{y} 'musical note G' ∼ *sol*^{y}*-üm* 'my G' contrasts with the pair *do:* 'musical note C' ∼ **do:-m* 'my C'. Another example is the unutterability of Norwegian imperatives ending in clusters with increasing sonority (Rice 2003). Paradigms such as *bade* 'bathe, inf.' ∼ *bad* 'bathe, imp.' or *håpe* 'hope, inf.' ∼ *håp* 'hope, imp.' contrast with *padle* 'padle, inf.' ∼ **padl* 'padle, imp.' and *åpne* 'open, inf.' ∼ **åpn* 'open, imp.'

We argue here that gaps reflect a speaker's synchronic knowledge of their phonology. Not only are there many examples like the Turkish and Norwegian ones above, in which a seemingly regular word-formation process is blocked, but absolute ungrammaticality can even be found in language games. Nevins and Vaux (2003) report experimental evidence on shm-reduplication in English (Pedro-schmedro! or cats-shmats!). They identify some speakers for whom words beginning in [m] cannot undergo this process, hence there is no possible shm-reduplicated form for words like *Schmidt* or *schmooze*. This example is presented here to further the claim that a model of online production must include the possibility that there is no output.

The claim that gaps must be modeled presents a fundamental challenge to Optimality Theory. The gaps under consideration here would seem to be cases in which some input may not be mapped onto any output. Prince and Smolensky (1993) are not unaware of these situations and respond with the proposal that the *null parse* is part of every candidate set. McCarthy (2002: 197) develops this idea further, suggesting that the *null output* – represented as ⊙ – 'has no structure whatsoever'. While one might accept the claim that a candidate with no structure satisfies all markedness constraints (which prohibit structure) and all faithfulness constraints (which depend on correspondence to determine violations), it nonetheless remains stipulative to suggest that the null output 'always and only' violates the constraint MPARSE, which requires that an output be parsed into a morphological category (McCarthy 2002: 198).

The survival of OT depends on an alternate solution, and we propose that this is to be found within optimal paradigms theory (McCarthy 2005). Gaps can only be found at the interface, i.e. when phonology blocks an expected word formation process. The notion of a gap becomes salient only when there is an unmet expectation that some word will be formed. Following optimal paradigms theory, candidates consist of entire paradigms, and some of those candidates may be incomplete, i.e. they may have gaps. The relative ranking of markedness constraints and constraints requiring the expression of morphological categories will be shown to predict gaps in the desired situations. Indeed, this approach facilitates an analysis of shm-reduplication which, contra Nevins and Vaux (2003), does not require inviolable constraints. The paper thereby develops arguments that when candidates consist of paradigms, we can escape having a row in the tableau for the ontologically dubious un-output, and rather compare complete candidate paradigms with incomplete ones, accounting for those cases in which nothing is a phonological fact.

Whole-word measurement for Finnish children at the end of the one-word stage

Katri Saaristo-Helin[1], Tuula Savinainen-Makkonen[1] & Sari Kunnari[2]
[1]University of Helsinki [2]University of Oulu
E-mail: Katri.Saaristo@helsinki.fi

The evaluation of children's early word productions is a theme that seems to be motivated particularly by clinical demands. In clinical practice a simple and practical method is being sought, which could be used as a reliable assessment tool of a child's phonological skills. So far the methods of analysing children's early phonological skills have made extensive use of formal articulation tests and the focus has been on the segments and measures of correctness. Ingram and Ingram (2001) introduced the *Phonological Mean Length of Utterance* (PMLU) measure as a new tool for assessing early word forms. The PMLU measure draws attention from the segments to the word as a whole and defines three varying dimensions of children's productions: correctness, complexity and variability.

In our study we made the first effort to apply the PMLU measurement to the data of early Finnish words (children at the end of the one-word stage). We assessed the phonological development of 17 children acquiring Finnish (9 girls and 8 boys) at the developmental point of 25 words. The analysis was made using the *Phonological Mean Length of Utterance* (PMLU) –method (Ingram & Ingram, 2001; Ingram, 2002). Two separate PMLU analyses were carried out: The first analysis, concentrating on consonants, was done following the procedure devised by Ingram & Ingram (2001). The second analysis also scored the correctness of vowels. Relating to the structure of the Finnish language, the PMLU results in both analyses were found to be much higher than those reported earlier for children acquiring English. The results show the apparent need for more language-specific research in order to develop the PMLU method suitable for clinical use in various language environments.

References:

Ingram, D. & Ingram, K. D. (2001) A Whole-Word Approach to Phonological Analysis and Intervention. *Language, Speech and Hearing Services in Schools* **32**, 271-283.

Ingram, D. (2002) The measurement of whole-word productions. *Journal of Child Language* **29**, 713-733.

From facts to phonology: an empirical study of rhotic allophony

Koen Sebregts
Utrecht Institute of Linguistics OTS
Utrecht University
koen.sebregts@let.uu.nl

James M Scobbie
Speech Science Research Centre
Queen Margaret University College, Edinburgh
JScobbie@qmuc.ac.uk

When is a fact a phonological fact? Recent studies of English (a language much-studied by phonologists) have, from new phonetic data, re-interpreted a number of phenomena (e.g. connected speech assimilations, stop epenthesis, /l/-allophony, flapping on /t/ and /d/, and weak-syllable vowel reduction) as non-phonological. It is not the case, of course, that all "laboratory phonology" necessarily leads to a reanalysis of phonological phenomena as phonetic: phonetic studies of r-sandhi and l-vocalisation have found categorical allophony that appears more phonological than phonetic. Perhaps the status of many problematic allophony phenomena would be not merely open to question, but, given empirical phonetic investigation, open to solution. In general we claim that it is primarily with new empirical data that we can usefully ask the question: "is such-and-such a phenomenon phonological?" But we do not claim that bare phonetic facts are deterministic, not even when more abstract theoretical considerations are applied. It is not easy to conclude what is or is not a phonological fact. Moreover, it may not always be possible or desirable to do so.

In this paper our empirical focus is on the realisation of /r/ in Dutch. It is notoriously variable, across speakers and across linguistic contexts (Van de Velde 1996, Sebregts et al. 2003). To some extent this variation is phonological – but to what extent? A relatively recent development in Netherlands Standard Dutch is the use of an anterior approximant in coda positions, rapidly becoming the most widely used variant in this context. There has been some controversy over its articulatory properties (and hence featural representation): it has been said to be alveolar (Gussenhoven 1992), retroflex (Stroop 1998), or a "bunched pre-velar" (Collins and Mees 1996). Using ultrasound imaging, we found that the "single" anterior variant is itself variable: the articulation can be any of those proposed above. This result echoes those of Guenther et al. (1999) and Zhang et al. (2003), who found that speakers of American English employ various articulatory strategies for /r/. This is possible even though there is a relatively stable acoustic effect. Dutch is systematically more complex than English, however, because some speakers (such as ours) have onset allophones for /r/ which are phonetically very different again: they are uvular trills or fricatives.

Ultrasound was further used to test another /r/-related claim: that, in coda positions it has scope over the whole syllable of which it forms part. Simpson (1998) and Lodge (2003), using acoustic and auditory analyses, show that this is the case for /r/ in German, and considering the vowel colouring effects /r/ seems to have, there is some reason to expect the same phenomenon for Dutch. Our results show the influence of final /r/ early in the syllable.

We discuss the variation between speakers and positions, which ranges from the relatively trivial to a more extreme and categorical type. The allophonic systems we present appear strongly categorical and we discuss the implications for feature theory. We also evaluate ultrasound tongue imaging as a technique for phonology. In this case it revealed fine-grained differences between speakers and between contexts for a single speaker. Although these differences are clearly phonetic facts, the question whether they are also *phonological* facts does not have an easy answer. Different theoretical approaches may yield different results in the way they model the phonologisation of systematic phonetic variation.

Onset weight in Arabela and Bella Coola

Nina Topintzi, UCL, email: i.topintzi@ucl.ac.uk

Phonological models ban any moraic contribution to syllable weight coming from onsets (Hayes 1989, Hyman 1985, Morén 1999). However, stress data from languages such as Pirahã and Aranda suggest that onsets participate in stress assignment. Previous approaches account for these by using some notion of prominence (Everett 1988, Hayes 1995, Goedemans 1999, de Lacy 2000).

