OCP12

The 12th Old-World Conference in Phonology

ABSTRACTS BOOKLET

Tuesday 27th - Friday 30th January 2015

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12th Old World Conference in Phonology

Workshop: Exceptionality in Phonology

27 January 2015, Universitat Autònoma de Barcelona

Provisional program

9.15-10.00	*Registration*	
10.00-10.15	*Opening remarks*	
10.15-11.00	***Invited speaker*** KIE ZURAW (UCLA)	Polarized exceptions: extreme bimodal distributions of word types
11.15-11.45	*Coffee break*	
11.45-12.15	Carlos-Eduardo Piñeros (University of Auckland)	Exceptional nasal-stop inventories
12.15-12.45	Amanda Rysling (U Mass Amherst) and Maria Gouskova (New York University)	A rule with exceptions or a minor rule? Polish revisited
12.45-13.15	Katherine Hout and Eric Bakovic (UC San Diego)	Two approaches to exceptionality in Mushunguli (Somali Chizigula)
13.15-15.00	*Lunch*	
15.00-15.30	Peter Rebrus (Hungarian Academy of Sciences) and Péter Szigetvári (Eötvös Loránd University)	Diminutives: Exceptions to the exceptions
15.30-16.00	Claire Moore-Cantwell and Joe Pater (U Mass Amherst)	Gradient exceptionality in Maximum Entropy Grammar with lexically specific constraints
16.00-16.30	Eric Bakovic (UC San Diego)	Exceptionality in Spanish stress
16.30-17.00	*General discussion*	
17.00	*Coffee*	

12th Old World Conference in Phonology

Main conference

28-30 January 2015, Universitat de Barcelona

Provisional program

MAIN SESSION

Wednesday, January 28th

8.45-9.15	*Registration*	
9.15-9.30	*Opening remarks*	
9.30-10.30	***Invited speaker*** PAUL DE LACY (Rutgers University)	The theory of Generative evidence
10.30-11.00	*Coffee break*	
11.00-11.30	Nancy Kula (University of Essex) and Bettina Braun (University of Konstanz)	The mental representation of ternary spreading: How are derived tones processed?
11.30-12.00	Siri Moen Gjersøe (Humboldt University of Berlin)	Downstep and phonological phrases in Kikuyu
12.00-12.30	Jeroen Breteler (University of Amsterdam)	Metrical tone shift and spread in Harmonic Serialism
12.30-13.00	John Joseph Perry (University of Cambridge)	Cyclically conditioned prosodic constituency in Gyalsumdo and beyond
13.00-15.00	*Lunch*	
15.00-15.30	Elan Dresher (University of Toronto) and Andrew Nevins (University College of London)	Undergoers are harmony sources: Maintaining iterative harmony in Oroqen dialects
15.30-16.00	Kevin Ryan (Harvard University)	Weak triggers and gang effects in Sanskrit retroflex harmony
16.00-16.30	Eva Zimmermann and Jochen Trommer (Leipzig University)	Exocentric Mutation as argument for Generalized Nonlinear Affixation
16.30-17.00	*Coffee break*	
17.00-17.30	Laurence Voeltzel (Université de Nantes)	Preaspiration of singletons in Faroese
17.30-18.00	Sławomir Zdziebko (Catholic University of Lublin)	Polish palatalizations as element addition
18.00-18.30	Birgit Alber (University of Verona)	Dialectal variation and typological properties

Thursday, January 29th

9.00-9.30	Savithry Namboodiripad, Marc Garellek and Eric Bakovic (University of California, San Diego)	Moraic geminates in Malayalam: Evidence from minimal word effects and loanword adaptation
9.30-10.00	Mathilde Hutin and Samantha Ruvoletto (Université Paris VIII Vincennes-Saint-Denis)	For the importance of fine-grained phonetic detail in phonology
10.00-10.30	Giorgio Magri (CNRS, Université Paris 8)	Idempotency and the early acquisition of phonotactics
10.30-11.00	Evan-Gary Cohen (Tel-Aviv University)	Phoneme consistency vs. lexical frequency in Hebrew rhotic acquisition
11.00-11.30	*Coffee break*	
11.30-12.00	Paul Boersma (University of Amsterdam)	OCP and Line-Crossing Constraint as aids to word segmentation
12.00-12.30	Silke Hamann and David W. L. Li (University of Amsterdam)	Diachronic changes in loanword adaptation: Loan doublets in Cantonese
12.30-13.00	Ross Godfrey (University of Toronto)	Morphologically conditioned lengthening as a processing effect
13.00-15.30	***POSTER SESSION & Lunch***	
15.30-16.00	Michael Dow (Université de Montréal)	Issues in unifying nasal vowel markedness
16.00-16.30	Benjamin Storme (MIT)	Closed Syllable Vowel Laxing: A strategy to enhance coda consonant place contrasts
16.30-17.00	Christina Bjorndahl (Cornell University, CMU)	The cross-linguistic phonological and phonetic identity of /v/
17.00-17.30	*Coffee break*	
17.30-18.00	Ranjan Sen (University of Sheffield)	Pre-Classical Prevarication in Latin Feet: Stratal synchronic structure and discretionary diachronic development
18.00-18.30	Shih-Chi Yeh (National Kaohsiung Normal University)	Sonority-driven stress in Paiwan: Phonological or phonetic factors?
18.30-19.00	Ben Hermans (Meertens Institute & VU University Amsterdam) and Francesc Torres-Tamarit (VU University Amsterdam)	On the variable parsing of long vowels

20.30 *Conference dinner*

Friday, January 30th

9.30-10.00	Marko Simonovic (Utrecht University)	Surface bases and Lexical conservatism. The case of the Serbo-Croatian *-ova-*
10.00-10.30	Gretchen Kern (MIT)	Syntactically unjustified morphs and other strategies for hiatus resolution in Irish prepositions
10.30-11.00	Adam Albright (MIT)	Faithfulness to non-contrastive phonetic properties in Lakhota
11.00-11.30	*Coffee break*	
11.30-12.00	Heather Newell (UQAM)	Structural Sensitivity in Phonology: Phonological Persistence
12.30-12.30	Jonathan Bucci (Université Nice Sophia Antipolis-BCL UMR 7320)	Vowel reduction and Raddoppiamento Fonosintattico induced by stress: The virtual length analysis
12.30-12.45	*Break*	
12.45-13.45	***Invited speaker*** MARC VAN OOSTENDORP (Meertens Institute & Leiden University)	Why syntax and phonology touch
13.45-14.00	*Closing remarks and Business meeting*	

POSTER SESSION

Thursday, January 29th, 13.00-15.30h *during lunch time*

Cristina Albareda (Universitat de Barcelona)	The contextual allomorphy and paradigmatic pressure of the prepositions *a*, *en* and *amb* in Catalan
Begüm Avar (Boğaziçi Üniversitesi)	Save Harmony: Rebellious roots troubling GP
Jieun Bark (University of Nantes)	How to represent the Korean consonants: A GP2.0. Perspective
Semra Baturay (Yıldız Teknik Üniversitesi)	Stress, suffixes and domain boundary in Turkish
Karolina Bros (University of Warsaw)	In search of the default Spanish vowel: Evidence from perception
Guillaume Enguehard (Université Paris 7)	Segmental representation of Livonian stød
Guilherme D. Garcia (McGill University) and Natália B. Guzzo (Universidade Federal do Rio Grande do Sul)	The prosodization of neoclassical elements in Brazilian Portuguese: Evidence from vowel reduction

Christopher Green and Michelle Morrison (University of Maryland)	On the realization, representation, and prosodic function of Somali topic-marking
Natália B. Guzzo (Universidade Federal do Rio Grande do Sul)	Prosodic recursion and the Composite Group: Can they reconcile?
Linda Heimisdóttir (Cornell University)	Aspiration as a temporally coordinated gesture: Evidence from Icelandic
Yujing Huang (Harvard University)	Position-sensitive sandhi: A case study of Jinan Tone 4 sandhi
Paul John (Université du Québec à Trois-Rivières)	On the representation of empty categories
Pavel Koval (Lomonosov Moscow State University)	Tone and syllable structure in Akebu Polar Questions
Mohamed Lahrouchi (CNRS, University Paris 8) and Sophie Kern (CNRS, University Lyon 2)	From babbling to first words in Tashlhiyt Berber: A longitudinal two-case study
Mairym Llorens Monteserin (University of Southern California)	Resolving contradictions in the Puerto Rican Spanish syllable coda
Maria Mitsiaki and Anthi Reviathiadou (Aristotle University of Thessaloniki)	Phonological gradience in Greek ##CC and grammatical modeling
Charlie O'Hara (University of Southern California)	Vowel Raising and Positional Privilege in Klamath
Diana Passino (Università di Padova)	Progressive and regressive metaphony in an Upper-Southern dialect of Italy: Some implications for phonological theory
Nuria Polo (UNED)	First approach to Phonological Phrase in Spanish Prosodic Hierarchy
Markus Pöchtrager (Boğaziçi Üniversitesi)	Alveolars on the verge of a nervous breakdown
Peter Rebrus and Miklós Törkenczy (Hungarian Academy of Sciences)	Variation and subpatterns of disharmony in Hungarian
Ellenor Shoemaker (Université Sorbonne Nouvelle - Paris 3)	The acquisition of non-native contrasts at first exposure
Ellenor Shoemaker (Université Sorbonne Nouvelle - Paris 3) and Sophie Wauquier (Université Paris 8)	Processing liaison in L2 French: The case of non-traditional learners
Anne-Michelle Tessier and Kayla Day (University of Alberta)	Grammatical restrictions on lexical avoidance in children's phonological acquisition
Alexandre Vaxman (University of Connecticut)	Diacritic weight scales: A novel approach to lexical accent systems

WORKSHOP ON EXCEPTIONALITY IN PHONOLOGY

to be held at the UAB (January, 27th)

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Polarized exceptions: extreme bimodal distributions of exceptional words

Kie Zuraw (UCLA)

The normal distribution—the bell curve—is common in all kinds of data, and is often expected when the quantity being measured results from multiple independent factors. The distribution of phonologically exceptional words, however, is sharply non-normal in the cases examined in this talk (from English, French, Hungarian, and Tagalog). Instead of most words' showing some medial rate of variation (say, 50% of a word's tokens are regular and 50% irregular), with smaller numbers of words having extreme behavior, words cluster at the extremes of behavior—that is, a histogram of exceptionality rates is shaped like a U rather than a bell. The U shape cannot be accounted for by positing a binary distinction with some amount of noise over tokens, because some items (though the minority) clearly are variable, even speaker-internally. In some cases (e.g., French "aspirated" words) there is a diachronic explanation: sound change caused some words to become exceptional, so that the starting point for today's situation was already U-shaped. But in other cases, such an explanation is not available, and items seem to be attracted towards extreme behavior.

Unexpected stresses in English derivation: exceptionally variable or variably exceptional? a case study of adjectives in *-able* and *-ory*

Sabine Arndt-Lappe, Heinrich-Heine-Universität Düsseldorf

It is a standard assumption in many grammatical theories that exceptional forms are an effect of the forms' exceptional properties being stored in the lexicon, whereas non-exceptional forms are interpreted as the result of rule- (or constraint-) governed, predictable behaviour. A matter of debate that divides current theories is how to interpret cases where grammatical rule application is variable and, at the same time, systematically constrained by lexical factors. The present paper seeks to contribute to this debate focussing on variability in stress assignment in derived words in English, specifically in derived adjectives ending in *-able* and *-ory*. The contribution will be both empirical and theoretical.

In descriptions of English morphophonology, traditionally a distinction is made between stress-shifting and stress-preserving affixes. In generative approaches, this distinction has figured prominently in the theoretical literature, providing the basis for far-reaching claims about the nature of phonology-morphology interaction (most notably in Lexical Phonology: cf. Kiparsky 1982 et seq., Giegerich 1999; cf. also e.g. Pater 2000, Zamma 2012, Bermúdez-Otero 2012, Stanton & Steriade 2014).

One aspect that has important theoretical implications but is still not well understood is the question of variability in stress assignment. Thus, many traditional generative approaches rest on the assumption that application of morpho-phonological stress rules is categorical (and, hence, non-variable). Variability, then, can only be a result of lexical marking and, hence, idiosyncratic behaviour (cf. e.g. Pater 2000), or alternatively, in dual-mechanism models, a result of a mechanism that is fundamentally non-grammatical (but 'associative', cf. e.g. Bermúdez-Otero 2012). Traditionally, stress in derived words in English has not been in the focus of much work devoted to variability. However, recent research has brought to light an increasing amount of evidence that strongly suggests that variability has been underestimated (cf. esp. Zamma 2012, Bauer et al. 2013: chpt. 9). Evidence is, however, so far largely anecdotal and unsystematic, and the theoretical status of the findings is unclear. The goal of the present paper is to provide a systematic empirical analysis of the stress behaviour of two derivational categories, *-able* and *-ory*, and to discuss pertinent theoretical claims in the light of the empirical facts.

-able is in general considered to be a stress-preserving suffix, but various cases of unfaithful stress assignment have been observed in the literature (Aronoff 1976, Giegerich 1999, Trevian 2007, Bauer et al. 2013: 186f., 297). These have been variably attributed to *-able*'s status as two different suffixes (Aronoff 1976: 122f.), its dual class membership (e.g. Giegerich 1999), semantic opacity (Burzio 2002), structural factors (Bauer et al. 2013: 186f., 297), or paradigmatic effects triggered by related bases (Stanton & Steriade 2014). Examples of forms discussed in the literature are given in (1).

(1)	a. stress preservation with *-able*:	abrígeable, álterable, ánalysable, mónitorable
	b. stress shift with *-able*:	analýsable, allocátable, documéntable

Another suffix that is known to exhibit stress variation is the adjectival suffix *-ory*. *-ory* is usually claimed to be stress-shifting (Liberman & Prince 1977, Zamma 2012). Variation has traditionally been described in terms of two conflicting stress rules that are both operative in *-ory* derivatives: weak retraction and long retraction (Liberman & Prince 1977, Hayes 1982). Contrary to traditional stress-shifting accounts, Bauer et al. note that "the stress pattern of the base is almost always retained with *-ory*" (Bauer et al. 2013: 301). Examples are provided in (2), taken from Bauer et al. 2013: 185, 301.

(2)	a. base-final stress with *-ory*:	advísory, conclúsory
	b. penultimate stress with *-ory*:	mígratory, contríbutory
	c. antepenultimate stress with *-ory*:	artículatory, antícipatory

The data for the present analysis come from a corpus of some 250 derivatives taken from the CELEX lexical database (Baayen et al. 1995) and from the *Oxford English Dictionary*. Unlike in previous studies, the corpus comprises only derivatives with long bases (> 2 syllables).

The study finds a substantial amount of stress variation both across and within lexical types. Moreover, quantitative analysis of the data suggests that the variation is systematic, reflecting the presence and interaction of stress preservation effects and effects of phonological wellformedness (esp. of syllable quantity) in both *-able* and *-ory* derivatives. The two morphological categories differ only in terms of the relative strength of the two effects. Neither of the two effects is categorical in the sense that it is exceptionless. Furthermore, phonological wellformedness is shown to be constrained by stress preservation. In particular, unfaithful stresses are more likely to occur if the unfaithful stress preserves the rhythmic structure of the base in the derivative.

In terms of their theoretical implications, the findings provide a challenge to several theoretical approaches that have been proposed to explain unexpected stresses in English derivation. For example, cases of stress preservation in stress-shifting processes and cases of stress shift in stress-preserving suffixation challenge the idea advanced in many stratum-based theories that phonological rule application is categorical. Likewise, the findings challenge approaches that emphasise the role of correspondence relations as sources of exceptional stresses because stress shift in stress-preserving suffixation also occurs independently of the presence of pertinent correspondence relations.

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Exceptionality in Spanish stress

Eric Baković, UC San Diego

Stress in vowel-final non-verbs (henceforth 'words') in Spanish regularly falls on the penultimate syllable, while stress in consonant-final words regularly falls on the final syllable. There are two classes of exceptions to this regularity: (i) stress on the syllable preceding the regular one (antepenultimate stress in vowel-final words, penultimate stress in consonant-final words) and (ii) stress on the syllable following the regular one (final stress in vowel-final words). Harris (1983) ('H83') provides compelling arguments for the claim that class (ii) is morphologically systematic, but falls short of the stronger claim that the pattern exhibited by this class is simply a subcase of the regular stress pattern. I argue that there is much to be gained from this latter claim, including a simple and elegant analysis of class (i).

We start with H83's key observation (p. 91) that vowel-final words with penultimate stress end in a terminal element (TE), generally a vowel *-o*, *a*, or *-e* (but sometimes a -V*s* sequence) and typically associated with gender marking. The TE is always the last morpheme before the (inflectional) plural suffix, and its quality sometimes varies in different morphological contexts. In the morphological analysis of Harris (1983), a TE is affixed directly to a *(derivational) stem*. In the examples below, square brackets indicate word boundaries (preceded by the TE) and parentheses indicate stem boundaries.

(1)	a. [(páp)-a]	'potato'	e. [(pap+ít)-a]	'potato (dim.)'		
	b. [(mán)-o]	'hand'	f. [(man+ít)-a]	'hand (dim.)'		
	c. [(adelánt)-e]	'ahead'	g. [(adelant+ít)-o]	'ahead (dim.)'		
	d. [(léj)-os]	'far'	h. [(lej+án)-o]	'distant'		

Stress on consonant-final words is regularly final, as shown in ((2)a-c). H83 (p. 91) argues that these words don't have a TE; under derivational affixation ((2)d-f), a TE is added and stress once again follows the penultimate pattern.

(2)	a. [(paréd)] 'wall'		d. [(pared+cít)-a]	'wall (dim.)'
	b. [(salón)] 'lounge'		e. [(salon+cít)-o]	'lounge (dim.)'
	c. [(animál)] 'animal'		f. [(animal+ít)-o]	'animal (dim.)'

H83 (pp. 116-119) further claims that vowel-final words with final stress ((3)a-c) also lack a TE, just like the consonant-final words in ((2)a-c). Support for this view comes from the fact that the final vowel in these words is present and invariable under derivational affixation ((3)d-f), where separate TEs arise — again, just like the consonant-final words in ((2)d-f).

(3)	a. [(café)]	'coffee'	d. [(cafe+cít)-o]	'coffee (dim.)'
	b. [(dominó)]	'domino'	e. [(domino+cít)-o]	'domino (dim.)'
	c. [(Perú)]	'Peru'	f. [(Peru+án)-o]	'Peruvian'

Given the above, the correct generalization about regular main stress in Spanish, in both vowel-final and consonant-final words, can be stated as follows: "stress the final syllable of the derivational stem" (Roca 1988, 2006). This generalization encompasses penultimate stress in TE-final words (1) and final stress in words without a TE, whether consonant-final (2) or vowel-final (3). But H83 (p. 94-95) rejects this generalization due to the consistently penultimate stress of bisyllabic prepositions (4) and productive truncations (5).

