OCP6

The Sixth
Old World Conference in
Phonology

ABSTRACTS BOOKLET

22nd – 24th January 2009

University of Edinburgh

With support from the British Academy and the Linguistics Association of Great Britain

This booklet contains the abstracts for all the papers presented at the **Sixth Old World Conference in Phonology**, held at the University of Edinburgh, in January 2009.

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

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

The **programme**, included in your registration pack, gives the timetable for the talks and the locations of the sessions.

Oral papers

Affricates in early word recognition: complex segments or not?

Nicole Altvater-Mackensen & Paula Fikkert, Radboud University Nijmgen, n.altvater@let.ru.nl

German has labial and coronal affricates. Although their exact phonological nature is still under debate (e.g. Hall 2000, Wiese 1996), it is widely accepted that affricates are complex segments combining stop and fricative features within one segment. The special status of affricates in the phonological system of German is reflected in development: affricates appear much later in children's productions than simple obstruents; they are often replaced by fricatives or substituted by stops (Elsen 1991). We might speculate that children's difficulties with affricates are due to problems with the accurate representation of their segmental complexity. Infants who set up a system of lexical contrasts have several possibilities to deal with affricates:

(i) They might start with ignoring their internal complexity and focus on one part, only, by representing either just the stop or just the fricative features.

(ii) They might be aware of their internal complexity and represent both, the stop and the fricative part of the segment.

Perception data might help to shed light on this issue. Recent research has shown that 18 month-olds detect mispronunciations of well-known words, if an initial fricative is replaced by a stop, but not vice versa (Fikkert et al. 2008 for Dutch, Mani & Plunkett 2008 for English). Fikkert and colleagues explain the asymmetric results by assuming underspecification of stops: A perceived fricative does not mismatch a target stop, which has no marked features for manner of articulation; in contrast, a perceived stop is a mismatch to a specified feature [continuant] for target fricatives. Depending on their phonological representation, we might expect similar asymmetric results for mispronunciations (MPs) involving affricates:

(iii) If children initially ignore the internal complexity of affricates and just focus on the fricative part (being the most salient feature), we expect a behavior corresponding to fricatives: we expect (a) that children detect MPs from affricate to stop, but not vice versa; and (b) that they do not detect MPs from affricate to fricative, or vice versa.

(iv) If children just focus on the stop part of an affricate and ignore the fricative part, we expect a behavior corresponding to stops: we expect (a) that children detect MPs from fricative to affricate, but not vice versa; and (b) that they do not detect MPs from stop to affricate, or vice versa.

(v) If children are aware of the internal complexity of affricates and represent both, the stop and the fricative part, we expect (a) that they detect MPs from fricative to affricate; and (b) that they detect MPs from affricate to stop.

So far, we tested 12 South-German 22 month-olds in a mispronunciation detection task, using a preferential looking procedure (Swingley & Aslin 2000). Children were presented with correctly pronounced and mispronounced well-known words with initial affricate, fricative or stop. MPs included fricatives and stops for affricate targets (i.e. ***Ferd*** and ***perd*** for ***Pferd***, horse), affricates and stops for fricative targets (i.e. ***Pfisch*** and ***Pisch*** for ***Fisch***, fish), and affricates and fricatives for stop targets (i.e. ***Pfuppe*** and ***Fuppe*** for ***Puppe***, doll). Our preliminary results suggest that children:

(vi) recognize MPs from fricative to stop, but not vice versa;

(vii) are sensitive to MPs from affricate to stop, but not vice versa;

(viii) do not detect MPs from fricative to affricate, or vice versa.

These results fit the predictions in (iii) made on basis of the assumption that children initially ignore the internal complexity of affricates and just focus on the fricative part. We will test additional children to improve the reliability of the results; and we will test infants' sensitivity to affricates, fricatives and stops in a discrimination task to make sure that the pattern observed is not due to perceptional problems.

Cyclic domains and prosodic spans in the phonology of European Portuguese functional morphs

Ricardo Bermúdez-Otero
University of Manchester
&
Ana R. Luís
Universidade de Coimbra

Stratal Optimality Theory imposes tight restrictions upon cyclic effects in phonology. Notably, each cyclic domain must be exactly coextensive with a grammatical constituent (cf. Inkelas 1989): indeed, each grammatical word must define a word-level phonological domain. Similarly, phonological processes applying within smaller cyclic domains must serially precede processes applying within larger domains. From these restrictions it is often possible to deduce precise empirical predictions about the division of labour between cyclic and prosodic effects in instances of morphosyntactic conditioning in phonology. One such instance is the phonological behaviour of functional morphs in European Portuguese, where a striking consilience of morphosyntactic and phonological arguments corroborates the predictions of Stratal Optimality Theory.

Morphosyntactic evidence shows that, in European Portuguese, a pronominal enclitic cluster belongs to the same grammatical word as its verbal host, whereas a pronominal proclitic cluster lies outside the grammatical word containing the verb (Luís forthcoming): enclitics, but not proclitics, trigger arbitrary allomorphy in the verb; proclitics, but not enclitics, take wide scope over coordination; and proclitics, but not enclitics, can be separated from the verb by certain X^0 constituents. This entails that enclitics combine phonologically with the verb at the word level, whereas proclitics do so at the phrase level.

However, the phonological behaviour of enclitics differs markedly from that of demonstrably word-level suffixes: unlike the latter, enclitics are stress-neutral, fail to block nasal glide insertion, fail to trigger front vowel centralization before palatals, and violate phonotactic conditions on the distribution of [ʎ]. In a strictly tristratal model (e.g. Kiparsky 2000, Bermúdez-Otero forthcoming), this leaves no alternative to postulating a prosodic difference between word-level suffixes and pronominal enclitics: suffixes incorporate into the prosodic word (ω), whereas enclitics Chomsky-adjoin to ω (Luís 2006).

Gratifyingly, this result can be verified independently. Evidence from stress demonstrates that, like enclitics, word-level prefixes Chomsky-adjoin to ω (Vigário 1999a). This entails that, except for their direction of phonological attachment, prefixes and enclitics should exhibit identical junctural properties, and indeed they do so. At prefix-stem and verb-enclitic boundaries, a hiatus between [ə] and a following vowel is always resolved by [j]-insertion; [ə]-deletion does not apply. In contrast, [j]-insertion competes with variable [ə]-deletion at the boundary between two content words, between a pronominal proclitic and the following verb, or between a forward-leaning function word like the preposition *de* 'of' and its host. This fact bears out the prediction that prefixes and enclitics should behave identically, and in addition reveals that hiatus resolution by [j]-insertion at the word level bleeds variable [ə]-deletion at the phrase level.

Remarkably, this last result provides phonological confirmation for the assignment of pronominal proclitics to the phrase level, which we established above on morphosyntactic grounds. Evidence from relative rates of [ə]-deletion diagnoses a contrast between the complementizer *que* 'that', on the one hand, and proclitics and prepositions, on the other (Vigário 1999a). Since all these elements are phrase-level, their difference must be prosodic: *que* attaches under a φ-node, whereas proclitics and prepositions Chomsky-adjoin to ω. But, in turn, if both prefixes and proclitics Chomsky-adjoin to ω, then their junctural differences must be explained cyclically: prefixes cannot trigger phrase-level [ə]-deletion because they undergo [j]-insertion at the word level, whereas proclitics can because they do not attach until the phrase level.

The analysis afforded by Stratal Optimality Theory enjoys several advantages. First, it relies on a restrictive version of prosodic theory: appeal to the clitic group is obviated (cf. Vogel 2007); reference to ω-projections suffices (Itô and Mester 2007). Secondly, it exactly converges with the morphosyntactic evidence on the demarcation of grammatical words in European Portuguese (cf. Vigário 1999a, 1999b). Thirdly, it does not require the recognition of so-called 'special clitics' (Zwicky 1977) as a separate grammatical category distinct from words and affixes (Bermúdez-Otero and Payne forthcoming; cf. Anderson 2005).

Variation (and some change) we can believe in: modularity in phonological theory

Sylvia Blaho & Curt Rice
CASTL, University of Tromsø
sylvia.blaho/curt.rice@hum.uit.no

This paper addresses the methodological issues regarding the modelling of variation in phonological theory. Following Chomsky's (1986) distinction between I-language and E-language, we define I-phonology as the study of possible and impossible grammars and the principles that govern them, while E-phonology deals with domains like phonetic variation, sound change or sociolinguistic factors. Under this view, the study of E-phonology involves a different the set of theoretical tools than the study of I-phonology.

We review two approaches that aim to account for variation using the mechanisms of phonology: a representational account by van Oostendorp (2007) and the floating constraint model of Antilla (1997, ff.). Van Oostendorp sets out to tackle a well-known problem of Dutch phonology. While final devoicing has traditionally been assumed to be categorical, recent research by Ernestus & Baayen (2006) has shown that it is incomplete and variable. In the context of Turbidity Theory (Goldrick 2000), van Oostendorp (2007) proposes three phonological categories: [voice] is (i) projected and pronounced, (ii) neither projected nor pronounced, (iii) projected but not pronounced. The first two of these categories are mapped onto non-gradient phonetics, giving full voicing and complete voicelessness, respectively. The third category, however, is mapped onto gradient phonetics and realised with partial devoicing.

i. *voiced*	ii. *variably voiced*	iii. *devoiced*
×	×	×
↑↓	↑	
voice	voice	voice

In this way, van Oostendorp implies that gradience can be modelled by increasing the number of categories. But, crucially, the model also requires the *mapping of a discreet phonological category onto gradient phonetics*. Once this is allowed, then his third category is unnecessary. Under a modular view of phonology, the dilemma is resolvable by mapping the 'projected and pronounced' representation ((i) above) onto gradient phonetics, such that the phonetic realisation of the feature will vary based on its phonetic context. Thus, final devoicing is Dutch is a phonetic phenomenon, and it is not represented in phonology.

In Antilla's model, variation is produced by partially fixed constraint rankings: some constraints are allowed to 'float', i. e., appear in different places in the hierarchy. The number of empirically identical grammars produced by such a ranking correlate with the likelihood of the form they produce. Thus, the wider the range of the float, the more fine-grained predictions the model produces. However, this also means that widening the range that a constraint can float across leads to more fine-grained predictions *even if the floating constraint does not interact with the constraints in the extended range*. Moreover, given that the constraint set is assumed to be universal, all languages should display the same percentages for variation – a prediction that is counter-intuitive at least.

We propose that constraint ranking should only account for possible and impossible grammars, and, when attempting to model variation and optionality, another toolset should be used. A case in point is Stochastic OT (Boersma 1998 ff.), a model that reflects the frequency of linguistic variants but does not suffer from the shortcomings of Antilla's account.

Finally, we present an integrated view of first language acquisition and adult language change. We argue that the same learning algorithm that makes first language learning possible can be used in language change to acquire the grammar of peers or even a hypothetical target in the case of innovation.

Old English Breaking as tongue root retraction

Bert Botma & Colin J. Ewen
Department of English/LUCL, University of Leiden
e.d.botma@let.leidenuniv.nl; ewen@let.leidenuniv.nl

The prehistoric diphthongisation process referred to as Old English Breaking (OEB) continues to defy a phonologically satisfying analysis, at least with respect to the relationship between the environment which apparently triggered the change and the nature of the diphthongisation process itself. A recent proposal is offered by Davenport (2005), who characterises the sound change as follows: "OEB was a diphthongisation process affecting both the long and short front vowels of OE (that is, long and short /i e æ/) when these were followed by either (i) a cluster initiated by a liquid /l r/ or (ii) the velar fricative /x/ (with or without a following consonant). In these environments a back vowel is epenthesised between the front vowel and the triggering consonant(s)". Representative data given by Davenport include OE *eald* 'old' (cf. OHG *alt*), OE *weorþan* 'to become' (OHG *werden*) and OE *leoht* 'light' (OHG *lihti*). Following e.g. Lass & Anderson (1975), Davenport assumes that the original epenthesised vowel was [u], "which subsequently harmonised to the height of the input front vowel", a process referred to as Diphthong Height Harmony (DHH). This analysis corresponds to accounts found in handbooks and other philologically oriented work, e.g. Hogg (1992: §§5.16–5.34).

As already indicated, questions which typically arise with respect to OEB concern firstly the environment: (a) to what extent can /l r x/ be said to form a natural phonetic/phonological class?, and (b) what is the import of the requirement that the sonorant triggers be followed by another consonant? Davenport attempts to account for both problems in terms of syllable structure, such that /l r/ are in the coda only when they trigger breaking, whereas /x/, which is banned from onset position by a phonotactic constraint, is always in the coda. The second problem concerns the nature of the epenthesised vowel: (a) is the insertion of [u] (or perhaps [o]) a reasonable transition between the front vowel and the various consonants which constitute the environment?, and (b) is the output of the subsequent change caused by DHH one that might be expected?

In this paper, we investigate whether the traditional treatment of the triggering environment as involving a single phonological property, 'backness', can be maintained and if so, whether the analysis of the change as involving the insertion of a high back vowel is plausible. We approach this by examining a phonological system which in the relevant respects appears to be similar to that of OE, i.e. Standard Dutch as spoken in the *Randstad* (cf. Smakman 2006), where we find diphthongisation before /l r/ in coda position, with the epenthetic vowel being central or back. Significantly, the realisation of the dorsal fricative is overwhelmingly uvular, i.e. [χ]. We postulate (a) that the likelihood of epenthesis before [χ] is greater than before [x] (cf. Gick & Wilson 2006), (b) that a schwa-like transition is more probable in the environment / V[–back] __ [ɬ ɹ χ] than e.g. [u], (c) that this analysis is plausible for OEB. We offer an analysis in which the three triggering consonants share a phonological property (tongue root retraction, or 'dependent |A|').

Davenport, Mike (2005). Old English Breaking and syllable structure. In Philip Carr *et al*. (eds.) *Headhood, elements, specification and contrastivity: a phonological Festschrift for John Anderson*. Amsterdam: Benjamins. 63–76.

Gick, Bryan & Ian Wilson (2006). Excrescent schwa and vowel laxing: cross-linguistic responses to conflicting articulatory targets. In Louis Goldstein *et al*. (eds.) *Papers in laboratory phonology 8: varieties of phonological competence*. Berlin: Mouton de Gruyter. 635–659.

Hogg, Richard M. (1992). *A grammar of Old English.* Vol. 1: *Phonology*. Oxford: Blackwell.

Lass, Roger & John M. Anderson (1975). *Old English phonology*. Cambridge: Cambridge University Press.

Smakman, Dick (2006). *Standard Dutch in the Netherlands: a sociolinguistic and phonetic description*. Ph.D. dissertation, Radboud Universiteit Nijmegen.

Sign-Based Morphology and Destructive Alterations in Berber

Patrik Bye, University of Tromsø

Sign-Based Morphology (SBM; Orgun 1996) has received increasing attention in recent years with applications to opacity, reduplication (Inkelas and Zoll 2005) and, most recently, infixation (Yu 2007). To date, however, there has been no significant SBM work on 'destructive' alterations like subtraction and ablaut — doubtless due to SBM's fundamentally declarative character (cf. Scobbie et al. 1996). In this talk, I will address how destructive alterations can be accommodated within this approach using examples from Tarifit Berber (Kossman 2000), a language with rich apophony. The solution to destructive alterations, I argue, is a layered representation consisting of a lexical (underlying), a morphological and an OT phonological layer. (Cf. Oostendorp (2007) on encoding morphological affiliation in the phonology.) Apparently destructive alterations are assigned to the morphological layer, leaving the information contained within the lexical layer intact and accessible to morphological processes (for purposes of allomorphy governed by underlying properties, and so on). Unlike earlier implementations of SBM, the present proposal does not countenance co-phonologies, in the sense of potentially different rankings of CON for each layer. Evaluation against extrinsically ranked universal constraints takes place exclusively on the phonological layer. Constraints at the morphological layer, however, are largely language-specific and declarative (or only interact intrinsically).

The introduction of a morphological layer has several desirable consequences. First, it allows us to maintain a principled separation of the universal constraints in CON and language-specific constraints. Second, Faithfulness constraints evaluate disparities between the phonological and morphological layers, not the lexical layer directly, such that subtraction and ablaut do not incur violations of Faithfulness (*contra* e.g. Wolf 2007). This allows us to rein in the number of phonological constraints, and makes it unnecessary to assume a typologically suspect dominance over the root by the affix or morphological process (reversal of RTFAITH≫AFXFAITH).

This talk will explore the concepts of layering and morphological declarativeness with reference to the formation of the negative preterite form of the verb in Tarifit. The exponent of the negative preterite is {i}, but its position depends on the shape of the verb root. Although complicated at first glance, this variation in position may be reduced to just two intrinsically ordered allomorphs. If the root ends in /a/, it is ablauted to {i}, e.g. $\sqrt{\text{ggnfa}}$+NEG.PRET→*ggənfi* 'to heal'; $\sqrt{\text{ɣufa}}$+NEG.PRET→*ɣufi* 'to smother'. (The disparity with the underlying form (root) arises at the morphological layer, and thus implies no violation of IDENT.) Elsewhere, {i} must directly follow the second radical of the root and must be adjacent to the final radical (either to its left or right). On the surface, this manifests itself in a variety of different behaviours. Triradicals show infixation, e.g. $\sqrt{\text{g}_1\text{g}^{\text{w}}{}_2\text{ð}_3}$+NEG.PRET→*gg*$^{\text{w}}$*ið* 'to blame'; $\sqrt{\text{ṣ}_1\text{m}_2\text{ḍ}_3}$+NEG.PRET→*ṣmiḍ* 'to be cold', but in biradicals {i} turns up as a suffix, e.g. $\sqrt{\text{k}_1\text{k}_2}$+NEG.PRET→*kki* 'to go'; $\sqrt{\text{n}_1\text{ɣ}_2}$+NEG.PRET→*nɣi* 'to kill'. In still longer roots, such as $\sqrt{\text{b}_1\text{b}_2\text{r}_3\text{ɕ}_4\text{n}_5}$ 'to blacken', the {i} cannot be realized without falling foul of at least one of the two absolute requirements on positioning just mentioned, e.g. **bbirɕən*, **bbərɕin*, both of which are phonologically fine. The declarative nature of morphological constraints entails that the negative preterite literally cannot be formed when the root exceeds three radicals and does not end in /a/. Indeed, the form used in these cases is identical to the aorist (here, *bbərɕən*), and I shall argue that when {i}'s arbitrary positioning requirements cannot be met, absolute ungrammaticality is the result, and recourse must be had to the morphologically less marked aorist form.