Recently, there have been analyses (cf. Gordon to appear) and data from other languages, e.g. Pattani Malay initial geminates (Hajek and Goedemans 2003) incorporating onset weight effects. The current paper adds to this research by presenting data from Arabela stress shift and Bella Coola Word Minimality and maintains that even if stress can be analysed as a prominence-based phenomenon, word minimality cannot, as it is unanimously considered a weight-based phenomenon. Therefore, moraic onsets must be admitted in the theory.

Although generally rhythmic (1), Arabela stress exhibits shift when the penult onset is an obstruent and the ultima is a sonorant. Thus, in (2) instead of the anticipated σσσσσ pattern, we find σσσσσ (Payne and Rich 1988).

(1)	sàmarú	'spirit'	(2)	nòwaʃìʃáno	*nòwaʃìʃanó	'brightened'
	rùpohónu	'to serve food'		sàpohòsáno	*sàpohòsanó	'deceived'
	sàkamànahá	'palm trees'		mwèratìtyénu	*mwèratìtyenu	'cause to be seen'

In a situation reminiscent of Pirahã, where voiceless obstruents attract stress more than the voiced ones, Arabela obstruent onsets attract stress more than sonorant ones. I treat the former as moraic and attribute stress attraction to WSP. However, WSP has a limited effect. The presence of high-ranked ALL-FT-R confines stress shift in appearing only in odd-syllable words with obstruent penults and sonorant ultimas. In all other occasions, stressing syllables with obstruent onsets *early* in the word offers a small gain in terms of WSP, but produces massive violations of ALL-FT-R that cannot be compensated for; hence the rhythmic pattern is preserved.

Next, I discuss Word Minimality in Bella Coola. This is satisfied by bimoraic words such as VV, VC and, surprisingly, CV.

(3)	a. V	*	c. VV	ya	"good"	e. CV	ƛ'i	"fast"
	b. C	*	d. VC	n̩ƛ'	"dark, night"			

The problem is how CV can satisfy WdMin if it is monomoraic. Bagemihl (1998) proposes that WdMin is an *input* condition and assumes that all segments start off as underlyingly moraic. In the input then, CV is bimoraic. During syllabification onsets lose their moras. Such a view is undesirable within OT where all constraints have to be imposed in the output. I claim that treating WDMIN as an output constraint and allowing CV-only words to be bimoraic in the output can solve this problem.

In bigger words, WDMIN can be achieved by other means so having moraic onsets is superfluous. Confirmation for this comes from Root Maximality facts where roots maximally include four moras and crucially onsets contribute no moras. I conclude that onsets are moraic only to satisfy undominated WDMIN.

Polar Tone in Kanuri

Jochen Trommer, University of Potsdam
jtrommer@uos.de

In a number of tone languages specific constructions exhibit high tone in the context of a low tone, and low tone in the context of a high tone. This phenomenon, called "polar tone" in the phonological literature (see Yip, 2002:159; and references cited there), is problematic for restrictive accounts of tonal phonology since it seems to require an equivalent of alpha-rules (Chomsky and Halle, 1968). In line with Hyman (1996), I argue that polar tone in Kanuri, a Nilo-Saharan language spoken around lake Chad (Cyffer, 1992), can be captured without mechanisms of this type and derives from independently motivated optimality-theoretic constraints.

In Kanuri, a polar tone arises in many verb paradigms, such as the imperfect forms. If the verb root bears a low tone as in (1a), the following tone on the suffixal string is high (or falling, i.e. high-low as in **s garîn**). If the tone of the root is high, the following suffixes are low (1b):

(1) a. *kar*, 'carve'

	sg	**pl**
1	kar kin	karíyen
2	kar min	karúwin
3	s garîn	saarîn

b. *kúd*, 'bring'

	sg	**pl**
1	kúd kin	kúdiyen
2	kúd min	kúduwin
3	súwúdin	sówúdin

That tone polarity here is due to morphological factors not to a phonological restriction (say the OCP) can be seen from the fact that adjacent low tones are allowed in the suffix string, as in **kúd kin**, but also from the comparison with other paradigms which have consistent high tone in the suffix string. The basic intuition behind my analysis is that imperfect **-in** is associated with the floating tone pattern H(igh) L(ow) which is not associated to syllables or segments. This pattern surfaces in both, high-tone and low-tone verbs, but in different positions:

(2)

Floating Tones:			H	L		H	L	
			|	|		|	|	
Segments/Syllables:	ka.	r	kin		kú	d	kin
	|		|		|		|
Preassociated Tones:	L		L		H		L

These different positions result since the tones of the floating pattern can merge with identical tones which are underlyingly associated with roots and imperfect **-in**. The exact position is derived from general optimality-theoretic constraints on tone, namely unviolated *FLOAT, MAX-TONE, SPECIFY and UNIQUENESS dominating NO-FUSION. For low-tone roots, (2a) is the only structure not violating these constraints. Fusion of the floating H with the root H in (2b) follows from high-ranked ALIGN-L(T) (Zoll, 1997). Finally, I show that the analysis also extends straightforwardly to forms with prefixes (which trigger high-tone spreading with specific roots) and paradigms with consistent high tone on the suffix string. Crucial to the analysis of all these patterns is that floating and preassociated tones are treated differently by Faithfulness constraints.

The avoidance of consonant repetition within words

Joost van de Weijer, Lund University, vdweijer@ling.lu.se

Previous reports have shown that the repetition of a consonant within a word tends to be avoided. McArthy (1986), for instance, showed that Arabic trilateral and quadrilateral roots usually lack identical consonants. Furthermore, it is a common phenomenon in many languages that suffixes are deleted when the final consonant in the stem is homophonous with the consonant in the suffix (Stemberger, 1981). A more informal observation is that two identical consonants are a typical characteristic of a few special categories in the lexicon: onomatopoetic words (e.g., *gurgle*, *murmur*, *babble*), words with a negative connotation (e.g., *twit*, *twat*, *crook*), or words that are typically used by children (e.g., *daddy*, *cookie*, *baby*).

The purpose of the present study is to support these observations with experimental data. For this purpose, the number of words with identical consonants in a language was counted, and compared to the expected number (see below) of words with identical consonants, in order to establish whether the observed numbers were significantly lower than the expected numbers. The comparison was done in the languages Swedish, German, Dutch and English.

The material that was used consisted of monosyllabic and bisyllabic monomorphemic words in the four languages. The Dutch, German and English words were selected from the Celex lexical database, and the Swedish words were provided by the department of linguistics at Gothenburg University.

The relative frequencies of the consonants in different positions within the words (i.e., word onset, second syllable onset, first syllable coda, word offset) were determined and used to calculate the expected numbers of words with identical consonants. The following example illustrates the calculation.

The English wordlist contained 3218 words with one or more consonants in the word onset and offset, but not in word-medial position (e.g., *rate*, *book*, *street*, etc.). Included in these were seven words in which the consonant /n/ occurred in both positions (*none*, *noon*, *noun*, *neon*, *nonce*, *nine* and *nun*). The relative frequencies of the consonant /n/ in English in word-initial and word-final position were 0.035 and 0.173 respectively. The expected number of words with /n/ in both positions would therefore be 0.035 × 0.173 = 19.44. The difference between the observed and the expected frequency is significant (one-tailed binomial).

Overall, the results confirmed the observation that repeated consonants tend to be avoided. Nearly all expected numbers exceeded the observed numbers in all four languages. The total expected numbers were approximately twice as high as the total observed numbers. Interestingly, in all four languages the differences between the observed and the expected numbers were largest for the consonants /l/ and /r/. Other consonants for which the difference between expected and observed numbers were consistently large were /d, f, s, t, n/. Another interesting finding was that, also in all four languages, the consonant /b/ showed the opposite pattern, i.e., the observed number of words in which /b/ occurred twice was higher than the expected number. This finding was seen most clearly in Dutch and English, and to a lesser extent, in Swedish and German. These results will be discussed in further detail at the conference.