(4)	a. [pára]	'for'	c. [désde]	'since'
	b. [hásta]	'until'	d. [sóbre]	'over'

(5)	a. [(múñe)]	'doll' (< *muñéca*)	c. [(prófe)]	'professor' (< *profesór*)
	b. [(árqui)]	'architect' (< *arquitécto*)	d. [(Máuri)]	'Maurice' (< *Maurício*)

This forces H83 to the odd position of having to distinguish between a covert TE in the forms in (2), (3) from the complete absence of a TE in the forms in (4), (5). The covert TE in the former case is necessary to state the rule in (6) responsible for final stress in these forms.

(6) A rhyme ending in a vocoid (= a [–consonantal] segment) that is final both in the stem and the word must be stressed. (Paraphrased from H83, p. 118.)

This amounts to stipulating that there is something exceptional about truncations (which are nouns, and are thus expected to have a TE), if not also about prepositions (which, being function words, are usually unstressed in normal discourse in any case). The evidence against the generalization that stress is final in the derivational stem is thus very weak.

Acceptance of the stem-domain analysis of stress leaves the exceptions classified under (i): stress on the syllable preceding the regular one, now understood as stress on the penultimate syllable of the stem. Near-minimal contrasts are given in (7): regularly stressed forms on the left and class (i) exceptionally stressed forms on the right.

(7)	a.	[(molín)-o]	'windmill'	f.	[(cómic)-o]	'comic(al)'
	b.	[(sabán)-a]	'savannah'	g.	[(sában)-a]	'sheet'
	c.	[(pistól)-a]	'pistol'	h.	[(epístol)-a]	'epistle'
	d.	[(animál)]	'animal'	i.	[(caníbal)]	'cannibal'
	e.	[(paréd)]	'wall'	j.	[(huésped)]	'guest'

It is uncontroversial that these contrasts are somehow lexically marked; that is, that class (i) stress is in fact an exceptional pattern, unlike class (ii). Specifically, I propose here an analysis of the key distinction between the regular and class (i) exceptional stress patterns in terms of Optimality Theory (OT; Prince & Smolensky 2004) with indexed constraints (Pater 2010). FINALSTRESS ("stress is final in the stem") is the constraint responsible for the regular stress pattern, and it is ranked above NONFINALITY ("stress is not final in the stem") but below NONFINALITY$_{(i)}$, lexically-indexed to class (i) exceptional stems.

(8) NONFINALITY$_{(i)}$ $\gg$ FINALSTRESS $\gg$ NONFINALITY

The ranking in (8) achieves the desired contrasts in (7) in the following way. The regularly stressed words on the left are not subject to NONFINALITY$_{(i)}$, and so FINALSTRESS selects as optimal a candidate with stress on the final syllable of the stem. The exceptionally stressed words on the right, on the other hand, *are* subject to NONFINALITY$_{(i)}$, which prefers candidates without stem-final stress. However, because FINALSTRESS is better-satisfied by stress nearer to the right edge of the stem (Hyde 2012, *pace* McCarthy 2003), stress optimally falls on the syllable immediately preceding the stem-final one.

This analysis of the class (i) exceptional stress pattern crucially depends on the stem-domain analysis of Spanish stress defended further above. FINALSTRESS accounts for the fact that stress regularly falls on the final syllable of the stem, and its interaction with NONFINALITY$_{(i)}$ accounts for the fact that stress exceptionally falls on the immediately adjacent syllable to the left of that stem-final syllable. Because H83's analysis does not take the stem as the domain of stress assignment in Spanish, it cannot so simply and elegantly account for the difference between the regular and class (i) exceptional stress patterns.

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Two approaches to exceptionality in Mushunguli (Somali Chizigula)

Katherine Hout and Eric Baković, UC San Diego

Language background. Mushunguli (Somali Chizigula, G.311) is spoken by the inhabitants of a small area around the lower Jubba River in Somalia, many of whom now reside in diaspora communities throughout the United States. The language is underdescribed, and there is no published description of the phonology. The data discussed here were collected by the first author from a native speaker consultant living in Columbus, Ohio, in 2011-2012.

Description of the problem. Potential vowel hiatus is usually resolved in one of two ways. Illustrations of both are provided in (1) and (2) below, using the example verb stem *-iv-* 'hear'; note that penultimate vowels are lengthened in all forms considered here.

(1) Glide formation: prevocalic high vowels *i,u* become glides *j,w*
u-iv-a → **wii**va 'it (cl. 3) heard' k**u-i**v-a → k**wii**va 'to hear'

(2) Fusion: low *a* + mid or high *e,i* / *o,u* are fused to mid *e* / *o*
a-a-iv-a → **ee**va 'he/she is hearing' k**a-i**v-a → k**ee**va 'he/she heard'

An exceptional group of stems, all high-vowel initial, resolve potential hiatus normally in contexts where glide formation is expected, but do not resolve hiatus in contexts where fusion is expected. The behavior of one such stem, *-it-* 'go', is illustrated in (3) and (4) below.

(3) Glide formation applies as expected
u-it-a → **wii**ta 'it (cl. 3) went' k**u-i**t-a → k**wii**ta 'to go'

(4) Fusion exceptionally fails to apply
a-a-it-a → **aii**ta 'he/she is going' k**a-i**t-a → k**aii**ta 'he/she went' (*k**ee**ta)

These stems do not differ from other high-vowel initial stems other than their failure to undergo fusion. Thus, their behavior needs to be accounted for in the phonology.

Two approaches. We compare two analyses of the data illustrated in (1)–(4) in this talk. The first is an *abstract representational analysis*, in which exceptional stems begin underlyingly with a glide that blocks fusion but that is critically deleted before glide formation (Hyman 1970; cf. Kiparsky 1968). The second is a *lexical constraint indexation analysis* in which exceptional stems are subject to a lexically-indexed faithfulness constraint that protects them from fusion (Pater 2010). We present arguments in favor of the lexical constraint indexation analysis based on the fact that it better captures the two critical generalizations in (5) and (6).

(5) The exceptional stems *all* begin with high vowels.

(6) These stems are exceptional *only* with respect to fusion.

In the **abstract representational analysis**, the behavior of exceptional stems is accounted for by assuming they begin with underlying homorganic glide + high vowel sequences. In the case of *-it-*, then, the underlying form would be /-jit-/. Because these glides never surface, a rule of homorganic glide deletion is required. This rule applies after, and thus counterfeeds, fusion; it applies before, and thus feeds, glide formation. This accounts for the difference in behavior between stems like /-iv-/ and stems like /-jit-/, as seen in the derivations in (7).

(7)

	/k**u-i**v-a/	/k**a-i**v-a/	/k**u-ji**t-a/	/k**a-ji**t-a/
Fusion	*n/a*	k**e**va	*n/a*	*n/a*
Homorganic Glide Deletion	*n/a*	*n/a*	k**ui**ta	k**ai**ta
Glide Formation	k**wi**va	*n/a*	k**wi**ta	*n/a*
Lengthening	k**wii**va	k**ee**va	k**wii**ta	k**aii**ta

This analysis captures the fact that all of the exceptional stems are high-vowel initial (5): only such stems are subject to homorganic glide deletion. The fact that the exceptional stems are exceptional only with respect to fusion (6), on the other hand, is effectively stipulated by ordering homorganic glide deletion between fusion and glide formation. Moreover, surface [ji] and [wu] clusters are unattested stem-initially in Mushunguli and exceedingly rare otherwise; any that are present underlyingly are dealt with by homorganic glide deletion, but any that might be created by glide formation — e.g. /**u-u**t-a/ → [**uu**ta] 'the bow (cl. 14), *[**wuu**ta] (length again due to penultimate vowel lengthening) — must be dealt with either by a repeated application of homorganic glide deletion or by another rule after glide formation.

In the **lexical constraint indexation analysis**, the behavior of exceptional stems is accounted for by assuming that they are subject to a lexically-indexed copy of a faithfulness constraint, IDENT(high)$_L$, that is violated by fusion involving high vowels. IDENT(high)$_L$ must then be ranked above the markedness constraint ONSET that drives hiatus resolution, blocking fusion for these lexically-indexed exceptional stems. Fusion applies to other stems because the non-indexed IDENT(high) is ranked below ONSET. The tableaux in (8) make this result clear.

(8) Exceptional stems block fusion

/k**a-i**t$_L$-a/	ID(hi)$_L$	ONS	ID(hi)
k**ee**ta	* !		*
☞ k**aii**ta		*	

Other stems undergo fusion

/k**a-i**v-a/	ID(hi)$_L$	ONS	ID(hi)
☞ k**ee**va			*
k**aii**va		* !	

Stems cannot block glide formation because the vowel that glides is in the prefix, not the stem; lexically-indexed constraints "apply if and only if the locus of violation contains some portion of the indexed morpheme" (Pater 2010: 133). Thus, even if exceptional stems are subject to a lexically-indexed copy of a faithfulness constraint, IDENT(μ)$_L$, that is violated by glide formation and that is ranked above ONSET, glide formation will apply so long as the non-indexed IDENT(μ) is ranked below ONSET. The tableaux in (9) make this result clear.

(9) Prefixes attached to any kind of stem undergo glide formation

/k**u-i**t$_L$-a/	ID(μ)$_L$	ONS	ID(μ)
☞ k**wii**ta			*
k**uii**ta		* !	

/k**u-i**v-a/	ID(μ)$_L$	ONS	ID(μ)
☞ k**wii**va			*
k**uii**va		* !	

This analysis captures the fact that exceptional stems are exceptional only with respect to fusion (6), as was just illustrated in (8) and (9): stem-initial vowels are materially affected by fusion but are not affected by glide formation. The fact that surface [ji] and [wu] clusters are unattested stem-initially and exceedingly rare otherwise, even as a result of glide formation, can also be accommodated under this analysis: assuming no featural distinctions between high vowels and homorganic glides (see e.g. Rosenthall 1997), such sequences can undergo fusion freely either because an anti-fusion UNIFORMITY constraint is sufficiently low-ranked or because such a constraint doesn't exist (Keer 1999). Assuming that UNIFORMITY does not exist as a constraint strengthens the result also captured by this analysis, that all of the exceptional stems are high-vowel initial (5): only such stems are subject to IDENT(high)$_L$, and only this constraint is potentially violated by fusion of a stem-initial vowel.

Conclusion. The lexical constraint indexation analysis better captures the generalizations stated in (5) and (6), and is thus to be preferred to the abstract representational analysis.

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Gradient exceptionality in Maximum Entropy Grammar with lexically specific constraints

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This paper shows that the combination of lexically specific constraints and Maximum Entropy Grammar yields a novel approach to a long-standing problem in phonological theory: the gradience of exceptionality. The problem of gradient exceptionality was perhaps first noted by Fidelholtz (1979: 58):

> It appears to be a problem for linguistic theory that there is nothing in the formal description of Polish stress which would indicate that Polish is a 'penultimate-stress' language, as compared with the similar rules in English, which is essentially a free-stress language.

When the penultimate syllable is light, stress falls on the penultimate syllable of some English and Polish words (e.g. English *banána*), and on the antepenult on others (e.g. *Cánada*). In English, both patterns are well-attested (Pater 1994), and each word's pronunciation is stable. In Polish, on the other hand, there are very few antepenultimately stressed words (about 0.1% of the vocabulary according to Peperkamp *et al*. 2010), and they tend to be borrowings, with frequent regularization to penultimate stress. Peperkamp and colleagues provide psycholinguistic evidence of a difference between the two languages: English speakers are much better than Polish at recalling the placement of stress on a sequence of novel words. The formal descriptions of both languages require lexical marking of one of the patterns (in English it is hard to say which one), but the number of exceptions – few or many – does not affect the grammatical status of the pattern at all in a standard generative grammar. This is true of the SPE formalism of Fidelholtz's time, of metrical rule approaches, and of OT accounts with lexically specific constraints, posited independently by Kraska-Szlenk (1995) for Polish and Pater (1995 [2000]) for English stress.

When lexically specific constraints are incorporated into a Maximum Entropy Grammar framework (MaxEnt: Goldwater and Johnson 2003), the outcome of learning does yield a grammatical difference between a language like Polish and one like English. MaxEnt differs from standard OT in having weighted rather than ranked constraints, and in defining a probability distribution over the members of a candidate set. Lexically specific constraints are clones of general constraints that apply to single lexical items. The tableaux in (1) illustrate the basic workings of MaxEnt and lexically specific constraints. We consider only candidates with a trochaic foot in final or non-final position. The general constraints conflict in wanting the foot to be final (Align-R) or not (Nonfinality). Lexically specific Align-R-*i* applies only to *banana*. Hand-chosen weights are given beneath the constraint names. This is a language with a general pattern of antepenultimate stress (Nonfinality > Align-R), and where *banana* is an exception. The column headed *H* shows the weighted sum of violations, and the probability (*p*) of each candidate in a tableau is proportional to exp(*H*). The probabilities of the correct stress patterns on both *banána* and antepenultimately stressed *Cánada* approach 1 (and could be made arbitrarily close to it by scaling the weights).

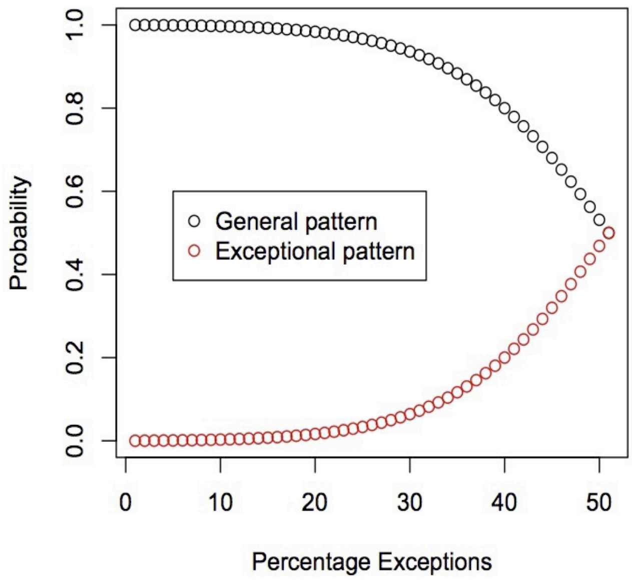
(1)

	Align-R-*i* 10	Nonfin 6	Align-R 1	*H*	*p*
ba(nána)$_i$		–1		–6	0.99
(bána)na$_i$	–1		–1	–11	0.01
Ca(náda)		–1		–6	0.01
(Cána)da			–1	–1	0.99

Given basic assumptions about how MaxEnt grammars are learned, the weights of the general constraints (and of the lexically specific ones) will vary as a function of the number of lexically specific constraints. As the number of exceptions increases, the strength of the encoding of a pattern in the general constraints decreases. This is illustrated in the result of a series of 51 learning simulations in which there were two possible locations for stress, and 100 words, with a general stress pattern with between zero and 50 exceptions. We posited a general constraint for each stress pattern, and two lexically specific constraints for each word - one favoring the general pattern and one favoring the exceptional pattern. Constraint weights started at zero, and were updated over 1000 epochs of Gradient Descent, with a learning rate of 0.1. At the end of learning, each word had probability of correct stress placement approaching 1, in all of the simulations. The grammatical encoding of the generalization can be seen in the weights of the general constraints, and in the resultant probabilities granted to stress in each position in the absence of lexical constraints. These probabilities are shown in Figure 1, and can be interpreted as the probability of each pattern being applied to a nonce word.

The probability of the general pattern ranges from 1.0 for an exception-less pattern, to 0.5 when stress is distributed equally across the two positions. This gradient model captures the difference between Polish and English: when the language has relatively few exceptions, the general pattern will apply not only to totally new forms, but whenever the speaker forgets a form – leading to regularization, especially of low-frequency items. However, the more exceptions the language has, the less regularization will obtain since the probability of a speaker choosing the exceptional form on a novel or forgotten word increases.

Figure 1: Probability of stress on a novel word (no lexically specific constraints) in each position (black = general pattern, red = exceptional stress)



The gradient strength of encoding of a general pattern is also compatible with further results from Peperkamp *et al.* (2010), who show that speakers of languages with fully predictable stress do even worse than Polish speakers in encoding novel stress patterns, and that Spanish speakers, whose language has a degree of exceptionality between Polish and English, also perform at a level intermediate between those two groups. The more strongly encoded a pattern is in terms of the weights of the general constraints, the higher the weights must be on exceptional items' lexically specific constraints in order to faithfully encode those exceptions. Since learning proceeds gradually, higher weights on lexically specific constraints would take longer to learn.

This result builds on several recent demonstrations of the usefulness of MaxEnt grammars for capturing lexically gradient patterns. Our model differs from Hayes and Wilson (2008) in being applicable to alternations as well as phonotactics, and from Hayes, Zuraw, Siptár and Londe (2009) in being able to encode word-specificity of a pattern. To show the breadth of coverage of this model, we will also present results of simulations on the learning of lexically specific alternations of differing degrees of strength in a single language (Dutch voicing: Ernestus and Baayen 2003 *et seq.*).

Exceptional nasal-stop inventories

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There are strict restrictions on what can and cannot be a nasal-stop inventory. Crosslinguistic studies have shown that certain members of this consonant class appear in the phonemic inventories of many languages, while others are found in only a few and there are yet others that do not seem to ever have phonemic status (Trubetzkoy 1939, Hockett 1955, Ferguson 1963, 1975, Thompson and Thompson 1972, Le Saout 1973, Crothers 1975, Maddieson 1984, 2011, Cohn 1993). The high degree of uniformity resulting from the ubiquity of a few members of the nasal-stop class suggests that the design of phonological systems is influenced by principles promoting the use of certain sound properties across all languages; however, the decision to declare such principles universal is problematic for there are few linguistic generalizations which are truly exceptionless.

(1) a. Every language with at least one nasal-stop phoneme has /n/
b. Every language with at least two nasal-stop phonemes has /m/
c. Every language with at least three nasal-stop phonemes has /ŋ/
d. Every language with at least four nasal-stop phonemes has /ɲ/

The generalizations in (1) suggest that there is a universal order of preference among nasal stops (i.e. /n/ > /m/ > /ŋ/ > /ɲ/), which one may hypothesize is due to decreasing degrees of articulator dexterity. This hypothesis holds that the tongue tip, lips, mid-dorsum and pre-dorsum are gradually less dextrous to form the fast and local constriction consonants require, an assumption leading to the hierarchy of anti-structural constraints presented in (2). The problem with this approach is that, while most languages are congruent with (2), there are a few which contradict it. Toaripi, for instance, has /m/ instead of /n/ as its only nasal-stop phoneme (Brown 1973) and Palauan is known for having the duo /m, ŋ/ rather than the expected /n, m/ (Foley 1975). Despite the low frequency with which they occur, such exceptions advise against the postulation of a universal place hierarchy. Hume and Tserdanelis (2002) and Hume (2003) draw the same conclusion from place assimilation.

(2) *PREDORSAL >> *MIDDORSAL >> *LABIAL >> *CORONAL

An easy way out of this predicament would be to attribute the exceptions to synchrony; a language would have an exceptional nasal-stop inventory for having inherited it from its ancestor. Unfortunately, this approach soon runs into trouble because there are cases in which a descendant has a unit lacking in the ancestor (e.g. Italian has /ɲ/ despite the fact that Latin did not) and others in which a unit present in the ancestor is lacking in a descendant (e.g. Proto-Austronesian had /n/ but Palauan does not). Furthermore, pointing to previous stages in the evolution of the language is unenlightening because it remits to past grammars without ever answering the question of what caused the irregularity in the first place.