Biases in phonology: explaining variation in Scottish Gaelic preaspiration

Ian Clayton, University of North Carolina-Chapel Hill
iclayton@email.unc.edu

Through factorial typology, Optimality Theory predicts a range of theoretically possible grammars. However, factorial typology can result in overgeneration, e.g. by predicting unattested epenthetic repairs to *NC̥ (Pater 1999). There are two conflicting solutions. Some scholars assert that typology is due to *analytic bias*--innate cognitive factors--and thus that theory should be constrained to allow a tighter fit with typology, e.g. via the *P-map* (Steriade 2002). Other scholars argue instead that typology is best attributed to *channel bias:* some constraint rankings are unattested because the relevant *phonetic precursors* do not occur (Ohala 2005, Barnes 2002). Further, if a diachronic explanation for typology is available, to constrain theory is redundant and undesirable (Myers 2002). This paper supports the second view, drawing evidence from asymmetries in the typology of Scottish Gaelic (SG) preaspirated voiceless stops.

The historically preaspirated stops of early SG have undergone processes of *deaspiration* and *fortition* in the modern dialects, and now show at least six configurations:
1. [hp ht hk] 2. [p ht hk] 3. [p t xk] 4. [hp ht xk] 5. [hp xt xk] 6. [xp xt xk]
Deaspiration, or loss of preaspiration, preferentially targets labial stops (dialects 2, 3); fortition, or substitution of the voiceless velar fricative [x] for the glottal [h], preferentially targets velar stops (dialects 3-6). A naive analysis of deaspiration and fortition as repairs to *[hT] (a set of place-specific constraints against preaspiration) results in significant overgeneration; for instance, by ranking *[hk] above MAX instead of *[hp], deaspiration can be made to favor velar instead of bilabial stops.

A production experiment has identified robust phonetic precursors to both asymmetries. Eight native SG speakers were recorded reading a list of Gaelic words designed to elicit preaspiration in a range of phonological contexts. Analysis revealed two phonetic asymmetries mirroring the phonological asymmetries. First, there were sharp differences in the duration of the preaspiration cue: shortest before bilabial stops, longest before velars. Second, several speakers frequently omitted preaspiration cues altogether: most frequently before labial stops, least frequently before dorsals. Thus, articulatory factors can account for the typological asymmetries without recourse to theoretical formalizations such as the P-map.

By contrast, in order for the P-map analysis to resolve the overgeneralization problem, the projection and fixed ranking of faith constraints must be based on perceptual similarities between target and surface forms. This implies two perceptual scales, expressing (A) that the perceptual difference between [h] and [x] is greatest before [p], least before [k], and (B) that the difference between [h] and nil is greatest before [k], and least before [p]:

A. ID[h-x]/V_ p » ID[h-x]/V_t » ID[h-x]/V_k
B. MAX[h-Ø]/V_ k » MAX[h-Ø]/V_t » MAX[h-Ø]/V_p

Attested configurations like [p ht hk] would be permitted by these scales, but unattested ones like [hp ht k] are prohibited.

However, both (A) and (B) remain hypothetical. If they cannot be empirically confirmed, the P-map account fails altogether. If these scales can be confirmed, then the P-map account of asymmetries in SG preaspiration mirrors facts already emergent in the phonetics. Thus, the argument that the P-map and similar extensions to standard OT amount to recapitulations of phonetic facts has considerable merit.

Is metathesis phonetically-driven? Evidence from dialects of Polish

Bartłomiej Czaplicki
University of Warsaw
bczaplicki@uw.edu.pl

Various approaches have been proposed to deal with metathesis. Here I discuss two proposals that make reference to production and perception: phonetically-based sound change and language processing. Ohala (1981) and Blevins (2004) claim that all language change is diachronic and results from errors in transmission of sound patterns across generations. Furthermore, sound change is non-teleological and any apparent phonetic optimization happens by chance. The other functional model makes use of language processing in general and the difficulty of serial encoding in particular. Similar sounds are predicted to be difficult to encode in a serial sequence in perception and production (Frisch 2004).

Phonetically-based approaches to metathesis fall into four categories: perceptual, compensatory, coarticulatory and auditory (Blevins & Garrett 2004). Two of these are attested in Mazovian dialects of Polish (Friedrich 1955, Zdunska 1965). Perceptual metathesis applies to segments or features with elongated phonetic cues, such as rhotics. As rhotics have been shown to span domains up to three syllables long (Heid & Hawkins 2000), both local and long-distance metathesis is expected, e.g. [duršlak] → [druɕlak]. Regarding the directionality of metathesis, the process is anticipatory, rather than preservative. Moreover, in line with Blevins & Garrett (2004), in most cases the rhotic is moved to a more salient position. The data motivate the following scale of prominence: stressed prevocalic > stressed preconsonantal, unstressed. A very interesting case of perceptual metathesis involves rC_i onsets turning into C_irC_i onsets and can be classified as copying, e.g. [rdɛst] → [drdɛst]. The underlying factor is the difficulty of teasing apart the phonetic cues of the closures of the stop and the trill. This case lends support to the claim that sound change is non-teleological. Instead of optimizing the syllable structure, the [rd-] → [drd-] change adds to the count of sonority violations. The insertion and deletion of liquids, another type of non-optimizing perceptual metathesis, contributes to Steriade's (1990) overview and implies that listeners are aware of the long-distance resonance effects of /r/ and /l/ and can use them (West 1999).

Coarticulatory metathesis resulting from extreme gestural overlap is exemplified by [bɨdgɔštš] → [bɨgdɔštš]. In line with the directionality predicted in Blevins & Garrett (2004), the process yields non-coronal – coronal sequences. A smaller degree of gestural overlap between consonants of different manner features may give rise to an excrescent segment (Ohala 1974), as seen in [hɛnrɨk] → [hɛndrɨk] and [rusk'ɛ] → [rustk'ɛ].

There remain several cases of lexicalized metathesis that seem incompatible with the tenets of phonetically-based sound change. The obvious driver for [mɨɕl] → [mɨlɕ] and [katɛxism] → [katɛxmis] seems to be syllable structure. However, Blevins & Garrett (2004) dismiss such cases, arguing that syllable optimization is in fact a by-product of the increased perceptual salience of the transposed segments. More problematic is the transposition of segments with short phonetic cues, e.g. [wɔdɨgi] → [wɔgidɨ], [prɔtsɛsja] → [prɔsɛtsja] and [pɛrmanɛntnɨ] → [pɛrnamɛntnɨ]. Given the inapplicability of phonetically-based solutions, a plausible explanation is afforded by the approach involving the difficulty of the serial encoding of similar segments. I conclude that metathesis is a cover term that comprises (at least) two types of processes: those which can be explained phonetically and those which require a psycholinguistic account incorporating the difficulty of the processing of similar sounds. These approaches are non-teleological in that they do not involve syllable structure optimization.

Prosodic Words in early child German: Evidence from compounds

Angela Grimm, University of Frankfurt am Main
Grimm@em.uni-frankfurt.de

In many languages, the constituents of compounds form prosodic words of their own (Peperkamp 1997). For example, German compounds usually consist of two or more lexical and prosodic words (1a) whereas underived simplex words form a single prosodic word (1b) (cf., Raffelsiefen 2000):

	compounds		*simplex words*	
(1a)	$[[{}^{\prime}\text{Oster}]_F]_{PW}\ [[_{\iota}\text{ei}]_F]_{PW}$	'easter egg'	(1b) $[[_{\iota}\text{Ele}]_F\ [{}^{\prime}\text{fant}]_F]_{PW}$	'elephant'

This paper examines if early word productions from child German provide evidence for the alignment of lexical and prosodic words. The study takes as a starting point the well-attested finding that children's prosodic words are initially limited to a single foot (cf., Fikkert 1994, Demuth & Fee 1995, Demuth 1996). With respect to the acquisition of compounds, the restriction to a single foot gives rise to the following two hypotheses: (H_1), if children represent simplex words and compounds in an adult-like fashion, at some stage in development the restriction to a single foot may affect the individual constituents of compounds (2a) but targets simplex words as a whole (2b):

H_1:	*children's representation ≅ adult form*	*predicted child output*	*pred. size*
(2a)	$[[{}^{\prime}\text{Oster}]_F]_{PW}\ [[_{\iota}\text{ei}]_F]_{PW}$	$[[{}^{\prime}\text{Oster}]_F]_{PW}\ [[_{\iota}\text{ei}]_F]_{PW}$	2 F, 2 PW
(2b)	$[[_{\iota}\text{Ele}]_F\ [{}^{\prime}\text{fant}]_F]_{PW}$	$[[{}^{\prime}\text{fant}]_F]_{PW}$	1 F, 1 PW

The alternative hypothesis (H_2) states that children represent simplex words and compounds as single prosodic words. If so, they should undergo the same reduction processes (3a, b)

H_2:	*children's representation ≠ adult form*	*predicted child output*	*pred. size*
(3a)	$[[{}^{\prime}\text{Oster}]_F\ [_{\iota}\text{ei}]_F]_{PW}$	e.g., $[[{}^{\prime}\text{ei}]_F]_{PW}$	1 F, 1 PW
(3b)	$[[_{\iota}\text{Ele}]_F\ [{}^{\prime}\text{fant}]_F]_{PW}$	$[[{}^{\prime}\text{fant}]_F]_{PW}$	1 F, 1 PW

The study examines 1378 target simplex words and 555 target compounds produced by four German children. The data collection took place in a longitudinal setting during their second year of life. The main findings of the database are summarized below:

- Compounds emerged with two monopedal constituents at a time where truncation to a single foot persisted in simplex words (see also Fikkert 2001 for child Dutch).
- The children consistently preserved the main-stressed syllable from simplex words. By contrast, from compounds they maintained the first constituent containing the main-stressed syllable (e.g., /ˈOster-ˌei/ 'easter egg' > [ˈOster]), or the second one containing the secondary-stressed syllable (e.g., /ˈFarb-ˌkasten/ 'box of paints' > [ˈkasten]). This suggests that constraints preserving input syllables in the output (MAX-σ) overruled contraints requiring faithfulness to the main-stressed syllable of the whole word (FAITH-STRESS).
- Compound productions never fall below the minimal size of two syllables, whereas truncation to monosyllables was frequent in simplex words.

These findings are consistent with the hypothesis (H_1) that children assign different prosodic structures to simplex words and compounds. By contrast, the alternative hypothesis (H_2) predicts outputs not attested in the database (e.g., /ˈOster-ˌei/ > *[ˈei] or *[ˈosei]). By this, the study does not only provide crucial empirical insights into the underinvestigated area of the acquisition of compounds; it also shows that children align lexical and prosodic words from early on. The results support OT-approaches to language acquisition proposing that children's phonological representations are specified for their prosodic and morphological structure in an adult-like way.

Phonetic Enhancement in Feature-Driven Loanword Adaptation:
A case of Japanese speakers' perception of Korean stops

H. Kim, T. Kamiyama and P. Halle (Hongik Univ. & CNRS; hyunsoonkim@hotmail.com)

The notion of "enhancement" was originally employed to features which are associated with distinctive features (e.g., Stevens, Keyser & Kawasaki 1986; Stevens & Keyser 1989). Now it has been extended from enhancing features to enhancement gestures which are not featural in origin, yet being affiliated with feature gestures (e.g., Keyser & Stevens 2001 ; Stevens & Keyser 2006). In the present study, we provide a piece of evidence for the latter interpretation of "enhancement" based on our perception experiments of how Japanese speakers perceive the Korean stops /t, t^h, t'/.

In a recent study on loanword adaptation between Japanese and Korean, Kim (2007, 2008) has proposed the enhancing role of L2 acoustic properties in L1 feature-driven perception of L2 sounds. For example, in word-medial position, Korean voiceless lenis plosives, which tend to get voiced in intervocalic position, are borrowed as voiced into Japanese; aspirated and fortis plosives as voiceless plosives, just like the word-initial Korean consonants which are all voiceless. Based on the adaptation data, Kim (2007, 2008) has suggested that Japanese speakers perceive Korean stops in terms of whether or not the vocal folds vibrate, and that this Japanese perception is driven by the Japanese laryngeal feature [±voice]. As to phonetic attributes such as closure duration and F0 values of a vowel after consonant release (related to glottal tensing), not aspiration (VOT), they are proposed to come into play to enhance the Japanese listener's perception of voicing contrast ([±voice]) in borrowing Korean stops.

In order to verify the proposal, we conducted perception experiments. We used nonsense words of the form *mV1CV2* (/mata/, /mat^{h}a/, and /mat'a/), in which the three-way phonation contrast of Korean stops appears word-medially. These materials were recorded in a carrier sentence by a native speaker of Seoul Korean. For the lenis stop /t/, some voicing murmur was observed within 20-30 ms after V1 offset. No such voicing was observed for /t^h, t'/; the fortis-stop sequences were characterized by a very long closure portion for /t'/ (together with very short V1 and V2), a high F0 at V2 onset, and a high-falling energy contour on the syllable /t'a/; the voiceless aspirated-stop sequences also had a high F0 at V2 onset but no increased energy on /t^ha/; their more salient characteristic was a long stop release with substantial aspiration. We manipulated closure duration (CD), F0 contour, stop releases (modifying either spectral structure or duration), first or second vowel duration, presence/absence of voicing murmur at the beginning of closure, and energy contour. The rationale of the manipulations was to apply to the sequence with a stop of one type (lenis, fortis, or aspirated) one or two parameters from another type. Our results showed that aspiration does not affect Japanese perception of voicing contrast, and that (a) the longer closure duration, the higher F0 in a stimuli with no vocal fold vibration in /t^h, t'/, the more Japanese listeners perceive the consonant as voiceless; (b) the shorter closure duration, the lower F0 in a stimuli with vocal fold vibration in /t/, the more Japanese listeners perceive the consonant as voiced.

Given the results, we suggest that the presence/absence of vocal fold vibration is a primary cue of the Japanese laryngeal feature [±voice] when Japanese speakers perceive Korean stops and that the phonetic properties in Korean stops –closure duration and F0 (both of which have no featural status in Japanese) – have an enhancing role in Japanese speakers' perception of voicing contrast ([±voice]), supporting Kim (2007, 2008). As some theoretical implications, we can say that our present study empirically supports the recent notion of "enhancement" (e.g., Stevens & Keyser 2006) and that the notion can be further extended from within a language to interlanguages, as in loanword adaptation between Japanese and Korean.

Deriving Local Optionality: Harmonic Serialism and Phonological Variation

Wendell Kimper // University of Massachusetts, Amherst // wkimper@linguist.umass.edu

A variable phonological process is *locally optional* if the choice of variant may be different at each locus within a single form. For example, a Minor Phrase (MiP) in Bengali may be either a single word or a larger XP (Hayes and Lahiri, 1991), and within a given domain both preferences may be instantiated simultaneously, as in (1b-c). Evidence for these forms comes from a L*H% pitch contour and the domain of assimilation processes.

Variation of this sort poses a vexing problem for Optimality Theory (OT). A multiple-rankings theory of variation (e.g., Anttila (1997); Boersma (1997)) predicts that variation should be *global* (Riggle and Wilson, 2005; Vaux, 2003). If the ranking chosen at Eval favors single-word MiPs, this preference should be expressed consistently throughout the entire domain. Candidates which mix and match variants, like (1b-c), are harmonically bounded unless ad-hoc constraints are introduced.

The solution to this problem is Harmonic Serialism (HS), a derivational version of OT with independent typological advantages (Prince and Smolensky, 1993/2004; McCarthy, 2000, 2002, to appear). In HS, Gen may only produce candidates that differ from the input by one single change (e.g., build one MiP). Eval applies to this limited set, and the output becomes the input of a new Gen→Eval loop. This process continues until the derivation converges (when the faithful candidate is optimal).

HS predicts local optionality when combined with a multiple-rankings theory of variation, in which some total order is imposed on the language's constraint hierarchy at each invocation of Eval. In HS, Eval is invoked multiple times within the derivation of a single form, and a different total order could be selected at each step; variation is thus possible *within* a given form. A derivation that results in (1b) is given in (3). At Step 1, the total order selected at Eval results in a single-word MiP. This is the input to Step 2, where a new total order results in a MiP encompassing all unparsed material. Derivations resulting in the attested forms in (1) are shown in (4), and unattested forms like *(kʰub)(ʈɔk gur-er)(jonno)* are eliminated with directional parsing (Align constraints).

Unlike Riggle and Wilson (2005)'s account, this solution requires no special mechanism particular to the task. Both HS and multiple-ranking theories are independently motivated, and local optionality follows from their combination. Because this does not rely on proliferating constraints, it extends correctly to inputs of increasing length.

(1) *[[[[kʰub] ʈɔk] gur-er] jonno]*
very bad molasses of
"of very bad molasses"

Attested Parses:

a. (kʰub ʈɔk gur-er jonno)
b. (kʰub ʈɔk gur-er)(jonno)
c. (kʰub ʈɔk)(gur-er)(jonno)
d. (kʰub)(ʈɔk)(gur-er)(jonno)

(2) Exhaustivity(MiP): Assign one * for every Prosodic Word not parsed as part of some MiP.

*WeakWord: Assign one * for every PWd parsed as a dependent in some MiP.

(3) **Step 1**

kʰub tɔk gur-er jonno	*WkWd	Exh
a. (kʰub tɔk gur-er jonno)	***	
b. (kʰub tɔk gur-er) jonno	**	*
c. (kʰub tɔk) gur-er jonno	*	**
d. ☞ kʰub tɔk gur-er (jonno)		***

Step 2

kʰub tɔk gur-er (jonno)	Exh	*WkWd
a. ☞ (kʰub tɔk gur-er) (jonno)		**
b. (kʰub tɔk) gur-er (jonno)	*	*
c. kʰub tɔk (gur-er)(jonno)	**	
d. kʰub tɔk gur-er (jonno)	***	

Step 3 *Convergence*

(4) (1a) Step 1: Exh ≫ *WkWd, Step 2: Convergence.
(1c) Steps 1 & 2: *WkWd ≫ Exh, Step 3: Exh ≫ *WkWd, Step 4: Convergence.
(1d) Steps 1, 2 &3: *WkWd ≫ Exh, Step 4: Any ranking, Step 5: Convergence.