Quasi-opacity and Harmonic Spans in Silly and Megisti Greek

Marc van Oostendorp, Meertens Institute & Anthi Revithiadou, University of the Aegean
marc.van.oostendorp@meertens.knaw.nl & revithiadou@rhodes.aegean.gr

A number of Greek dialects developed a phonological process very similar to Vowel Harmony (VH) due to a long period of contact with Turkish. In this paper, we focus on Silly and Megisti, hitherto unknown in the literature, in order to study the interaction between VH and vowel epenthesis. This interaction poses a puzzle for surface-based accounts of phonology since it looks opaque. We propose that no extra theoretical devices – such as Output-Output Correspondence or Sympathy – are needed to account for these phenomena, once we accept appropriate theories of phonological representations and extend the notion of CONTAINMENT to the phonology-morphology interaction. Unlike in Standard Greek, in Silly and Megisti, complex onset clusters are not tolerated and are, therefore, broken up by the high vowel /i/. Interestingly, VH in Silly (Dawkins 1916, Kostakis 1968) affects the epenthetic vowel: /psá.ri./ *pisári* 'fish', /tré.no./ *tirénu* 'train' vs. /ká.stro./ *kásturu* 'castle', /á.spros./ *áspurus* 'white'. (Unstressed mid vowels raise.) In this respect, Silly contrasts with another dialect of the southern zone, namely Megisti (Pantelis 2002), which also exhibits VH and epenthesis; here, however, VH does not affect epenthetic vowels: /a.tmós./ *atimos* 'steam', /ka.pnós./ *kapinós* 'smoke'. Evidently, this is an example of counterfeeding opacity. In rule-based terms, epenthesis precedes VH in Silly, whereas the opposite order applies in Megisti. Under this approach, it still remains a question why, even in Silly, the harmonic vowel is only the *target* and never the *trigger* of VH. Our account is based on the theory of HARMONIC SPANS (HS, McCarthy 2004), according to which every feature divides the word into a number of HSs. If adjacent segments share a feature, they are in the same span: one of them is the *head* and defines the feature value for the whole span. VH is restricted by a constraint which requires a word to have as few spans as possible – in the optimal case, exactly one. We propose that in both dialects, different HSs are formed at the beginning and at the end of the word. Specifically, in Megisti, VH is expressed as vowel copying in initial HSs, e.g. /velóni/*volóni* 'needle', /cenúrjo/*tsunúrjo*'new', and as spreading of backness and roundness in final HSs, e.g. /vraçóli/ *vraséli* 'bracelet'. The formation of HSs depends on the position of stress: targeting a stressed vowel is generally avoided. Examples like /vraçóli/ *vraséli*, however, show that when the stressed vowel cannot escape VH, the final HS prevails over the initial one. (Silly VH is similar with some minor differences to be pointed out in the talk.) The second component of our analysis draws on MORPHOLOGICAL RECOVERABILITY, which requires, informally, *morphological structure to mirror phonological structure*. Following Van Oostendorp (2004), we propose a phonological theory that allows access to morphological information by extending the OT notion of CONTAINMENT to morphology: phonological material should be contained in its morphological sponsor. In particular, we argue that the following conditions hold for HSs: (i) The head of a HS should be [contained] in a morphological domain, (ii) All segments in a HS should be [contained] in the morphological domain of the head. The morphological domain of a segment is, roughly, the word it belongs to underlyingly. Clearly, (i) and (ii) stand in a Paninian relation: if a form violates (i), it will also violate (ii), but not vice versa. According to (i), well-formed HS cannot have heads that lack a morphological domain. Thus, epenthetic vowels cannot qualify as heads and, consequently, can never act as triggers (Silly). Furthermore, (ii) imposes a stricter condition on HSs since it requires all of its segments to be in one morphological domain. This implies that epenthetic vowels cannot be included in a HS and, as a result, can never harmonize (Megisti).

Given these assumptions, a purely monostratal theory can easily account for the described facts, and no reference needs to be made to extra representations or derivations.

Is phonological deafness frequency-dependent ? the case of liaison consonant in French

Sophie Wauquier-Gravelines (1) & Noël Nguyen (2)
(1) Dept Sciences du langage, Univ. Nantes, France
(2) Laboratoire Parole & Langage, CNRS & Univ. Provence, Aix-en-Provence, France
wauquiers@wanadoo.fr nguyen@lpl.univ-aix.fr

In French, liaison refers to the appearance of a latent consonant at a lexical boundary before a vowel initial word in words that in other contexts end in a vowel ("un enfant" : "un" [ɛ̃] + "enfant" [ãfã] is pronounced [ɛ̃nãfã], *a child*), this latent consonant could be realised at the onset of the second word ([ɛ̃nãfã] is generally syllabified [ɛ̃/nɑ̃/fã], [ləpətitami] is generally [lə/pə/ti/ta/mi], *the little friend*), but it could also be realised as a coda of the first word (Encrevé, 1988). But liaison is not always realised : in some contexts, liaison is completely obligatory, ([ɛ̃nãfã] « un enfant », *a child*) in other cases it is facultative ([desɔldazãglɛ] / [desɔldaãglɛ] « des soldats anglais » *British soldiers*) and in some cases forbidden (*[ɛ̃sɔldatãglɛ] « un soldat anglais » *a Bristish soldier*).

Two main alternative conceptions of liaison could be proposed.

One could consider that, both for production and perception, the speaker-hearer uses phonological abstract representations of liaison. It could be formalized in different ways (for a review see Encrevé, 1988, Paradis & El Fenne, 1995). But whatever the framework, realisation (or absence of realisation) of liaison is constrained by the prosodic, morphological and syntactic context.

An alternative point of view is to consider that liaison is mainly a lexical phenomenon (Bybee, 2001). In this conception, there is no available abstract representation of latent consonant and each word is stored with all the liaison contexts (« enfant » is stored in all its most frequent contexts of realisation « un petit enfant », « les enfants », « un grand enfant »), and « un petit enfant » is analysed as a lexical unit and not as an NP. In this framework, realisation (or absence of realisation) of liaison is mainly constrained by the lexical frequency of the first and the second word and the frequency of occurrences of word1 +word2.

Nevertheless, psycholinguistic measurements apparently invalidate this claim. Fougeron & al. (2001a, 2001b) have shown that neither the frequency of word 2, nor frequency of occurrences of word1+ word 2, have any effect on the realisation of liaison.

In our paper we will investigate this issue. Wauquier-Gravelines (1996) found that liaison consonants are more difficult to detect than word-initial consonants in a speeded phoneme-detection task (higher proportion of misses and longer reactions times for LCs than for WICs). No significant difference was found in the acoustic characteristics of liaison consonant compared to word-initial consonants. She attributed this response pattern to differences in the phonological status of both consonants and assumed that more cognitive resources are required to process a underlyingly floating liaison consonant (Encrevé, 1988), compared to a word-initial consonant. One could argue indeed that if « un navire » (*a boat*) and « un avion » (*a plane*) would be stored as complete lexical units, in both cases, « n » would be detected as an internal consonant. On this account, liaison consonants should have the same phonological status as word-initial consonants, and the former should not therefore be more difficult to detect than the latter. The present study further explores this 'deafness effect' associated with liaison consonants using a phoneme-detection task in the following contexts : 1) word-initially, 2) liaison 3) « enchaînement » 4) word-medially, with a systematic control of contexts for both acoustical realisations of targets and words' frequency. Our goal is to establish more precisely the respective role of phonological status of liaison consonant, acoustic and lexical informations in the on-line treatment of liaison and discuss the validity of predictions that are made by Bybee's claims on French liaison both for adult and child psycholinguistics.

Voicing contrast: licensed by prosody or licensed by cue?

Max W. Wheeler (University of Sussex, m.w.wheeler@sussex.ac.uk)

In recent phonological work two approaches to neutralization have been developed, labelled *licensing by prosody* and *licensing by cue* (Steriade 1997). The licensing-by-prosody approach is developed by Beckman (1998) and Lombardi (1999, 2001). The central element is the universal difference between onsets and codas when it comes to realizing consonantal contrasts. Contrasts that may be realized in onsets may be neutralized in codas.

The licensing by-cue-approach is developed by Steriade (1997, 1999). This approach bases constraints licensing specific features not just on hierarchies derived from cross-linguistic typologies, but more specifically on differences in perceptual cues to be found in different phonetic contexts. Steriade (1997: 6) identifies seven phonetic properties known to be available as cues to voicing contrast in obstruent stops: closure voicing, closure duration, duration of preceding sonorant, F_1 values in preceding vowel, burst duration and amplitude, voicing onset time (VOT), and F_0 and F_1 values at onset of voicing in a following sonorant. On this basis V_V and V_Sonorant contexts favour voicing contrasts.