The view defended here is that the ways in which exceptional nasal-stop inventories are structured are brought about by conflict between functional principles. The challenges that the exceptions to (2) pose are resolved when one takes into account that both articulation and perception bear on the design of phonological systems and that they often disagree in their assessment of place features because their functional goals are different. In grammars where articulation has priority, the order in (2) can be respected, but in those where perception takes the lead, distortions follow. The important revelation this study makes is that what appears to be evidence against a u niversal place hierarchy based on articulator dexterity is actually evidence for an additional universal place hierarchy: one based on perceptual ease.

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Diminutives: exceptions to the exceptions

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Backness harmony with the neutral behaviour of *i*, *í* [iː] and *é* [eː] — all front vowels phonetically — are the most often analysed aspects of Hungarian phonology (see Siptár & Törkenczy 2000 and Törkenczy &2011). We discuss transparency and anti-harmony: **transparency** is observed when a back + neu-tral mixed stem takes a back suffix (BN+B): eg *hamis-ak* 'fake-PL', while the non-mixed neutral stems take a front suffix (NN+F): eg *tigris-ek* 'tiger-PL'. This behaviour of neutral vowels is largely compulsory and productive. On the contrary, **anti-harmony** is restricted to a specific, closed stem-class: monosyllabic stems with a neutral vowel that take a back suffix alternant (N+B): *sír-ban* 'grave-INESS'. This must be seen as exceptional, since "normal" neutral stems are suffixed by a front alternant (N+F): *hír-ben* 'news-INESS'.

Suffixed forms also show transparent behaviour: a back stem followed by a neutral suffix obligatorily takes the back alternant (B+N+B): eg *nap-i-ak* 'day-ADJ-PL'. The two effects can be combined if an anti-harmonic stem is suffixed by a neutral suffix. In this case the suffix will also be back after an anti-harmonic stem (N(+N)+B): eg *hid(-i)-ak* 'bridge(-ADJ)-PL'. If the stem is harmonic front, the suffixed form will be front too (N(+N)+F): eg *viz(-i)-ek* 'water(-ADJ)-PL'. Crucially, these phenomena are independent of the morphological status of the morphemes: the suffixes can be deverbal or denominal and inflectional or derivational. The harmonic exceptionality of anti-harmonic stems is thus inherited by their derivates. Some possible patterns are summarized below:

(1) *Harmonic types of neutral forms*

Stem	only front suffix	front or back suffix	only back suffix
a. monomorphemic	F	N	B
	FN, NN		BN
b. suffixed	F+N	N+N (!)	B+N

Thus, stems of the type X+N seem to show the same pattern as their absolute stem (X) does: *a neutral suffixed form is harmonically identical to the stem* (see Törkenczy et al 2013). This hypothesis of harmony preservation will be tested in a subsystem of Hungarian morphophonology: we will examine what happens if **truncation** interacts with the harmonic patterns. There are two truncating suffixes relevant here, both of them induce vowel-zero alternation in the stem and contain neutral vowels. The verbal forming suffix *-ít* show the harmony preserving effect mentioned above, ie if the stem contains a neutral + back vowel sequence its truncated suffixed forms will also do so (*N***B** and *N*+N+**B**): eg *bén**a*** 'paralyzed' and *bén-ít-h**a**t* 'id.-VERB-MOD', and the same is true for front vowels (*N***F** and *N*+N+**F**): eg *bék**e*** 'peace' and *bék-ít-h**e**t* 'id.-VERB-MOD'.

The diminutive (DIM) suffixes *-i, -ci, -csi, -si* etc, however, show a different pattern. *Neutral vowelled DIM forms are always harmonically front regardless of the original harmonic class* of the truncated stem: eg *Tib**o**r, Év**a*** (names) and *Tib-i-n**e**k, Év-i-n**e**k* 'id-DIM-DAT', and for common nouns also: eg *kir**á**[j]* 'cool', *pis**a*** 'piddle' and *kir-csi-*

*n**e**k, pis-i-n**e**k* 'id-DIM-DAT'. It is important to note that source of the front harmonicity cannot be the DIM suffix, because the suffix vowel shows transparent behaviour: eg *Sára* name, *gazda* '(dog-)keeper' and *Sár-i-n**a**k, gazd-i-n**a**k* 'id-DIM-DAT'. That is, the vowel of the DIM suffix is *transparent for back vowels and not transparent for the neutral vowels* of anti-harmonic stems. The difference of these two suffixes in their harmonic behaviour is the same as the one in (1): *-ít* suffixation is similar to other (non-DIM) suffixation (1b), and forms with DIM *-i* is similar to monomorphemic forms (1a). Harmony preservation can be analysed by assuming paradigmatic uniformity constraints between the stem and the suffixed form, hence violation of preservation is explained by a special status of DIMs.

A similar phenomenon arises when the stem contains a back vowel + *e* sequence (Be). In this case since the *e* is optionally transparent to the backness, systematic vacillation occurs: Be+B/F, eg *József-nak/nek* 'name-DAT', *bunker-nak/nek* 'bunker-DAT' (see Siptár & Törkenczy 2000 and Törkenczy 2011). In the diminutive forms, however, the last vowel is *i* (instead of *e*) which is always compulsorily transparent, thus these DIM forms can be suffixed with back allomorphs only: B+i+B, eg *Józs-i-nak/*nek*, *bunk-i-nak/*nek* 'id.-DIM-DAT'. This is structurally analogous to the case of neutral vowel stems shown above: *harmonic preservation does not hold* in the case of diminutive formation, but the harmonic class of these DIM forms is identical to the harmonic class of the monomorphemic stems of the same form: Bi+B.

A possible explanation of the "exceptionality" of DIMs is rooted in the special process of DIM formation in morphology.

1. It is not entirely productive: it is unpredictable which of the several DIM suffixes will be used with a given nominal (and many potential diminutive forms are odd by speakers' judgement).
2. the degree of DIM truncation is special: while all other truncating suffixes delete only one vowel, DIM suffixes delete a string of potentially any length. This is because DIM formation is output oriented: a DIM form has to be two syllables long.
3. DIM forms often undergo lexicalization: the semantic link between the morphological base and its DIM form is often obscured.

Therefore DIMs have much weaker links to their root than other derived forms, thus they do not belong to their root's paradigm. This explains why the harmonic behaviour of DIMs is not inherited from their root, hence they follow the pattern of morphologically simplex polysyllabic stems.

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A rule with exceptions or a minor rule? Polish revisited

Amanda Rysling and Maria Gouskova

Introduction. It is difficult to identify whether a rule is default or exceptional when a language supplies many examples of rule undergoers and non-undergoers. Polish vowel-zero alternations are such a case. The tendency has been to give Polish and Russian alternations a unified analysis. We supply analytic and quantitative arguments for analyzing Polish alternations as general and epenthetic, but subject to exceptions, in contrast to Russian's exceptional alternation caused by deletion (Gouskova 2012, Gouskova Becker 2013).

Polish yers. In Polish, [e] alternates with zero in the final syllables of some words but not others, shown in (1). Hayes (2009, ch. 12) points out that whether the alternation is treated as deletion (Gussmann 1980, Bethin 1992, Jarosz 2008, Rubach 1986, 2013) or epenthesis (Czaykowska-Higgins 1988), there must be lexical exceptions: there are vowels that do not alternate (1a), and there are contexts (e.g., [t_r]) in which vowels appear in some words but not others (cf. (1c) and (1e)). Regardless of a word's pattern with case suffixes, [e] appears in the last stem syllable with the diminutive suffix [-ek], as in the `Diminutive' column in (1)—except in obstruent-obstruent clusters, which may be unbroken in the diminutive (see (1e)).

(1) *Six types of patterns in Polish*

	UR	Unaffixed	Case Suffix	Diminutive	Gloss
(a) Nonalternating V	/seter/	sete̲r	sete̲r–ɨ	seter–ek	‘setter’
	/kalek/	kale̲k	kale̲k–i	kalet͡ʂ–ek	‘cripple’
(b) Epenthesis: 1σ	/dɲ/	d͡ʑe̲ɲ	dɲ–i	d͡ʑe̲ɲ–ek	‘day’
	/mgw/	mgʲe̲w	mgw–ɨ	mgʲe̲w–ek	‘fog’
(c) Epenthesis CC# > 1σ	/sfetr/	sfete̲r	sfetr–ɨ	sfete̲r–ek	‘sweater’
	/lalk/	lale̲k	lalk–i	lalet͡ʂ–ek	‘doll’
(d) Variable epenthesis	/bit-v/	bitf, bite̲f	bitv–ɨ	bite̲v–ek	‘battle’
	/vew-n/	vewn, vewe̲n	vewn–ɨ	vewen–ek	‘wool’
(e) Exceptional blocking I	/vʲatr/	vʲatr	vʲatr–ɨ	vʲate̲r–ek	‘wind’
	/katedr/	katedr	katedr–ɨ	katede̲r–ek	‘cathedral’
(f) Exceptional blocking II	/most/	most	most–ɨ	most–ek	‘bridge’
	/swuʒb/	swuʃp	swuʒb–ɨ	swuʒb–ek	‘service’

Analysis. We argue that Polish vowel-zero alternations should be analyzed as epenthesis, using lexically indexed constraints (Pater 2008 inter alia). In non-alternating words such as (1a), the vowel is present in the UR. Alternating words such as (1b–d) differ in which constraint triggers epenthesis: in monosyllables, it is HEADEDNESS, the pressure to have a vowel nucleus (Szpyra 1992, Hayes 2009). In longer alternating words, the vowel breaks up a CC# cluster, so *CC# > DEP (see (2a)). Sonorant-final clusters are especially common in this category. The third category of words has optional alternations at the morpheme boundary, usually affecting the same suffixes (-v, -n). The cases in which there are no alternations between unaffixed and case forms (see (1e, f)) are specified as exceptions to epenthesis: indexed CONTIGUITY$_{Ex}$ is ranked above *CC#, see (3). For such morphemes, CONTIGUITY$_{Ex}$ may be dominated, since there is obligatory epenthesis for CR-final stems in the context of diminutives: compare (3a) and (3b) for evidence that *CRC > CONTIGUITY$_{Ex}$. We attribute this to the selectional requirements of the [-ek] suffix, which favors bases that do not end in CR clusters. *CC# also determines the site of epenthesis in /CCC/ words: in /mgw-a/ [mgw-a] ‘mist’ and /pxw-a/ [pxw-a] ‘flea,’ the vowel always appears after the first two consonants: [mgʲe̲w] ‘mist (gen. pl.).’ Finally, there are words with no alternations at all, such as (1f), in which epenthesis is blocked by CONTIGUITY, but also not triggered by *CRC in diminutives.

Why not deletion? In our analysis, [vʲatr] and [most] are exceptions to epenthesis. The alternative is that [seter] resists deletion. A deletion analysis does not explain why only the

[e] vowel alternates, or why [e] is predictably present in the context of the diminutive suffix even in morphemes that resist the alternation elsewhere. To explain that pattern, a Russian-style deletion account (Gouskova 2012) would still have to posit epenthesis in diminutives.

(2) *Analysis of Polish words with alternations*

/sfetr/ ‘sweater’	HEADEDNESS	*CRC	CONTIG$_{Ex}$	*CC#	DEP
a. sfeter~sfetr				W	L
/sfetr–ɨ/ ‘sweater’					
b. sfetrɨ~ sfeterɨ					W
/mgw/ ‘mist’					
c. mgʲew~ mgw	W				L

(3) *Analysis of Polish words without alternations*

/vʲatr/ ‘wind’	*CRC	CONTIG$_{Ex}$	*CC#	HEADEDNESS	DEP
a. vʲatr~vʲater					W
/ vʲatr-k-a/					
b. vʲaterka~vʲatrka	W	L			L

Alternation is the general rule. The POLEX lexicon of Polish (Vetulani et al. 1998) contains 41,742 nouns. Of these, 6.3% contain a non-alternating [e] (see (4b)), 15.8% exhibit vowel alternation (see (4a)), and 16.1% end in CC# in some grammatical case (see (4c)). Of nouns that end in CC#, which may be considered exceptions to alternation, the majority end in the suffixes [-oɕtɕ], [-izm], [-ist], [-stv], [-ovɲ] and [-ɨtm], see (4ci). These suffixes categorically never host alternating vowels, tend to be part of a more formal register in language use, and represent 11.1% of the lexicon. Thus, 5.0% of the lexicon ends in CC#, but does not contain these particular suffixes, see (4cii). If Polish speakers know that the above suffixes are unacceptable contexts for vowel insertion, and so rank faithfulness to them above *CC#, then the number of CC# words that must be treated as idiosyncratic exceptions to the epenthesis rule (5% of the lexicon) is far smaller than the number of words that undergo it (15.8% of lexicon) in Polish, compared to Russian's 17% unbroken CC# and ~9% alternation.

(4) *Corpus statistics*

		Count of forms	Of lexicon	Example
(a)	Alternating [e]	6,581	15.8%	sfetrɨ~sfeterɨ
(b)	Non-alternating [e]	2,624	6.3%	seter~seterɨ
(c)	Ends in CC# cluster	6,729	16.1%	
i.	*Suffixed*	*4,630*	*11.1%*	markɕizm~markɕizmu
ii.	*All unsuffixed*	*2,099*	*5%*	swuʃp~swuʒba
(d)	CCV# or non-[e] CVC	25,808	61.8%	azja~azji
	Total	41,742	100%	

Discussion. Russian and Polish vowel alternations are historically related, but they diverged: in Russian, they are exceptionally triggered, but in Polish, they are the result of a productive rule subject to exceptions. Many differences between the languages follow from this. In Russian, alternation is not extended to loanwords (dizelʲ/dizelʲa `diesel'), vowel quality is only semi-predictable (mid [e] and [o]), and there are paradigm gaps (e.g., [mgla] `mist' does not have a genitive plural). In contrast, Polish readily extends alternation to loanwords (dizel/dizl-a `diesel'), predictably alternates [e], and has no paradigm gaps (/mgw-/ `mist' is [mgʲew] in the genitive plural). The analysis makes a testable prediction that Polish speakers should extend the alternation to novel items more readily than Russian speakers; this prediction differentiates our theory from traditional accounts that posit similar representations for yers both languages.

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The theory of Generative evidence

Paul de Lacy (Rutgers University)

This talk is about evidence for Generative theories of the phonological module (PhM). I address two questions: How do we determine what evidence for a PhM theory is?, and what is the quality of extant PhM evidence?

In response to the first question, I argue that criteria for evaluating device detections as evidence for a theory must be derived in part from that theory; I then provide specific examples. For the second question, I focus on the evidence presented in support of specific subtheories of the phonological module, namely my theory of markedness (e.g. de Lacy 2006). I conclude that the type of evidence I presented for my theories is fundamentally inadequate, arguably to the extent that all putative evidence of its type should be deemed of indeterminate worth for Generative theories of the PhM.

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WHERE SYNTAX AND PHONOLOGY TOUCH. A REPRESENTATIONAL VIEW OF THE INTERFACE

Marc van Oostendorp (Meertens Institute & Leiden University)

Let us suppose that we have a working model of syntax as well as one of phonology. We are then still faced with the problem how to connect those models to each other. The standard assumption is that this is done through some translation (quasi-)module, taking certain aspects of the syntactic representation (constituent structure, maybe some features) and translating them into phonological representations (prosodic trees) and have phonology operate on those. This leaves several questions unanswered such as why is it trees that map onto trees, and why is other syntactic information irrelevant to phonology; as well as: why do phonologically empty elements often display a special syntactic behaviour.

I argue that a purely representational view of language can answer these questions. There are no syntactic or phonological derivations, let alone a translation machine translating the outcome of one to the input to the other. Rather, there is syntactic and phonological structure which form two dimensions of the same structure.

These two dimensions are shaped according to similar principles: features, and structure. The features are necessarily domain-specific, because they talk about different things. However, structural principles are shared between the two modules. Furthermore, the modules can also notice whether or not there are any features at all on the other side, or nothing. I will show how various well-known and not so well-known cases of syntax-phonology mapping follow from this view, which then argues for taking purely representational ideas of linguistic theorizing more seriously.

Dialectal variation and typological properties

Birgit Alber - University of Verona

Historical change and its manifestation as dialectal variation in space often either gradually increase or gradually decrease markedness from one historical stage/dialect area to the next. Variation of this type can be modeled as change of ranking of a single constraint on a hierarchy of fixed markedness constraints. However, when fixed constraint rankings are abandoned in favor of set inclusion constraints, grammatical closeness of dialects, and hence the direction of change, cannot be expressed any more in a straightforward way. A measure for closeness is recovered once the typology is analysed in terms of *properties* (Alber&Prince, in prep.).

A simple example illustrating the argument is vowel apocope in Italian, which, in general, does not take place in central and southern varieties (CS), affects postsonorant vowels in the Veneto varieties (Ven.) and postsonorant and postobstruent vowels in the Lombardian (Lomb.) dialects:

(1) Apocope in Italian dialects

	CS	Ven.	Lomb.		Data from AIS, CS = Radda in Chianti (543), Ven. = Venezia (376), Lomb. = Brescia (256)
postobstruent apocope	sordo	sordo	surt	'deaf'	
postsonorant apocope	sole	sol	sul	'sun'	

A successful model of the spreading of vowel apocope has to account for the fact that (a) there are no dialects where apocope affects the postobstruent, but not the postsonorant context and (b) apocope spreads gradually from least marked varieties that do not allow for consonant final words (CS) over more marked varieties in the north-east which allow for words ending in sonorants (Ven.) to the most marked varieties in the north-west allowing both words ending in sonorants and words ending in obstruents (Lomb.).

Assuming the constraints *T# (no obstruent final words), *N# (no sonorant final words) and the apocope trigger *V# (no vowel final words), a fixed markedness hierarchy *T#>>*N# with *V# ranked at different heights of it according to language can account for dialectal variation (assuming that in all grammars *V# dominates the faithfulness constraint MAX, thus making apocope possible, in principle):

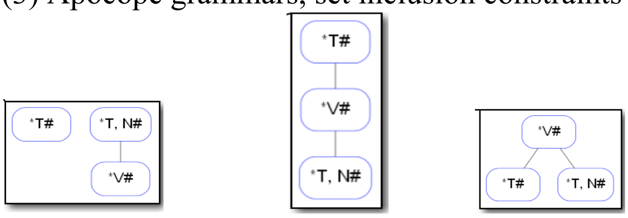
(2) Apocope grammars with fixed markedness hierarchy:

CS:		*T# >>	*N# >>	*V#
Ven.:		*T# >>	*V# >>	*N#
Lomb.:	*V# >>	*T# >>	*N#	

An approach in these terms correctly derives observation (a) and, as for (b), explains gradual spreading of apocope as gradual promotion of the constraint *V#, from CS to Ven. to Lomb., leading to minimal grammatical differences between the grammars of the three dialects.