Phonology as information: Bantu vowel harmonies, stems, derivation and inflection

Nancy C, Kula, University of Essex (nckula@essex.ac.uk) & Lutz Marten, SOAS (lm5@soas.ac.uk)

Bantu vowel height harmony has been described in a number of works (see e.g. Hyman 1999), and has often been taken as evidence for the special status of the 'final vowel' (FV) – which is not included in the harmonic span of height harmony – as either inflectional, or as merely fulfilling prosodic requirements on syllable structure:

(1) a-li-m-[komb-ol-e]-a (< komb-ul-i-a) [Swahili]
SUBJ1SG.-PAST-OBJ3SG.-clean-REVERSIVE-APPLICATIVE-FV
's/he cleared him/her (e.g of debt)'

In (1), all vowels are harmonized except for the final one which remains *-a*. In contrast, this talk focuses on a different kind of harmony found in a handful of Bantu languages, including some Southern Swahili dialects (KiNungwi, KiNgoma) and Bantu languages of South Western Africa (Herero, Kwanyama, Lucazi, Dciriku). These languages have, in addition to the height harmony described above, a 'vowel-copying' harmony. In Lucazi, for example, the verb stem *fúm-*, 'come' takes a copy of the stem vowel, i.e. *-u*, as final vowel in the anterior, present perfective, anterior conditional, negative present, and negative potential (Fleisch 2000: 142-43):

(3) tu-na-fúm-u [Lucazi]
1PL-TAM-come-VOWELCOPY
'we came'

This harmony is restricted to some (lexically specified verbs), and could be seen as part of their (idiosyncratic) inflectional information. However, when vowel-copying predicates are used with derivational suffixes, the final vowel remains *-a* for the majority of suffixes, even in those tenses where the underived stem takes a harmonic final vowel:

(4) tu-na-fúm-in-a [Lucazi]
1PL-TAM-come-APPLICATIVE-*NO* VOWELCOPY
'we came for …'

This fact provides evidence against the view that vowel-copying is part of lexical inflectional information as this information should be 'blind' to any derivational processes. There are prima facie at least three different possible analyses for the vowel-copying data: (i) the vowel-copying may be 'blocked' by the height harmony operative in the derivational suffixes; (ii) the data may provide evidence for the existence of a lexical stem and a derivational stem in Bantu (Kula 2002); (iii) the facts may result from a more complex interaction between (some) derivational and inflectional process than usually assumed in the literature. We explore a combination of option (ii) & (iii) and show that the suffixes that allow vowel-copying constitute a set of object-oriented extensions that occur with definite aspect. Vowel-copying is, we argue, a marker of telicity, i.e. indicates the direction of an event to a physical endpoint (the object) and a temporal endpoint (definite aspect).

The goal of this talk is thus to show that phonological processes can generally be motivated from parsing considerations, and that specifically vowel-copying shows how complex semantic information, such as telicity and aspect, can be encoded transparently by phonological processes.

Phonological variation in voicing across word boundaries

Maria-Rosa Lloret (Universitat de Barcelona) mrosa.lloret@ub.edu
Jesús Jiménez (Universitat de València) jesus.jimenez@uv.es

In the OT literature the debate on voice neutralization has mainly focused on two issues: *a*) whether pre-consonantal coda agreement (e.g., in Catalan [soɡ. bɔ́] 'I'm good', [ez. βɔ́] 'it's good', [sok. tɾíst] 'I'm sad', [es. pá] 'it's bread') and word-final devoicing (e.g., in Catalan [sók] 'I'm', [és] 'it's') are instances of licensing by cue (Steriade 1997) or instances of licensing by prosody (Beckman 1998), and *b*) whether certain 'derivational' effects (e.g., stop word-final voiceless maintenance in pre-vocalic position in central Catalan: [so.k á.ɾə] 'I'm now') are instances of surface correspondence relations (e.g., for Catalan Wheeler 2005) or instances of constraint re-ranking at different levels (e.g., for Catalan Bermúdez-Otero 2001, 2006, Beckman&Ringen 2007, 2008). A much less studied issue is the phonological reason for the voicing of word-final obstruents in pre-vocalic context across word boundaries, a phenomenon that is also present in different languages (e.g., in central Catalan [e.z á.ɾə] 'it's now').

In this paper we focus on the word-final pre-vocalic context and sustain a general assimilatory interpretation of voicing within a prosodic and parallel OT approach to voice neutralization. In our view, the constraint responsible for voicing is AGREE(±voice) ('An obstruent agrees in voicing with a following segment'), limited to the prominent word-initial position in the case of voicing across words ($\text{AGREE}(\pm\text{voice})_{\text{WIn}}$). The scope of this constraint, though, is constrained by the role of NO-VC-LINK (Itô *et al.* 1995), which penalizes the linkage of [±voice] between vowels and consonants in accordance with their degree of dissimilarity; e.g., the linkage between a vowel and a stop is worst than the linkage between a vowel and a fricative. In a language like Catalan where voicing across words shows dialectal differences (cf. (1)) the interaction of NO-VC-LINK constraints for specific series of sounds with respect to sonorancy with $\text{AGREE}(\pm\text{voice})_{\text{WIn}}$ and AGREE(±voice) accounts for the facts. The same view can be taken for Dutch, for example, where Limburg dialects, unlike other varieties of Dutch, show voicing of all final obstruents across words in pre-vocalic position despite the fact that they devoice word-finally, e.g., [kɪ.ʀək] 'church', [kɪ.ʀə.ɡ yl] 'church owl' (Hinskens 2007).

(1)

	Stop, f # V	Affricate # V	SibilantFricative # V
Southern Valencian	Yes	Yes	Yes
Central Catalan	No	Yes	Yes
Alghero Catalan & varieties of Valencian	No	No	Yes
Central Valencian	No	No	No

Violable Generation

‘Ōiwi Parker Jones
University of Oxford, Computational Linguistics Group
oiwi.parkerjones@ling-phil.ox.ac.uk

In classic Optimality Theory (e.g. Prince and Smolensky, 1993/2002/2004), the generator module (GEN) has been ignored on principle. It is conceived of as a black box which accepts an input and returns a candidate set (CAN); the evaluator module (EVAL) then accepts the input, CAN, and a grammar (i.e. a ranking of the universal constraint set CON), and returns a set of optimal candidates. Since the theory is surface-oriented, more attention has been paid to EVAL than GEN. Since CON rather than GEN is supposed to constrain the output sets, GEN may not arbitrarily limit CAN; in particular, GEN has been claimed to produce an unrestricted number of epenthetic candidates (e.g. McCarthy, 2002). In theory, then, GEN may be infinitely productive. But such a GEN is impossible for the analyst on the street to use, since it cannot be computed. In practice, then, analysts populate CAN (as relevant to a particular example) according to their own intuitions. This is a dangerous practice, since removing any ‘necessarily’ optimal candidates will not stop EVAL from returning some ‘contingently’ optimal candidate. The resulting fallacy can already be observed in Prince and Smolensky’s pioneering work (Prince and Smolensky, 2002:175; discussion in Hall, 2000:15). If analysts as clever as Prince and Smolensky can commit it, one wonders about the validity of the optimality-theoretic literature in general. Therefore, in this paper we investigate GEN, both theoretically and computationally.

Recent work by Samek-Lodovici and Prince (1999, 2002) distinguishes between those candidates which can win on some ranking of CON and those which cannot. Consequently, GEN need only produce the potential winners (i.e. the ‘contenders’), and, because of harmonic bounding, the set of these turns out to be finite. We propose, then, that GEN has access to the input and to CON, and that, like EVAL, GEN permits constraint violations, too. However, unlike EVAL, GEN does not have access to the grammar (i.e. the language-specific constraint ranking).[1] We compute GEN for an analysis of Czech epenthesis by running a revised version of Hall’s (2000) implementation of OT for every permutation of CON. The approach uses a monotonic derivation, from an underspecified internal representation to a progressively specified representation. Higher ranked constraints add their specifications first, and lower ranked constraints must accept violations if they introduce contradictions. In this way, a violable GEN can be implemented. From a theoretical perspective, then, the focus remains on CON. The difference is the relevance of CON to GEN. Furthermore, GEN’s limitations follow from first principles. From a practical perspective, this approach makes it possible to arrive at CAN automatically. As such, it provides for a check against human error, thereby avoiding the aforementioned fallacy. The approach could be extended to other analyses and the resulting constraint implementations for GEN pooled into an open communal repository, akin to the Rutgers Optimality Archive for papers.

[1] Unlike EVAL, GEN does not have access to CAN either, because that would be circular!

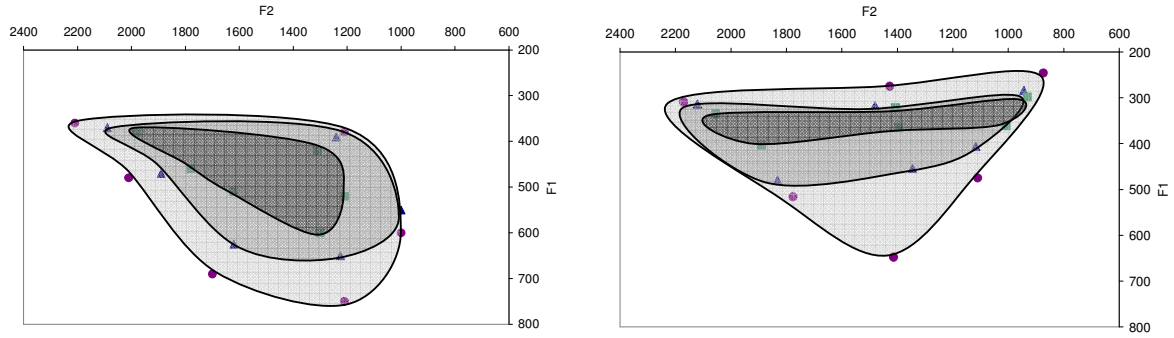
Vowel harmony effects on vowel reduction

Mary Pearce UCL and SIL mary_pearce@sil.org

All phonologists are familiar with phonetic changes in the quality of unstressed vowels, and many examples are given in the literature particularly from Indo-European languages. This paper focuses on the little discussed effects of vowel harmony on this vowel reduction using examples from several language families. Barnes (2006, 2007) and Crosswhite (2001) describe two types of reduction: prominence reducing reduction, which tends towards being categorical, and vowel undershoot, which generally produces a phonetic change in quality. In this paper, we are concerned mainly with the second type. Gendrot and Adda-Decker (2005, 2006) have made a thorough investigation into 8 languages, and they claim that reduction is based on the phonetic duration of the vowel (rather than any phonological categorisation such as 'unstressed'). In short syllables, they claim that the vowel converges towards a schwa-like quality. Underlying features form the target, but the full quality of the vowel is not realised unless there is sufficient time (approximately 80ms) for the articulators to arrive at the target. This paper gives evidence to support this claim in languages that have no vowel harmony, and then goes further in claiming that reduction is blocked in vowel harmony domains. Within a harmony spreading domain, even in vowels of short duration, the quality of the vowel is not schwa-like. It retains the quality of the feature which is spreading. The result is that the phonetic reduction appears to be blocked. So in (1), Kera, which has fronting and rounding harmony, has no significant convergence of F2.

(1) Converging polygons due to decreasing vowel duration in English and Kera

(a) English (no harmony) (b) Kera (fronting and rounding harmony)



We will see several examples of this effect in vowel harmony languages. Using acoustic measurements of the formants and duration of vowels we will find that phonetic vowel reduction is affected by the presence of a phonological harmony domain. In most Indo-European languages, the reduction in both F1 and F2 is clear and straightforward. But in Chadic languages which have palatalisation and labialisation processes, there is no reduction in F2. In height harmony and ATR harmony languages, it is F1 reduction which is limited. We will also investigate languages with partial vowel harmony, and we will see that reduction within the spreading domain can occur only with unspecified or non-harmonising vowels. Also, outside of the domain, reduction can occur. We will conclude that the instructions sent to the articulators concerning each feature apply for the duration of a harmonic domain, setting a starting point for each vowel in the domain. This means that even vowels of short duration will retain the quality of the spreading feature.

These claims have implications for the phonological analysis of vowel harmony. They predict that the vowel quality of short vowels can be used in the analysis of spreading features to decide on the valency and privative or binary nature of each feature.

Does Turkish dis harmony?*

Markus A. Pöchtrager (markus.pochtrager@boun.edu.tr),
Boğaziçi Üniversitesi, İstanbul, Turkey

Background. In Government Phonology (GP; Kaye, Lowenstamm & Vergnaud 1985, 1990; Kaye 1990), Turkish Vowel Harmony (TVH) has received considerable interest (Charette & Göksel 1994, 1996; Denwood 1997; Ploch 1998). TVH is usually understood as an element from the harmonic head spreading into a recessive position, cf. (1). Recessive positions (in the stem or suffixes) contain either nothing or the element **A** underlyingly. **I** and **U** spread to the right, but **U** does not combine with **A**. Unlicensed empty nuclei are realised as *ı* [ɨ].

(1)	*il-ler* 'country-PL'	*inek-ler* 'cow-PL'	*ok-u* 'arrow-ACC'	*ok-lar* 'arrow-PL'
	A	**A A**	**A**	**A A**
	I>>>	**I>>>>>**	**U>>**	**U**

Problem. The Minimality Principle of GP states that processes apply whenever their conditions are met (Kaye 1992: 141). Thus, any element **I** or **U** *must* spread to the right. Furthermore, since recessive positions only contain **A** or nothing, any **I**/**U** in them must come from the left. Disharmonic words (DWs) pose a problem: In (3a), the harmonic head contains an **I**/**U** failing to spread. In (3b), the second nucleus contains an **I**/**U** not coming from the left.

(3) a. *bira* 'beer', *mühim* 'important' b. *hafif* 'light', *arzu* 'wish'

Kaye (p.c.) proposes that DWs have a compound structure, i.e. [[*bi*][*ra*]]. This explains the existence of DWs as well as irregular stress in *bira*, whose (initial) stress pattern is like that of compounds. Attractive as that account might seem, it makes three problematic predictions: (P1) The individual parts of such dummy compounds should *always* be big enough to be domains in their own right, (P2) stress should be irregular for *all* DWs and (P3) DWs should allow for *any* vowel combination. None of those predictions is borne out, however.

Solution. We leave aside P2 for now (stress not being an issue for my proposal) and begin with P3: Close inspection of the occurring DWs reveals that empty nuclei are always harmonised. They never lead to disharmony, i.e. *ı* (the realisation of an empty nucleus) never follows any other vowel but *a* or *ı* (which is harmonic). This provides the crucial clue.

Instead of claiming that DWs are compounds, I propose that (C1) recessive positions can contain any combination of elements (instead of only nothing or **A**) and that (C2) spreading only occurs into empty-headed positions. Claim C1 immediately explains why we find words like *hafif*, *arzu* etc. It also makes compound morphology unnecessary and thus avoids P1. C2 explains why empty nuclei are always harmonised, i.e. why harmony never disrespects *ı* (avoiding P3): *ı* is the realisation of an empty nucleus (empty-headed by definition), and if there is an **I** or **U** in the harmonic head, they will spread into that empty position.

C2 seems problematic for *bira* vs. *il-ler*. In *bira*, the second nucleus is lexically filled (with **A**) and thus, no material can spread into it. The nucleus of *-lar* also contains **A**, yet here we *do* have spreading (*il-ler*, **il-lar*). Interestingly, the *a* in *bira* and the *a* in *-lar* are phonetically different (usually not mentioned in accounts of TVH). I submit that the *a* in *bira* is a headed by **A**, while *-lar* has an empty-headed **A**. The empty nucleus thus forms a natural class with unheaded **A**: both are headless expressions and thus, both undergo TVH by C2. Harmonic and disharmonic words find a unified explanation.

I conclude with a discussion of differences between recessive positions in stems and suffixes (improving on C1), the notion "harmonic head" and the constraints generating the Turkish vowel system.

---

* Thanks to hip hop music for creating the slang clipping *to dis(s)* from *to disrespect*.

Quality and Quantity – German infants' perception of stop contrasts

(Muna Pohl, University of Konstanz, muna.pohl@uni-konstanz.de
Janet Grijzenhout, University of Konstanz, janet.grijzenhout@uni-konstanz.de)

This paper investigates German infants' perception of native and non-native stop contrasts. The field of infants' perception of fine phonetic detail has been dominated by the findings of Werker & Tees (1984) and subsequent studies supporting their line of argumentation with the main hypothesis of 'perceptual reorganisation' (e.g., Werker & Lalonde 1988; Polka & Werker 1994; Rivera-Gaxiola et al. 2005). While neonates are assumed to be able to discriminate all speech contrasts, this capacity seems to be lost at the end of the first year of life in favour of a perception that is adapted to the mother tongue in that only those speech contrasts are discriminated that are phonemic in the native language. This developmental pattern is taken to apply to nearly all speech contrasts. However, Best et al. (1988) have shown that place-of-articulation contrasts in Zulu clicks are not only discriminated by English neonates but also by older infants and adults. The authors infer that the non-native contrasts cannot be mapped onto any of the native phoneme categories and are perceived in an extra-linguistic, mainly acoustic fashion.

In an experiment which tests German six- to 16-month-olds' ability to discriminate German and Swiss German stop contrasts, we show that there are other contrasts which are not compatible with the assumption of perceptual reorganisation. In German, the laryngeal contrast in stops is realised by a difference in VOT. In Swiss German, closure duration is the sole distinguishing factor between singleton and geminate stops. Phonologically, the laryngeal contrast in German is – like the contrasts tested in infant speech perception so far – represented by a feature. The length contrast in Swiss German is represented on a higher prosodic level by association lines to the timing tier. Syllable structure determines whether the contrast between geminates and singletons is maintained or neutralised (Kraehenmann 2003).

Our findings show that German infants are able to discriminate the German laryngeal contrast, but even the youngest infants – who are expected to still have universal perception skills – fail in discriminating the Swiss German quantity contrast. The results indicate that the quantity contrast does not follow the pattern of perceptual reorganisation. Furthermore, this finding suggests that the phonological structure of a contrast plays an important role in early language acquisition. Infants might start to establish a phoneme inventory by categorising speech sounds on the basis of segmental information that can be expressed by means of distinctive features and they later concentrate on information for which they need other skills such as prosodifying segments.

We hypothesise that as long as infants have not learnt to process complex syllable structures, they will not discriminate consonantal length contrasts. Thus, the Swiss German quantity contrast seems to be a contrast that – unlike most other contrasts – has to be learnt with linguistic experience. Parents' perception of laryngeal and length contrasts was tested as well and the results show that German adults also have difficulties in categorising stops that differ only in closure duration, suggesting that the length contrast is learnt by infants only if the native phoneme inventory requires it.

Fortis / Lenis in North Low Saxon.

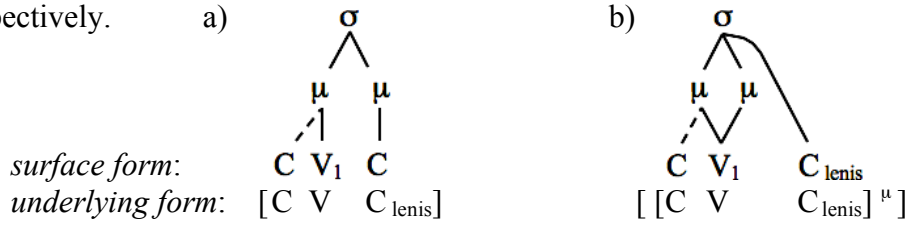
Maike Prehn (Meertens Instituut), maike.prehn@meertens.knaw.nl

It is well known that in the southern most part of the West Germanic language continuum, in the Swiss German dialects, a fortis/lenis contrast exists within the consonant system (cf. Kraehenmann 2003:98ff.). Interestingly, such a contrast is also found in the utmost northern part of the language area, in the Low German (LG) dialect group of North Low Saxon. The LG fortis consonants appear to block CVCV compensatory lengthening (CL) as described by Mora Theory (Hayes 1989). Although phenomena such as this have been regarded as counter evidence against Mora Theory (Kavitskaya 2002), the contrast of fortis/lenis can readily account for the blocking. The fortis Cs are behaving as geminate consonants, being inherently moraic. The lenis consonants on the other hand do allow for CVCV CL. Their moraic status varies depending on the presence or absence of a moraic morpheme.