The licensing-by-cue approach is attractive since it seeks to explain the differential distribution of phonetic properties such as voicing directly in terms of the articulatory and perceptual characteristics of different phonetic environments. Licensing by prosody appeals rather to elements of prosodic organization —specifically, syllable structure— which is held to be psychologically real, but only indirectly manifest in the stream of speech. Steriade asks (1997: 50) ‘what would count as genuine evidence for syllable-final devoicing?’ She goes on: ‘The simple answer is: any system that allows us to compare voicing maintenance in onset O[bstruent]R [=sonorant] sequences with voicing neutralization in heterosyllabic O.R. Thus the hypothetical language ... distinguishes voiced obstruents in the OR sequences functioning as onsets, but neutralizes voicing in every other obstruent-C sequence, including in heterosyllabic O[.]R.’

I show that Catalan is a language that provides such evidence, as Steriade suspected. For example the word *poc* ‘little’ has the UR /pɔk/ and is realized [ˈpɔk] in utterance final position. However, the phrase *poc lògic* ‘not very logical’ must be realized with a voiced stop [ˌpɔg.ˈlɔ.ʒik]. In such a phrase /k/ is in coda position, where voicing is neutralized, and any coda obstruent agrees in voice with a following consonant. This is so despite the fact that /kl-/, like /gl-/, is a well-formed sequence in Catalan, *provided it is in onset position* —as in *clar* [ˈkla] ‘clear’ versus *gla* [ˈgla] ‘acorn’; *tecla* [ˈte.klə] ‘key’ versus *regla* [ˈreg.glə] ~ [ˈre.ɣla] ‘rule’. I also give an account of the constraint ranking that governs postlexical resyllabification, which means that a phrase like *poc lògic* may not be resyllabified *[ˌpɔ.ˈklɔʒik] to preserve input voiceless /k/. The conclusion is that the theoretical option of licensing by prosody, in the case of voicing contrasts, must be retained.

Four Classes in English Lexicon: Solutions to Old Problems and a New Prediction by Partial Ordering Theory

Hideki Zamma
Kobe City University of Foreign Studies
zamma@inst.kobe-cufs.ac.jp

Since Chomsky and Halle (1968), it has been widely assumed that English suffixes can be divided into two major categories (cf. Siegel (1974), Allen (1978), Kiparsky (1982), Halle and Mohanan (1986), Halle and Vergnaud (1987), Benua (1997), etc.). The defining characteristics of classhood include, for example, (i) whether or not a suffix is stress-neutral and (ii) whether or not a suffix is capable of attaching to the root base. From time to time in the literature, however, it is pointed out that some suffixes have "dual membership" in both of the classes. In other words, the same suffix sometimes exhibits both stress-neutral and root-attaching behaviors; e.g. *-able/-ible*, *-ize*, *-ment*, etc. (cf. Aronoff (1976), Selkirk (1982), Fudge (1984), Szpyra (1989), Giegerich (1999), etc.). This fact has posed a serious problem to any theory of lexicon with dichotomy, because it suggests that some of the characteristics in suffixation might not be attributed to the difference between the two classes.

This paper proposes that the charactersitics attributed to classes 1 and 2 are not uniformly assigned to all the suffixes that belong to each class, and that some suffixes can have both of the characteristics which are generally supposed to be assigned to different classes. This analysis is possible in the framework of Partial Ordering Theory (cf. Anttila (2002)), where constraint ranking can be different among various groupings in the lexicon. In this framework, typical Class 1 suffixes can be analyzed as having stress-shifting and root-attaching rankings, both of which are opposite to typical Class 2 suffixes. The dual membership suffixes, on the other hand, can be analyzed as having only one of the typical Class 1 rankings (i.e. root-attaching ranking) as well as one of the typical Class 2 rankings (i.e. stress-neutral ranking).

This analysis also sheds another light on the classic problem of violation of Affix Ordering Generalization (cf. Selkirk (1982), etc.). In the traditional analysis with strict dichotomy, it is a serious problem that some of the Class 2 suffxes can be further affixed by Class 1 suffixes. Given the fact that such "problematic" suffixes are mostly dual membership ones, which are often classified as Class 2 suffixes (e.g. *-ability*, *-ization*, *-mental*, etc.), it is possible to reanalyze the ordering principle so that only typical Class 2 suffixes cannot be followed by other types of suffixes.

The present analysis further predicts a new pattern which has not been observed in the literature: a stress-shifting and non-root-attaching pattern. Closer investigation of English suffixes reveals that this prediction is born out (e.g. *-(i)an*), suggesting that the present analysis is on the right track.

A Perceptual Redefinition of I and U

Gyula Zsigri
University of Szeged, Hungary
zsigri@hung.u-szeged.hu

In Government Phonology and some other theories that use unary features, **I** is the element (or particle) of palatality and **U** is the element of labiality. With these two elements, [i], [y] [ɨ] and [u] may be represented as:

i	y	ɨ	u
I	IU	_	U

While this representation has its typological merits, it fails to account for the acoustic and perceptual similarities of palato-labial [y] and velar [ɨ]. The F2–F1 values of [y] and [ɨ] are between the values of [i] and [u] and native speakers of various languages that have [y] but not [ɨ] (including Dutch, German and Hungarian) tend to substitute [y] for [ɨ] when they learn a language that has [ɨ] but not [y] (e.g. Russian). Native speakers of Slovak, a language that has neither [y], nor [ɨ], often substitute Russian [ɨ] with [ui], a rising diphthong that Slovak does not have either. However, the above table implies that [y] and [ɨ] are maximally distinct within the row of high vowels.

The same applies to the row of mid vowels where the only feature shared by acoustically and perceptionally similar ø and ɔ is that they are non-high:

e	ø	ɔ	o
IA	IUA	_(A)	UA

This discrepancy between acoustics/perception vs. phonological representation is not new. It is also present in classifications using binary features:

	i	y	ɨ	u	e	ø	ɔ	o
back	**–**	**–**	+	+	**–**	**–**	+	+
round	–	+	–	+	–	+	–	+
high	+	+	+	+	**–**	**–**	**–**	**–**

The proposed redefinition of **I** and **U** is based on articulatory properties that influence the F2–F1 values. **I** is the element of short distance between the dorsum and the lips, while **U** is element of long distance between the dorsum and the lips. Lip-rounding or the retraction of the dorsum increase the distance, while forwarding the dorsum decreases it. A sound that contains **I** but not **U** is realized with the highest F2–F1 value in its row: [i] in the row of high vowels, or [e] in the row of mid vowels. A sound that has **U** but not **I** has the lowest F2–F1 value in its row: [u] in the row of high vowels, and [o] in the row of mid vowels. A mixture of **U** and **I** (low and high F2–F1 values) averages in a medium F2–F1 value just like the lack of both of them.

Poster session

Prosodic Structure Preservation in Government Phonology

Katalin Balogné Bérces
ELTE/PPKE, Hungary
bbkati@yahoo.com

The paper aims to evaluate the role of Structure Preservation in phonological theory, in suprasegmental structure in particular. It argues that a maximally constrained grammar should contain some form of it, and therefore theoretical operations modifying prosodic structure during the course of derivation (such as resyllabification) are undesirable.

The paper subjects Standard Government Phonology (SGP) under close scrutiny. This theoretical framework claims to adhere to a strong version of Prosodic Structure Preservation, which is usually referred to as the Projection Principle, quoted in (1).

(1) The Projection Principle
Governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation.

Although all proponents of SGP claim to conform to the Projection Principle, SGP analyses have violated it on numerous occasions. Perhaps the most problematic situation is the one when adjacent empty skeletal positions (an empty nuclear position and a following empty onset or nucleus) meet upon the concatenation of morphemes, in which some of the original relations are not preserved. When analysing cross-word tapping in English, for instance, Harris and Kaye (1990) and Harris (1994) delete a word-final (empty) nuclear position to explain how a word-final /t/ comes into contact with a following vowel-initial word. This is not the only example, though; in SGP it is generally assumed that in the sequence of a vowelless syllable (i.e. Cv) and an onsetless one (cV) (with lower-case letters denoting empty positions), the ("extended") OCP operates in such a way that the first, empty nucleus is "suppressed" (along with the empty onset to its right) and as a result the two syllables are fused (or "superimposed"), i.e. $C_1v_1c_2V_2$ ends up as C_1V_2. Obviously, this "reduction" violates the Projection Principle (also suspected by Brockhaus 1995: 212 and explicitly stated in Szigetvári 1999: 102), since the government relation licensing the empty vowel gets deleted together with the empty vowel, in the same way as the government relation linking the empty onset c_2 to its original nucleus V_2.