However, fixed rankings of constraints are not a desirable addition to the theory. An approach in terms of set inclusion constraints which are in a stringency relation to each other (Prince 1999, de Lacy 2002) can retrieve the typological implication (a), but, at first glance, fails on the modeling of dialect variation (b). Thus, we can propose the constraints *{T}# (no obstruent final words), *{T, N}# (no obstruent and sonorant final words) and *V# (no vowel final words) which correctly generate the typology of attested languages (observation a):

(3) Apocope grammars, set inclusion constraints (generated with OT-Workplace)



CS Ven. Lomb.

However, there is no obvious way to predict the change from CS to Ven. to Lomb. in terms of minimal grammatical differences. Change from CS to Ven. implies two changes in the grammar of CS: constraint *{T}#, which is inactive in CS, must be ranked above *V# and *V# must be ranked above *{T, N}#. Change from Ven. to Lomb. implies one change: reranking of *{T}# and *V#.

The predictive power of the model is restored once the typology is analysed in terms of *properties*. The properties of a typological system are defined as the set of ranking conditions which are both sufficient and necessary to generate every language of the typology (Alber&Prince, in prep.). Properties have two values (A and B), one the logical opposite of the other, and free combination of property values generates all languages of the typology. The typological analysis of vowel apocope yields two properties, P1 (total resistance to apocope vs. some apocope) and P2 (total apocope vs. some resistance to apocope):

(4) Properties of apocope typology

P1: value A: *{T, N}# >> *V#
value B: *V# >>*{T, N}#

P2: value A: *V# >> *{T}# & *{T, N}#
value B: *{T}# v *{T, N}# >> *V#

	*{T, N}#	*V#	*{T}#
P1-A	W	L	
P1-B	L	W	
P2-A	L	W	L
P2-B	W	L	W

The grammars of the three languages of the typology can be classified according to properties, obtaining the following assignment of property values to each language:

(5) Property values according to languages

	CS	Ven.	Lomb.
P1	A	B	B
P2	B	B	A

A fourth logically possible combination of the property values - P1-A and P2-A - is excluded because of contradiction: a language cannot combine the rankings P1-A and P2-A, which contradict each other, and hence cannot be both totally resisting to apocope and totally open to apocope.

The property values of each language give us a measure for the path of dialect diversification from CS to Ven. to Lomb. Closeness between grammars is expressed as one switch in property value (shaded cells in table above), thus predicting that CS will change to its closest neighbor Ven. and Ven. to its closest neighbor Lomb.

In conclusion, typological analysis in terms of properties allows us to define grammatical closeness between grammars as one switch of property value. Languages which are closest neighbors in these terms represent subsequent stages in language change and adjacent dialect areas. An analysis of this type accounts for cases of variation where change in time and space follows an implicational markedness scale, without having to assume fixed rankings of markedness constraints.

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Faithfulness to non-contrastive phonetic properties in Lakhota

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It is well known that members of inflection paradigms may show unexpected phonological similarity, creating exceptions to general phonological processes (Kenstowicz and Kisseberth 1977; Kiparsky 1978). Approaches based on Output-Output Faithfulness (Kenstowicz 1997; Steriade 2000; McCarthy 2005) derive this similarity using special faithfulness constraints that hold only among paradigmatically related surface forms. Stratal approaches, on the other hand (Bermúdez-Otero 2011), account for this similarity using input-output faithfulness to intermediate steps in the derivation. Under the latter approach, what distinguishes paradigmatically related forms from other strings is that faithfulness constraints may be promoted partway through the derivation, effectively "turning off" the process. In this paper, I present new data from a paradigm uniformity effect in Lakhota (Siouan; Dakotan sub-branch) that cannot be analyzed using faithfulness to intermediate forms. The reasons are simple: (1) the necessary intermediate form does not seem to exist, and (2) even if it did, later stages in the derivation would require faithfulness to be too low to have any lasting effect on the output. Furthermore, paradigm uniformity targets a property that is *never* contrastive in any language, raising the question of whether any IO-Faith constraint should ever be able to preserve it. I argue instead that the facts follow naturally from an account that incorporates OO-Faithfulness for phonetic properties.

In all Dakotan dialects, stops and affricates contrast for aspiration and ejection: ka 'there' vs. k^{h}a 'to mean' vs. k'a 'to dig'. The phonetic quality of aspiration varies considerably between and within dialects, and it is realized sometimes with velar frication (k^{x}a) and sometimes with glottal frication (k^{h}a) (Ullrich 2008, p. 6). In the Lakhota dialect, both are employed, with the distribution determined primarily by the following vowel. Ullrich (2008, pp. 697–8) states that "[t]he two types of aspirated stops occur in complementary distribution and never contrast in meaning." Nevertheless, because the difference in frication noise is contrastive for fricatives (/x/ vs. /h/), he transcribes them differently. Inspection of dictionary entries involving aspirated stops reveal the distribution in (1), favoring velar frication before non-high vowels, especially when back. (The vowel transcribed as [ũ] is actually realized partway between [ũ] and [õ].)

(1) Velar vs. glottal aspiration in Lakhota

p^{h}i	p^{h}ĩ	p^{h}u		t^{h}i	t^{h}ĩ	t^{h}u		k^{h}i	k^{h}ĩ	k^{h}u	
p^{x}e		p^{x}o	p^{x}ũ	t^{h}e/t^{x}e		t^{x}o	t^{x}ũ	k^{h}e		k^{x}o	k^{x}ũ
		p^{x}a	p^{x}ã			t^{x}a	t^{x}ã			k^{x}a	k^{x}ã

This distribution is productively enforced, and can be illustrated by placing the same morpheme in different following contexts. Lakhota generally bans codas, but it is possible to vary the following context by placing morphemes in certain syntactic contexts, where the final vowels of certain morphemes are deleted, as in (2). When this happens, the quality of aspiration is determined by the quality of the following vowel, respecting the distribution in (1).

(2) Readjustment of aspiration quality depending on the following vowel

/makha/ 'earth'	+	/a-máni/ 'APPL-walk'	ma**kx**ámani 'travel on foot'
	+	/itʃú/ 'take'	ma**kh**ítʃu 'take up land, settle'
	+	/eglakĩjã/	ma**kh**eglakĩjã 'across the earth (adv.)'
/napha/ 'flee'	+	/ijája/ 'leave'	[na**ph**íjaja] 'leave a place fleeing'

Certain stem-final vowels also show paradigmatic [a]~[e]~[ĩ] alternations, in a process known as ablaut: [sapa] ~ [sape] ~ [sapĩ] 'black'. The distribution in (1) leads us to expect that aspirated stops have velar aspiration before [a], dorsal before [ĩ], and variable realization before [e] (depending on place of articulation). However, aspiration is always velar before ablaut vowels:

(3) Paradigm uniformity under ablaut

	'hit'	'try to do'	'tell the truth'
3sg+PROG	a**p**ˣa-hã	iju**t**ˣa-hã	witʃa**k**ˣa-hã
3sg+NEG	a**p**ˣe-ʃni	iju**t**ˣe-ʃni	witʃa**k**ˣe-ʃni
3sg+EMPH	a**p**ˣe-xtʃa	iju**t**ˣe-xtʃa	witʃa**k**ˣe-xtʃa
3sg+FUT	a**p**ˣĩ-kte	iju**t**ˣĩ-kte	witʃa**k**ˣĩ-kte

The preservation of velar frication is problematic for a stratal account. First, it is not clear what intermediate stage of the derivation would be responsible for conditioning velar aspiration in forms like [apˣe-ʃni] or [apˣĩ-kte], since these forms do not contain the back vowel that would ordinarily condition it. One possibility is that these forms really do contain [apˣa] at some stage of the derivation; another possibility is that they simply contain [apˣ], and velar aspiration is the default realization when non-prevocalic. Although there is no direct support for either claim, let us assume for the sake of argument that the context is indeed present to derive intermediate [apˣ]. Then, an IO-IDENT constraint for aspiration quality must be promoted in order to preserve this quality. However, the forms in (2) show that this is unworkable: even if IO-IDENT(asp) is ranked highly at some point in the derivation, it must be demoted again at the phrasal level, so that the quality of aspiration can once again between determined by the following vowel context. However, this later evaluation would obliterate intermediate [apˣ], and thus fails to predict paradigm uniformity.

A second argument against the stratal approach comes from the fact that the putative IO-IDENT constraint must preserve the dorsal or glottal quality of aspiration. As far as I have been able to establish, this phonetic distinction has not been documented to be contrastive in any language, which raises the question why its effects are only seen in cases of paradigm uniformity, and never basic contrasts.

Both of these problems are circumvented in an approach in which OO-Faith demands that inflected forms be faithful to a privileged base form. Converging evidence from several distinct cases of over- and underapplication indicate that the base of Lakhota verb paradigms is a form that ends in the ablaut vowel [a], which should condition velar aspiration. This quality is then carried over to other inflected forms by BASE-IDENT(frication), as in (4). Additionally, I argue that by distinguishing different dimensions of faithfulness (IO vs OO), we gain some insight into why aspiration quality can be preserved paradigmatically, but not as a lexical contrast. Following Flemming (2008) and Steriade (2008), I argue that the these dimensions are driven by opposing forces: lexical contrasts should be perceptually maximally distinct, while allomorphs should be minimally distinct. This principle may preclude constraints such as IO-IDENT(frication quality) from CON altogether, or at least make it very unlikely that they will be satisfied. OO-IDENT, on the other hand, may freely targets such properties, since they contribute to detailed similarity that helps to make allomorphs readily identifiable. This distinction is unavailable in an approach that eschews different dimensions of Faithfulness.

(4) Misapplication of aspiration quality

/apʰa-he/	Base-Ident(fric)	*Cˣ/[+hi,…]	*Cʰ
a. apʰahe			*!
☞ b. apˣahe			

/apʰĩ-kte/	Base-Ident(fric)	*Cˣ/[+hi,…]	*Cʰ
a. apʰĩkte	*!		*
☞ b. apˣĩkte		*	

The degree to which the phonological patterning of a segment correlates with its phonetic properties lies at the heart of understanding how sound systems come to be structured as they are. This paper presents the results of a cross-linguistic phonological and phonetic investigation of /v/ that aims to assess (a) what the cross-linguistic phonological identity of /v/ is, and (b) how the phonological status of /v/ in certain languages correlates with diverent phonetic properties. The phonetic study is considered in light of a database study that examines the phonological status of /v/ in terms of inventory structure, phonotactics and participation in phonological processes, specifically focussing on its relationship to sonority and its valuation of the [sonorant] feature. The results of this investigation suggest not only that the correlation between phonological status and acoustic realization is not one-to-one, but also that our understanding of what it means to be a voiced-voiceless obstruent pair (as in /z, s/) is inadequate to capture the relationship between /v, f/.

The motivating case for this study comes from Russian, in which /v/ patterns ambiguously with respect to the feature [sonorant]. Like obstruents, Russian /v/ undergoes final devoicing (hence [prav-a] ~ [praf], 'right (fem./masc.)'), and regressive voicing assimilation to [f], so that /v supe/ is realized as [f supe] 'in the soup'. However, like sonorants, it does not trigger regressive voicing assimilation, thus the contrast [tverʲ] 'Tver', [dverʲ] 'door' (Padgett, 2002). Russian is not the only language to display such patterning: /v/ displays the same asymmetry in Slavic languages, such as Bulgarian (Scatton, 1984) and Czech (Hall, 2003), as well as in non-Slavic languages, such as Hebrew and Hungarian (Barkai and Horvath, 1978; Kiss and Bárkányi, 2006). Such patterning presents a puzzle for phonological theory: if /v/ is specified as an obstruent, then it should trigger regressive voicing assimilation, as do other obstruents, but if /v/ is specified as a sonorant, then it should not undergo the obstruent voicing processes of voicing assimilation and final devoicing.

The existence of "ambiguous /v/" challenges the frequent, if tacit, assumption that if an inventory contains both /v/ and /f/, they form a voiced-voiceless obstruent pair. This is indeed the case for Greek, in which /v/ distributes as the voiced counterpart of voiceless /f/: both occur in fricative-fricative clusters ([fxaristo] 'thank you'; [vɣazo] 'I remove') and as the first member of a fricative-sonorant cluster ([floɣa] 'flute'; [vlakas] 'idiot'); moreover both are subject to the general requirement that obstruent clusters agree in voicing ([evɣlotos] 'eloquent'; [efstaθia] 'steadiness'). However, one need not look to pathological cases to find counterexamples to the traditional classification. In Serbian, /v/ has the distribution of a sonorant, in that it can follow both voiced and voiceless obstruents yielding contrasts such as [tvoj] 'your' vs. [dva] 'two'. Moreover, while obstruents trigger regressive voicing assimilation, sonorants do not, and nor does /v/ (hence /s-variti/ is realized as [svariti], not *[zvariti] 'digest'). Thus, in addition to the phonological ambiguity /v/ exhibits with respect to the sonorant-obstruent divide in languages such as Russian, /v/ also displays what has been dubbed ambivalence (Mielke, 2008a) with respect to the feature [sonorant].

The three-way classificatory typology of /v/ exemplified by Russian, Greek and Serbian casts doubt on what is known about the phonological identity of /v/. A database of over 500 languages (Mielke, 2008b) was analysed to assess co-occurrence relations with other segments (e.g., /f/, /w/) and natural classes (e.g., whether the presence of /v/ correlates with the presence of a voicing contrast in plosives). For example, Maddieson (1984) discusses implicational relations with respect to voicing contrasts, including that the presence of a voiced fricative implies the presence of its voiceless counterpart. With respect to the sibilants /s, z/, this tendency is a near-universal, with only two languages in the PBase (out of 548) containing /z/ but not /s/. In contrast, 32 languages in the PBase have /v/ without /f/. Such asymmetries call into question the assumption that the relationship between /f, v/ parallels that of /s, z/. Considerations of inventory structure are rarely made explicit in the literature, but are often used in heuristic reasoning about a segment's phonological identity. For example, it is perhaps unsurprising that Serbian does not contain a labial approximant such as /w/ against which /v/ contrasts, and one might posit this is a necessary condition for sonorant patterning of /v/. A natural follow-up question is whether the absence of a labial approximant is also a sufficient condition for such patterning; the answer in this case is no, where Greek, which also does not have a labial approximant, fills the role of counterexample. A smaller, subset dataset comprising 100 languages, selected for geneological and geographical balance based on the WALS 100-language sample, is examined to assess correlations between inventory structure and the phonological classification of /v/ in terms of patterning and phonotactics. The results of this study suggest that while co-occurrence restrictions do not determine the valuation of /v/ with respect to [sonorant], certain trends emerge; for example, the presence of a labial approximant correlates with obstruent patterning of /v/.

Phonetically, [v] is a prime candidate to straddle the obstruent-sonorant divide, as voiced non-strident fricatives present an aerodynamic tension between maintaining voicing and adequate frication (Ohala, 1983). Such considerations have led some to propose that the phonological ambiguity of /v/ in languages such as Russian arises from some kind of phonetic intermediacy with respect to sonority (Padgett (2002) for Russian and Kiss and Bárkányi (2006) for Hungarian, and Barkai and Horvath (1978) for Russian, Hebrew and Hungarian). Acoustic studies purporting to establish a direct link between the phonology of ambiguous /v/ and its phonetic realization have only looked at the acoustics of [v] in a single language (Lulich (2004) for Russian, Kiss and Bárkányi (2006) for Hungarian), and thus it is not known whether the tight relationship between phonology and phonetics implicitly assumed in these studies extends to cases in which /v/'s patterning is unambiguous. Results comparing the phonetic realization of tokens of Russian [v] with tokens of [v] in "control languages" where /v/ patterns either with obstruents (Greek) or with sonorants (Serbian) are recalled: briefly, tokens of Russian [v] exhibit frication in word-initial stressed position, like Greek, but exhibit little to no frication in word-medial unstressed position, like Serbian. These results are expanded upon in the current study by comparing the results of Greek, Russian and Serbian to English, which differs in local inventory structure by having /w/. Preliminary results suggest that the main difference in realization in English [v] tokens is devoicing, found in the majority of tokens. This is in contrast to, for example, the realization of Greek [v] tokens which, despite their obstruent classification, are almost never devoiced. Devoicing is seen not only in word-initial contexts, but is prevalent in intervocalic contexts, suggesting that partial devoicing of /v/ may in fact be a relevant cue for its phonological categorization as an obstruent in English.

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OCP and Line-Crossing Constraint as aids to word segmentation

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Recently, Boll-Avetisyan and Kager (2014, henceforth B&K) showed that Dutch listeners can use labiality as a word segmentation cue in pre-lexical perception. B&K claim, without providing any explicit formalization, that Boersma's (1998, 2000, 2009) version of the Obligatory Contour Principle (OCP) cannot handle the experimental facts. In this talk I show that B&K's pre-lexical perception results are in fact straightforwardly accounted for with Boersma's autosegmental constraint sets, without any additional assumptions.

In Optimality Theory, Myers (1997) formulated the OCP as a violable constraint on phonological surface representations. Boersma (1998, 2000, 2009) argued that the Line-Crossing Constraint (LCC), too, should be regarded as a violable constraint on phonological surface representations, and that both OCP and LCC should be parametrized by the amount of phonological material that intervenes between the two elements:

(1) Autosegmental constraints (copied from Boersma 2009)

a. OCP (*feature value*, *material*): the surface form cannot contain two instances of *feature value* if not more than a certain amount of *material* intervenes;
b. LCC (*feature value*, *material*): a single instance of *feature value* in the surface form cannot span across a certain amount of *material*.

Boersma (1998, 2000) argued that these constraints are universally ranked by the amount of intervening material: OCP is ranked lower if there is more intervening material (e.g. lower across a prosodic word boundary than across a syllable boundary), whereas LCC is ranked higher if there is more intervening material (e.g. higher across a prosodic word boundary than across a syllable boundary). To explain a widely attested ban on having two labials within the same word, the labial versions of both constraints have to be high-ranked (the input is an underlying form, the candidates are surface forms; the indexes denote labial specifications):

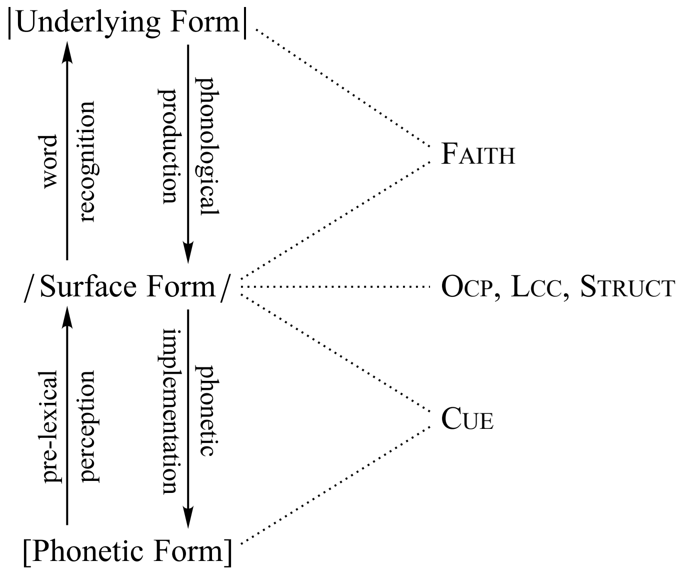
(2) Deleting one of the two underlying labials

$\|\{\text{pama}\}_{\text{Wd}}\|$	LCC (*lab*, $\}_{\text{Wd}}\{$)	OCP (*lab*, $\}_\sigma\{$)	LCC (*lab*, $\}_\sigma\{$)	IDENT (PLACE)	OCP (*lab*, $\}_{\text{Wd}}\{$)
$/\{\{\,p_1\,a\,\}_\sigma\{\,m_1\,a\,\}_\sigma\}_{\text{Wd}}/$			*!		
$/\{\{\,p_1\,a\,\}_\sigma\{\,m_2\,a\,\}_\sigma\}_{\text{Wd}}/$		*!			
☞ $/\{\{\,p_1\,a\,\}_\sigma\{\,n\,a\,\}_\sigma\}_{\text{Wd}}/$				*	

We see here that if (and only if) both OCP and LCC are ranked above faithfulness, the surface form deletes one of the underlying labials. Given the simplified underlying form and constraint set employed here, this result is independent of whether the underlying |p| and |m| share their labial specification or not.