The issue. North Low Saxon Cs do not uniformly allow for CVCV CL after schwa drop of the final syllable. The voiced Cs seem to permit this process, whereas the voiceless Cs and sonorant Cs prevent it. Assuming laryngeal features such as [voiced] or [spread glottis], it is unclear how these features could interact with moras since they appear on distinct levels of representation. The blocking of mora-movement by voiceless Cs thus poses a challenge to Mora Theory.

Fortis/Lenis. The solution is such that not the laryngeal features are crucially contrastive in LG, but rather the opposition of fortis vs. lenis. Fortis Cs are moraic, which defines them as geminates in terms of Mora Theory. They constitute literally *strong* configurations that occupy much space within a Prosodic Word (PrWrd). A preceding V is accordingly truncated. The lenis Cs in contrast tend to avoid bearing weight. They try to occupy as little space as possible, providing the V with a greater amount of space within the foot. They are inherently singleton Cs.

Extrasyllabicity. Structurally, the difference between synchronic fortis/lenis Cs can be expressed by extrasyllabicity. Van Oostendorp (2000:94) assumes that consonantal segments can be extrasyllabic, i.e. inside the PrWrd but at the periphery of the syllable. This definition also applies to LG lenis Cs. They are not associated to a mora, thus leaving an additional mora to the nucleus.[1] The phonetic result is then an *overlong* V. Diachronically, lenis Cs remain in those cases where a moraic morpheme ($^{\mu}$]) of a deleted syllable is preserved. Those segments of a mono-syllable allowing for lengthening of the nucleus are extrasyllabic lenis Cs. The structures of synchronic mono-syllables ending in fortis and lenis C are given in a) and b), respectively.



Sonorants are neither. The opposition of fortis/lenis is not suited to describe sonorant Cs. They generally behave different from obstruent Cs in being not laryngeally specified for [spread glottis] or [voiced] as has been pointed out earlier in a feature-theoretic framework (cf. Rice 1993). Rather, they belong to a laryngeal category of their own (i.e. [SV]). Translated to the analysis at hand, this means that sonorant Cs are neither fortis nor lenis. They need to be moraic, i.e. structurally geminates, for independent, sonority-related reasons.

[1] The result of this extrasyllabic structure would be an identical configuration of onsets and lenis codas. The main argument against such a parallel structure is that onsets are not able to trigger CL. Hyman's (1985) approach offers a solution in associating the onsets to the head-mora of the succeeding nucleus.

What Emerges from Merge in Phonology?

Bridget Samuels & Cedric Boeckx, Harvard University
{bdsamuel, cboeckx}@fas.harvard.edu

With the advent of the Minimalist Program, attention has shifted to defining the set of basic operations in the grammar. This has increased the degree of apparent similarity–at the level of pure computation–between syntax and phonology. For example, the conception of movement as copying, leading to the claim that chains must be linearized, is reminiscent of reduplication in phonology (e.g., Raimy 2000). Agree finds a direct counterpart in the way harmony processes are characterized in phonology (Mailhot & Reiss 2007). Additionally, biolinguistic research has reopened the possibility of deep homology between the syllable and the syntactic phrase (Carstairs-McCarthy 1999). Minimalism has also led to a discharge of problems from pure syntax to the interfaces, much like many problems of pure phonology have been relegated to phonetics.

At the same time, Minimalist pursuits appear to lead to the hypothesis that there is a deep asymmetry between the mapping from syntax to meaning and the mapping from syntax to sound/sign. Chomsky (2008), for example, takes syntax to be optimally designed for LF purposes, but not for PF, confirming Bromberger & Halle (1989)'s suggestion that phonology is different. In this talk we focus on what we take to be the key difference between syntax and phonology: in syntax, the fundamental operation is Merge (combine α and β symmetrically), whereas in phonology it is Concatenate (asymmetrically add α to β). Whereas iterative applications of Concatenate yield a flat linear structure, Merge yields a nested hierarchical structure. That is, syntactic structures must be linearized, but linear precedence is a primitive in phonology. Since phonology lacks Merge, it also follows that it lacks internal movement, since movement is a subspecies of Merge (Internal Merge or re-merge; Chomsky 2004). In the presence of re-merge, the notion of identity to which syntax is sensitive is endocentric or endoskeletal (defined internal to the system), whereas identity is extrinsic in phonology. This finds a parallel with rule application, which is extrinsic in phonology, but intrinsic in syntax (Bromberger & Halle 1989, Reiss 2003).

However, Merge is still very relevant to phonological matters. In fact, we suggest that the presence in syntax of two distinct kinds of Merge (Chomsky 2004), set-Merge (the symmetric case) and pair-Merge (asymmetric; the adjunction case, similar to Concatenate) is reflected in phonology, and that this is one manifestation of a more general strategy that aids in making public not only the content of syntactic terminals, but also the speaker's intended bracketing of those terminals. We show that, cross-linguistically, many phonological processes such as post-lexical segmental rules, tone sandhi, and cliticization apply freely across word/morpheme boundaries when these elements have been joined by set-Merge, but that the processes are blocked by occurrences of pair-Merge, by certain phonetically null syntactic elements, and by chunks of syntax that are compiled in a distinct workspace (complex specifiers, parentheticals, adjuncts, etc.); in other words, we show that the category of 'obligatory I-phrase domains' results directly from the nature of syntactic structure-building. This is corroborated by recent work showing that phonological processes are constrained by syntactic phase boundaries and obey the PIC (Marvin 2002, Piggott & Newell 2006, and others). We believe these are all facets of the same phenomenon, and we argue that studying the PF interface in this light suggests a strictly syntax-driven conception of phonological domains, i.e., a 'direct reference' theory.

Acoustic Cues to Speech Segmentation in French: Native and Non-Native Strategies

Ellenor Shoemaker, University of Texas at Austin, ellishoe@gmail.com

A growing body of work has demonstrated that listeners use extremely fined-grained acoustic detail to modulate lexical access (see for example Salverda, *et al.* 2003; Shatzman & McQueen, 2006). And while most spoken word recognition models (e.g. McClelland & Elman, 1986) assume that the phoneme is the smallest pre-lexical unit, the exploitation of fine-grained acoustic differences such as duration challenges the view that phonemes are treated as discrete units in the mental lexicon prior to lexical processing.

In spoken French, the phonological processes of liaison, elision, and enchaînement often render syllable and word boundaries ambiguous (e.g. *un air* 'a melody' and *un nerf* 'a nerve', both transcribed and syllabified as [œ̃.nɛʁ]). Some research has suggested that in the case of liaison speakers of French give listeners acoustic cues to word boundaries by varying the duration of liaison and initial consonants. Several production studies have shown that consonants that surface in liaison (e.g. /n/ in *un air*) are significantly shorter than the same consonant in initial position (e.g. /n/ in *un nerf*) (Wauquier-Gravelines, 1996; Spinelli, *et al.*, 2003). In addition, several studies have shown that even though the location of word boundaries can be rendered ambiguous, lexical access is not hindered due to liaison and subsequent resyllabification in French (see for example Gaskel, *et al.*, 2002). Using a lexical decision task that utilized cross-modal priming in French, Spinelli, McQueen, and Cutler (2003) tested whether phrases rendered ambiguous by liaison hindered lexical access. In this study, reaction time was measured and recognition of vowel-initial words was not slowed due to resyllabification after liaison. For example, the words *oignon* 'onion' and *rognon* 'kidney' were both recognized with equal speed in the phrases *le dernier oignon* 'the last onion' and *le dernier rognon* 'the last kidney', respectively, though both phrases would have seemingly identical acoustic content. These authors hypothesize that listeners exploit "subtle but reliable" acoustic cues in French to mark word boundaries and that access to mental representations in the lexicon is facilitated by these cues (2003: 248), though this study did not demonstrate directly that these durational differences were guiding participants' responses in the priming task.

One way to directly test the exploitation of duration as a segmentation cue is to manipulate and exaggerate this single acoustic factor while holding all other factors constant. To this end, the current study employed a forced-choice identification task which utilized phrases rendered ambiguous by liaison in which the pivotal consonants (i.e. the /n/ in *un air/nerf*) had been instrumentally shortened and lengthened, while the rest of the phrase remained unaltered. In this study, three consonants that surface in liaison environments, /n,t,z/, were tested using both real-word and non-word stimuli (e.g. *un épeu/népeu*). A three-step continuum of durations was created for ambiguous stimuli including each of the three consonants—a short version representing a liaison consonant, a baseline version, and a long version representing an initial consonant. Thirty-six native speakers of French and 36 advanced late learners of French as a second language (L2) were then asked to identify phrases containing these manipulated stimuli.

The results suggest that duration alone can indeed modulate the lexical interpretation of sequences rendered ambiguous by liaison in spoken French. Overall, native speakers were 70.0 % correct in identifying the manipulated stimuli, while non-native speakers were 64.7% correct. For the baseline stimuli, where we hypothesized that there would not be enough acoustic information to bias the listener in one direction or the other, both groups scored roughly at chance (native mean = 50.9%, non-native mean = 49.3%).

However, the current results also suggest that this acoustic cue may not be utilized consistently by all speakers. The native speakers did perform significantly better than the non-native group ($t=1.96$, $df=70$, $p=.053$), though both groups exhibited a large amount of variance. The native range of mean accuracy was from 50 – 92 % (SD = 13.3) correct and the non-native range of mean accuracy was from 49 – 92 % (SD = 9.23). This suggests that though these durational differences may be systematically present in the speech stream, not all listeners exploit this cue to the same extent and that there may be other cues (bottom-up *or* top-down) that are exploited more reliably.

In addition, the current results have manifest implications for the study of the plasticity of the perceptual system as well as the upper limits of second language acquisition. Though there was a good deal of variance in both groups, eight out of 36 non-native participants scored at or above the native mean. These results are particularly interesting in that they are in line with current research that suggests that not only can advanced L2 learners develop native-like sensitivity to non-contrastive phonological variation in an L2, but that these learners can exploit this information in L2 speech processing (see for example Darcy *et al.*, 2007).

Welsh Syntactic Soft Mutation without Movement or Empty Categories

Mark Steedman, Edinburgh, steedman@inf.ed.ac.uk

This paper offers an analysis of the much-studied phenomenon of "soft mutation", or lenition of initial consonants, in Welsh. The purpose of the paper is to show that the relevant facts can be parsimoniously accounted for without the use of devices like syntactic movement or empty categories with phrasal status. Instead, the phenomenon can be captured in a purely monstratal, derivationally monotonic theory of grammar, using only the resources of lexical specification of local phonological features, and rules of little more expressive power than context-free grammar.

Zwicky 1984:389 points out that the very diverse contexts or "triggers" for this mutation (which include certain determiners, prepositions, verbs, particles, etc.) seem to observe the following very natural constraint:

(1) The trigger determining a rule feature for a morphophonemic rule must be adjacent to the affected word and *c*-command it.

Among such triggers, the effect of the tensed verb can be illustrated by the following minimal pairs, adapted from Ball and Miller 1992 and Tallerman 1990, 2006, 2009, in which the mutation from *cath* ("cat") to *gath* is in all cases the relevant alternation:

(2) a. Gwelodd y ddynes gath.
saw the woman cat
"The woman saw a cat"

b. Gwelodd cath y ddynes.
saw cat the woman
"A cat saw the woman."

(3) a. Pwy welodd gath?
who saw cat
"Who saw a cat?"

b. Pwy welodd cath?
who saw cat
"Whom did a cat see?"

(4) a. Gwelodd gath.
saw cat
"He/she saw a cat"

b. Gwelodd cath.
saw cat
"A cat saw."

(5) a. Mae cath ddu yn yr ardd.
is cat black in the garden
"There is a black cat in the garden."

b. Mae yn yr ardd gath ddu.
is in the garden cat black
"There is in the garden a black cat."

Zwicky (1984) and Roberts (2005) follow traditional descriptive accounts in interpreting these data in terms of a nominative/accusative case-marking function for soft mutation in these specific contexts However, Tallerman points out that such a role appears inconsistent with the alternation seen in (5a,b), where the *black cat* in each example seems to fulfill the same thematic role. Moreover, as noted earlier, soft mutation does not apply to objects of non-finite verbs, except when, like (5b) they too are separated from the said verb by some *further* argument in a nonstandard position:

(6) a. Roedd y ddynes yn gweld cath ddu ar deledu
was the woman ing-see cat black on television
"The woman was seeing a black cat on television"

b. Roedd y ddynes yn gweld ar deledu gath ddu
was the woman ing-see on television cat black
"The woman was seeing on television a black cat"

Tallerman (2006, 2009) proposes that soft mutation is triggered by a linearly preceding phrasal category, such as NP or PP, and not by a mere verb. The trigger constraint must accordingly be changed (because under Tulliver's assumption of binary branching the putative trigger is non-commanding).

This assumption accounts for all of the facts (2) to (6). However, it does so only at the cost of assuming that, in the subject question (3a), a *wh*-trace with NP phrasal status in VSO subject position intervenes and triggers soft mutation in the object. (In (3b), no object *wh*-trace in VSO position intervene between verb and subject, so mutation is not triggered on the latter.) Similarly, a phonologically empty pronoun subject (*pro*) with the same phrasal status in the same position has the same effect in (4a), but is absent in (4b). Tallerman suggests that the phenomenon of soft mutation provides evidence for the linguistic and psychological reality of such empty categories.

The present paper shows that these data can be accounted for under the following simpler assumptions: that soft mutation (rather than non-mutation) is the default; that the exceptions considered here correspond to the notion "first argument of the verb", rather than case as such; and that the morphonemic rule concerned is subject to Zwicky's principle (1). The analysis is developed using combinatory categorial grammar (CCG), which is attractive for the purpose because it is strongly lexicalized, supports "surface compositional" semantics, and directly expresses the notion "first argument". No further assumptions other than those standard in CCG are required, and in fact the above assumptions are compatible with a wide range of grammatical theories.

However, under those same assumptions, excluding phonologically-active and syntactically-realized empty categories as a residue of relativization and subject-drop is a forced move. Hence, the phenomenon of Soft Mutation in Welsh may be taken as evidence *against* the necessity of such constructs in syntactic theory, rather than evidence for it.

Canadian Flapping and Raising in OT-CC

Olga Tihonova [olga.tixonova@gmail.com] and Martin Kraemer [martin.kraemer@hum.uit.no]
University of Tromsø/CASTL

This study offers the formal analysis of counterbleeding interaction of Flapping and Diphthong Raising in Canadian English along the lines of *OT with candidate chains* (OT-CC; McCarthy 2007), and models its acquisition by the EDCD algorithm (see Tesar & Smolensky 1998). Prior attempts to incorporate counterbleeding opacity in OT either require too much additional machinery (see Bermudez-Otero 2003 for Stratal OT account) or make wrong predictions (see Mielke, Armstrong & Hume 2003 for a transparent analysis and Idsardi 2005 for criticism).

In Canadian English /t/ and /d/ are realized as [ɾ] when preceded by a vowel or [r] and followed by a vowel, e.g. [fæ**ɾ**ər] cf. [fæt]. The diphthongs /aɪ/ and /ɑʊ/ undergo raising to [əɪ] and [ʌʊ] when followed by a voiceless obstruent in the same foot, e.g. [n**əɪ**f] cf. [n**aɪ**vz] (see Bermudez-Otero 2003 for more data). Interaction of flapping and raising leads to counterbleeding opacity, where raising seems to apply out of context, e.g. [ɹ**əɪɾ**ɪŋ]. In classic OT analysis, the intended opaque winner ends up harmonically bounded by the more faithful candidate ***[ɹ**aɪɾ**ɪŋ].

The crucial difference between classic OT and OT-CC is that in the latter the output candidate includes not only a surface form, but also the chain of intermediate forms, where each successive form is harmonically improving and minimally different from the preceding. For the case in question such candidate chains will look as follows:

Valid candidate chains for the input /ɹaɪtɪŋ/ with LUMSeqs
a. < ɹaɪt-ɪŋ > - <>
b. < ɹaɪt-ɪŋ, ɹəɪtɪŋ> - **<FaithV>**
c. < ɹaɪt-ɪŋ, ɹaɪɾɪŋ > - <**FaithC>**
>>d. < ɹaɪt-ɪŋ, ɹəɪtɪŋ, ɹəɪɾɪŋ >- <**FaithV, FaithC>**

The strongest competitor of candidate (d) with the output [ɹəɪɾɪŋ] is candidate (c) with the output [ɹaɪɾɪŋ]. What crucially distinguishes these two candidates is the sequence of Localized Unfaithful Mappings or LUMSeq (where LUM is "a single violation of a basic faithfulness constraint in a specific location in a form") that defines these two chains. In candidate (c), there is just a single LUM, i.e. the violation of the FaithC constraint that affects the intervocalic /t/. In the intended winner, i.e. candidate (d), the FaithC-violating LUM is preceded by the FaithV-violating LUM, affecting the low diphthong. At this point we need an additional constraint that would favor candidate (d) over candidate (c). OT-CC introduces PRECEDENCE constraints that state the conditions under which an output candidate must and must not violate two specific faithfulness constraints. **Prec(FaithV,FaithC),** for example, states that in the optimal candidate the violation of FaithC must be preceded by the violation of FaithV. When appropriately ranked, such a PRECEDENCE constraint rules out the non-raising candidate [ɹ**aɪɾ**ɪŋ].

OT correctly predicts the existence of the 'Dialect B' with transparent interaction between flapping and raising (see Joos 1942 for description and data). We demonstrate that the OT-CC analysis of both opaque and transparent interaction of flapping and raising is learnable with EDCD algorithm. Having acquired the 'transparent' Dialect B, the learners of the 'opaque' dialect resort to permuting initially low-ranked PRECEDENCE constraints, and thus converge on the final ranking capturing the opaque interaction of flapping and raising.