The paper shows that the redefinition of SGP's two basic mechanisms, government and licensing, as found in Ségéral and Scheer (1999) and applied to a strict CVCV skeleton, yields an account of cross-word phenomena that avoids such violations of the Projection Principle. An additional modification to the theory is also introduced: government is assumed to be contracted on the melodic tier.

References:

Brockhaus, Wiebke (1995) Skeletal and suprasegmental structure within Government Phonology. In Jacques Durand and Francis Katamba (1995) (eds.) Frontiers of Phonology: Atoms, Structures, Derivations. Harlow: Longman. 180-221.

Harris, John (1994) English Sound Structure. Cambridge, Mass. and Oxford: Blackwell.

Harris, John and Jonathan Kaye (1990) A tale of two cities: London glottalling and New York City tapping. The Linguistic Review 7: 251-274.

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

Szigetvári, Péter (1999) VC Phonology: A Theory of Consonant Lenition and Phonotactics. PhD dissertation, MTA/ELTE, Budapest.

Ein wirkliches Factum oder ein algebraisches Zeichen? The crisis of facts vs. abstraction in nineteenth-century historical phonology

András Cser
Pázmány Péter Catholic University, Piliscsaba
cser@btk.ppke.hu

(either oral paper or poster)

It is well known that in the first half of the nineteenth century comparative and historical linguistics focused on morphological structure in the first place. Although one of the most magnificent discoveries of historical-comparative phonology, referred to as Grimm's Law, was made in the 1810's by Rasmus Rask, phonology played a subsidiary role to morphology. What could be called the "models" of language and of language development were all explicated in morphological terms; to put it more stringently, for the majority of linguists, theories of language were theories of morphology. These morphological speculations were one of the targets the Neogrammarians attacked most vigorously. Claiming – in the spirit of uniformitarianism – that the general framework of Proto-Indo-European grammar cannot have been so radically different from what is found in the daughter languages, they brought morphology "down to earth".

Phonology was different from the point of view of abstractness. Sounds were indeed treated in a superficially abstract manner in the first half of the century, but this was mainly based on (i) the phonetic imprecision of the *littera*-tradition, whose most eloquent example in our period is Grimm's identification of the IE aspirated stops with the High German affricates; (ii) the fact that sounds were largely studied in the framework of correspondences, which itself by nature invites a broader perspective and a search for a "common denominator" within a set of given sounds rather than their phonetic detail; (iii) the fact that the languages studied were overwhelmingly dead languages, for which phonetic details were inaccessible. To these points one may add the impact of the Indian tradition, as witnessed by Schleicher's phonological introduction to the Compendium (1861), which is a recasting of Panini's gradation theory. Schleicher was fond of algebraic formulations: in his 1859 paper on morphology he introduces the topic with a highly elaborate notational system for types of morphological elements and types of their relations. By contrast, such "algebraic" formulations were highly unpopular with the Neogrammarians and the majority of their contemporaries. The Neogrammarians strove successfully to make "phonology more phonetic" and generally more rigorous and, paradoxically, earned the contempt of some of their opponents for introducing a different kind of abstractness by reconstructing, for the first time ever, a segment not attested in unchanged form in any of the Indo-European languages (the syllabic nasal(s), Brugmann 1876).

In turn, their reception of Saussure's *Mémoire* is indicative of their predisposition. While they admit that his analysis of Ablaut and the vowel system in general is highly logical, they politely dismiss or ignore it as far-fetched and lacking sufficient empirical motivation. Brugmann's review of it in the *Literarisches Centralblatt* (1879), which marshals some rather common-sense, but in retrospect false, arguments, is a very typical instance of their attitude, and it probably set the tone for many of his contemporaries. We suspect that the Neogrammarians found Saussure's work not so much ill conceived as embarrassing. They must have realised that it was a thorough and intelligent work by an extremely knowledgeable student (21 at the time of completing the book) and its logic of argumentation was coherent and forceful. But it must have reminded them of the algebraic way Schleicher had represented the PIE vowel system, and Saussure's formulation, which they found unduly abstract, was superficially just the kind they wanted to purge linguistics of at last.

A synergistic explanation of opacity effects in loanword adaptations

Ashley W. Farris, Indiana University--awfarris@indiana.edu

Two main camps have emerged in the debate over how borrowing languages adapt new sounds from the source language (see LaCharite & Paradis 2003 for a review). The phonetic view (e.g., Silverman 1992, Yip 1993, Kenstowicz 2003) holds that borrowers may fail to perceive certain sounds or features of the source language and adapt those sounds as they are misperceived. This "misperception" then establishes the underlying representation for the newly borrowed word. The phonological view, on the other hand (e.g. Paradis & LaCharite 1997, Ito & Mester 1999, LaCharite & Paradis 2002), holds that borrowers correctly perceive sounds and features in the source language but apply the phonological constraints of their own language to modify the output, creating a licit form in the borrowing language. This paper explores whether or not either of these explanations can stand alone, or if perhaps both are necessary to explain some forms of loanword adaptation. Chain-shift borrowings (/x/ is borrowed as [y] but /y/ is borrowed as [z]) into Mokilese, Hindi, and a family of historical neighbors of Finnish are examined in order to reveal what causes borrowers to adapt a sound that is already found in the borrowing language.

While the Hindi and Finnish chain-shifts might be explained by a phonetic misperception theory, the more interesting and challenging case is Mokilese. Illustrative data are displayed in Table 1. In Mokilese, English /t/ is adapted as [s] and English /s/ is adapted as [c], resulting in opacity (/t/ is not borrowed as [c]). Moreover, the sounds [t, s, c] are all present and contrastive in all positions in native Mokilese words. Thus the chain-shift appears to be gratuitous—the three borrowed phonemes should all be within the perceptual space of the borrowing speakers, yet they are not borrowed transparently. There seems, then, to be no ready explanation for this chain-shift.

The proposed solution is synergistic in that it draws from both phonetics and phonology. The first stage in the Mokilese shift, in which /t/ is borrowed as [s], can in fact be explained from a perceptual point of view: the speakers of the borrowing language may have made a mismatch between perceived features in the source language and the correct underlying form. This can be attributed to the strong spirantization of word-final [t] in some dialects of British English. However, the second stage of the shift cannot be explained from a solely perceptual perspective—nothing in the source language is an obvious cause the /s/ to [c] shift. Here we must turn to the phonological concept of contrast preservation (e.g., Łubowicz 2003). Speakers of the borrowing language initiate the second stage of the chain-shift in order to preserve meaningful phonological contrasts. This account implies that borrowers are sufficiently aware of the contrasts in the source language to attempt to preserve them in the borrowing language—that is, even though a sound may be misperceived, the underlying distinction between sounds remains. Speakers then adapt the sound according to the constraints of the borrowing language. The solution proposed draws upon Ito & Mester's (1995) theory of lexical stratification as well as theoretical machinery proposed to deal with chain-shifts, such as comparative markedness (McCarthy 2002).

These results have important consequences for the study of loanword adaptation. First, they serve to unite the fields of perceptual phonetics and phonology in a way which has not previously been explored within the realm of loanword adaptation. Second, they support the claim that some loanword adaptations are the result not of processes in either the source or borrowing language (Broselow 2004), but rather of a greater need to preserve meaningful phonological contrasts. Finally, these results also shed light on different optimality theoretic accounts of chain-shift effects in general. (NIH DC-00012, 001694)

Table 1: Chain-shifts in loanword adaptation

Source language	Borrowing language	Sounds borrowed	Examples	
English	Mokilese	/t/ → [s]	/blæŋkɪt̬/ → [pilaŋkis̬]	'blanket'
		/s/ → [c]	/s̬ɚkʌms̬aɪz̬/ → [c̬orkomʷc̬aɪc̬]	'circumcise'
		/ʃ/ → [c]	/ʃip/ → [c̬i:pʷ]	'sheep'

PALATALIZATION AND UMLAUT:
Two sides of the same coin

Monika Fischer
University of Szeged, Hungary
Theoretical Linguistics PhD programme
fischermonika11@hotmail.com, monika.fischer@durham.ac.uk

The paper is an attempt to find a unified representation of palatalization and umlaut. Namely, I view the two processes as two sides of the same operation, differing only in the type of segments they apply to. Palatalization is the fronting and raising of consonants and umlaut is the fronting and raising of vowels. Consequently, they should be represented in the same way and in a simple way, too, considering the "fact" that they are highly frequent and rather natural processes in the languages of the world.