To see how Boersma's versions of OCP and LCC affect pre-lexical perception, we have to realize that they are part of a multi-level model of phonology and phonetics, in which they influence the output of phonological production, as in (2), as well as the output of pre-lexical perception, as later in tableau (4):

(3) How OCP and LCC influence production and comprehension



In the following pre-lexical perception tableau, the input is the auditory-phonetic form, and the output candidates are phonological surface forms that differ in the number of perceived words and in the number of labial features (CUE(PLACE) is a cue constraint that punishes the perception of auditory labiality as a coronal feature value):

(4) Perceiving a word boundary

[pama]	LCC (*lab*, $\}_{\mathrm{Wd}}\{$)	OCP (*lab*, $\}_{\sigma}\{$)	LCC (*lab*, $\}_{\sigma}\{$)	CUE (PLACE)	OCP (*lab*, $\}_{\mathrm{Wd}}\{$)
$/\{\{p_1\ a\}_{\sigma}\{m_1\ a\}_{\sigma}\}_{\mathrm{Wd}}/$			*!		
$/\{\{p_1\ a\}_{\sigma}\{m_2\ a\}_{\sigma}\}_{\mathrm{Wd}}/$		*!			
$/\{\{p_1\ a\}_{\sigma}\{n\ a\}_{\sigma}\}_{\mathrm{Wd}}/$				*!	
☞ $/\{\{p_1\ a\}_{\sigma}\}_{\mathrm{Wd}}\{\{m_2\ a\}_{\sigma}\}_{\mathrm{Wd}}/$					*
$/\{\{p_1\ a\}_{\sigma}\}_{\mathrm{Wd}}\{\{m_1\ a\}_{\sigma}\}_{\mathrm{Wd}}/$	*!				

The result is that that the listener, given two auditory labial segments, perceives two words. Together, the labial OCP and the labial LCC have conspired to help the listener segment the speech stream into words, which is precisely what B&K found in their Dutch listeners.

The talk contains much more detail than this. For instance, learning simulations with Dutch data show that the word segmentation effect of (4) happens only for labials and not for coronals, which have a much larger probability of co-occurrence within a Dutch word. Again, this is precisely what B&K attested in their Dutch listeners.

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Metrical tone shift and spread in Harmonic Serialism

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Bounded high tone shift and spread

Some Bantu languages feature a process called *high tone shift*, where "high tones delink from the sponsor syllable [and] surface on the so-called target syllable" (Zerbian and Barnard, 2008). In *bounded* tone shift, the target syllable is defined relative to the location of the sponsoring element. Crosslinguistically, such target syllables are generally either one or two syllables away from the sponsor. Analogous to bounded tone shift is bounded tone spread. In spreading, the tone does not delink from the sponsoring syllable.

Saghala (Patin, 2009), spoken in southeast Kenya, shows both bounded tone shift and spread. Example forms are shown in (1). Syllables that are underlyingly specified for high tone are underlined, and surface high tones are marked with an acute accent.

	a.	∅	nɟovu	'elephant(s)'
(1)	b.	izí	nɟóvu	'that elephant'
	c.	ilya	nɟóvú	'these elephants'

(1a) shows that in isolation, the noun [nɟovu] is toneless. In (1b) and (1c), tone is contributed by a determiner. Because the two determiner phrases differ in their surface tonal pattern, H tone must be linked to different parts of the two determiners underlyingly: word-initial in (1b), and word-final in (1c). The generalization for Saghala is then: tone surfaces on the two syllables following the sponsor syllable.

This presentation focuses on a metrical, serial OT analysis of Saghala. First, the following section will motivate the analytical approach. Then, a sample derivation is presented.

The metrical foot as a bounding domain

A recurrent question in analyzing bounded tone shift and spread is how to derive the bounded nature of the processes. Research since the 1980s has sought to employ metrical feet as a bounding domain; if tone must stay contained within a foot, it follows that it can only shift a limited number of syllables (see Sietsema, 1989, for an overview). However, later works on bounded tonology (Bickmore, 1996; Odden, 2001; Patin, 2009) refrained from using a metrical approach. Bickmore (1996) cites a.o. the ternary nature (i.e. two-syllable distance) of some tonal processes as a problem for metrical accounts.

In recent years, the concept of the metrical foot has gained flexibility: there are proposals for layered, ternary feet (Martínez-Paricio, 2013; Martínez-Paricio and Kager, 2014) as well as for a general organizing role for feet in various tonal processes (De Lacy, 2002; Pearce, 2006; Weidman and Rose, 2006; Shimoji, 2009). This warrants a renewed investigation of the role of metrical structure in bounded tonal shift and spread.

Recent work on bounded tone processes still often couches its analysis in a rule-based framework, rather than in an Optimality Theoretic context. This is because the derivational nature of rule-based theory is better suited for tone shift than the parallel nature of standard OT. However, Harmonic Serialism (HS, McCarthy, 2010) unites the OT principle of constraint interaction with the seriality present in earlier frameworks. Consequently, it should be explored whether HS can account for bounded tonal processes.

This presentation aims to contribute to the above challenges with the following results:

- The bounded nature of Saghala tonology is accounted for with ternary feet
- Tone shift is derived using Harmonic Serialism

Saghala sample derivation

The combined domain of Saghala shift and spread spans three syllables. It is proposed here that this domain coincides with the edges of a ternary foot. Following Martínez-Paricio and Kager (2014), this foot is layered, consisting of a binary foot head and a satellite syllable. For example, the metrical structure for (1c) is shown below in (2). The inner and outer foot are referred to as minimal foot (MinFt) and non-minimal foot (NonMinFt).

(2) i((lya nɟó)$_{MinFt}$ vú)$_{NonMinFt}$

The derivation will cover a schematized version of (1c), where the grammar maps /oóoo/ to [ooóó]. This is the default pattern in Saghala. Four deviating patterns also exist, involving word boundaries and tonal contact. While the full analysis can account for these facts, the present account is simplified for reasons of space.

In HS, GEN is defined as a set of operations that may be applied to change the input form. For the present analysis, these operations are tone spreading, tone delinking, foot placement and foot expansion. Furthermore, the following markedness constraints are used in the derivation:

Name	*Effect*	*Definition*
LICENSE-H	Foot creation	* for each H not associated to a footed syllable
CHAIN-L(σ $_{\omega}$)	Foot directionality	* for each unparsed syllable not in a chain from [$_{PrWd}$.
ALIGN-R(H,MINFT)	Tonal spreading	* for each H not associated to a Ft$_{Min}$-final syllable
ALIGN-R(H,NONMINFT)	Tonal spreading	* for each H not associated to a Ft$_{NonMin}$-final syllable.
*ALIGN-L(MINFT,H)	Tonal delinking	* for each H associated to a Ft$_{Min}$-initial syllable.

The tableaux below show the six steps of the process. For reasons of space, the derivation shows only the deciding constraints at each step, and constraint names have been abbreviated.

1. Foot construction.

oóoo		LICENSE-H	CHAIN
a. oóoo		*!	
☞ b. o(óo)o			*
c. (oó)oo			**!

2. Rightward foot expansion.

o(óo)o		CHAIN	A-R(H,MINFT)
a. o(óo)o		*!	*
☞ b. o((óo)o)			*
c. (o(óo))o		*!	*
d. o(óó)o		*!	

3. Tone spreading to the right edge of FtMin.

o((óo)o)		A-R(H,MINFT)
a. o((óo)o)		*!
☞ b. o((óó)o)		

4. Tone spreading to the right edge of FtNonMin.

o((óó)o)		A-R(H,NMFT)	*A-L(MINFT,H)
a. o((óó)o)		*!	*
☞ b. o((óó)ó)			*
c. o((oó)o)		*!	

5. Tone delinking from the left edge of FtMin.

o((óó)ó)		*A-L(MINFT,H)
a. o((óó)ó)		*!
☞ b. o((oó)ó)		

6. Further delinking is suboptimal; termination with output [ooóó].

o((oó)ó)		A-R(H,MINFT)
☞ a. o((oó)ó)		
b. o((oo)ó)		*!

The above derivation has correctly produced the Saghala pattern: an underlying high tone associated to a single sponsor syllable has surfaced on the two syllables to the right of the sponsor, and delinked from the sponsor itself.

Conclusion

This presentation has used cutting-edge insights in phonological theory to offer a metrical, serial OT analysis of Saghala tonology. Future work will take a crosslinguistic perspective on tone shift and spread to further support the present contention that metrical structure in a serial OT context is sufficient to account for bounded tone phenomena.

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Vowel reduction and Raddoppiamento Fonosintattico induced by stress:
The virtual length analysis.

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The raddoppiamento fonosintattico (RF) is triggered by stress. It is an external sandhi process that reduplicates the initial consonant of the second word in a sequence of two whenever the final vowel of the first word is stressed (e.g. *città ppulita* "clean city" vs. *casa pulita* "clean city") (Loporcaro 1997). This process is well-known especially in Tuscany (Chierchia 1986).

This paper identifies a correlation between stress-triggered RF with another phenomenon which at first appears not to be related to it, namely reduction of unstressed vowels in certain Italian dialects. Drawing on diatopy, the goal of this paper is to show that both phenomena are incompatible, that is, that no system can combine both processes. As an exemple, let us consider a dialect that reduces unstressed vowels, e.g. Coratino (in the Apuglia region). In Coratino, all vowels (except /a/) surface as schwa in unstressed syllables. Table (1) illustrates the process of vowel reduction in unstressed syllables (in Coratino).

1)	r_	"wheel"	r'**o**tə	"small wheel"	r**ə**t'ɛddə
	m_	"apple"	m'**e**lə	"small apple"	m**ə**l'ɛddə
	_m	"file"	l'**i**mə	"to file"	l**ə**m'atə

Table (2) shows that reduction does not occur when the unstressed vowel and the adjacent consonant have similar articulation places, e.g. /u,o/ are protected against the reduction in presence of an adjacent labial/velar consonant while /i,e/ are protected by the adjacency of a palatal consonant.

2)	p_	"poor"	p'**o**vərə	"poor dim"	p**o**vər'iddə
	_m	"lamp"	l'**u**mə	"small lamp"	l**u**m'inə
	k_	"rope"	k'**o**rdə	"small rope"	k**u**rd'ɛttə
	_ɟ	"fog"	n'**e**ɟɟə	"augmentative"	n**e**ɟɟ' uzzə

According to Bucci (2009), resistance to reduction is due to the fact that the resisting vowels share a melodic prime with an adjacent consonant. Sharing, i.e. branching protects the vowel against reduction. Honeybone (2005) shows that in many languages, branching structures resist lenition (a well-known case is that of the integrity of geminates).

The two resisting contexts in Coratino, i.e. sharing of a melodic prime between an (unstressed) vowel and an adjacent consonant, and stressed, should thus be investigated: we must assume that since these two contexts have the same effect (i.e. absence of reduction), they have something in common. Since adjacent vowels and consonants which have a similiar place of articulation branch, we suggest that stressed vowels must also have a branching structure. Therefore: branching vowels should be analysed as long vowels. As a consequence, we must assume that, in Coratino, stressed vowels are phonologically long while reduced vowels are phonologically short (similar accounts have been proposed for Italian (Larsen 1998), and for other languages (Scheer 2000).

According to Chierchia (1986), stress materialises at the phonological level by some syllabic space. In the version of the idea adopted in this paper, stress materialises as an empty X unit. A stressed vowel branches on one (adjacent) X unit.

We assume that there may be a difference between the phonological representation of an object and its phonetic execution. This is a matter of phonetic interpretation: a given phonological, i.e. abstract, object may receive different interpretations at the phonetic level, i.e. a more concrete level. For example, in Italian, phonologically (i.e. virtually) long vowels may be interpreted as: 1) long phonetic objects (duration in milliseconds); 2) reduction-resisting vowels ; 3) diphthong (frangimento).

Italian dialects which exhibit vowel reduction are spoken in the south center area of Italy. In this area, all dialects behave like Coratino: stressed vowels are phonologically long. In the proposed analysis, the opposition between full and reduced vowels, in systems with reduction, is conceived as an opposition in length. Therefore, vowel-reduction dialects need the syllabic space provided by stress in order to make stressed vowels branch. Dialects which do not exhibit vowel reduction do not contrast long and short vowels, and stressed vowels in these varieties do not take up the syllabic space provided by stress. In these dialects, the syllabic space provided by stress is occupied by the following consonant, as illustrated under (3a). However, in vowel-reducing varieties, as illustrated under (3b), it is the preceding (stressed) vowel which uses up the space provided by stress, thereby preventing the following consonant from undergoing gemination.

```
3a) Dialects without vowel reduction
word 1 tronco             word 2 = stressed RF
 X    X   X       [X]      X    X    X
 |    |   |                |    |    |
 ...  C   V                C    V    ...
3b) Dialects with vowel reduction
word 1 tronco             word 2 = no stressed RF
 X    X   X       [X]      X    X    X
 |    |   |                |    |    |
 ...  C   V                C    V    ...
```

In short, the analysis predicts that stress-induced RF and vowel reduction are incompatible within a single variety: both compete for the same syllabic space.

The paper presents detailed dialectal data concerning the 1064 research points of the ALI (Atlas of Italian Linguistics), which precisely identifies the dialects which display reduction. The data are confronted with the varieties exhibiting stress-induced RF. We show that, in accordance with the prediction made above, there is a tendency for the two processes to be in complementary distribution.

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PHONEME CONSISTENCY VS. LEXICAL FREQUENCY IN HEBREW RHOTIC ACQUISITION

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Introduction: This paper examines the role of phoneme consistency in Hebrew rhotic (ʁ) acquisition. Based on evidence I provide, I propose that phoneme consistency (i.e the degree of allophonic variation a phoneme displays in a given prosodic context) is a major factor in determining acquisition order. Furthermore, I suggest that positional frequency in the lexicon does not play a noticeable role in ʁ acquisition. Phoneme consistency biases acquisition order, the less consistent onset ʁ allophony hindering the necessary generalisations required for its encoding, abstract representation and production compared to consistent coda ʁs.

Previous research: ʁ is about the last consonant to be fully acquired in Hebrew (Lavie 1978, Ben-David 2001). Assuming three stages of segmental acquisition (deletion→substitution→faithful ʁ), Ben-David et al.'s (submitted) cross-sectional study shows that word-final and word-medial ʁs complete these stages before word-initial ʁs (Ben-David et al. do not distinguish between word-medial codas and word-medial onsets). Compared to other segments' acquisition, a strange pattern emerges in the acquisition of the Hebrew ʁ. Although the late acquisition of rhotics is common cross-linguistically (Bosma-Smit et al. 1990 for English, Hua & Dodd 2000a/2000b for Putonghua, Amayreh and Dyson 1998 for Jordanian Arabic, Freitas 1994 for Portuguese inter alia), the patterning of Hebrew ʁ's acquisition (i.e. being fully acquired in coda position before being fully acquired in onset position), is unusual. This stands in sharp contrast to other Hebrew consonants, where onset acquisition precedes coda acquisition. In Cohen et al.'s (2013), an extensive acoustic study of ʁ allophony variation in Hebrew, controlling for position and neighbouring segments, prosodic position is shown to affect phoneme consistency. Word-final ʁs show more consistency (approximants with some frication and devoicing), while word-initial ʁs show considerable inconsistency, surfacing as approximants, fricatives, trills, taps and even plosives.

Data and analysis: The current study is based on transcriptions and acoustic analyses (PRAAT – Boersma&Weenink 2014) of weekly recordings the natural speech of two infants during acquisition from the onset of speech until the completion of ʁ acquisition (data are drawn from the Language Acquisition Project directed by Bat-El and Adam at Tel-Aviv University). I analyse the attempted and actual productions of ʁ during various developmental stages in the subjects (Adam and Bat-El 2008, 2009), counting the deletion, substitution and faithful productions of the ʁs.

Results: The results reported in Ben-David et al. (submitted) were partially replicated in the current study. The following picture of ʁ acquisition emerges: ʁs are attempted and produced earlier in coda positions than in onset positions. During the earlier stages, the phenomenon is more pronounced, but later on, the distribution nears that observed in the lexicon. This demonstrates the role of selectivity in early acquisition (for Hebrew: Ben-David 2001:342, Bat-El 2012, Becker 2012, Cohen 2012 ; for other languages: Drachman 1973, Schwartz and Leonard 1982 to name a few), attempting the coda-ʁ forms before the onset-ʁ forms. Word-final codas precede word-medial and word-initial ʁs, and consonant-adjacent ʁ is the last to be acquired, codas before onsets.

Lexicon analysis vs. acquisition patterns: The following compares the distribution of ʁ in Hebrew nouns (Bolozky&Becker 2006) vs. attempted targets in the productions of two infants, SR and RM:

	Initial	**Medial Onset**	**Medial Coda**	**Final**
Lexicon	445	**1897**	634	818
SR	213	401	184	**773**
RM	1105	1198	692	**1225**

Clearly, if frequency played a role in infants' acquisition, word-medial onsets – not word-final codas – would be the most commonly attempted ʁ, and the earliest to be produced faithfully.

Discussion: While it has been argued that the more frequently a segment appears in a certain prosodic position, the more rapid its acquisition in this position is (e.g. Zamuner 2003:70), this cannot be a relevant factor in Hebrew ʁs, as onset ʁs are more frequent that coda ʁs. The acoustic input available to the Hebrew acquirers, however, is inconsistent in onsets, while being relatively consistent in codas. The consistency in codas allows for simpler generalisation of the patterns and, subsequently, categorisation of the segment. Phoneme consistency, I argue, biases segmental acquisition, facilitating earlier production of the consistent coda allophones (codas) compared to the inconsistent onsets.