Resolving some paradoxes through binary feature spans

Nina Topintzi[1] and Marc van Oostendorp[2]
Aristotle University of Thessaloniki & TEI of Patras[1], Meertens Instituut & Universiteit Leiden[2]
topintzi@enl.auth.gr[1] / Marc.van.Oostendorp@meertens.knaw.nl[2]

This paper argues for the constraint BINSPAN which requires that feature spans are maximally binary. Utilizing such a constraint and combining it with relatively standard representations and assumptions, resolves several – apparent – paradoxes. To this end, a range of phenomena (palatalization and centralization, vowel harmony, tone and umlaut) are considered in various languages (Samothraki Greek, Cappadocian Greek, Ekegusii, Limburg Dutch respectively).

Samothraki Greek (Katsanis 1996) presents a unique case of an opaque conspiracy whereby two independent processes, namely palatalization of velars before front vowels and centralization of front vowels after velars to [î] or [ê] (sounds close to [ɯ] of Turkish and [ɨ] of Romanian), both converge into the avoidance of velar plus front vowel sequences (*the conspiracy part*). While palatalization is the preferred strategy to avoid such sequences (1), centralization is chosen instead if an underlying /r/ intervenes between the velar+front vowel sequence. On the surface, however, *r*-deletes and causes lengthening of the subsequent vowel (2). This is an independent process that occurs generally in the language (3) and so we would expect that palatalization could still occur after *r*'s loss. And yet it does not (*the opacity part*). To account for that, we relate the lengthening of the vowel to palatality spreading. We argue that palatality in Samothraki Greek can spread from a short vowel to the consonant, but not from a long vowel to it; the latter would entail ternary linking of the palatality feature contra BINSPAN. Centralization is thus preferred because it bypasses this problem.

(1) *Palatalization in front of /i, e/* [N.B: palatalization is marked as ' after the C in question]
/kima/ [k'ima] 'wave' /xino/ [x'inu] 'pour' /ɣena/ [ɣ'ena] 'birth'

(2) *Centralization in Velar + r + i/e and minimal pairs with palatalized words*
kîːma from /krima/ *k'iːma 'pity' vs. k'ima from /kima/ 'wave'
xîːma from /xrima/ *x'iːma 'money' vs. x'ima from /xima/ 'bluntly'

(3) */r/-deletion and lengthening*
mavuːs from /mavros/ 'black' θeːfu from /θrefo/ 'feed'

Other cases in support of BINSPAN are briefly illustrated. More specifically, in Limburg Dutch, the umlaut feature spreads from the suffix to the stressed syllable, but only if this syllable is immediately adjacent to the suffix; arguably, the reason for this is that otherwise we would require a ternary span for autosegmental features. In the same vein, vowel harmony in Cappadocian Greek (Revithiadou et al. 2006) occurs in a binary domain that is not imposed by morphological imperatives and so has to be phonologically explained. Similarly, Ekegusii H-tone spreads locally on the next TBU (the mora), but not beyond that (Bickmore 1997). Reanalysing such local spreading in terms of attraction to a licenser, e.g. the root (Zoll 1998) is impossible. Only a span binarity analysis seems viable.

Binarity requirements in terms of features should come as no surprise; similar restrictions emerge at the level of the foot or the mora. In this paper, we have presented several cases of the former type and anticipate that further exploration will reveal additional examples in support of BINSPAN.

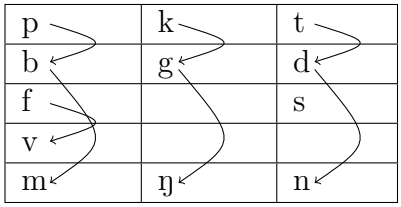
Chain-shifting Mutation in Irish and Multi-valued Features

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

Cases of "quirky" (phonologically non-uniform) consonant mutation have led many researchers to stipulate mutation-specific rules and constraints (Lieber, 1992; Zoll, 1996; Wolf, 2005a, 2005b) or to attribute mutation to a basically unrestricted morphology component (Green, 2005; Iosad, 2006, 2007, 2008). In this talk, I show, using data from Irish, that one substantial subtype of quirky mutation, chain-shifting mutation (Gnanadesikan, 1997), receives a straightforward interpretation as affixation under the multi-valued feature model of sonority and stricture features proposed for independent reasons by de Lacy (2002).

Problem: In the "eclipsis" type of Irish consonant mutation (Pullman, 2004 and references cited there), specific morphological contexts trigger a change of root-initial voiceless stops (fricatives) to voiced stops (fricatives), and of voiced stops to nasals (1a). Under standard assumptions on feature inventories and possible OT-constraints, this cannot be captured by assuming a mutation morpheme containing the floating features [+nasal] and [+voiced] since a faithfulness constraint ensuring preservation of [+nasal] for roots starting with voiced stops should also effect its realization for roots starting with voiceless stops (*/pkt/ → /mŋn/). The phonological change triggered by eclipsis is quirky/non-uniform because it cannot be characterized by a natural class of features, but systematic in that it chain-shifts: Every mutated sound is transformed into a more sonorous sound.

(1) a. **Eclipsis**



b. **Representation of Sonority**

Voiceless Stops:	son:x
Voiced Stops:	son:xx
Voiceless Fricatives:	son:xxx
Voiced Fricatives:	son:xxxx
Nasals:	son:xxxxx

Theoretical Background: de Lacy (2002) argues independently, based on a general theory of scale-effects in markedness constraints, for a grid-like representation of sonority where the sonority scale is directly incorporated into phonological features as in (1b), and more sonorous segments contain more grid marks.

Analysis: Under this approach, the eclipsis morpheme can be represented as a prefix consisting of a defective segment (Zoll, 1996) which fuses obligatorily with the root-initial consonant and is specified (among other features) as [son:x]. The high-ranked constraint MAX x_{son} ensures that for every instance of a sonority grid mark in an input segment there is a grid mark in the corresponding output segment such that fusion with the defective segment leads in effect to shifting the sonority value by one. The ranking of faithfulness constraints for other features sanctions concomitant voicing and nasalization, but blocks fricativization for the given input which forces epenthesis of an additional sonority element for root-initial voiced stops resulting in a two-step sonority shift to nasals. The same type of analysis extends naturally to the second major mutation type in Irish ("Lenition") where (drastically simplifying) nasals and stops spirantize, and fricatives debuccalize or delete. This can be derived if stricture is represented in a similar way as (1b) assuming a three-way contrast between nasals/stops ([stric:x]), fricatives and approximants ([stric:xx]) and glottal consonants ([stric:xxx]), and a mutation affix containing [stric:x].

The Prosodic Word Group as a domain of prosodic hierarchy

Marina Vigario
(Universidade de Lisboa – Laboratório de Fonética, FLUL/CLUL)
marina.vigario@mail.telepac.pt

This work argues in favour of the existence of a prosodic constituent between the Prosodic Word (PW) and the Phonological Phrase (ϕ), the Prosodic Word Group (PWG), a constituent distinct from the Clitic Group (Nespor and Vogel 1986) in that it is not crucially relevant for the prosodization of clitics, but rather of certain compounds and other syntactic words formed of more than one PW (as in *((téacher's)$_{PW}$ (ùnion)$_{PW}$)$_{PWG}$*). The topic has recently attracted the attention of different scholars (Ito & Mester 2006, 2007, Kabak & Revithiadou 2006, Vigario 2006, 2008). In line with some previous work, our aim is twofold: (i) to show that this constituent has all the properties expected from a basic domain of the prosodic hierarchy; and (ii) to demonstrate the superiority of this account over the alternative one resorting to recursive structures – as in *((téacher's)$_{PW}$ (ùnion)$_{PW}$)$_{PW}$* (e.g. McCarthy and Prince 1994).

We present an extensive array of phonological phenomena crucially referring to this level of phonological grouping, and not to the levels of the PW or the Phonological Phrase – e.g. stress patterns in many Germanic languages (prominence at the level of what we call the PWG is *s-w*, whereas it is right dominant at the level of PW and of ϕ); *e* deletion in European Portuguese (EP) (a stressless *e* obligatorily deletes PW-finally, except if the PW is followed by a PW starting in a stressed V, and both are grouped under the same PWG, as in (grand[j] Área)$_{PWG}$ 'penalty area' vs. (grande)$_{UT}$ 'big' or (grande Área)$_{\phi}$ 'big area'). Many facts show the similarity between the PWG and the remaining prosodic constituents: (i) several types of phenomena belonging to the same language cue the PWG (e.g. vowel deletion rules, prominence, and pitch accent and focus distribution, in EP – Vigario 2003: chap. 6); (ii) the phenomena reviewed are of various types – segmental (e.g. apocope and apheresis in Baule – Leben & Ahoua 1997; schwa deletion in French – Hannahs 1995); tonal (e.g. pitch accent distribution in English and Dutch, a.o. – Ladd 1996, Gussenhoven 2004); durational (e.g. accentual lengthening in Dutch – Cambier-Langeveld 2000); and prominence related (see above); (iii) the crucial data consist of postlexical phenomena (e.g.Vigario 2003: chaps 3, 6 for the EP data); (iv) the evidence compiled comes from many languages; (v) some of the data show that the PWG is also sensitive to size constraints (like other prosodic domains – Selkirk 2000) (in Baule, monosyllables must be included in an adjacent PWG, in our terms); and (vi) the construction of the PWG is also obtained via mapping constraints similar to PWs and the higher prosodic domains (e.g. Peperkamp 1997, Truckenbrodt 1995, 2007); specifically, we propose that a constraint of the WRAP family is at play, requiring X^{lex} (lexical syntactic heads) to be grouped under a PWG.

Some of the arguments given in favour of this proposal over the alternative one based on recursion are the following: (i) since the same properties should always characterize a given level of prosodic hierarchy, the latter hypothesis predicts that recursive PWs must have the same stress pattern as non-compound words; however this is not the case in languages like Dutch, English, or Swedish, where the general stress rule at the level of the PW is right handed (e.g. *onomatopéia*), but initial at the level of the PWG; (ii) recursion should yield a distinction between lower and higher PW nodes in terms of *strength* (Ladd 1996, Frota 2000), but instead what is found is often a distinction of *kind* (different categorical rules apply with reference to each level); (iii) the PWG hypothesis allows to eliminate an important source of violation to NON-RECURSIVITY (Selkirk 1996), a constraint that is crucial for deriving an essential difference between prosodic structure (which is flatter) and syntactic structure (which is deeper) (Ladd 1996); (iv) as this domain has all the properties of a constituent of prosodic structure, not adopting this hypothesis represents a weakening of the whole theory of prosodic structure.

Poster papers

Perceptual Place Cues

Azra Ali
University of Huddersfield azra.ali@hud.ac.uk

There has been movement in current phonology research to model the interaction between perceptual processes, phonetics and phonology (Hume & Johnson 2001; Hayes & Steriade 2004). Many authors in these two books provide substantial evidence highlighting that perception plays an important role in the sound structure of language. However, the research focuses on acoustic information only for i) mapping/modelling of perceptual cues to phonology and ii) perceptual cues to consonant place of articulation. Only Remez briefly touches on multimodal perception of speech, but, shortfalls when linking it to phonology. Thus, we argue that audiovisual speech perception must be taken into account when modelling perceptual processes in phonology.

Some phonologists have argued (at recent LabPhon 2008) that plosives are generally hard to distinguish (especially phoneme /p/ and /t/) and that the formant transitions in syllable onsets are more reliable cues to consonant place than coda transitions. The experimental evidence that was put forward (Wright 2001) is based on intelligibility rate of consonants in onsets and in codas in presence of variable acoustic signal-to-noise. Misperceptions of place consonants were made by participants, but mainly in noisy conditions, although, greater misperceptions were made for consonants in the coda position than in the onset position. However, place cue evidence from audiovisual speech has not been taken into account. Therefore, we aim to address this imbalance by highlighting a body of evidence from cognitive audiovisual speech literature (e.g. Auer et al, 1998 etc.), lip aperture (Brown 2000) and from element phonology, for e.g. Kaye (1989) and Harris & Lindsay (1995) that have postulated cognitive entities that highlight acoustic and **visual cues** in shaping sound structure, perception and phonology.

In addition, we will present new experimental data that probes listeners perceptual place cues, in the onset and coda position. We use a cross-splicing technique, as shown in Fig.1, taking /p/ from onset in /**p**a/ and cross-slicing it with /p/ from coda in /a**p**/. We predict that the accuracy rate for codas and replaced onsets (e.g. $\mathbf{p}_c$a) will be greater in the audiovisual modality than in the audio only modality. Cross-splicing was constrained so that the original and replaced C was phonologically the same with the same vowel context and was spliced at amplitude zero-crossing. For the pilot study, we focused on CV and VC syllables with voiceless plosives /p t k/. There were 6 CV syllables (3 natural and 3 replaced onsets), and 6 VC syllables (3 natural and 3 replaced codas) in both modalities with 2 randomization of each stimulus. The experimental design was, *position* (onset, coda), *type* (natural, cross-spliced), *consonant* (/p t k/), and *modality* (audio, audiovisual). We opted for a forced choice response and participants were asked to identify the consonant. Results from our initial study with 10 participants, supports our prediction. In the audio modality only, accuracy rate were: onset natural 96%, replaced onset 88%, coda natural 93% and replaced coda 95%. Whilst in the audiovisual mode, accuracy rate for **all** stimuli (natural and cross-splicing) were 100%. This clearly shows that visual cues can improve speech intelligibility for place consonants even with cross-splicing. The study also showed that onsets are at advantage (96% and 95%) over codas (93% and 88%). However, despite some previous comments, in the audio mode only, /p/ was rarely confused for a /t/ and /t/ rarely confused for a /p/. More often it was phoneme /k/ that was confused for /p/, and phoneme /t/ was confused for /k/. In our future audio and audiovisual studies, we aim to; i) extend the current study with more blocks and participants, ii) include voiced and nasal stops, iii) add different levels of white noise to the stimuli and iv) measure lexical decision time too.

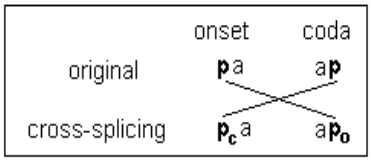


Figure 1

Synchronic and diachronic aspects of [spread glottis] within GP's privative framework

Katalin Balogne Berces - PPKE University, Piliscsaba, Hungary - bbkati@yahoo.com
Daniel Huber - Sorbonne Nouvelle, Paris 3, France - huberd@freemail.hu*

This paper develops a unified account of various laryngeally specified phenomena in Germanic (esp. in English and German, but crucially not in Dutch) with reference to a (privative) [spread glottis] (henceforth [sg]) feature. It is accepted here (following Iverson & Salmons 1995, 2003 in particular) that one and only one laryngeal tier/element is needed in systems like English/German/etc. (the spread glottis system) and French/Hungarian/etc. (the voice system) (as opposed to more complex systems like Thai and Gujarati, cf., e.g., Harris 1994:135). In English, for instance, it is [sg] which is distinctive for *all* obstruents, while in, say, French, it is [voice] that encodes laryngeal contrasts in all obstruents. Encoding the laryngeal contrast by [sg] provides a neat account of several phonotactic patterns in English, which can all be reduced to the sharing of the [sg] feature: the "lack" of aspiration in tautosyllabic *s*+$C_{[obs]}$, e.g., *tick* [t^hɪk] versus *stick* [stɪk]; devoicing of the sonorant in both $C_{[sg]}$ +$C_{[son]}$ and *s*+$C_{[son]}$, e.g., *lay* [leɪ] versus *play* [pl̥eɪ] and *slay* [sl̥eɪ]; assimilations of plural /s/ as in *cat+s* [k^hæts], general devoicing of non-intersonorant lenis stops as in *bad* [b̥æd̥].

While this argument is admittedly not new (see Iverson & Salmons 1995, 2003), it does seem to have a greater and welcome explanatory power than hitherto assumed. First, it leads to a unified analysis of synchronic (see above) and diachronic (see below) processes within the privative Element Theoretical approach of Government Phonology (GP – Kaye et al. 1985, Harris 1994, Backley & Takahashi 1998, etc.). The paper argues that, contrary to what is assumed in, e.g., Harris 1994, in spread glottis systems like English the active laryngeal element is not **H** (standing for high tone in other contexts) but it is the noise element **h**. All the English allophonic variations mentioned above (as well as the identical distribution of plosive aspiration and the segment /h/) receive a straightforward explanation, and such an analysis seems to hold true for all other Germanic languages (except Dutch). As a side-effect, the inventory of elements utilized in spread glottis systems is reduced by one, which desirably constrains the generative power of the model.

Second, the role of [sg] could give new insights into some patterns of diachronic consonantal changes and lenitions as well. Iverson & Salmons (1995) already gave an elegant account of Grimm's Law exceptions, viz. why IE **sp* **st* **sk* clusters did not undergo the shift. This can be refined and extended to cover all phases of Grimm's Law. Furthermore, it will be proposed here that the presence or absence of [sg] in all obstruents of a system may determine the way medial clusters like /pt kt/ change. In addition, the analysis may also shed some light on riddles like why Dutch differs from the other Germanic languages in this respect, and how [sg] emerged in Germanic.

References:

Backley, P. & T. Takahashi. 1998. Element activation. In E. Cyran (ed.) Structure and interpretation. Studies in phonology. Lublin: Folium: 13-40.

Harris, J. 1994. English sound structure. Cambridge, Mass.: Blackwell.

Iverson, G. K. & J. C. Salmons. 1995. Aspiration and laryngeal representation in Germanic. Phonology 12: 369-396. http://www.uwm.edu/~iverson/larygmc.pdf

Iverson, G. K. & J. C. Salmons. 2003. Laryngeal enhancement in early Germanic. Phonology 20: 43-74. http://www.uwm.edu/~iverson/enhancegmc.pdf

Kaye, J., J. Lowenstamm & J.-R. Vergnaud. 1985. The internal structure of phonological representations: a theory of charm and government. Phonology Yearbook 2: 305-328.

* The authors are listed in alphabetical order.

‘Alpine’ Lombard as a testing ground for feature theories

Stefano Canalis
University of Padova
stefano.canalis@unipd.it

Introduction. The goal of this paper is to describe and analyse a (morpho)phonological process found in an area between Switzerland and Italy; in particular, the implications it has for the theory of phonological features will be highlighted.

Background and data. Nowadays the process in question is restricted to few (predominantly old) speakers in some valleys near the Maggiore lake, at the border between Italy and Switzerland (although its area was once wider, Salvioni 1886). The vowel system of (most of) the varieties spoken in this area (which are considered sub-varieties of the Lombard ‘dialect’, Sanga 1997) is /i, e, ɛ, a, o, u, ø, y/. Diachronically, when a word ended in unstressed [i], a palatal glide was added to the stressed vowel, giving rise to a falling diphthong. Later, all word-final unstressed vowels save [a] were lost; still later, diphthongs underwent monophthongization, the palatal glide being ‘fused’ with the preceding vowel (an example of the diachronic processes in (1), the outcomes of monophthongization in (2)). Since word-final [i] was the marker of several inflectional categories, as a result they came to be expressed only by a change in the stressed vowel (3).