The sources of data are Proto-Slavonic and the initial stages of Germanic languages. I chose a reconstructed Slavonic language to account for palatalization because it was productive at that stage and is not productive in Slavic languages today. The reason I opted for historical data in the analysis of umlaut is because in Old High German and Old English it was still a purely phonological process and not a morphologically conditioned alternation as it is in modern Germanic languages.

In order to harmonise the representation of *all* palatalization processes, I will first integrate the different umlaut and palatalization phenomena separately. Namely, both types of processes occur in many different languages, even some languages unrelated to Indo-European, such as Chamorro and Korean. Umlaut in Proto-Slavonic differs from umlaut in Old High German and Old English in its direction, in the trigger and in the domain of the process (the former is progressive, triggered by a preceding front consonant, occurring in a CV sequence; the latter is regressive, triggered by a following high front vowel in the same foot). Linguists defined the former as an instance of assimilation and the latter as an instance of vowel harmony. Palatalization is also a cover term for many different instantiations of spreading the element I, whether it is progressive or regressive, lexical or post-lexical, phonemic or phonetic.

A further proof for the close relation between all the palatalization processes is a tendency of Proto-Slavonic called palatality harmony. The tendency refers to the "fact" that CV sequences agree in backness or frontness, i.e. all segments in a sequence are either front or back. The three subprocesses of the tendency are umlaut, palatalization and yodization.

In other words, the nature of all palatalization processes is spreading of palatality. In Government Phonology, it is represented by spreading of an element **I**. I argue for a combination of Government Phonology and Optimality Theory in which the government phonological principles are reformulated as violable Optimality Theory constraints and therefore ranked. The optimal candidate violates the least constraints in least degree. In our case, these candidates will be the surface forms which satisfy the higher ranking of structure preservation in the case of Proto-Slavonic and the higher ranking of licensing constraints in the Germanic languages.

Furthermore, since the question of palatalization involves the issue of coronals and their representation with phonological primes, my second aim is to show how the representation of assimilatory processes epitomises as a question of underspecification and markedness. In my opinion, an adequate representation of coronals and thus a valid account of palatalization assimilation offer some cues as to what linguistic and extra-linguistic factors should be taken into account when formulating a theory of markedness and underspecification.

Russian Vowel Reduction and Phonological Opacity

Janina Molczanow
University of Warsaw
jmolczanow@poczta.onet.pl

The aim of this paper is twofold. First, it proposes a novel analysis of Vowel Reduction in Russian within the framework of Optimality Theory (Prince and Smolensky 1993). Second, it discusses the opaque cases that result from the interaction of Vowel Reduction with other phonological processes, such as Glide Deletion and Retraction.

The basic generalisation is that the unstressed nonhigh vowels /a/, /o/ and /e/ are reduced to [i] after soft onsets (*ikanie*) and to [a] elsewhere (*akanie*). Traditionally, it has been assumed that *ikanie* is caused by the presence of the feature [-back] on the preceding palatalised consonant. However, such an account is unappealing as it fails to explain the fact that the back high vowel *u* does not undergo fronting after a palatalised consonant.

It will be argued that the raising of nonhigh vowels that takes place after palatalised consonants is best analysed as an assimilation in height. Since soft consonants are not only [-back] but also [+high], nonhigh vowels are raised in order to agree in the feature [+high] with the preceding palatalised consonant.

Moreover, *ikanie* interacts with the processes of Glide Deletion and Retraction. In informal speech, the combination **ji* is simplified by deleting the glide: *ji* → *i*. Additionally, Russian has a process of Retraction which turns word-initial /i/ into [ɨ] after words and prefixes ending in a hard consonant. So, on the one hand, the front glide *j* acts as a trigger with respect to Vowel Reduction in that it induces the raising of unstressed non-high vowels (e.g. *jévro* [e] 'Euro' – *jevrópa* [i] 'Europe'). On the other hand, Vowel Reduction feeds Glide Deletion (e.g. *jévro* [je] 'Euro' – *jevrópa* [i] 'Europe'). Glide Deletion, in turn, creates the context for Retraction (e.g. *jevrópa* [i] 'Europe' – *v jevrópu* [v ɨ] 'to Europe'). Consequently, the phrase *v jevrópu* 'to Europe' shows the opaque interaction of three phonological processes, Vowel Reduction, Glide Deletion and Retraction: /v je/ → /v ji/ → /v i/ → /v ɨ/.

Standard Optimality Theory, which evaluates output forms using one set of ranked constraints, cannot analyse opaque generalisations. Nonserial auxiliary theories designed to deal with phonological opacity include sympathy theory (McCarthy 2002), output-output theory (Benua 1997), the theory of Targeted Constraints (Wilson 2001), and others. The interest of the Russian data lies in the fact that none of these theories can successfully handle the case of opacity outlined above. It will be argued that a modified version of Optimality Theory, derivational OT (Kiparsky 1997, 2000, Rubach 1997, 2000a,b), can provide a straightforward account of the phenomena under consideration.

The (non)realisation of Irish consonant mutation: phonetics or phonology?

Victoria Kingsley O'Hagan, University of Ulster
vk_ohagan@yahoo.co.uk

In this paper I provide empirically motivated and entirely novel insights into the interface between phonetics and phonology. An examination of the phenomenon of Irish Initial Consonant Mutation reveals that errors with respect to the idealised target produced by non-native speakers instantiate a pattern also found in native speakers (O'Hagan & Kraemer, 2004). Both native and non native speakers fail to mutate at the perceptible level. Spectral analysis of word initial consonants betrays the presence of high frequency noise suggesting frication. These results indicate that the articulatory gestures associated with the desired mutation can be made in some cases by native speakers, even when no mutation is apparent. This raises an extremely important theoretical question: how phonetically concrete should phonology be?

The empirical motivation of this paper is substantial. Twenty five native speakers were sampled providing a database of more than 700 lenition tokens, and the data was collected by means of cloze tests and analysed using Praat.

Previous accounts of IICM have largely been fallen into two categories. First, Duffield (1995) examines the syntactic triggers for IICM; second the phonological processes involved have been examined by Grijzhenhout (1995) and Gnanandesikan (1997). Since the end of the Middle Irish period, IICM has in many ways appeared sporadic and irregular (Lieber, 1987), complicated by issues of grammatical gender, number and case. I argue in this paper that matters are neither as sporadic nor as irregular as they seem. The observable fact that mutation can be instantiated at a sub-perceptual, gestural level implies that a large number of apparent mutation 'failures' are in reality no such thing. Mutation exists at a phonetic level. These findings provide a new insight into 'phonological fact': contrasts we associate with phonology can be sub-perceptual.

Duffield, N. (1995). *Particles and Projections in Irish Syntax*. Dordrecht: Kluwer Academic Publishers.

Gnanadesikan, A. (1997). *Phonology with Ternary Scales.* Doctoral dissertation, University of Massachusetts, Amherst.

Grijzenhout, J. (1995). *Irish Consonant Mutation and Phonological Theory*. Ph.D. dissertation, Univ. of Utrecht.

Lieber, R. (1987). *An Integrated Theory of Autosegmental Processes.* Albany: SUNY Press.

O'Hagan, Victoria & Martin Kraemer (2004) *The acquisition of Irish initial consonant mutations and the universal hierarchy* (ms)

Is French a Semitic Language?

Claudine Pagliano, Université Paris X & CNRS
cpaglian@u-paris10.fr

The purpose with this paper is twofold.
- Firstly, to display new data on contemporary French, based on series of enquiries realised during the outgoing project 'Phonologie du Français Contemporain' (PFC; cf. Durand & Lyche 2003): in certain varieties of French, consonantal clusters typically described as bogus clusters or coda-onset sequences, are observed at the initial of words.
- Secondly, to demonstrate the link between the free distribution of consonantal clusters at the initial of words and the lack of appearance of a glottal stop at the same place: the free distribution shows that the initial is a 'weak position' in the sense of Scheer & Ségéral (2001), therefore it cannot trigger any epenthesis.

Semitic languages are characterized by a free distribution of consonantal clusters, due to its templatic phonology, whereas languages such as German display a restriction in the distribution of consonantal clusters: only so called 'branching onsets' are tolerated, to the exclusion of "coda-onset" sequences and bogus clusters.