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Issues in unifying nasal vowel markedness

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The behavior of phonemic nasal and contextually nasalized vowels (hereafter conflated as "nasal vowels," unless otherwise specified) is well documented from an empirical, cross-linguistic standpoint, but there is little consensus on what phonological principle, if any, governs their patterns. Phonological accounts of nasal vowel phenomena often invoke phonetic explanations, such as articulatory or perceptual ease. This trend reflects in part a larger difficulty in distinguishing coarticulation (a phonetic phenomenon) from assimilation (phonological); it also reflects ongoing debates about the purview of the domains in the phonetics-phonology interface. While crucial in our understanding of vowel nasality, phonetic-based explanations are insufficient under a modular approach where phonology is clearly delineated. In this presentation, I propose the Nasal Vowel Markedness Hierarchy as a sonority-based, framework-independent component of phonological grammar, using evidence from cross-linguistic surveys and personally collected nasometric data. I also offer a possible implementation of this hierarchy within a stringent framework (e.g., de Lacy 2006) and evaluate the various, testable predictions made by this system.

Efforts to establish markedness relations among nasal vowels encounter several issues. First, nasalization processes previously analyzed as phonological may in fact be phonetic; this complicates determining attested versus unattested inventory types under the expanded sense of the term "inventory" (including non-contrastive segments of a language as well as phonemes). The difference between process types has typically been thought to be reflected in the duration and/or intensity of nasalization (especially with respect to measurement-specific thresholds), where nasal coarticulation supposedly results in low rates, versus the high to near-complete rates demanded by assimilation. This scale alone introduces the possibility for "grey areas" but is further complicated when one weighs the minimal time necessary to achieve proper nasal coupling against the shorter duration/ diminished prominence of certain vowels (especially high and/or central). Depending on the measurement and instrumentation, high percentages of nasalization therefore may not necessarily identify a process as phonological.

Even under the broad definition of the term, nasal vowel inventories often demonstrate several kinds of gaps, whether between oral and nasal congeners, between phonemic and contextually nasalized vowels, or between undergoers of progressive versus regressive nasalization. As such, nasal vowels may give the impression of high levels of irregularity, obscuring motivation of a universal hierarchy. In addition, the directionality of markedness relations among nasal vowels is debatable, especially under phonetic explanations. The notion of low vowels as inherently longer than high, when linked with the perceptual preference for nasality on long vowels, has been taken as evidence for a parameter where low nasal vowels are favored over high. Meanwhile, inherent velic positions and aerodynamic factors provide evidence for the opposite parameter, where high nasal vowels are favored over low (cf. Hajek 1997 for an in-depth discussion).

While some caution must be exercised when applying older data or analyses to phonology, we are not to discount them on this basis, and working hypotheses can still be gleaned. An examination of Ruhlen's (1975) survey of 100 languages shows that, with the sole exception of certain Iroquoian languages, no language with nasal vowels (phonemic or allophonic) lacks a low nasal vowel. Though rare, singleton nasal vowel inventories (even under the broad definition) are reported and necessarily consist only of a low vowel (e.g., Ile de Groix Breton). In addition, personally collected nasometric data of Vimeu Picard and several varieties of French support independent evidence for the incorporation of a front-back parameter. Based on these observations (among others), I propose the Nasal Vowel Markedness Hierarchy in (1), along the lines of the general vowel sonority hierarchy.

(1) Nasal Vowel Markedness Hierarchy

High central	>	Mid central	>	High back	>	High front	>	Mid back	>	Mid front	>	Low
ɨ̃	>	ə̃	>	ũ	>	ĩ	>	õ	>	ẽ	>	ã

An example of each category is given. '$x > y$' = 'y is less marked than x.'

This hierarchy claims that low nasal vowels are the least marked of their kind. Peripheral nasal vowels will never be more marked than central, but among the peripheral nasal vowels, high are essentially the most marked.

The claims made by the hierarchy in (1) and the strictness thereof are intimately linked to the kind of framework into which the hierarchy is incorporated. One promising possibility is stringency in Optimality Theory (e.g., de Lacy 2006), which has several advantages but one potential disadvantage. First, this framework claims that while markedness relations are universal, competing forces can obscure or conflate them, and it easily derives gapped inventories. Deep-set grammatical relations can thus be captured without sacrificing flexibility; that is, the hierarchy need not be exceptionless, nor must segments be contiguous. In addition, stringency correctly predicts that no system can exclude the least marked member of the hierarchy (i.e., the low nasal vowel), unless all others are excluded as well. However, the current implementation of the hierarchy precludes certain types of nasal vowel raising processes, whereas numerous potential counterexamples are documented (e.g., Beddor 1982). It is not clear what criteria must be met for a process to be considered impossible by the theory, though this is a claim that will warrant substantial investigation in the future.

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Undergoers are Harmony Sources: Maintaining Iterative Harmony in Oroqen Dialects

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Nevins (2010) proposes that vowel harmony observes relative locality, whereby a vowel that lacks a required feature seeks it from the nearest source, where 'nearest' is parametrically defined (e.g. the nearest vowel to the right, or the nearest vowel on the right bearing a contrastive value of the required feature, etc.). On this approach harmony propagates iteratively across a harmony domain. Walker (2014) argues that Baiyina (henceforth B.) Oroqen round harmony does not operate in this way; rather, she proposes that a single trigger may be related non-iteratively to multiple targets, of which all but one are necessarily non-local in the sense of Nevins (2010). While trigger-target relations need not be local, Walker (2014: 510) nevertheless requires that round harmony 'is local with respect to propagation; that is, harmony proceeds only among adjacent syllables.' We will argue that B. Oroqen does not require this kind of analysis. We will propose an analysis that observes locality, and which takes account of the similarity between B. and another dialect, Z. Oroqen.

We will begin by presenting an analysis of round harmony in Z. Oroqen as described by Hu (1986), Zhang, Li & Zhang (1989), and Zhang (1996). Round harmony is triggered only by the non-high vowels /ɔ, ɔɔ, o, oo/; these vowels are also subject to restrictions on where they may occur in a word. The high round vowels /ʊ, ʊʊ, u, uu/ neither trigger nor participate in round harmony, and may occur freely in any position in a word.

Non-high round (henceforth NHR) vowels in Z. Oroqen must occur in a span that starts at the left edge of a word. That is, for a NHR vowel to occur in the second syllable of a word or further, a NHR vowel must occur in the first or preceding syllable (1). A long NHR vowel may occur alone in a monosyllabic stem or followed by any vowel (2), but a short NHR vowel must be followed by another NHR vowel (1, 3). That is, a NHR vowel must be anchored by the first two moras of a stem (Zhang 1996).

(1) a. kɔrɔ 'terrible' *kirɔ b. oŋkoo- 'rain heavily' *uŋkoo-

(2) a. mɔɔ 'tree' b. nɔɔdaa- 'throw' c. oorin 'all'

(3) a. *mɔ b. *nɔdaa c. *orin

Only low vowels are affected by round harmony. However, as (2b) shows, [+round] does not spread within a stem from a single long NHR vowel. It follows that sequences of two round vowels in a stem, as in (1), are *not* the result of round harmony, but are generated as such from underlying round vowels. For [+round] to spread it must be anchored in two syllables, not just two moras (Zhang & Dresher 1996, Zhang 1996, Walker 2001), as demonstrated in (4), where [+round] is copied from a stem to a suffix. [+round] cannot be copied by a high vowel (5a), nor can it skip a vowel (5b). In other words, needy suffixal low vowels copy all-values of [±round] from a NHR vowel to their left.

(4) a. ɔlɔ-wɔ 'fish' DEF. OBJ. *ɔlɔ-wa b. oloo-ro 'boil' PRES. TNS *oloo-rə
c. mooro-ro 'moan' PRES. TNS *mooro-rə d. mɔɔ-wa 'tree' DEF. OBJ. *mɔɔ-wɔ

(5) a. boodo-dʐi 'knife' INSTR. b. tɔrɔki-wa 'boar' DEF. OBJ. * tɔrɔki-wɔ

To account for the distribution of NHR vowels and of vowel harmony requires a combination of a morpheme structure constraint (MSC) and a harmony mechanism. The MSC states that a [+round] feature on a non-high vowel (that is, a *contrastive* [±round] feature, according to Zhang 1996 and Dresher & Zhang 2005) must be anchored by the first two moras in a stem. We assume that non-high suffix vowels, represented by A in (6), are needy for the features [round] and [ATR] (we do not attempt to account for the latter here), and seek these features from vowels on their left. [+round] must be supplied by a non-high vowel, and locality, based on all-values of [±round], thereby becomes the adjacent leftward syllable. When a donor can be found in an adjacent syllable, the suffix surfaces as [+round] (6a); otherwise, it receives [–round] by default (6b).

(6) a. ɔ lɔ -wA → ɔlɔwɔ
σ σ σ
\ / |
[+rd] ← .

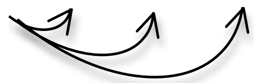
b. tɔ rɔ ki -wA → tɔrɔkiwa
σ σ σ σ
\ / | |
[+rd] x ← .

B. Oroqen (Li 1996) differs in some ways from Z., but these differences should not obscure their significant similarities. As in Z., [+round] is normally copied by a suffix only from a sequence of at least two NHR vowels. Thus, we argue that the harmony mechanism is identical to Z. The main difference involves the MSC alone. In Z., a single short NHR vowel in a stem may not co-occur with any vowel except another NHR vowel; in B., this restriction is relaxed to allow a high vowel to follow (7a). The restriction against a single short NHR vowel co-occurring with a non-high non-round vowel remains in force (7c).

(7) a. moliktə 'a kind of wild fruit' b. gɔlɔɔ 'log' c. *gɔlaa

Walker (2014) interprets (7b) as resulting from stem-internal harmony triggered by a single initial short NHR vowel, rather than to an MSC. This leads her to the conclusion that [round] harmony in B. is triggered by a *single* short NHR vowel, but not by a long one; and that a long vowel can nevertheless transmit a [+round] feature if it is part of a continuous span that originates with a trigger, as shown schematically in (8).

(8) o loo -wkoon -no-



B. Oroqen has a suffix *–nɔr* which is non-needy for both rounding and ATR. This suffix can provide [+round] to a following suffix (9). B. has also borrowed disharmonic stems with NHR vowels not preceded by another NHR vowel; these vowels also furnish [+round] (10).

(9) ətʃəxə-nɔr-wɔ-t 'paternal uncle' PL-DEF.ACC-PERS.REF(1PL.INCL) *ətʃəxə-nɔr-wa-t
(10) kinɔ-wɔ 'film' (Russian) DEF.ACC *kinɔ-wa

These facts suggest a reinterpretation of the harmony source: [+round] can only be copied from a *non-initial* syllable. Such an analysis thus makes the two dialects of Oroqen look very similar rather than radically different, and maintains the iterative nature of vowel harmony.

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Downstep and phonological phrases in Kikuyu

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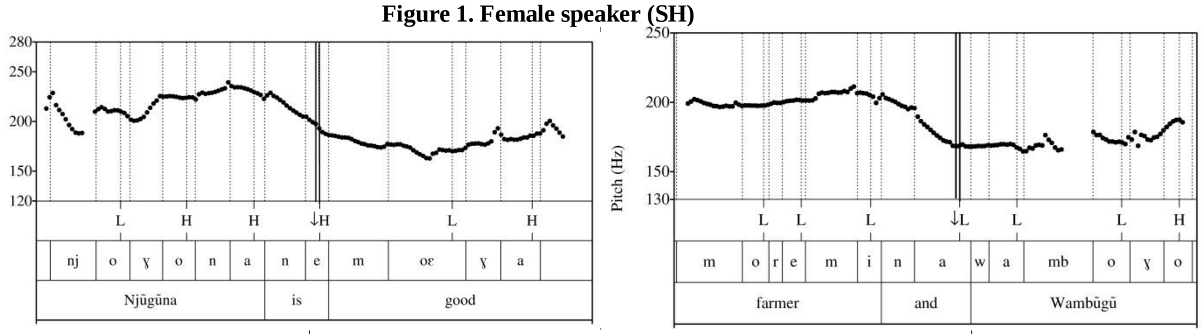
Introduction. Downstep (ꜜ) in Kikuyu (Bantu, E51) attests several interesting properties; (i) It lowers the pitch of both H and L tones contrary to many Bantu languages where downstep only affects H tones; (ii) It can trigger a raising of L tones as the sequence [HꜜL] is banned; (iii) It applies across word boundaries at the edge of a prosodic domain while cross-linguistically it commonly applies *within* a domain (Yip 2002). This study provides an acoustic reproduction of the data of Clements & Ford (1981) along with new data from a northern Kikuyu speaker and proposes a rule refinement in the syntax-phonology framework that accounts for the syntactic distribution of downstep. I claim that downstep marks the right edge of a phonological phrase (p-phrase).

The tonal effects of downstep. Kikuyu has an H(igh) - L(ow) tonal opposition. The source of downstep is a floating L tone; Ⓛ or / `/, that has arisen through a rightward tone shift and appears final in the tonal pattern of certain words. The presence of Ⓛ is lexical conditioned for nouns and modifiers, and grammatical for verbs, forming part of the tense-aspect marking. Ⓛ triggers a downstep that can result in three tonal changes depending on the tonal sequence:
A. It lowers the tone of a following syllable in the sequences /Hꜜ#H/, /Lꜜ#H/ and /Lꜜ#L/ (=*Lowering*). In figure (1), the floating L tone final in /njòɣóná `/ and /mòrèmì `/ triggers a downstep that lowers the H-toned copula /né/ (i), and the pitch of the L tone of /nà/ 'and' (ii).

Figure 1. Female speaker (SH)



(i) Downstep of an H tone: /HꜜH/ **(ii) Downstep of an L tone: /LꜜL/**

B. Ⓛ can trigger raising before the lowering applies (=*Raising-Lowering)* as [HꜜL] is banned in Kikuyu. In the tonal sequence /Hꜜ#L(L...)H/, the downstep attaches to the final H tone and the intervening L tone(s) will be raised to H. The output is [H#H(H...) ꜜH] as shown in (1)

1. /ɣòrèrá kàmà**ú `** **mòkàndá** moɛ̀ɣá/ Underlying tones ***/Hꜜ#LLH/**
   [ɣòrèrá kàmà**ú** **mókáꜜndá** moɛ̀ɣá] Surface tones **[H #HH ꜜH]**
   IMP:buy Kamau 3.rope 3.good
   'Buy Kamau a good rope' (Clements 1984, Speaker SH)

C. If no underlying H tone follows an /Hꜜ/, all the L tones will be raised and there is no trace of the downstep other than the raising itself; /Hꜜ#L(L...)/ → [H#H(H...)] (=*TotalRaising*). Important to note is that *Raising-Lowering* and *TotalRaising* only occur with downstep and therefore differ from the bounded High Tone Spreading rule which is also attested in Kikuyu.

Domain. Kikuyu has SVO order and modifiers follow the head. The application of downstep is sensitive to constituency. In the vP, downstep appears between the first and the second complement in a ditransitive sentence (see (1) above) and between a postverbal complement and adverb (2). In (2), Ⓛ is final in both the verb /ndɔ̀:nìrɛ́ `/ and the complement /mòrèmì `/. No downstep appears between the verb and complement (2a-b) or between the noun and the adjective /mòrìtò/ (2b). Instead, Ⓛ shifts and triggers a downstep that appears before the adverb /rò:ʃín./ . As the tonal sequence is /L↓L/, *Lowering* applies to the the first syllable /rò:/.

2. [TP [T V1 [vP t1 [VP t1 [DP NP] ↓[AdvP]]]]] **[**TP [T V1 [vP t1 [VP t1 [DP NP [AP A]] ↓[AdvP]]]]]
   a) nd-ɔ̀:n-ìrɛ́ mòrèmì ↓**rò:**ʃíně b) nd-ɔ̀:n-ìrɛ́ mòrèmì mòrìtò ↓**rò:**ʃíně
   1.SM-see-RC.PST 1.farmer 11.morning 1.SM-see-RC.PST 1.farmer 1.ugly 11.morning
   'I saw the farmer this morning.' 'I saw the ugly farmer this morning.'(Speaker SH)

No such Ⓛ*-shift* occurs between a subject noun and a verb. In (3) downstep is triggered from the Ⓛ in /mòrèmì `/ that has the effect *Lowering* on the subject marker /à/ of the verb.

3. [TP [DP NP **]** ↓[T V1 [vP t1 [VP t1 [DP NP]]]]]
   mòrèmì ↓**à**-tɛ́m-íré mòtě /mòrèmì `/ /à-tɛ́m-íré `/ /mòtě/
   1.farmer 1.SM-cut-PST 3.tree
   'The farmer cut a tree.' (Clements 1984, Speaker SH)

Analysis. The elicited data of the Kikuyu speaker (SH) show the same distribution of downstep as described in Clements & Ford (1981) and confirms that the downstep is sensitive to syntax. Following the general assumptions of the syntax-phonology mapping, where a p-phrase relates to a syntactic phrase (XP) (Nespor & Vogel 1986, Selkirk 1986, Truckenbrodt 1995, 1999), I propose that downstep appears at the right edge of a p-phrase. When an L tone follows an /H↓/, the downstep is realized further to the right causing *Raising-Lowering* or *TotalRaising* beacuse of the constraint *H↓L. In all other tone sequences (/H↓H/, /L↓H/ and /L↓L/), the downstep appears at the p-phrase edge triggering *Lowering*. I suggest the following OT ranking for Kikuyu p-phrases: *H↓L » ALIGN-XP, R » WRAP-XP. ALIGN-XP, R accounts for the right edge after the subject NP before the VP as shown in (3). In a sentence with two objects or an object and an adverb, ALIGN-XP, R demands a right edge after the first object NP and a downstep appears there (1), (2a-b). There is no boundary between a head and a complement (2a-b), (3) so no downstep appears. Linearly, modifiers in the DP follow the head in Kikuyu but it is the lexical NP within the DP that triggers the prosodic boundary. WRAP-XP is satisfied with following phrasing: ((X XP_1) XP_2) where the whole VP is wrapped.

Cross-linguistically, downstep is a rule that commonly applies *within* a domain (Yip 2002) and Kikuyu downstep behaves more like a boundary tone. Indeed, as Odden & Roberts-Kohno (1999) point out, it is similar to the super-low (SL) boundary tone in the neighbouring language Kikamba [E55] that marks the right edge of X^{max}. According to Clements & Ford (1979), downstep in Kikuyu diachronically relates to the SL tone of Kikamba. Beacuse of the tone shift in Kikuyu, the SL tone has moved one syllable to the right resulting in an Ⓛ that triggers downstep. This edge-marking property can therefore be accounted for diachronically.

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Morphologically Conditioned Lengthening as a Processing Effect

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In a recent article on incomplete neutralization, Roettger et al. (2014:22) question "whether it is really necessary to capture such a small effect in terms of reflexes of abstract linguistic entities." In this presentation, I seek to answer a similar question regarding the phenomenon of morphologically conditioned lengthening. Morphologically conditioned lengthening refers to any situation where (a) vowels before morpheme boundaries (e.g., the vowel of *tacks*) are longer than corresponding vowels in tautomorphemic environments (e.g., the vowel of *tax*), or (b) morphemes (e.g., the [-s] of *tacks*) are longer than corresponding nonmorphemic strings (e.g., the [s] of *tax*). Morphologically conditioned lengthening of the (a) type has been reported for English by Walsh and Parker (1983) and Losiewicz (1992), while morphologically conditioned lengthening of the (b) type has been reported for English by Frazier (2006) and Sugahara and Turk (2009).