Problems. This process looks somehow similar to *i*-umlaut in Germanic languages; borrowing from various analyses of the latter phenomenon (a.o. Lieber 1987, Lodge 1989, Féry 1994), it will be assumed that in the varieties under discussion here the phonological exponent of morphemes like ‘masculine plural’ can be formally represented as a floating feature, which is attached to the stressed vowel. However, singling out this feature isn’t a trivial matter. If standard binary features were adopted, the process should be broken into several unrelated parts: fronting from [+back] to [–back] (/u/ > [y], /o/ > [ø]), raising from [+low] to [–low] (/a/ > [ɛ]), raising from [–high] to [+high] (/e/ > [i], /ø/ > [y]) and, when /ɛ/ is raised to [e] rather than to [i], also change from [–ATR] to [+ATR] (assuming that the feature [ATR] correctly represents the contrast between /ɛ/ and /e/); the floating feature should be [–back], [–low], [+high] or [+ATR] depending on the quality of the stressed vowel. This solution obviously conceals the uniform nature of the process, which could be informally described as ‘get the stressed vowel one step closer to /i/’.

Proposal. Given the problems with standard binary features in representing this process, an alternative feature theory ideally should a) unify fronting and raising into a single feature b) treat height as a scalar dimension, rather than as the combination of several independent features c) exclude that derounding is a possible phonological process (whereas all the other vowels are ‘attracted’ towards /i/, /y/ remains unaffected). The adoption of some of the fundamental tenets of Dependency, Particle, Government Phonology (Anderson & Ewen 1987, Schane 1984, Kaye et al. 1985) would offer a solution to the problems outlined above: the floating feature could be just one, the unary component **I** (‘frontness’, or ‘acuteness’), height shifts could be represented as the result of increasing the preponderance of **I** with respect to **A** ‘aperture’, and [–round] would not be part of the feature inventory.

(1) **gati* ‘cats’ (sing. **gatu*) > **ga̯iti* (sing. **gatu*) > **ga̯it* (sing. **gat*) > [gɛt] (sing. [gat])

(2) *a̯i > [ɛ], *ɛ̯i > [e] or [i], *e̯i > [i], *o̯i > [ø], *u̯i > [y], *ø̯i > [y] (*i and *y remained unchanged)

(3) [kaˈval] ‘horse’ ~ [kaˈvɛl] ‘horses’ / [ˈpɛrdi] ‘I lose’ ~ [ˈperdi] ‘you (sing.) lose’ / [rɛd] ‘net’ ~ [rid] ‘nets’ / [ker] ‘heart’ ~ [kir] ‘hearts’ / [mɔl] ~ ‘soft-sing.’ ~ [møl] ‘soft-plur.’ / [kuˈlur] ‘colour’ ~ [kuˈlyr] ‘colours’ / [trøɲ] ‘thunder’ ~ [tryɲ] ‘thunders’

The phonology of English: exceptions and conflict

Jean-Michel Fournier & Véronique Abasq
Laboratoire Ligérien de Linguistique
Université François-Rabelais de Tours, France
fournier@univ-tours.fr

Even within a single dialect, such as British English that is our usual field of investigation, the English language displays an impressive number of exceptions, whatever the rules that have been suggested by various authors, and just as impressive a number of variants.

As argued in previous papers, English phonology can be viewed as the interplay of 3 different phonological sets inherited from a complex history:

- a derivational phonology, from its Germanic source, that maintains the pronunciation of the deriving form (to which adds the special case of prefixed non-substantives, of Germanic origin);
- a segmental phonology, outcome of the merge between Anglo-Norman and Old English, where determiners are segmental sequences and number of syllables;
- a 'borrowed' phonology (or 'exogenous'), found in 'foreign' and learned words, that preserves stress patterns and the pronunciation of stressed vowels from the original languages, particularly French, Italian, Latin and Greek, a phonological set essentially due to late borrowings from the 16th century onward.

This paper sets out to show that a sizeable number of exceptions can be attributed to conflicts between these sets rather than to actual exceptions, in other words that it is precisely this situation of conflicting phonological sets that accounts for the high number of exceptions (and variants) in contemporary English. Our study concentrates on the two most important phenomena of lexical phonology: stress placement and pronunciation of the stressed vowel.

We begin with the study of the conflict between derivational and segmental phonology, first in the case of strong suffixes (which imply segmental rules – sometimes called 'stress-imposing') and neutral suffixes, then in that of multicategorial prefixed words. We then proceed with the conflict between the endogenous and the exogenous sets (and the few cases between the exogenous and the derivational set).

Finally, an overview of exceptions within the segmental set reveals that a sizeable number can be attributed to cases of ambiguity or evolution, ie of similarly conflicting 'rules'. They further display specific features (mainly number and variants) that distinguish them from other exceptions within the segmental set, and relates them to the exceptions studied above.

We conclude that there are two types of exceptions. The most numerous type, by far, relates to the regulation level between the sets rather than to actual rules of stress placement or vowel pronunciation: in other words, these exceptions are actually perfectly regular, but according to the wrong set. If actual exceptions are thus far fewer than could be thought, such a system implies that although the possible pronunciations of a given unit are mostly predictable, its actual behavior is not, except statistically, unless it belongs to the endogenous segmental set only.

Coda aspiration and deletion in Eastern Andalusian Spanish: a functionalist approach

Mark Gibson
Universidad Complutense de Madrid
markgibson@hotmail.com

Eastern Andalusian Spanish (EAS) is replete with dialectal peculiarities uncommon to other more conventional varieties of Peninsular Spanish. Among these deviations is the aspiration and deletion of post-nuclear /s/ in both word-internal and word-final positions. Of particular interest, we examine a sub-set of dialectal variants which, along with simple aspiration (variety A, /s/→[h]), exhibit pre-aspirated geminaton (variety B, /s/→[^{h}C].C) in addition to fully geminated unaspirated codas (variety C, /s/→[ØC].C) before consonants marked for [-voice] and [-sonorant]. In previous analyses, these forms have presented a myriad of modeling difficulties.

Morris (2000) couches his analysis of these forms in the claim that a markedness constraint, *C[+cont], plays a crucial role in aspiration by targeting coda fricatives marked for [+cont]. Later, perceptual cues which associate alveolar [s] to [h] exposed in Widdison (1995a, 1995b, and 1997) provide the key factor for constraint interaction. According to these studies, glottal widening linked to [s] is retained after debuccalization of [s] eliminates alveolar constriction. Consequently, [h] is produced by the interaction of a constraint, *C[spr], with *C[+cont]. Essentially, Morris' claim assumes all three variant segments to be associated with an underlying alveolar /s/.

Notwithstanding, two main discrepancies emerge with regard to Morris' analysis. Firstly, /s/ in Spanish is underlyingly dental, not alveolar (Alonso-Cortés, 2003), implying that any alveolar feature be introduced post-lexically. And although stratified versions of OT are quite apt to handle such complications, there is no phonological rationalization for which to do so, since aspirating regions in Spain typically do not produce the alveolar sibilant.

Instead, our analysis understands all three varieties as a continuum in different diachronic stages toward total segment deletion. We argue that a productive justification for these deviant forms lies not in the theoretical frameworks themselves, but rather in rethinking the phonological elements on which these paradigms are based. We will show that a functionalist interpretation of the underlying representation in these cases facilitates a consistent model which is capable of justifying a desired output without resorting to Output/Output Correspondence (Kager, 1999) principles implicit in previous studies.

For all varieties, we identify the supremacy of a constraint, LAZY-$_{(CODA)}$ (Kirchner, 1998), which debilitates coda consonants. PRESERVE-CODA seeks to preserve the morphological segment but does not specify surface features for the unit. This basic skeleton produces [h] from /s/, as in Variety A.

Subsequently, we contend that varieties B and C represent advanced stages of this basic hierarchy. However, we argue that the phonological base of these varieties does not degenerate back to /s/, but rather stems from a phonologized /h/ produced over time in Variety A. Although controversial, our argument is supported by independent functionalist principles as well as by the fundamental arguments for Lexicon Optimization (Prince and Smolensky, 1993). In so doing, our analysis preserves the benefits of OT's Input/Output Correspondence while shedding light on the aforementioned dialectal variants.

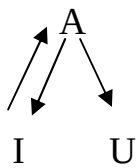
Structure of resonance elements on the example of Classical Arabic

Anna Goleń
Catholic University of Lublin
agolen@gmail.com

The talk provides the contribution of the CSL interpretation (Cyran 2003) of CVCV version (Lowenstamm: 1996) of Government Phonology (e.g. Kaye et al. 1990, Harris 1994, 1995) to the general debate on the special status of coronals, e.g. Paradis and Prunet eds. (1991).

In this presentation the vocalic template of Classical Arabic and the phenomena that occur within it serve as a starting point for the discussion of the status of resonance elements. It is established that within the vocalic template the vocalic elements have to remain in balance. The balance of elements is guaranteed by the same mechanisms which organise the vocalic alternation pattern - apophony. The key to the understanding of the resonance pattern of words seems to be the Resonance Pyramid, which reflects the characteristics and dependencies between the elements. The most striking quality of the resonance system depicted by the Resonance Pyramid is the double structure of A element, which may be the key to the cross-linguistically infamous behaviour of coronals especially *r* and *s*, as well as their clustering abilities.

Resonance Pyramid



Due to the complexity of the matter, I restrict the analysis to the Classical Arabic example. In the first part of the presentation, an in-depth examination of the template of stem vowels is offered. The second part sheds light on the exceptional behaviour of the hollow verbs with respect to the template (Chekayri and Scheer 2004). Finally, the Apophonic Path of Guerssel and Lowenstamm (1996) is redefined into the Apophonic Pyramid, whose structure accounts not only for the apophonic pattern but also for the stem vowels system and its unification in the case of hollow verbs. In this way, the Pyramid structure is proven to be general for Classical Arabic vowel patterning. It reflects the unique double structure of A and predicts I and U glide-tendencies.

Postlexical alterability of mora representation in Japanese: Evidence from poetry

Manami Hirayama, University of Toronto, manami.hirayama@utoronto.ca

This paper investigates whether representations really alter when they appear to do so. In Japanese, as in many other languages, underlying (typically high) vowels often lose their voicing postlexically in certain contexts (hereafter HVD), creating a sequence of voiceless consonants, with apparent deletion of the vowel (e.g., /suka/ → [ska]). The question arises as to whether the vowel is present or absent representationally; if it is absent, the postlexical representation is altered. The status of the vowel is in fact the topic of debate in Japanese phonology, as some researchers (e.g., Beckman & Shoji 1984) argue for deletion of the vowel, while others (e.g., Tsuchida 1997) argue that the vowel is not deleted but rather devoiced.

In this paper, I test the status of the vowel by considering the consequences of devoicing vs. deletion for prosodic structure, particularly focusing on the mora. If the vowel deletes, the mora projected with the vowel in the lexical domain might be deleted, as argued by Kondo (2005) based on duration measurements. Others, however, argue for the maintenance of mora unit. Tsuchida (1997), for instance, bases her analysis on the fact that vowels undergoing and not undergoing HVD are treated identically in processes where mora count is crucial. Tsuchida's argument is problematic, however, since the processes under discussion are lexical, not postlexical; they thus do not provide evidence for the postlexical status of the mora.

I show that there is evidence in Japanese that mora count is postlexical, in a phrasal vowel lengthening process. I then investigate the question of maintenance/deletion of the mora in HVD in poetry; poetry provides interesting grounds to examine this question, given that the meter is based on mora count. If vowels delete in HVD, one might expect compensation for the deleted moras. A process called *jiamari* in Japanese appears to show such compensation. However, examining over 100 poems, I show poetry does not show demoraification.

First, there are many poems where the potential undergoer of HVD contributes to the meter; vowels here are present. Second, there are lines with more moras than the meter requires, known as *jiamari*. Although one is tempted to conclude that *jiamari* is used to compensate for deleted vowels in HVD, these excess moras are unlikely to be present to compensate for three reasons. First, there are *jiamari* lines without any potential undergoer of HVD; *jiamari* here cannot be related to HVD. Second, if the ratio of *jiamari* lines containing a potential undergoer of HVD to all *jiamari* lines is considered, it is only at chance level that the *jiamari* line contains an undergoer of HVD. Third, there are cases where more moras are added than would be needed if *jiamari* were due to deletion of vowels with HVD.

Thus, poetry provides no evidence for demoraification on the vowel undergoing HVD. I conclude that the vowel that appears to be deleted in HVD is in fact present in the representation. This reinforces evidence from other sources that postlexical and lexical prosodic structure are identical to each other, without any altering of the structure (e.g., Hirayama 2007). It also raises questions of the postlexical prosodic alterability in other languages that show similar apparent deletion, as to whether it is really deletion.

Observational aspects of privative elements

Michael Ingleby, Research Associate
School of Human & Health Sciences.
University of Huddersfield

Arguments in favour of representing phonological oppositions as privative rather than equipollent began with the Prague school (Trubetzkoy 1939) and have continued in various forms through the development of Dependency Phonology (Anderson & Jones 1974), Feature Geometry (Clements 1985) and the various element phonologies led by Government Phonology (Kaye, Lowenstamm & Vergnaud 1985, 1990). A succinct statement of these arguments and the consequences for the theory of markedness and weight, constituent structure, process and harmony has been given in the chapter on melody in the textbook of Harris (1994). The arguments that phonological segments contain elements with distinct acoustic signatures were presented in the 2002 review of Durand & Laks (chapter 5, Ingleby & Brockhaus), and essential steps towards relating privative elements to visible facial gestures were taken by Harris & Lindsay (1995). Broadly, these and other researchers have described phonological segments as having content made up of just a few privative elements or unary primes that can exist in isolation or combination, and they have represented the phonological processes that account for contextual phonetic variety as assimilation or loss of elemental material. Alternatives to this view of segment content have been dominated by the equipollent features of SPE, which bring serious combinatorial over-generation problems into phonological representations.

Here, we contemplate the future impact of broad range of fairly new empirical tools on the measurement of content, suggesting that acoustic signatures can be embellished by complementary visual observations on lip-shape, contact palatography, X-ray and dielectric tomography of the vocal tract, functional magnetic resonance imaging or EEG potential mapping of speakers and listeners. All such tools probe articulation, audition and cognitive response using sets of observables that define an abstract pattern space in which individual segments are mathematical points and groups of segments with notional equality of phonological content as clusters of points. We illustrate a few pattern-analytical tools for separating clusters by adjusting the coordinates of pattern space to minimise the within-cluster variance of equal-content clusters and maximise between-cluster variance.
By using tools from statistical pattern recognition, we are forced into a position of admitting that elements can belong to a segment to a degree.

Such gradience of attachment of a privative element to a segment calls for a revision of the elemental expression that represents a segment in element phonologies. It has been customary to use expressions consisting of a head element and a number of less salient operator elements. We suggest that an ordered list of all elements, beginning with a head and continuing with decreasing salience is a truer response to evidence than the customary expression, arguing that uncertainties over the temporal location of segment boundaries inevitable endow a segment with some content reflecting overflow from neighbouring segments or pauses. We relate overflow to the widespread practice of representing segments in context as triphones – central segment content and overflow from neighbours – and point to some examples of longer-ranged overflow in, say, Arabic where pharyngeality or ‘emphasis’ can spread over all the segments in a phonological word.

Finally, we use the salience list type of expression to model some of the illusory phenomena that are elicited when incongruent speech is presented to listeners. If left-ear and right-ear signals are in conflict, or if conflicting auditory and visual signals are presented, many speakers experience cognitive illusions that are different from the content of either set of observables. We show that such phonological fusion effects can be accounted for by having the signatures of elemental patterns move down the salience ranking in the event of conflict, so that, say, left-ear ‘tip’ with right-ear ‘pip’ produces the illusion ‘kip’, audio ‘nag’ with visual ‘bag’ produces illusion ‘mag’. A large body of experimental research on incongruent speech confirms the robustness and persistence of such illusions in listeners of many mother tongues, and they have been called phonological fusion effects (Cutting 1975).

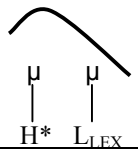
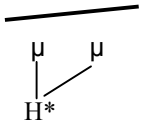
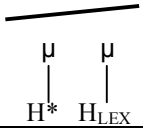
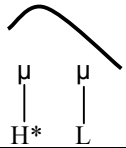
Understanding the partial reversal of tonal contours:
OCP-effects in two Franconian dialects

Bjoern Koehnlein (Meertens Instituut), *bjoern.koehnlein@meertens.knaw.nl*

Over the last years the Franconian tone accents have been extensively discussed from a theoretical perspective (s. e.g. Gussenhoven 2000 and 2004, Peters 2006). However only dialects following the so-called "Rule A" have been taken into account. In none of this work "Rule B" aka "Rule reversal" has been mentioned although it is descriptively well-known (s. e.g. Bach 1921), especially for its puzzling reversal of tonal contours: In declaration we find a falling tone where in Rule A a level high tone shows up and vice versa (non-final position). However in interrogation the contours are similar instead of reversed. Gaining a better understanding about the tonal system of the "Rule B"-dialects and their typological relation to the "Rule A"-dialects is a long-term desideratum in tone accent research (s. e.g. Bach 1921, de Vaan 1999, Schmidt 1986, 2002 and 2006) and presents a challenge for theoretical phonology.

In our talk we will present an account that aims at solving this yet unsolved riddle. Instead of proposing a representational difference that leads to the partial reversals our analysis breaks the major synchronic differences down to the interaction of two constraints: OCP and IDENT-T. In order to illustrate our proposal we will present and compare tonal analyses of the dialects of Arzbach (Rule B) and Roermond (Rule A). Whereas Arzbach is as yet disregarded our analysis for Roermond will improve on a former account by Gussenhoven (2000). In our analyses both dialects have a lexical H on the second Mora of Accent 1 whereas Accent 2 is lexically toneless. We will show that a simple reranking of OCP and IDENT-T is the basis for the reversed tonal contours in declaration:

In Roermond declarative contours the underlying lexical H changes to L being preceded by H*. In interrogation though where it is preceded by L* it remains unchanged. We propose that this follows from the OCP which is well-attested for tonal languages (e.g. Leben 1973). However unlike in Roermond the lexical tone *always* shows up as H in Arzbach. We account for these differences by introducing a constraint ranking OCP >> IDENT-T for Roermond whereas in Arzbach the ranking must be IDENT-T >> OCP, resulting in a stable lexical high tone. This explains why in interrogation the lexical tone comes out as H in both dialects. In declaration though the reversed rankings in combination with a slightly different mapping of the H*L focus tones[1] lead to the striking reversal of tonal contours:

„Rule A“, declaration, non-final (example from Roermond, Gussenhoven 2000)		**„Rule B“, declaration, non-final** (example from Arzbach/Westerwald)	
[bɛin[1]] 'leg, pl.'	[bɛin[2]] 'leg, sg.'	[bain[1]] 'leg, pl.'	[bain[2]] 'leg, sg.'
			