Scheer & Ségéral (2001) account for the strength of a position, which shows through a resistance to lenition or reinforcement, in promoting the hypothesis, proposed by Lowenstamm (1999) for independent reasons, according to which the beginning of the word is preceded by an empty onset followed by an empty nucleus, that is a [CV] unit: the very presence of a preceding empty nucleus places the first onset of the word in a strong position. The strength of the initial consonantal position is linked to restrictions on consonantal clusters (cf. Seigneur-Froli 2001): in languages where the word begins with an empty [CV] unit (German for instance), consonantal clusters are distributionnally limited (#TR but neither *#RT nor *#TT). The initial [CV] unit therefore determines both the distributional restriction of initial clusters and the strength of the position. To the contrary, its absence determines a free distribution of consonantal clusters at the initial of words and the weakness of the position.

	languages with an initial [CV]	languages without an initial [CV]
distributional restriction of initial clusters	✓	x
strong initial of words	✓	x

French is generally considered as belonging to the same type of languages as German, i.e. languages which display a restriction in consonantal clusters at the initial: in the lexicon, you can't find any #RT not #TT, the only consonantal clusters tolerated are #TR. However, data extracted from enquiries made during the PFC project show that these 'forbidden' clusters are indeed observed, especially in informal speech, at various degrees depending on the speaker. Therefore words in contemporary French tend to lose their initial [CV] unit.

In Pagliano (2003), it is demonstrated that a strong position at the beginning of the word shows on the surface through the epenthesis of a glottal stop in the empty onset of words beginning with a vowel. If French is a language of the German type, we should observe an epenthesis at the beginning of each vocalic initial word. This is not the case: epenthesis is observed at the initial of words only in emphatic cases or, for some speakers, at the beginning of propositions.

This last fact is explained through the hypotheses developed here: a weak position doesn't trigger any consonantal epenthesis, therefore French doesn't display epenthesis at the initial of words. It tends to belong to the same type of languages as Semitic languages, according to the strength of the initial position.

Iambicity without stress in Kera

Mary Pearce, UCL & SIL, mary_pearce@sil.org

The Chadic language Kera (Ebert 1979, Pearce 1998, 2003) exhibits iambicity without stress. This paper argues that feet are constructed over a combination of light and heavy syllables, and that deletion and lengthening of vowels takes place as necessary to form the iambic feet (H) and (LH). We will consider inputs of the form /CVCV/, where in phrase-medial position, the final vowel is deleted, giving a monosyllabic, heavy foot (CVC). In phrase-final position, the second vowel undergoes iambic lengthening, giving an output (CVCV:). The input form is retained when the definite article -ŋ is added (CVCVŋ).

/bɛgɛ/	phrase-medial:	[bɛg nuutu] *animal his*	'his animals'
	phrase-final:	[bɛgɛ:] *animal*	'animals'
	definite article:	[bɛgɛŋ] *animal-DEF*	'the animals'

In disyllabic feet, the contrast between the two vowels is maximised, causing shortening in the non-head vowel as well as lengthening in the head vowel. This claim will be supported by acoustic duration measurements. This result would be expected from the Iambic/Trochaic Law of Hayes (1985). We will also consider alternative accounts of iambs and trochees as given by Kager (1993, 1995), Van de Vijver (1998), and Mellander (2004) and an OT account of Kera iambic feet which gives the ranking: SWP, LAPSE » DEP-μ, MAX-V. The relative ranking of DEP-μ and MAX-V interact with phrasal constraints that choose either [bɛg] or [bɛgɛ:] in different phrasal environments.

As well as lengthening, deletion and shortening, other clues to the iambic nature of Kera are found in the system of vowel allophony and the domains of vowel harmony and tonal/voice spreading. Previous work on Chadic (Newman 1972, Roberts 2001, Wolff 2001, Jagger and Wolff 2002) makes few references to Chadic metrical structure, but foot structure is clearly a central part of Kera phonology, and Kera can be added to the list of languages with foot structure in the absence of overt stress.

Final empty nuclei: evidence from a Serbo-Croatian language game (šatrovački)

Olivier Rizzolo, Université de Nice-Sophia Antipolis, rizzolo@unice.fr

The goal of this talk is to show that the functioning of a Serbo-Croatian language game known as šatrovački calls for the existence of empty nuclei after word-final consonants.

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

(2) The data that are presented come from work with "native" speakers of šatrovački that I have conducted in summer 2004. The corpus collected contains 194 words.

(3) 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' > *dəle*, *beč* 'Vienna' > *čəbe*, *vic* 'joke' > *cəvi*.

(4) Different analyses may be thought of :

a. a lexicalist solution: schwa is underlyingly present after word-final consonants. This is rather unlikely since schwa is not present in the phonemic inventory of S-C.
b. it must thus be regarded as epenthetic: schwa is inserted in order to break up initial consonant clusters such as *#čb, *#dl or *#cv, which are systematically produced by C_1VC_2 > C_2C_1V. This solution, however, does not account for the fact that the insertion always occurs in the same location: *$əC_2C_1V_1$, e.g. *beč* > **əčbe*, would do as well.
c. the analysis under b. may be associated to a typological reasoning of the kind that OT embodies in the constraints ONSET and NOCODA: CVCV is way more unmarked than VCCV since, unlike VCCV, it does not incur a violation of either constraint. Still, S-C knows restrictions on #CC: *#dl or *#čb for example are ill-formed. So does šatrovački. Such clusters are systematically broken up (see examples under (3)). How to explain, then, that perfectly licit S-C clusters such as, say, #sp, or #cv (e.g. *sposoban* 'capable', *cvet* 'flower') are broken up in šatrovački : vic > *cəvi,*cvi, pas* 'dog' > s*əpa, *spa*. Therefore, the reason for schwa insertion is not to be sought in constraints on initial clusters.

(5) My proposal is the following : the solution lies in the acknowledgement of final empty nuclei. 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: $C_1VC_2ø$ > $C_2øC_1V$, then vocalisation of the empty site, ø > ə.

Stress placement in Nuuchahnulth.

Ben Thorp, University of Newcastle-upon-Tyne. (ben.thorp@ncl.ac.uk)

Previous literature broaching the subject of stress patterns in Nuuchahnulth presents somewhat conflicting opinions. Although generally accepted is the locating of primary stress within the first two syllables of the word, other aspects of the stress system remain disputed. Indeed, even primary stress location does not find unanimous agreement: all concur that stress should fall within the first two syllables, but upon *which* syllable remains unclear. The general rule asserts that:

> *Primary stress in Nuuchahnulth falls on the first syllable unless the second syllable is heavy and the first is light, in which case it falls on the second.*

Consequently, it is deemed that in cases where syllable weight is equal in both the first two syllables, the first syllable will receive stress. This is a view expressed by Stonham (1999, to appear) and Wilson (1985).

ʔúːsimc'aƛ	*'now trained at such-and-such'*
t'asíːʔak'i	*'his door'*
tíqʷiɬʔaƛ	*'now he sat down'*

(from Wilson (1985))

However, Waldie (2003) challenges this assertion, claiming that in situations of two equally weighted initial syllables, either may receive stress.

tána?is	*'child'*
nawáyas	*'someone hanging around outside'*

(from Waldie (2003))

In this paper I examine the stress system of Nuuchahnulth, developing the argument that either of the first two syllables may be stressed as observed in Waldie (2003). However, I explore the possibility that this optionality is not entirely arbitrary and suggest that the selection of the stress-bearing syllable may be discerned from a closer analysis of the internal construction of the syllable. Key to this investigation are firstly the sequences of V?V, which exhibit tendencies to influence stress assignment; and also the idea of an expanded weight hierarchy which identifies criteria for weight beyond length of vowel. This concept is an expansion of a proposal in Stonham (1999) in which he posits that coda-nasals are, in fact, intimately linked with the nucleus of the syllable and so possess moraic properties which consequently cause such VN clusters to behave as heavy syllables during the assignment of stress.

I attempt to implement Nuuchahnulth's stress system within a (stratal) OT framework, proposing that the language employs a multi-tiered moraic level. The overall aim of the paper is to establish a definitive analysis of Nuuchahnulth's stress system.

References

Stonham, J. To appear.
Stonham, John. 1999.
Waldie, Ryan. 2003.
Wilson, Stephen Andrew. 1985.

The double life of clusters: both complex and simple?