The effects reported by these authors are indeed quite small. Frazier found that vowels that precede morpheme boundaries are 7.3% longer than vowels that do not; for Sugahara and Turk, this effect was only 4.7% (16 ms on average). Losiewicz reported an increase of 5 ms for morphemic /-d/ compared to nonmorphemic /d/. Attempts at explaining such phenomena by positing a morphologically sensitive rule of phonetic implementation face hurdles. Hurdle one: If the rule is learned, it follows that the effect must be large enough to be perceptible. Walsh and Parker found that the difference between morphemic and nonmorphemic /z/ was imperceptible, and similar experiments on incomplete neutralization have found that incompletely neutralized segments are imperceptible (Roettger et al. 2014), leading one to be wary of the perceptibility of "small" effects in general. Hurdle two: If the rule is posited to be innate, one has to answer the conceptual question of why such a rule should exist in the first place, particularly if one assimilates morphologically conditioned lengthening of the (a) type to preboundary lengthening in general, as Sugahara and Turk do. Since prosodic cues are generally recognized to aid in aspects of acquisition such as word segmentation and constituent identification, one would think that if any prosodically sensitive rule of phonetic implementation were to be innate, it would be one with perceptual advantages.

A plausible alternative hypothesis for the origin of morphologically conditioned lengthening is that it is a processing effect. It is worth considering an analogy with word frequency effects in production. Several studies have shown that frequent words are more quickly recognized in a lexical decision task than infrequent words are (see, e.g., Forster and Chambers 1973). The fact that frequent words are often *pronounced* with shorter duration than infrequent words are (Whalen 1991, Gahl 2008) can then be hypothesized to be derivable in some way from their quicker activation. Adapting this line of reasoning to the phenomenon of morphologically conditioned lengthening is straightforward. Since it has been shown that there is evidence for online decomposition of words with inflectional affixes (see McQueen and Cutler 1998:sec. 3.2 for a review), morphologically conditioned lengthening could then be derivable from the presence of an extra computational step (i.e., morpheme combination) in online production. Morphologically conditioned lengthening would then be thought of not as a rule of grammar (not part of the speaker's competence) but rather as an inevitable consequence of production (a "performance factor").

To provide evidence in favor of this hypothesis, one can try to show that the degree of lengthening can vary depending on factors that are known to affect processing of morphologically complex words. One such factor is—again—lexical frequency. Alegre and Gordon (1999) showed that, while low-frequency morphologically complex words were indeed stored as separate pieces, high-frequency morphologically complex words were stored as whole words. If morphologically conditioned lengthening were a grammatical rule, we would expect it to apply equally regardless of the word's frequency. But if morphologically conditioned lengthening is an artifact of production, we expect it to be sensitive to frequency: high-frequency morphologically complex words should behave as if they are morphologically simple, and resist morphologically conditioned lengthening. This line of thought was pursued by Losiewicz (1992), but in a somewhat roundabout way, as no single experiment compared the role of frequency in complex versus simple words.

To test the hypothesis more directly, I devised an experiment in which participants were asked to read aloud words of four different types: real simple, real complex, nonce simple, and nonce complex. Complex words had a *-s* suffix, and were matched with simple homophones ending in [z]. The real-nonce distinction was taken to be a logical extension of the frequent-infrequent distinction: if a word has never before been encountered, then it is not possible for it to be stored as a whole. The words were presented to participants within sentences, so that cues such as determiner choice or verb agreement could help participants recognize nonce words as being either morphologically complex or simple.

I predicted that the underlined part of a word such as *s<u>ees</u>* would be longer than the underlined part of a word such as *s<u>eize</u>*, in line with earlier studies showing (a)- and (b)-type lengthening. I also predicted that there would be a positive interaction between complexity and novelty, such that there would be a greater lengthening effect among nonce words (those where there is obligatorily a computational step of morpheme combination) than among real words (those where there might not be a step of morpheme combination). According to a linear mixed effects model (with complexity, novelty, and their interaction entered as by-subject random slopes, and complexity entered as a by-item random slope), the interaction of complexity and novelty had a positive effect on vowel+coda duration (10.5 ms, SE = 5.8 ms, $t = 1.95$). The 95% confidence interval of this estimate (found with the *confint()* function in R's lme4 package) did not dip below zero, suggesting that the positive effect was not due to chance. An ANOVA comparing this model with one without an interaction term revealed that the model with the interaction term was a significantly better fit ($\chi^2(1) = 4.14$, $p = 0.042$).

While there was no significant main effect of complexity for this model, a nearly significant complexity effect for a model fitted only to the nonce word data (i.e., the data where a complexity effect was most expected) was found (8.7 ms, SE = 4.3 ms, $t = 2.04$; model comparison revealed that the model with the complexity term was nearly a significantly better fit: $\chi^2(1) = 3.58$, $p = 0.058$). The absence of a significant main effect was likely due to the fact that participants were not instructed to pronounce the words at a slow speaking rate as (for example) Sugahara and Turk's participants were. As the size of the effect is roughly in line with what Sugahara and Turk found at a normal speaking rate, I take the lengthening effect to have nonetheless been sufficiently replicated.

The takeaway of these results—particularly the interaction result—is that there is some evidence supporting the idea that morphologically conditioned lengthening is an artifact of processing. While it still remains to come up with an explicit account of how extra duration can be derived from extra retrieval time, I take this data to support a link between the two, making a phonological (i.e., grammatical) explanation unnecessary.

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Diachronic changes in loanword adaptation: Loan doublets in Cantonese

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Background:

For more than 20 years, the literature on loan words has been revolving around the question whether loan adaptations happen in perception, in phonology, or in both (for an overview, see Kang 2011). In a recent paper, Boersma and Hamann (2009) argue that speech perception *is* phonological, since it is influenced by phonotactic restrictions (as evidenced by psycho-linguistic experiments such as those by Dupoux et al. 1999), and that perceptual adaptations are thus always phonological. By formalizing such adaptations in an Optimality-theoretic perception grammar with the same phonotactic constraints also applying in phonological production (BiPhon model, Boersma 2007), Boersma and Hamann account for discrepancies between loan adaptations and native phonological processes (so-called *divergent repairs*; Kenstowicz 2005) in Korean.

Minimal word requirement in Hongkong Cantonese:

In this talk we take up the observation that in Hongkong (HK) Cantonese, loan adaptations seem to be restricted by a minimal word requirement (MINWORD). Silverman (1992) and Yip (1993) employ such a word restriction to account e.g. for the difference in borrowings of English *print* as /.p^hiː.liːn./ and *printer* as /.p^hɛːn.t^haː./ (Silverman 1992: 290), where in the first case the consonant cluster is rescued by an epenthetic vowel, but this rescue mechanism cannot be applied in the second case as the resulting word form would have more than two syllables. Instead, the liquid is deleted.

In later work, Yip (2006) revises her earlier assumption and proposes that MINWORD *cannot* hold for HK Cantonese loan adaptations, since recent loan data show no influence of such a phonological restriction.

Our proposal:

Rather than categorically refusing a role of MINWORD in HK Cantonese loan adaptations, we propose that the lack of influence of this constraint in recent loans is due to a diachronic change in the perception (and production) grammar of the adaptors, as illustrated with the loan doublets from English in (1) and (2) (Yip 2006; Bauer & Wong 2008):

(1)	a) *gei⁶lim¹*	/kej.liːm/	bakery cream	early borrowing
	b) *kwim¹*	/k^{wh}iːm/	facial/drinkable cream	recent borrowing

(2)	a) *pej¹si²*	/.p^hej.siː./	place	early borrowing
	b) *pej¹lej¹si²*	/.p^hej.lej.siː./	place	recent borrowing

Both earlier borrowings of these doublets are in accordance with a high-ranked MINWORD constraint but show different rescue mechanisms: vowel epenthesis in (1a) and liquid deletion in (2a). The recent borrowings both indicate a low-ranking of MINWORD, since the form in (1b) is monosyllabic and that in (2b) consists of three syllables, though both preserve perceptual cues to the two consonants in the original English onset cluster.

We propose that the diachronic change in the perception grammar, i.e. the change in the ranking of MINWORD, is due to greater exposure to English (including HK Cantonese English) in the younger generation(s) of HK Cantonese native speakers.

Formal account:

The difference between the two perception grammars and thus in the adaptation patterns of older and younger generations of HK Cantonese speakers are formalized as illustrated with tableaux 1 and 2 for the two adaptations of *place*.

Tableau 1: Earlier adaptation of English word *place* by HK Cantonese listeners: high-ranking of MINWORD

[_ᵖlejs]$_{Auditory}$	*/.CC/	*/+fric./	MIN WORD	*[s] / /	*[_ᵖ] / /	*[l] / /	*[ ] /V/
/.plejs./$_{SF}$	*(!)	*(!)	*(!)				
/.plej.siː./$_{SF}$	*!						*
/.lej.siː./$_{SF}$					*!		*
☞ /.pej.siː./$_{SF}$						*	*
/.pej.lej.siː./$_{SF}$			*!				**

Tableau 2: Recent adaptation of English word *place* by HK Cantonese listeners: low-ranking of MINWORD

[_ᵖlejs]$_{Auditory}$	*/.CC/	*/+fric./	*[s] / /	*[_ᵖ] / /	*[l] / /	*[ ] /V/	MIN WORD
/.plejs./$_{SF}$	*(!)	*(!)					*
/.plej.siː./$_{SF}$	*!					*	
/.lej.siː./$_{SF}$				*!		*	
/.pej.siː./$_{SF}$					*!	*	
☞/.pej.lej.siː./$_{SF}$						**	*

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On the variable parsing of long vowels

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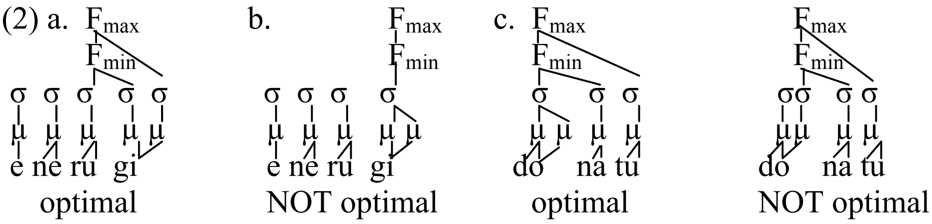
We propose that in some languages a syllable with a long vowel can be parsed as one heavy syllable or as two light syllables, depending on the phonological environment. In the latter case one 'phonetic' syllable maps into two 'phonological' syllables, showing that phonological representations can diverge quite a bit from what seems to be physically obvious. This 'abstract' approach solves three outstanding problems: 1) Accent Assignment in Tokyo Japanese, 2) Accent retraction in Ancient Greek, 3) A curious case of Tonal Accents in Franconian that has recently come under the attention of generative linguists (Köhnlein 2011).

Tokyo Japanese

Words that are borrowed into the Tokyo dialect receive accent on the antepenult mora, unless that mora is the second half of a heavy syllable, in which case the accent is assigned to the fourth mora from the right (McCawley 1968, Kubozono 2006).

(1) ku.ri.sú.ma.su 'Christmas'
e.ne.rú.gii 'energy'
dóo.na.tu 'donut'

Adopting recursive feet, as in Martínez-Paricio and Kager (2014), we can say that a 'layered' trochee is assigned at the right edge. Formally it means that $Foot_{min}$, the lower foot level, gravitates as far to the left as is possible, provided that $Foot_{max}$ is aligned to the right edge. We furthermore propose that W-to-S (Weight-to-Stress) cannot be violated in Tokyo; that is, a heavy syllable cannot occupy a weak position in the foot. We can now account for the Tokyo system, assuming that long vowels are variably parsed; they are parsed in such a way that the accented mora is placed as far to the left as is possible. The first form in (1) is trivial; the antepenult syllable (= mora) receives the accent. In the second form the (final) long vowel is parsed as *two light syllables*, because that allows the accent to be placed on the penult syllable (2a); if the long vowel would be parsed as one syllable, then that syllable would be heavy, and high-ranking W-t-S does not allow a heavy syllable to be skipped by the accent (2b). On the other hand, in the third form, exactly the opposite happens. There *the long vowel is parsed as one* (heavy) *syllable*, because that allows the accent to be located further to the left. This does not violate W-to-S, because the heavy syllable is located in the foot's head (2c).

(2)


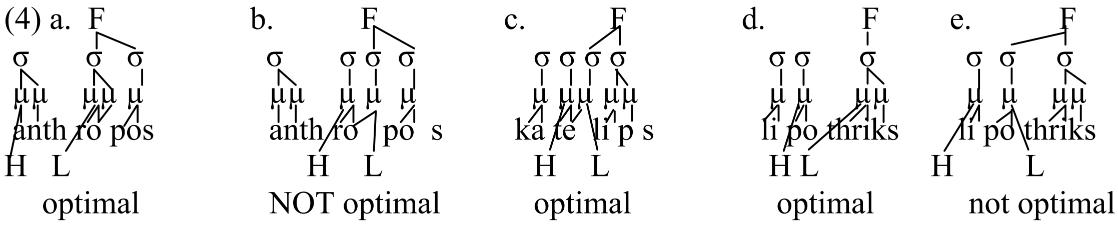
Ancient Greek

Here, a trochee is assigned at the right edge. If the final syllable has a long vowel, it absorbs the trochee entirely; if the penult has a long vowel, then the trochee dominates not only that long vowel, but also the final (light) syllable, in order to be properly aligned to the word edge. This is shown by forms like *anthroo^{H}(po^{L}on)* 'persons, gen. pl.' and *a^{H}n(thro^{L}opos)* 'person, nom. sg.' We mark the domain of the foot with brackets. In Ancient Greek a HL melody is assigned at the left foot edge, with H being assigned to the vowel immediately to the left of the foot edge and L to the first vowel to the right of the foot edge (Sauzet 1989). In Ancient Greek W-to-S is high ranked. Therefore, if the final syllable contains a long vowel, it will be accented, irrespective of whether it is parsed as two light syllables or as one heavy syllable. If, on the other hand, a long vowel is located in the prefinal syllable and the final syllable is light, then the long vowel is parsed as one heavy syllable, because then the trochee can be made bigger, while still being aligned to the right word edge (4a).

Ancient Greek has an interesting accent retraction rule that so far has not been understood. If the final syllable ends in two consonants, then the foot expands one mora to the left, but only if that mora is the second half of a long vowel. This is shown in (3).

(3) li. po^{H}. (thr^{L}iks) 'balding'
ka. te^{H}(e^{L}. lips) 'terrace'

We propose that, in principle, in this language a foot must be binary at the level of its daughters (the syllable level). A syllable with two consonants is heavy, so, with W-to-S being high ranked, it must occupy a foot's head position. However, that implies that the foot is monosyllabic. Now, we propose that in order to satisfy the bisyllabicity requirement, the dominance relations are switched from trochaic to iambic. Furthermore, in function of this requirement, a *long vowel is parsed as two (light) syllables*. It cannot be parsed as one heavy syllable, because then the dominance switch would create a violation of W-to-S. This explains why we get an iamb in *kateelips* in (3) and (4c). We also propose that the dominance switch is blocked if it would create an iamb in which the dependent syllable has an onset, as in (4d). The blocking of the dominance switch is a case where onset adds to weight (Topintzi 2010); in Ancient Greek it means that a syllable with an onset cannot occupy a weak position in an iamb. Obviously, this constraint must be higher ranked than the bisyllabicity requirement. The crucial representations we have discussed are given in (4).

(4)


Franconian

Franconian dialects have 'tonal accents' the distribution of which is largely determined by vowel quality; long high vowels have the so called Accent2, whereas mid and low vowels have Accent1 (Köhnlein 2011). Examples are given in (5).

(5) li:^{2}tər 'litre' pre:^{1}stər 'priest'
bu:^{2}tə 'outside' wɔ:^{1}pə 'weapon'

The Franconian accents have traditionally been analyzed in terms of lexical tones, as in Gussenhoven (2000). This is wrong, as it is well known that in 'real' tone languages the distribution of lexical tone is never determined by vowel quality (Fromkin 1968).

The central characteristic of the Franconian 'tonal accents' is that in Accent1 two tones of the intonational melody are assigned to one and the same 'phonetic' syllable, whereas in Accent2 only one tone of the intonational melody is assigned to a phonetic syllable. We propose that high long vowels are parsed into one phonological syllable, whereas mid and low long vowels are parsed into two phonological syllables. This, we claim, is a type of 'vowel reduction effect': a highly sonorous vowel does not like to be parsed in a weak (dependent) mora. It must therefore be parsed as a head mora, creating an independent syllable. This explains the anchoring of the intonational melody; a weak mora (the second half of a long, high vowel), does not accept a separate tone, so that the tone must be assigned to the next syllable. On the other hand, a strong (head) mora (the second half of a long mid or low vowel) does accept a separate tone. We show this in (6), with the declarative melody HL.

(6)


For the importance of fine-grained phonetic detail in phonology

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Phonology can be defined as the cognitive ability to organize the sounds of a language into abstract categories, where phonemes are ideal concepts clearly separated from their phonetic realizations. However, if recent studies have tried to re-consider the relationship between phonetics and phonology (i.e. Kingston, 2007), little has been said about fine-grained phonetic detail, viz. the articulatory and/or acoustic, non-phonemic information that is to be found in phonetic inputs.

In this abstract, we would like to make a case for the importance of what has been commonly called “fine-grained phonetic detail”, asserting that it is in fact no detail. It can be of paramount importance to model data in phonology or to explain phonological processes. Two arguments shall be presented to enlighten how phonetics informs phonology: one from data in first language acquisition and one in loanword phonology. In both cases, an external input is treated by a specific matrix to create a licit output. Our claim is that this matrix draws its content from low-level information.