μ μ H* L_{LEX}	μ μ H*	μ μ H* H_{LEX}	μ μ H* L

By introducing a set of constraints that can account for the typological relation between the different Franconian dialects our talk also aims at broadening the general knowledge about the interaction of lexical and intonational tones.

[1] High-ranked NOFALL $(\mu\mu)_\sigma$ in Roermond results in a post-focal association of L in Accent 2-syllables. This leaves behind a H on the head mora that spreads to the second mora of the focus syllable (due to the constraint μ' ← T). In Arzbach both H and L associate with the focus syllable.

English Low Vowel Tensing

Martin Krämer (University of Tromsø)

This paper discusses low vowel tensing, as found in the eastern United States (New York, Philadelphia) and in Belfast English. In Belfast, tenseness of the low vowel is phonetically realised as increased duration and by backing (Harris 1989, 1990, Krämer 2006).

We find tense low vowels in syllables closed by nasals, fricatives and voiced stops (1), while the low vowel is lax in bisyllables (2), and in syllables closed by voiceless stops (3).

(1)	maːn	baːd	paːθ	paːs
(2)	lærɹ̩	wægn̩	hæpɪj	
(3)	hæt	flæp	(4)	paːsɪn

Benua (1995) analyses a parallel pattern in Philadelphia/New York English (Labov, Yaeger & Steiner 1972, Labov 1994, Setzer 1998, Gordon 2004) where tensing is realised as lengthening and raising in terms of two markedness constraints on the tenseness/laxness of the vowel in the respective environments. This captures the insight that the two phones are in complementary distribution, though it does not explain the nature of the pattern, i.e., the connection between tenseness and the quality of the following consonant. This aspect of the pattern has largely been neglected even though it raises a number of theoretical issues.

From the vantage point of moraic theory the pattern is unexpected since the more sonorant consonants that cause tensing are those that are cross-linguistically attested as the less marked segments to be associated with a mora and the moraic status of the following consonant could be the factor that determines whether a vowel is lengthened or not in response to a requirement such as Foot Binarity (FOOTBIN) that enforces bimoraicity of feet. In Optimality Theory (OT), differential compatibility of consonants in coda position with moraicity is usually attributed to the individual consonant class's position on the sonority hierarchy and can be captured in the form of a universal hierarchy of markedness constraints (in the spirit of Prince & Smolensky's 1993 universal peak and margin hierarchies). The tensing pattern in Belfast and New York English requires a ranking reversal in which the markedness constraints against moraic sonorants, fricatives and voiced stops are ranked higher than the markedness constraint against moraic voiceless stops, which makes this analysis unattractive. A purely phonetic account is excluded by the overapplication of tensing in derived forms such as (4) (pass-ing), which most analyses focus on (Harris 1989, 1990, Setzer 1998, Benua 1995 inter alios).

In this paper I propose a representational solution: Voiceless stops are distinguished from voiced stops in these varieties by the presence of a mora rather than the presence of a laryngeal feature, such as [spread glottis]. Thus, the contrast between /d/ and /t/ is one of length (moraicity), as also manifest in the phonetic realisation (voiceless stops are longer than voiced stops). FOOTBIN requires stressed syllables of monosyllabic words to be heavy either via mora insertion on the vowel or the presence of a mora on the following tautosyllabic consonant. This mora is present in voiceless stops but not in the other consonants. Faithfulness to underlying moras bans insertion of a mora on coda consonants. Thus, the only way for a mono-syllabic word to satisfy FOOTBIN at the moraic level is by lengthening the vowel. For all other contexts, the vowel doesn't need to undergo lengthening, since there is a following syllable that adds the required structure to the foot. Ranking of NLV ('no long vowel') above faithfulness bans long vowels from surfacing in non-predictable contexts. Thus, these varieties have a length contrast in stops, but not in vowels. Length in vowels is emergent due to foot binarity and banned before moraic (voiceless) stops (Compare as well Belfast [bit] 'beat', [biːd] 'bead', [bɪt] 'bit' [bɪːd] 'bid').

The Morpho-phonology of Hebrew Valence Changing

Lior Laks, Tel-Aviv University
lakslior@post.tau.ac.il

This talk sheds light on the interaction between valence changing operations and morpho-phonological constraints in Hebrew. I examine the thematic operations that derive decausatives, reflexives and reciprocals, manifested in Hebrew by relations among prosodically distinct configurations, called binyanim (e.g. *niCCaC*, *hitCaCeC*). Following Reinhart & Siloni (2005), I assume these operations apply in the lexicon, while passivization applies in the syntax. I argue that the criteria for choosing a binyan are unique to the morpho-phnology of the lexicon, thereby supporting the existence of two types of morpho-phonology. The derived counterparts (e.g. decausatives) of *hiCCiC* verbs exhibit an intruiging variation. Some are formed in *niCCaC* (e.g. *hirdim* 'put to sleep'- *nirdam* 'fall asleep'), while others are formed in *hitCaCeC* (e.g. *hiršim* 'impress'- *hitrašem* 'become impressed'). This variation results from two competing morpho-phonological constraints. The selection of *hitCaCeC* is due to **markedness**; *hitCaCeC* is less marked than *niCCaC* as it is prosodically uniformed throughout its inflectional paradigm. The selection of *niCCaC* is due to **faithulness**; *niCCiC* has a consonant cluster in its past and present forms, which allows preserving the structure of the input of *hiCCaC*. Choosing *niCCaC* yields (partial) uniformity within the derivational paradigm. Moreover, there are four pattrens that manifest a tendancy to choose *niCCaC*. This stems from faithfulness constraints that block the application of phonological processes.

1. Block deletion: Verbs whose initial stem consonant is *t* or *d* usually escape *hitCaCeC*, since such derivation creates the homorganous /tt/ or /dt/ clusters, which are prohibited in Hebrew. Forming a verb in *niCCaC* blocks the application of deletion, which would be required to amend in homorganic clusters. For example, the decausative counterpart of *hidhim* 'amaze' is *nidham* 'become amazed' and not **hi**td**ahem* or **hi**d**ahem*.

2. Block metathesis: Some verbs with a strident as their initial stem consonants do not have a derived form in *hitCaCeC*, as this would result in metathesis (e.g. *hi**ts**arek* → *hi**st**arek* 'comb oneself'). Again, the selection of *niCCaC* allows avoiding the application of this process (e.g. *hicmid* 'stick'→ *nicmad*/ **hi**ct**amed* 'stick oneself').

3. Block prosodic and vocalic alternation: Verbs whose initial stem consonant is a glottal stop have an identical prosodic structure in *hiCCiC* and *niCCaC*. The glottal stop in both binyanim is preceded and followed by /*e*/. For example, *he'eliv* 'insult' and its derived counterpart *ne'elav* (**hit'alev*) 'become insulted' share the same number of syllables and two first vowels. *NiCCiC* is more faithul to *hiCCiC* than *hitCaCeC*, and hence it is prefered.

4. Block stop-fricative alternation: Verbs whose first consonant stem is /*f*/, /*v*/ or /*x*/ usually have a dervied counterpart in *niCCaC* in order to maintain the fricative consonant. As these fricatives tend to surface as stops in post-consonantal position, derivation in *hitCaCeC* may result in an alternation (e.g. *hi**v**hil* 'frighten' → *ni**v**hal* /* *hit**b**ahel* 'become frightened').

The analysis reveals the effect of morpho-phonological constraints on thematic operations. In contrast to the above constraints, the morphology of passivization is predictable and is hardly subject to variation. I argue that this difference results from the component of the grammar where operations apply. As the above constraints are unique to the lexicon, the analysis supports the claim that morpho-phonology is an independent component that interacts with the lexicon (Aronoff 1976, Anderson 1977, Scalise 1984 among others).

References

Anderson. S.R. 1977. *On the formal description of inflection*. CLS 13: 15-44.
Aronoff, M. 1976. *Word Formation in Generative Grammar*. MIT Press, Cambridge, Mass.
Horvath, J. and Siloni, T. 2005. *Active lexicon: Adjectival passives*. Paper presented at the Semitic Workshop, Glow 28, University of Geneva.
Scalise, S. 1984. *Generative Morphology*. Foris, Dordrecht.

Extrasyllabic clusters and alignment among prosodic domains

John Matthews, Chuo University, matthews@tamacc.chuo-u.ac.jp

It has been often observed that word-final consonant sequences in English, among other languages, bear a rather remarkable resemblance to sequences found in heterosyllabic medial clusters, leading several researchers to conclude that they constitute evidence for onsets followed by a final empty nucleus (Kaye, 1990; Harris and Gussmann, 2002) or for empty-headed syllables (Piggott, 1991, 1999). In the latter case medial and final coda–onset sequences receive a unified analysis at the cost of divorcing the syllable, as a formal unit of prosody, from its basis in segmental melody. Traditionally, syllables are understood to organize segments together around peaks in sonority, with some cross-language variation based on phonotactics, sonority distance, or structural complexity. To sanction syllables altogether devoid of such a sonority peak introduces a separate syllabification algorithm whose sole function is to capture the onset-like profile of word-final consonants and consonant sequences.

The present paper proposes that both word-final consonants and onset consonants are licensed by the same prosodic element but that they appear in distinct structural configurations. Onset consonants are licensed internal to the syllable; final consonants are licensed extrasyllabically by an element further up the prosodic hierarchy in violation of constraints demanding alignment among prosodic constituents. To begin, we recognize the traditional syllable constituents Onset and Rhyme to be (non-head and head, respectively) instances of a unit of the prosodic hierarchy below the level of the syllable. As the terminal element of the prosodic hierarchy, this unit, provisionally termed a 'prosodic bit' (β), is solely capable of licensing a full range of segmental contrast. Segments licensed directly by any other unit of prosody (syllable-σ, foot-ϕ, or p-word-ω, for example) are, consequently, subject to severe distributional restriction. Such segments may be limited to a single, invariant consonant in some cases or to segments whose melody is entirely dependent on feature specifications shared with an adjacent, fully licensed segment in others.

The principles of binarity and headedness are taken to hold for all elements of the prosodic hierarchy, but exhaustivity is shown to vary across languages, governed by, under the present analysis, a set of alignment constraints. Violations of ALIGN(σ,β) are incurred by representations like those described above in which a segment is licensed by a non-terminal member of the prosodic hierarchy (i.e., a constituent other than β). It is argued that English tolerates such violations in forms such as *em*.***p***.*ty*, *sym*.***p***.*tom*, *san*.[***k***].*ti*.*ty* where the melodic content of highlighted segments is licensed exclusively through sharing with adjacent segments. In addition, English initial *s*-C clusters are cases in which violations at the left edge are permitted but segmental contrast is entirely neutralized.

A violation of ALIGN(ϕ, σ) is incurred by representations in which an extrasyllabic bit (β) is licensed directly by a foot (ϕ). However, the β in such configurations continues to exercise its full capacity for licensing segmental contrast and no distributional restrictions are observed. It is segments in this configuration that correspond to the 'onsets of empty-headed syllables' under alternative accounts without, of course, the concomitant need for either a succeeding segmental position devoid of segmental content or a syllable with no peak in sonority. Thus, whereas the head-β of a syllable corresponds to the Rhyme/Nucleus in traditional models of syllable structure, a non-head-β may appear either internal to a syllable, as an onset, or extrasyllabically, either as a final consonant/cluster (e.g., German: *Haupt* 'chief,' *Markt* 'market,' *feilsch* 'bargain, imp. sg.'; French: *vitre* 'pane,' *maigre* 'slim,' *peuple* 'people'; Polish: *jesiotr* 'sturgeon,' *wydr* 'otter (gen.pl.),' *trefl* 'clubs,' *akr* 'acre'; Icelandic: *snʏ:pr* 'scolding,' *pʏ:kr* 'secretiveness,' *sø:tr* 'slurping,' *kʏmr* 'bleating') or as an initial sequence of onset clusters (e.g., Polish: *drgnac* 'shudder' and *fstrɛt* 'repulsion' — Kurylowicz, 1952; Gussmann, 1992).

Presentation type: either form

Parallelism vs. serialism in stress assignment

Kathryn Pruitt, Univ of Massachusetts Amherst, kpruitt@linguist.umass.edu

Hyde (2007) reveals a problem in the standard treatment of stress in classic parallel Optimality Theory (pOT). With the ranking FTBIN >> PARSE-σ >> ALLFTL, pOT easily predicts the existence of a partially quantity-sensitive language with a complicated stress system. In this hypothetical and indeed unattested language, a heavy syllable can form a monosyllabic foot only if it is an odd-numbered syllable in an odd-parity word and only if it is the leftmost such syllable in that word. Otherwise, quantity-insensitive left-aligning disyllabic trochees are formed. The following input-output pairs illustrate: /LLLLL/ → (ˈLL)(ˈLL)L; /HLLLL/ → (ˈH)(ˈLL)(ˈLL); /LLHLL/ → (ˈLL)(ˈH)(ˈLL); /LLLLH/ → (ˈLL)(ˈLL)(ˈH); /HLHLH/ → (ˈH)(ˈLH)(ˈLH); /HLLL/ → (ˈHL)(ˈLL); /LHLL/ → (ˈLH)(ˈLL), etc. In this paper I show that this errant prediction is not an isolated case but instead is symptomatic of a larger problem that arises from allowing metrical parses to be determined in parallel. By changing only the mode of evaluation from parallel to serial, we eliminate this class of problems and correctly predict these languages not to occur. Specifically, iterative foot optimization (IFO) couched in the framework of Harmonic Serialism (HS; Prince and Smolensky 1993/2004:6-7, 94-96; McCarthy 2000, 2006, 2007ab, to appear-ab) provides a better framework for analyzing natural language stress systems than does pOT.

In the FTBN >> PARSE-σ >> FTL language in pOT, an input /HLL/ can perfectly satisfy PARSE-σ and FTBIN by making H a monosyllabic foot (output (ˈH)(ˈLL)). For input /HLLL/ however, maximal parsing and foot binarity can be achieved only by creating disyllabic feet (output (ˈHL)(ˈLL)). Thus, although the parsing mode is ostensibly left-to-right, as in /LLLLL/→(LL)(LL)L, whether an initial heavy syllable becomes a monosyllabic foot or not depends exclusively on the parity of the word – whether it has an odd or even number of syllables. An implicit assumption of generative phonology is that parity-counting is carried out only via metrical constituents, but since pOT allows entire metrical structures to be compared at once, its metrical constituents effectively transfer this power beyond its normal purview to create this strange prediction.

In HS with IFO in contrast, feet are built one-at-a-time in the derivation of metrical structure, and each foot is chosen by being the most optimal foot at its step in the derivation. Stress assignment begins by first choosing the best possible way of building one foot, given an input and a constraint hierarchy. It proceeds by continuing to choose the best next foot among all possible alternatives, respecting the previously built structure (Prince 1985). The constraint ranking remains the same throughout the derivation. HS/IFO does not share OT's prediction in the above case because the derivations required by these input-output pairs, (i) /HLLL/ → (ˈHL)LL → (ˈHL)(ˈLL) and (ii) /HLL/ → (ˈH)LL → (ˈH)(ˈLL) cannot be simultaneously optimal. If the constraint hierarchy favors the first step in (i), /HLLL/ → (ˈHL)LL, it will also favor the input /HLL/ being parsed as (ˈHL)L at the first step, rather than (ˈH)LL. Conversely, if the constraint hierarchy favors the first step in (ii) /HLL/ → (ˈH)LL, then it will also cause input /HLLL/ to be first parsed as (ˈH)LLL. That is, an initial heavy syllable will be treated the same in either an even- or odd-parity word, barring constraints that refer directly to word parity, because the derivation has not look-ahead to see that maximal parsing depends on treating odd- and even-parity words differently.

The result is that HS/IFO correctly fails to predict the strange language Hyde (2007) observed in pOT because it prevents progressive parity-counting in a left-to-right derivation of metrical structure, while pOT, surprisingly, allows languages with such descriptions. HS/IFO constrains the typology of stress systems to those that make decisions locally and without look-ahead, whereas pOT predicts the existence of languages which appear to make stress decisions non-locally. Stress-shortening/lengthening interactions and the interaction of stress with edge restrictions such as non-finality provide additional support for the HS/IFO analysis over pOT for equivalent reasons.

FURTHER ARGUMENTS AGAINST PARSIMONY

AN EXEMPLAR-BASED VIEW OF SOUTHERN BRITISH ENGLISH GLOTTALIZATION

Péter Rácz - Eötvös Loránd University, Budapest
levertvagy@gmail.com

Southern British English shows glottalization of obstruents in word-final and word-medial position. Our claim is that the latter is phonetically unnatural, and that it can be explained via an analogical process based on word-final glottalization, which finds its way into pre-vocalic positions in larger constructions stored as monolithic wholes in the lexicon. As we will see this claim can only be maintained if we employ richly-detailed representations, so it is an argument for such representations in phonology.

Glottalization in SBE affects *t* (and, to a lesser extent, *p,k* and *θ,d*) word-finally and word-medially. The extent of word-final glottalization depends on the quality of the following segment: it is highly frequent before pauses and voiceless stops (*Quiʔe!, quiʔe cool*), less so before fricatives, and even rarer before sonorants (*a biʔ smart, do iʔ right*) (Wells, 1982; Kortmann & Schneider, 2004). Word-final glottalization will always precede the word-medial one both in terms of environments, target segments (cf. (Harris, 1994:195) or Trudgill (1974) on Norwich English) and social register - an RP speaker would never call *butter buʔer* ((Wells, 1982:299) see also Fabricius (2000), Altendorf (2003)). Both processes are more probable to occur in high frequency forms (Bybee, 2001).

This process has an overlooked aspect: intervocalic glottalization is highly unusual. While stops are prone to lenite in this environment, they will typically lose stricture (that is, manner) rather than place – American English flapping would be an example. While the loss of place word-finally can be functional (Steriade, 2000; Browman & Goldstein, 1990), it is not easy to find reasons for word-medial glottalization. This difference is hardly recognised in the literature on lenition (but see Dienes & Szigevári (1999) on Ségéral & Scheer (1997)).

Relying on an exemplar-based representation (Nosofsky, 1988), we propose that, in this case, word-medial lenition is partly the analogy of word-final lenition, explaining the unusual lenition trajectory of the word-medial obstruents. This is a process happening in time, so a snapshot model of a speaker's competence will not contain it. Here is the outline of the change: first, word-final coronal stops lose place in high-frequency words (i.e. *but, at, it*) , pulling the representations of the individual words towards a shared schema V?## (*buʔ, aʔ, iʔ*). Since many of these words are also stored in larger constructions (i.e. *but you, at it, it is*), the representations of these constructions begin to shift too, resulting in the schema V?V (*buʔ you, aʔ it, iʔ is).* This schema is copied by frequent single-word representations, resulting in forms like *ciʔy, buʔer, beʔer*.