Marianna Tóth (masa@nytud.hu), Eötvös Loránd University, Budapest

In English some unstressed vowels preceding word-final non-coronals systematically fail to reduce: *dialog* ˈdaɪəlɒg (cf Ross 1972). This means that the pattern əg# is entirely missing, while some coronal consonant clusters are licit in the very same context: *moment,* ˈməʊmənt. The table below summarizes the search results in an electronic database of 70000 words transcribed in Received Pronunciation. (N is unspecified for place, always agreeing with the following stop. 1 əlt = *difficult*, 2 əld = *herald*, *emerald*, 2 əb = *scarab*, *cherub*).

	t	p	k	d	b	g
ə __#	✓	✓	✓	✓	2	—
əN__#	✓	—	—	✓	—	—
əl __#	1	—	—	2	—	—

Previous solutions to this anomaly range from additional minor rules amending the stress system (Ross 1972) to arguments evoking perception (to the effect that even though schwa gives weaker cues, the default coronal place can be easily recognized even without a full vowel preceding it) (Burzio in press). I am seeking an explanation in the represenation of the consonants in question using a model partly based on VC Phonology (Szigetvári 1999). The phenomenon is challenging because certain clusters seem to need less license than single segments. Therefore, some of the central questions are going to be: which dimension counts when we are looking at complexity? Melodic *and* skeletal? Does the same melodic configuration need more license if it is linked to more than one C positions? The governing C within a cluster is often argued to need 'extra' license to govern. Do certain single segments require even more? Under such an analysis then (partial) geminates are the reverse of contour segments: two C slots on the skeleton and one structured element bundle. The problem is worth examining in a larger context too, since in a model where the skeleton is made up of strictly alternating C and V positions the representations of the following consonantal and vocalic entities pair up: long monophthong/geminate, true heavy diphthong/partial geminate, hiatus/bogus cluster. Diphthongs and long monophthongs behave both as units and as structures made up of two parts: e.g. they count as two slots/moras for stress, but they can also alternate with one short segment. The dual nature of long vocalic entities is documented in various descriptive grammars. The inclusion of diphthongs in vowel systems is argued for and against. Clusters (not contour segments), however, are rarely if ever treated as parts of consonant systems. I intend to explore the parallels in detail — looking at the behaviour of these pairs on the system level — and to see where they break down.

Burzio, Luigi (in press) 'Phonology and Phonetics of English Stress and Vowel reduction.' To appear in *Language Sciences*. (http://www.cog.jhu.edu/pdf/Phonology%20and%20Phonetics.pdf)

Ross, John R. (1972) 'A reanalysis of English Word Stress.' in M. Brame (ed.) *Contributions to Generative Phonology*, University of Texas Press, Austin.

Szigetvári, Péter (1999) 'VC Phonology: a theory of consonant lenition and phonotactics.' unpublished PhD dissertation, Eötvös Loránd University, Budapest. (http://seas3.elte.hu/szigetva/papers.html)

Quality-Sensitive Accents in Ryukyuan

—A Unified Acoustic and Phonological Account Along With other Japanese Dialects—

Yuko Z Yoshida

yuyoshid@mail.doshisha.ac.jp

SOAS / Doshisha University

This phonological analysis backed by acoustic study reports that the Ishigaki, one of the Ryukyu dialects, conforms to a quality-sensitive accent system which reflects the vowel duration. This new analysis provides a unified account for quality-sensitivity in the Kyoto dialect and Standard Japanese. For this paper, a field study of data from this lesser known Ishigaki dialect recorded in 1967 on gramophones is digitalised to enable us to obtain acoustic measurements of the vowels in the dialect.

A close phonological and acoustic study of the 4 short vowel inventories, /a, i, u, ï/, in the Ishigaki dialect reveals that the longest - /u/ - attracts lexical accents most. Acoustic measurement of vowel durations reveals also that /e/ and /o/ in the vowel inventory reported in earlier descriptive studies of the dialect in fact hardly appear as short vowels unlike the other four (formerly mentioned) vowels. Phonological analysis of the data also reveals that /e/ and /o/ only appear as the result of a phonological process, e.g. fusion.

A proposal is made extending the theory of Phonological Elements (Kaye, Lowenstamm & Vergnaud 1985 & 1990, Harris & Lindsey 1995, Charette & Göksel 1996). Specifically, the licensing potential of Phonological Expressions (segments) consisting of 3 Elements A, I and U, either on their own or in combination, is projected to the prosodic level to determine the head location of the word domain. Along with the claim, two constraints are proposed for the Ishigaki dilect: 1) Simplex expressions (U) are headed, and 2) No complex PE is allowed on a single timing slot. This explains the fact that combinations of the elements, /ï/ (I.U), /e/ (A.I) and /o/ (A.U) on single timing slots are not preferred in this dialect: /ï/ alternates with other high vowels in the dialect as acoustically attested in this paper, and the two other combination expressions, /e/ (A.I) and /o/ (A.U), are only permitted when occupying two timing slots, resulting in long vowels.

The above analysis provides a clue for a better modelling of the more general tendencies in prosodic information of native words in Standard Japanese (SJ) and the Kyoto dialect. These dialects are also quality-sensitive and the location of lexical accents on words of smaller size, which were believed to be inherently lexical, is now better understood. In these two dialects again, new acoustic measurement of accented and unaccented vowels shows that the longer the duration of a vowel, the better the likelihood of the vowel to attract accents. As for SJ, /a/ and /i/ show a strong tendency to carry lexical accents in native SJ nouns. However, /u/ in SJ is the least common accent-bearing vowel in Standard Japanese. This shows a striking contrast in other dialects in discussion: the Kyoto and Ishigaki dialects both with rounded /u/, have preference for locating an accent on /u/. Rounding relates closely to the duration of /u/: SJ /u/ being unrounded, repels accents, and the round /u/ in the Kyoto & Ishigaki, which is much longer than the unrounded counterpart in SJ, attracts accents. In PE terms, presence/absence of its salient property ROUND (lowered F2 in acoustic terms) reflects the headedness of the simplex PE, headed (U) and headless (U). Headed (U) in the Ishigaki and Kyoto dialects projects its licensing potential to the word domain whereas the headless counterpart in SJ, (U), does not.

The final remark centres round scarcity of word-initial /e/ in the Kyoto dialect and SJ in reference to the constraint (2) above of the Ishigaki dialect.

Special session

What is a phonological fact?

Speakers (abstracts in alphabetical order)

Juliette Blevins (Max Planck Institute for Evolutionary Anthropology)

Final Devoicing: A Family of Facts

Phonology is the study of sound patterns in the world's languages. These patterns include overall properties of contrastive sound inventories, as well as patterns determining the distribution of sounds or contrastive features of sounds and their variable realization in different contexts. One kind of phonological fact is what we might call a *psychological fact*: a speaker's implicit knowledge of these sound patterns, as evident in extensions to novel items, or as indicated by experiments probing phonological categorization and well-formedness. A very different kind of phonological 'fact' is the *descriptive fact* in phonological typology: some sound patterns do not occur, others are rare, others are recurrent, and still others are universal. Explaining recurrent sound patterns is one common goal of phonological theory, and yet, evidence of a speaker's implicit knowledge of sound patterns rarely moves us closer to understanding why certain sound patterns recur with greater than chance frequency across the world's languages. Many explanations are also put forth without a detailed synchronic and diachronic typology of the sound pattern under study. In this paper, I highlight the importance of descriptive facts in phonological theory. I demonstrate that final obstruent devoicing is a recurrent sound pattern demanding explanation, and describe a constellation of properties, synchronic and diachronic, associated with this sound pattern. I suggest that the family of facts associated with final devoicing is best understood in terms of an evolutionary approach, where final devoicing is an emergent sound pattern. This contrasts with the inadequacy of innatist approaches, which posit specific phonological knowledge favoring final devoicing. Along with clarifying cross-linguistic properties of final devoicing, this case study provides a model of the general usefulness of detailed typologies in understanding the nature of recurrent sound patterns.

Bruce Hayes (University of California, Los Angeles)

"These are a few of my favorite facts": advances in phonology from new data sources

I discuss three new methods of data gathering in phonology:

- new kinds of phonological experiments, particularly those involving learning of artificial languages
- data corpora—now often very large, and gathered from the Web
- automated searching for phonological environments

I will try to show that these methods offer novel ways to address important questions in phonological theory. These questions include:

- the possible existence of a priori biases, perhaps from UG, in phonological learning
- the active role of phonetics in shaping phonology
- the degree of detail of the native speaker's phonological knowledge.

Charles Reiss (Concordia University)

Facts about phonologies *vs*. phonological facts

In this talk, I try to defend the idea that a claim that is true about phonological systems does not necessarily reflect a phonological fact. True generalizations may be due to the nature of phonological acquisition or the nature of systems interfacing with phonology. Recognizing these non-phonological factors can give us insight into how phonology should be pursued.