R-intrusion after diphtongs in New Zealand English and intervocalic *r*-deletion or pre-nasal flapping in Southern American English are other cases where such analogical processes can be argued to have taken hold (Kortmann & Schneider, 2004; Sóskuthy, 2008).

Such an account differs from the traditional Generative approaches in at least three crucial respects: since the representations of forms consist of phonetically detailed exemplars the speaker perceived or produced (on exemplars, see Nosofsky (1988)), (i) it admits predictable features (such as English glottal stops) into the representation, so they can serve as bases of analogy (Itkonen, 2005; Skousen, 2002), (ii) it allows higher frequency forms to act as flagships of change and pull other forms with them (Wedel, 2007), and last but not least, (iii) it admits the possibility of storing larger, frequent constructions as single units (like *it is* or *I don't know*) in the lexicon (Bybee & Scheibman, 1999; Boyland, 1996). Our account, then, eschews abstract features and minimal representations in favour of broader, more fine-grained generalisations, and in this sense, it provides arguments against a parsimonious view of phonology.

Why r? An alternative look at hiatus-fillers in English

Márton Sóskuthy, Eötvös Loránd University; mrhowardppa@yahoo.com

In this talk, I present a novel approach to the phenomenon of *r*-insertion in English, which takes into account both synchronic and diachronic facts. The analysis is based on the assumption that synchronically arbitrary processes may have a plausible diachronic explanation (Blevins 2004), which does not have to be duplicated in synchronic terms. Contrary to most previous analyses, I claim that the main motivating factor in the development of *r*-insertion is analogy, and use quantitative data to support this argument. Moreover, I show that the widespread analogical extension of the intrusive-*r* pattern was facilitated by phonetic factors, indicating that analogy may in fact be present even at the level of phonetic realisation. Before moving on to the analysis itself, I take a brief look at hiatus and the history of intrusive consonants in English.

In most, if not all, dialects of English, the first vowel in word-internal heterosyllabic V-plus-V sequences must be high or end in a high off-glide. As high vowels tend to spawn a hiatus-breaking glide in prevocalic position ([j] or [w], e.g. *Leo* ['liːjəʊ], *Buick* ['bjuːwɪk]; Harris 1994; Gick 1999; Uffmann 2007), it appears that there is in fact no hiatus word-internally in English. The situation, however, is rather different at word-boundaries, where a low vowel may have found itself in prevocalic position before the development of *r*-intrusion.

The pattern of *r*-insertion has arisen more or less independently in at least three dialects: Southern British English (SBE), Eastern Massachusets English (EaME) and New-Zealand English (NZE). Apparently, this development only took place in dialects where *r* had undergone vocalisation in the coda. Certain tendencies in modern English and evidence from Hay & Sudbury (2005) suggest that *r*-insertion first appeared after [ə] and was extended to [ɑː] and [ɔː] only later. However, early sources suggest that intrusive-*r* occurred after [ɔː] already in the 1830s (MacMahon, 1998), which indicates a fuzzier developmental pathway. A further interesting fact is that *r*-insertion appeared shortly after the diphthongisation of [eː] and [oː], that is, when word-internal hiatus was lost in English (cf. above). Finally, a similar pattern of insertion involving *l* has emerged in some US dialects, showing developments very similar to those of intrusive-*r* (Gick, 2002).

Based on the observations above, I propose that the first step in the evolution of *r*-insertion was the merger of forms ending in [ə] (e.g. *comma*) and [ər] (e.g. *better*) in prepausal and preconsonantal position (cf. Gick 2002). Type-frequencies taken from the CELEX database suggest that the *better* group may have contained significantly more members than the *comma* group (3,639 vs. 627 types), which explains why some *comma* words began to behave like *better* words even in prevocalic position. Also important is the fact that the majority of English words end in a consonant (C#: 32,780; V#: 9,717); this may have sped up the development of word-final *r*-insertion. The analogical model predicts that intrusive-*r* should also appear after [ɑː] and [ɔː], although with less likelihood, as the difference between the size of the originally *r*-ful and *r*-less group is smaller ([ɔː]: 79 vs. [ɔːr]: 293; [ɑː]: 68 and [ɑːr]: 128). This type of analogical levelling has a further important consequence: *r*-insertion eliminates the differences between word-internal hiatus and word-boundary hiatus by extending the word-internal pattern. Thus, *r*-insertion can now be reinterpreted as a default hiatus-filling mechanism after non-high vowels—and this reinterpretation is undoubdtedly facilitated by the fact that the phonetic make-up of *r* is very similar to that of [j] and [w] in certain respects. A very similar history could be sketched for *l* as well, although it has not yet reached the stage at which *r*-insertion is. An analogical account has the additional advantage of predicting that high frequency words will be reluctant to change (Bybee, 2001): function words ending in non-high vowels such as *wanna* and *gonna* do not normally provoke *r*-insertion in EaME (McCarthy, 1991).

Multiple Spell-Out and Prosodic Opacity

Dragana Šurkalović
CASTL, Tromsø
dragana.surkalovic@hum.uit.no

This paper investigates the view that multiple PF spell-out (Uriagereka 1999, Chomsky 2000, 2001, 2004) creates opaque prosodic phrasal domains analogue to those in syntax and offers an account of how prosodic domain opacity can be accounted for and formalized within the OT framework. It assumes the view of the Prosodic Hierarchy argued for by Ito and Mester (2006, 2007) and claims that phonological computation needs to proceed in cycles in order to achieve domain opacity.

The basic claim of the Multiple Spell-Out Hypothesis (MSOH) (Uriagereka 1999, Chomsky 2000, 2001, 2004) is that the syntactic computation proceeds in phases. Certain parts of the structure of an utterance get spelled-out to the PF and LF component before the whole structure is computed. The internal structure of such chunks becomes inaccessible to the rest of the computation, which gives rise to syntactic islands. As a consequence of this approach, the PF interface is claimed to also process these chunks separately (Dobashy 2003, Ishihara 2003, Adger 2007, Kratzer and Selkirk 2007, Revithiadou and Spyropoulos (R&S) to appear). These syntactic phases are spelled-out as Prosodic Phrases (or Major Phrases) which are also claimed to become islands, opaque for phonological processes.

The paper looks at data from external sandhi processes that are blocked by Prosodic Phrase boundaries, such as French *liaison*, or Modern Greek voice assimilation, degemination and nasal-stop assimilation:

(1) a. /θélo ta kulurákja/ → [θélo ***d***a kuluráca]φ ‘(I) want the cookies’
b. /ásximos satrápis/ → [ásximo***Ø******s***atrápis]φ ‘ugly satrap’
c. /éxun palépsi/ → [éxu***mb***alépsi]φ ‘(they) have wrestled’
but e.g.:
d. /*to* axláð**i** to éfaye o kóstas/ → [tØ axláð**i**]φ [**t**o éfaje o kóstas]φ
‘As for the pear, Kostas ate it’
(R&S to appear:9-10)

In Greek, clitic-doubled DP objects, which are syntactic islands, are also phonological islands in that they resist restructuring when not binary, while other phrases restructure into the optimal binary form in (2b) :

(2) a. $[\omega]_{\phi}\ [\omega\ \omega\ \omega]_{\phi}$ b. * $[\omega\ \omega]_{\phi}\ [\omega\ \omega]_{\phi}$

Following the argument in R&S (to appear), I assume this is due to their different derivational status in syntax – they are adjuncts, independently spelled-out before merging with the main derivation, and thus independently processed by PF. However, in the Ito and Mester (2006, 2007) view of the Prosodic Hierarchy there is only one phrasal projection, φ, and thus no means of distinguishing opaque prosodic phrases resulting from adjunct spell out from other phrases, by e.g. labeling them differently (Major phrases vs Minor phrases). Consequently, in a parallel evaluation no version of Alignment constraints can prevent restructuring or sandhi processes.

The proposal here is that the output of the first spell-out cycle becomes the input of the second cycle and a combination of PARSE φ and Input-Output Faithfulness constraints results in the observed domain opacity effects. It reduces the amount of syntactic information required to be seen by phonology, and derives the effect of size and structure of the syntactic constituent on prosodic phrasing by adopting the ‘spell-out as last resort’ view of Uriagereka (1999).

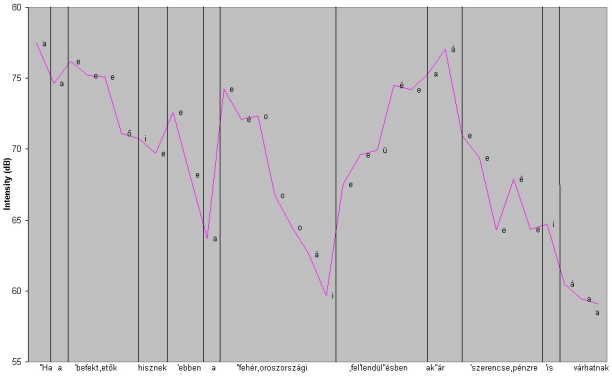
(The non-existence of) secondary stress in Hungarian

Dániel Szeredi *Sylvia Blaho*
ELTE, Budapest & *CASTL, Tromsø*
daniel@szeredi.hu sylvia.blaho@hum.uit.no

While it is generally accepted that Hungarian has initial primary stress, the secondary stress pattern of the language has been subject to considerable debate. The most widely cited view, originating from Hayes (1995: 330, based on Kerek 1971), is that the language displays a very basic quantity-insensitive left-to-right trochaic foot assignment without quantity sensitivity and extrametricality, i.e., that secondary stress falls on every odd-numbered syllable. Conversely, Szinnyei (1912:12) argues for a quantity-sensitive ternary pattern: according to him, secondary stress falls on the third and fifth syllable unless the third syllable is light, in which case secondary stress is on the fourth and sixth syllables.

These views, however, lack both phonetic and phonological evidence to support them: the claims have been made without prior articulatory or acoustic measurements, and they also lack support from phonological processes like stress-sensitive vowel lengthening or shortening, or foot-initial strengthening or medial weakening of consonants. Moreover, an impressionistic survey of native speaker judgements raises doubts regarding both accounts: speakers reject secondary patterns as well as both quantity-sensitive and quantity-insensitive tertiary footing.

To test the claims above, a pilot study examining 4 native Hungarian speakers both in casual and in formal careful speech has been conducted, with the following results:



Vowel intensity graph of a sentence; word boundaries are marked with vertical lines

- Of three possible phonetic correlates of stress (Raphael *et al.* 2007: 232), F0 and duration provide no evidence for secondary stress. F0 is determined by the information structure of the sentence (supporting Varga 2002), while vowel duration is only influenced by the lexical length contrast and local factors like following sonorants.
- As for intensity, a clause-final word may have its highest intensity peak on its penultimate or ultimate syllable. This, however, is a function of sentence structure, not word stress.
- Eliminating influences of clause structure, words consisting entirely of light syllables usually do not have a secondary stress at all: the first syllable has the highest intensity and the intensity peaks on the following vowels decrease gradually.
- If there is a slight increase of intensity, its place is usually where Szinnyei predicts it.
- There is a slight influence of morphological factors: compounds can receive secondary stress on the first syllable of their second member.
- We found no evidence of quantity-sensitivity: neither long vowels nor closed syllables attract secondary stress.

In sum, although more work is clearly needed to definitively describe the stress pattern of the language, our results falsify the wide-spread claim that Hungarian has binary secondary stress.

ON PHONOTACTIC CONSTRAINTS IN COGNITIVE PHONOLOGY

Riitta Välimaa-Blum
Université de Nice–Sophia Antipolis and CNRS/UMR 7018

riitta.blum@unice.fr

Cognitive linguistics assumes that languages are fundamentally symbolic systems, and if this is so, then we can take it that, in the course of language acquisition, we form mental representations of units that are meaningful. Usage-based grammars propose that languages emerge in function of their use so that a speaker's knowledge of his language derives from he has actually said and perceived. Negative phonotactic constraints relate to meaningless units, phonemes, and they characterize something that cannot be said in a language. The question arises now whether cognitive phonology and usage-based grammars have room for negative phonotactic constraints at all. It has been argued that, apart from metalinguistics knowledge, speakers have no independent mental representation of speech sounds per se, but only of symbolic units. I will argue that the positive phonotactic constraints correspond to two different kinds of knowledge. On the one hand, speakers have procedural knowledge of the well-formed sound sequences, and on the other, they have schematic knowledge of what constitutes a well-formed word, and neither of these requires autonomous memory structures of speech sounds. Speakers seem to be able to distinguish that which is phonotactically ill formed from that which is well formed, and this might point toward separate a knowledge base of phonemes. However, the ability to tell apart the phonotactically well-formed from the ill-formed utterances arises from the interplay of (i) the procedural and schematic knowledge of the positive constraints and (ii) an auditorily represented, exemplar-based lexicon. It emerges from this that 'knowing' the positive constraints entails knowing the negative ones as well, but without any explicit constraints.

Invited speakers

The abstractness of minimal contrast

B. Elan Dresher
University of Toronto

Phonologists working in a variety of theoretical frameworks have recently independently proposed that 'minimal contrast' plays an important role in phonology (Padgett 2003a, Nevins 2004, Calabrese 2005, Campos Astorkiza 2007). According to the definition proposed by Nevins (2004: 142), a segment S with specification αF is *contrastive* for F if there is another segment S´ in the inventory that is featurally identical to S, except that it is –αF. This definition is generally understood as applying to surface phonetic forms; Dispersion-Theoretic (DT) approaches (Flemming 2002, 2004, Padgett 2003a, b, Campos Astorkiza 2007) explicitly evaluate contrast with respect to the phonetic surface. I will argue that the notion of minimal phonetic contrast is largely illusory (the phonetic surface being a hostile environment for minimal contrasts), and an inadequate basis for a general theory of contrast; moreover, it makes the wrong predictions about the workings of the phonology.

I will argue that phonology is indeed sensitive to contrast, but the relevant type of contrast must be assigned hierarchically by successively dividing an inventory by a list of ordered features, as proposed by Jakobson and his collaborators (Jakobson, Fant and Halle 1952, Jakobson and Halle 1956; see Dresher 1998, 2008, in press, Hall 2007, Mackenzie 2009). This procedure, called the Successive Division Algorithm (SDA), is abstract in two senses. First, it applies to underlying, not to surface, representations; in fact, this procedure ***assigns*** contrastive representations. Second, all contrasts are minimal at the point in the feature hierarchy where they are assigned, but not necessarily thereafter. For example, if the first feature in the list is [sonorant], it divides the inventory into two sets, one made up of [sonorant] sounds and one consisting of non-sonorants; at the point of division, this is a minimal contrast, because no other features have yet distinguished segments from each other. The addition of later contrastive and non-contrastive features may make these contrasts non-minimal from a surface point of view.

I will show how a hierarchical approach to contrastive specification allows for a superior analysis of a variety of cases. Examples to be discussed include the East Slavic post-velar fronting (Padgett 2003a). I will argue that Padgett's DT analysis, besides requiring extremely problematic machinery, is unable to capture the generalization posited by Jakobson 1929, whom Padgett credits as partially inspiring his own account. The SDA however, is able to express Jakobson's insight directly, while being much simpler, also. I will also consider a generalization about Inuit palatalization observed by Compton and Dresher (2008), to the effect that /i/ can cause palatalization only when it has a contrastive palatalizing feature. This case is significant because in most dialects the relevant contrast exists at the underlying, not at the surface, level, due to a phonetic merger of two underlying vowels to surface [i]. This case shows strikingly that phonological contrast is not defined at the surface.

In sum, phonologically relevant minimal contrasts are to be found in the mind in the form of hidden hierarchical structure, and are not overtly present in surface phonetics.

Usage-based representations: Evidence from New Zealand English /r/-sandhi

Jennifer Hay
University of Canterbury

/r/-sandhi is the pronunciation of prevocalic /r/ in environments like 'ca/r/ alarm', where the /r/ is orthographically present (known as linking /r/) and 'ma/r/ and pa', where there is no /r/ in the orthography (known as intrusive /r/). The theoretical literature on /r/-sandhi is sizeable, and one focus of theoretical discussion is whether the /r/ is underlyingly present, or whether it is inserted. I argue that neither is strictly speaking true. Rather, the /r/ is partially present, and is embodied in the remembered phonetic detail of previously encountered words. The frequency and degree of /r/-fulness, then, differs across lexical items, and also across individuals. Evidence for this position comes from a set of studies on New Zealand English /r/-sandhi, including:

(a) corpus work showing that the likelihood of a word being produced with linking /r/ is related to the overall probability of that word occurring before vowels.

(b) correlations between the frequency with which a word or individual has an /r/, and the F3 of the /r/ when it is produced. The less likely an /r/ is to be produced in a certain environment, the weaker the articulatory constriction when it is produced. I argue that such effects are the result of a production target created by averaging over /r/-ful and /r/-less memories in the lexical representation.

(c) perception experiments across different groups of speakers showing that /r/ in various environments is differently salient to different individuals, in proportion to the degree to which they have encountered /r/ in that environment.

Taken together, the body of data on New Zealand English /r/-sandhi provides strong evidence for usage-based, constantly-updated, and phonetically rich lexical representations.

The importance of the unspeakable

Marc van Oostendorp
Meertens Instituut & Leiden University

Absolute ungrammaticality, or 'ineffability', is usually seen as a technical problem for OT. Given that output forms almost always violate at least some constraints, every input will lead to some 'optimal' output. How is it possible then that some forms simply cannot be produced? Theories which are not built on soft constraints do not seem to suffer from a similar problem: certain forms are simply ruled out. On closer inspection, it turns out that the problem is more complicated, and that there are various related problems which are problematic also for other theories of grammaticality.

First, there is the issue of gradient grammaticality: some forms are neither completely grammatical nor completely ungrammatical, but they are supposed to be 'marked', which is annotated in some systems by a question mark. Given that our theories should be able to deal with such judgements (as well as with the corpus statistics usually corresponding to them), we need to refine our ideas of grammaticality in one way or the other.

Secondly, I turn my attention to an empirical domain that has so far received very little attention in the theoretical phonological literature: lexical selection by young children. It can be shown that the words which children try to produce at a given stage obey certain constraints, which are sometimes different from those which govern their actual outputs. Thus, children may simply not try to produce any words with some relatively marked segment at all, before they move on to a stage where they will try to do so. Given that words with these segments then all of a sudden show up massively, it seems that children at some earlier stage knew the words already, but were actively avoiding them.

I will also discuss an (OT) interpretation of the notion absolute ungrammaticality which can cover these and other cases, and point out how from this we get a clearer idea of the concept of grammaticality.