In the acquisition of French ‘liaison’, a phonetic detail as the length of the vowel and the consonant involved in this phonological process is a cue to determine their phonological status. The Liaison consists in the surfacing of a latent segment – liaison consonant (LC) – that is resyllabified in the following noun starting with a vowel (e.g. *les* [le], en. *the* + *ours* [uʁs], en. *bears* → *les[z]ours* [le.zuʁs], en. *the bears*). The phonological-autosegmental model uses a LC which is a floating segment, with respect of both the segmental and syllabic tiers (Fig. 1., Encrevé, 1988). Nonetheless liaison causes many infant difficulties in French speech segmentation that seem vanished at 6 years of age, when children acquire this double-floating nature of the LC autosegment (Wauquier, 2009). To find out some evidences of this underlying representation, we analyze 43 French children's productions (M 6; 3) in a picture naming task. In the task, we propose 18 couples of cards depicting the same animal or object but differing in number (one vs. many). The interviewer names the first card producing an elision (e.g. *l'ours* [luʁs], en. *the bear*) then asks the child to name the second card in order to produce the plural and so the liaison (e.g. *les[z]ours* [le.zuʁs], en. *the bears*) and vice-versa (interviewer’s input: liaison *les[z]oreillers*, [le.zɔ.ʁɛ.je], en. the pillows → child’s production: elision *l'oreiller* [lɔ.ʁɛ.je], en. *the pillow*). The test items alternate at random with fillers that don’t require productions of liaison or elision (e.g. interviewer’s input: *les gateaux* [le gɑ.to], en. *the cakes* → child’s production: *le gateau* [lə gɑ.to], en. the cake). The results show that when it’s asked to produce an elision [lɔ.ʁɛ.je] (en. the pillow) from a liaison [le.zo.ʁɛ.je] (en. *the pillows*), children product the same percentage of (1) good answers as [lo.ʁɛ.je] (32%) and of (2) sequences that preserve the LC at the beginning of the noun as [lə-zo.ʁɛ.je] (33%). We analyze these children's productions through the software PRAAT and we discover:

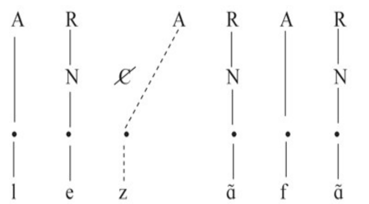

Fig. 1. Autosegmental representation of French liaison in *les enfants*, en. *the children* (Encrevé, 1988)

- in (2), the LC [z] doesn't make any difference in length from the LC in the correct production of liaison as *les ours* [le.zuʁs], en. *the bears*.
- However, the vowel [ə] is in average longer (198ms and 178ms) in (2) than in non-liaison sequences as in the filler *le gateau,* [lə gɑ.to], en. *the cake* (150ms).

The length of the vowel in wrong elision productions is evidence of the underlying phonological representation of liaison at 6 years of age, where LC is a floating segment. The skeletal position and the segmental content of LC are preserved and the LC itself is floating from the segmental and the syllabic tiers: in the segmental tier it causes the lengthening of the previous vowel, as it happens for the vowel in liaison (Nguyen et al. 2007) and doesn't happen between separated words where the consonant is the lexical onset of the noun (e.g. *le gateau* [lə gɑ.to], en. *the cake*); in the syllabic tier it fills the onsetless syllable and avoid hiatus, preventing the elision process.

A second argument can be found in Korean loanword phonology, where phonetic detail such as a release burst can be held responsible for a phonological process, i.e. epenthesis. It has been commonly assumed that the release burst which is sometimes realized after the coda in English should be responsible for the insertion of a final vowel in Korean, as follows:

English		Korean	vs.	English		Korean
ˌækəˈdɛmɪk˺	>	akʰademik˺		ˈplɑːk˹	>	pʰɨʟʟɑkʰɨ
ˈnɪp˺	>	nip˺		ˈpaɪp˹	>	pʰaipʰɨ
ˈfæt˺	>	pʰæt˺		ˈfruːt˹	>	pʰɨʟutʰɨ

Among some others, Kang (2003) and Boersma & Hamann (2009) give interesting analyses of that fact. But none of the authors cared to *prove* that release burst was actually the reason for epenthesis. Indeed, several exceptions are to be found: Some English items which would be expected to release their final codas do not undergo final epenthesis in Korean (en. *hotcake* [ˈhɑtˌkeɪk˹] > ko. [hɑt˺kʰeik˺]) and, conversely, English items which would be expected not to release their final codas do undergo epenthesis in Korean (en. *audit* [ˈɔdɪt˺] > ko. [oditʰɨ]). That variation is problematic because it means that there is no strict causality between release burst in English and epenthesis in Korean. However, in a more recent 2000-item database, we used other cues (tenseness of the preceding vowel, point of articulation of the coda and stress pattern) to calculate the probability of the release burst for each item, assigning them a "Release Burst Index" (RBI). We showed that release burst after post-vocalic codas in English was indeed *statistically correlated* with final vowel insertion in Korean (r^2=0.9441).

As a conclusion, one has to grant fine-grained phonetic detail the importance it has. Taking it into consideration allows us to support otherwise acceptable phonological models with more accuracy by giving concrete evidence through phonetic data. Given the important effects it can have, low-level information should be modelled into phonology since we believe it can provide interesting feedback to Strict-CV Phonology (Lowenstamm, 1996) and especially the way it deals with timing.

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Syntactically unjustified morphs and other strategies for hiatus resolution in Irish prepositions

Previous work has examined cases of lexical conservatism where the phonology uses a syntactically unjustified morph to improve phonotactics (e.g. Steriade 1999). Irish prepositions show that the phonology is not blind to the morphological features attached to these morphs, but chooses the least marked among them. This paper expands on the analysis presented in O'Brien (2007) by explaining the behavior of prepositions before both singular and definite articles and bare NPs, and where they resolve hiatus through morph insertion, schwa deletion, or epenthesis.

1. The problem

Irish prepositions inflect for person and number only when they have no overt object:

(1) a. le Máire b. *léi Máire c. léi d. *léi sí/í e. *le sí/í
with Mary with.3sgF Mary with.3sgF with.3sgF she/her with she/her

However, the 3sgM form is used by some prepositions to avoid a hiatus before the definite article, /ən/ (2a), while others delete a schwa instead (2b). (2c) shows that the 3sgM morph insertion is triggered by the definite article, and not a [+def] feature on a genitive phrase.

(2) a. leis an gcat b. den chat c. le cat na comharsan
/lʲɛʃ ən gat/ /dʲən xat/ /lʲɛ kat nə 'koːɾsən/
with.3sgM the cat off.the cat with cat the.gen neighbors.gen

2. Use of the 3sgM before the singular definite article

Following Wolf (2008), I analyze this using a series of constraints to allow insertion of syntactically unjustified morphs to improve the phonotactics:

(3) **Dep-Morph(F):** For every instance f of the node F at the exponent level, there is an instance f' of the node F at the syntactic level, and f corresponds to f'.

Constraints against insertion of the more marked features (e.g. F, pl, 1^{st}) outrank *Hiatus, and will not be used for hiatus resolution. The less marked features rank low, favoring their insertion (4a) over deletion of a schwa (4c), when either strategy would work to resolve hiatus.

(4)

le + an cat 'with + the cat'	Dep-M (1st/2nd)	Dep-M (f/pl)	*Hiatus	Max(ə)	Dep-M (3rd)	Dep-M (M)	Dep-M (sg)
☞ a. /lʲɛʃ ən gat/ [3,sg,m]					*	*	*
b. /lʲɛ ən gat/ [Ø]			*!				
c. /lʲɛn gat/ [Ø]				*!			
d. /lʲæt ən gat/ [2,sg]	*!						*

However, in prepositions where the 3sgM form ends in a vowel (5c), the schwa deletes (5a), rather than inserting an inflected form which would introduce more marked features (5d).

(5)

do + an cat 'for the cat'	Dep-M (1st/2nd)	Dep-M (f/pl)	*Hiatus	Max(ə)	Dep-M (3rd)	Dep-M (M)	Dep-M (sg)
☞ a. /dən xat/ [Ø]				*			
b. /də ən xat/ [Ø]			*!				
c. /do: ən xat/ [3,sg,M]			*!		*	*	*
d. /dəm ən xat/ [1,sg]	*!						*

3. Use of the 3sgM before the plural definite article

A further puzzle lies in the fact that most of the prepositions which appear in their 3sgM form before a singular definite article also do so before the plural definite article /nə/ despite there being no hiatus. (I explain one of the exceptions as phonetically motivated and the other as morphologically motivated.) To analyze these facts, I claim that correspondence holds between the forms of the preposition appearing before any definite article (and not a [+def] feature):

(6) **CORRFEATURE(PREP/_[DEF])$_{SG/PL}$** : Assign one violation to any candidate whose features differ from the canonical example of a preposition before a definite article.

In (7), this correspondence constraint motivates the insertion of the 3SGM morph despite a lack of phonological motivation.

(7)

le + na cait 'with the cats'	CORRF(PREP /_[DEF])$_{SG/PL}$	DEP-M (3RD)	DEP-M (M)	DEP-M (SG)
☞ a./lʲɛʃ nə gatʲ/ [3,SG,M]		*	*	*
b. /lʲɛ nə gatʲ/ [Ø]	*!			
+DEF, +SG: lʲɛʃ [3,SG,M]				

In prepositions which resolve hiatus through schwa deletion in the singular, the base form appears in the plural (8a) (minus the /-n/ of the singular definite article, which appears in (8b)).

(8)

ó + na boscaí 'from the boxes'	CORRF(PREP /_[DEF])$_{SG/PL}$	DEP-M (3RD)	DEP-M (M)	DEP-M (SG)
☞ a. /o: nə bɔski:/ [Ø]				
b./o:n nə bɔski:/ [Ø, +DEF,+SG]	*!			
+DEF, +SG: o:- [Ø]				

4. Hiatus resolution before bare NPs

Before a vowel-initial bare NP, a schwa will delete to avoid hiatus, but hiatus is otherwise tolerated. This appears contrary to the constraint ranking in (4) and (5) where insertion of the 3SGM was less costly than deleting a schwa. To account for this, I propose that there is also correspondence between forms that appear in contexts other than before a definite article:

(9) **CORRFEATURE(/_[-DEF])$_{PREP}$** : Assign one violation to any candidate whose features differ from the canonical example of a preposition not before a definite article.

In (10), the candidate with hiatus (10a) is the winner. A full vowel cannot be deleted (10b) and the 3SGM morph cannot be inserted without violating the correspondence constraint (10c).

(10)

le + éan /lʲɛ e:ən/ 'with a bird'	DEP-M (1,2,F,PL)	MAX(V)	CORRF (/_[-DEF])$_{PREP}$	*HIATUS	MAX(ə)	DEP-M(3SGM)
☞ a. /lʲɛ e:ən/ [Ø]				*		
b. /lʲe:ən/ [Ø]		*!				
c. /lʲɛʃ e:ən/ [3,SG,M]			*!			***
base [-DEF]: lʲɛ [Ø]						

But, in (11), hiatus can be resolved through deletion of a schwa (11a) which satisfies correspondence because no additional features are introduced, as in (11c).

(11)

do + éan /də e:ən/ 'for a bird'	DEP-M (1,2,F,PL)	MAX(V)	CORRF (/_[-DEF])$_{PREP}$	*HIATUS	MAX(ə)	DEP-M(3SGM)
☞ a. /dʲe:ən/ [Ø]					*	
b. /də e:ən/ [Ø]				*!		
c. /do: e:ən/ [3,SG,M]			*!			***
base [-DEF]: də [Ø]						

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The mental representation of ternary spreading: How are derived tones processed?

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Previous research on tonal processing in Mandarin Chinese, Cantonese, Taiwanese, and Thai show a number of significant findings including: (i) that there is integral processing of segments (and in particular vowels) and tones by tone language speakers (Braun & Johnson 2011, Repp & Lin 1990); (ii) there is a preference for vowel over tone information in vowel and tone monitoring tasks (Ye & Connine 1999); and (iii) there is more categorical processing (in particular identification) of tone by tonal listeners (Sun & Huang 2012), although alternative views on the latter do exist (Francis, Ciocca & Ng 2003). The integral processing of vowels and tone in Asian tone languages can be seen to follow from the dense tone-to-syllable association; the fact that nearly all syllables/morphemes are tonally specified; and that there are considerably few tonal (Sandhi) processes in Asian tone languages (Yip 2002: 173ff).

This paper investigates whether such findings hold in a different tonal language family, namely Bantu languages. In contrast to Asian language tone Bantu languages have few tonal contrasts (usually two); only a few syllables/morphemes are lexically specified for tone; and the surface tonal realization is derived from intricate tone spreading rules as, for example, discussed in the seminal works of Goldsmith 1976, and Clements & Goldsmith 1984. In addition, tone in Bantu is relative rather than categorical in terms of height.

The paper specifically investigates the mental representation of derived tones (i.e. non-lexical tones) in Bemba, testing whether native speakers can produce and perceive ternary High tone spreading in novel contexts. In a production task we test whether ternary spread can be extended to non-words. This is complemented with an AX discrimination task comparing binary v. ternary spread, which are phonologically contrastive, on the one hand, with a tonally similarly salient but non-phonologically relevant contrast, on the other. We show that in both the production and perception of non-words, ternary spread is distinct from binary spread, suggesting that derived tone is equally mentally represented as lexical tone is.

The paper will report results from two experiments conducted with twenty-three native speakers of Bemba (age: 18 to 66 years, 37.7 (mean) and SD 14.3 years; 15 male, 8 female). Experiment 1 investigates the application of ternary spreading processes (in contrast to unbounded spreading, see examples in 1-3) in the production of non-words, using a variant of the *Wug* test (Berko 1958, Ratner & Menn 2000). Specifically, participants heard real and nonce verb forms in one conjugation and had to conjugate them into another form (1^{st} pl. to 3^{rd} pl.). This task involves the application of a ternary spreading process in the participants' variety. If ternary spreading is a rule-based process, we expect speakers to produce ternary spreading in non-words as well. If it is lexically encoded, we expect fewer cases of ternary spread in the non-word condition than in the real-word condition.

Experiment 2 investigates behavioural results in a speeded AX discrimination task in which nonce stems with binary vs. ternary spread are contrasted with a long inter-stimulus interval (ISI) of 2 seconds. Such a long ISI allows us to tap into phonological representations (Babel & Johnson 2010, Cowan & Morse 1986, Crowder & Morton 1969). If ternary spread is cognitively specified, listeners should be sensitive to the difference between a binary and a ternary spread. On the other hand, if ternary spread is just an allophonic variant of binary spread (attested in one variety of Bemba, see Bickmore & Kula 2013) or is simply the result of phonetic overshoot, we predict that listeners will have difficulties in perceiving the difference.

We used two kinds of control conditions in Experiment 2; one with a tonal difference that is equally salient but involves a paradigmatic contrast (High vs. Mid, Mid vs. Low) instead of the syntagmatic contrast between a binary and ternary spread. The second control condition involves real-words with a binary vs. ternary spread to address whether participants perform a dialect discrimination (in which case participants' sensitivity to the tonal contrast should be the same in the non-word and real-word condition) or not (in which case we would expect no or a smaller difference in the real-word condition than in the non-word condition due to lexical activation).

The production results show that native speakers of Bemba are equally able to produce ternary spreading in non-words; thereby suggesting inferential, rule-based processes (cf. discussion in Pinnow & Connine 2014). The perception results show more sensitivity to the binary-ternary contrast than to a non-contrastive paradigmatic contrast (High vs. Mid, Mid vs. Low), despite similar acoustic differences reflecting sensitivity to a phonologically relevant contrast. The results were analysed in R using linear-mixed effects regression models.

Thus while it may be a legitimate assumption that tone is part of a syllable's mental representation in Asian tone languages, this assumption is not tenable in Bantu tone languages, where the results show that both in production and perception speakers have a mental representation of derived tone and crucially that such representation can be as crisp as ternary spread. The results thus provide experimental evidence of treating tone as autosegmental in Bantu.

Examples (lexical highs are underlined, low tone unmarked)

(1) Unbounded Spreading
bá-ka-mu-londolol-a → *bá-ká-mú-lóóndólól-á*
2SM-FUT3-1OM-explain-FV
'They will introduce him'

(2) Binary Spreading (dialect 1)
bá-loondolol-é → *bá-lóondolol-é*
2SM-explain-SUBJ
'They should explain'

(3) Ternary Spreading (dialect 2)
bá-loondolol-é → *bá-lóóndolol-é*
2SM-explain-SUBJ
'They should explain'

IDEMPOTENCY AND THE EARLY ACQUISITION OF PHONOTACTICS

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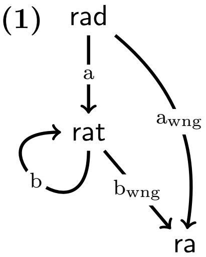
§1-Motivation. The acquisition of patterns of alternation lags the acquisition of contrast and phonotactics (Hayes 2004). There is thus an early developmental stage when the child manages to acquire phonotactics without the aid of alternations. It is common in both the computational literature (e.g., Prince & Tesar 2004 and Tesar 2013) and the acquisition literature (e.g., Gnanadesikan 2004 and Pater & Barlow 2003) to model this acquisition stage by assuming that the learner complements the phonotactically licit surface forms it is trained on with completely *faithful* corresponding underlying forms. Is the assumption of faithful underlying forms computationally sound? In particular, are there guarantees that the target grammar does indeed map phonotactically licit phonological forms faithfully into themselves? If that is the case, the target grammar is called *idempotent*. This paper provides guarantees for OT idempotency. It thus lays the foundations for a number of existing models of the early stage of the acquisition of phonotactics.

§2-Intuition. Suppose that a grammar maps rad into rat, as in (1a). Hence, rat is phonotactically licit. Idempotency thus requires rat to map to rat, as in (1b). Suppose by contradiction that rat maps instead to some non-faithful candidate, say ra as in ($1b_{wrong}$). The fault must lie with markedness or faithfulness. Suppose the fault lies with markedness, which exerts too strong a pressure in favor of ra. Thus, some markedness constraint which prefers ra over rat is ranked too high. But this is impossible: rad would then be mapped to ra as in ($1a_{wrong}$) to start with. Suppose next the fault lies with faithfulness, which does not provide a sufficient barrier against the unfaithful mapping ($1b_{wrong}$). Thus, consider a faithfulness constraint F which does not contribute a barrier. In the sense that F does not prefer the faithful mapping (1b) over ($1b_{wrong}$), namely is not violated by ($1b_{wrong}$), as stated in the antecedent of (2). Suppose the consequent of (2) holds as well. It says that F also fails at preferring (1a) over ($1a_{wrong}$). But this is impossible, because the faithfulness barrier against the mapping ($1a_{wrong}$) must be strong enough for it to be unattested. I now formalize this intuition that condition (2) guarantees idempotency and investigate which faithfulness constraints satisfy it.

(1)

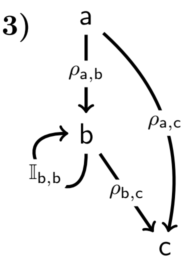


(2) If $F(/\mathsf{rat}/, [\mathsf{ra}]) = 0$, then $F(/\mathsf{rad}/, [\mathsf{ra}]) \leq F(/\mathsf{rad}/, [\mathsf{rat}])$

§3-Framework. I adopt a version of McCarthy & Prince's (1995) representational framework. A *candidate* is a triplet $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a},\mathsf{b}})$ consisting of an *underlying* string a of phonological segments, a *surface* string b, and a *correspondence relation* $\rho_{\mathsf{a},\mathsf{b}}$ between the segments of a and those of b. An OT grammar G takes an underlying string a and returns the optimal candidate $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a},\mathsf{b}})$ relative to the constraint ranking considered, among those candidates which share the underlying form a. A surface form b is *phonotactically licit* according to G provided there exists at least an underlying form a such that G maps a into a candidate $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a},\mathsf{b}})$ whose surface string is b. The grammar G is *idempotent* provided it maps any form b phonotactically licit according to G into the candidate $(\mathsf{b}, \mathsf{b}, \mathbb{I}_{\mathsf{b},\mathsf{b}})$, where $\mathbb{I}_{\mathsf{b},\mathsf{b}}$ is the identity correspondence relation among the segments of b.

§4-The IFC. Which conditions on the constraint set guarantee that each grammar in the corresponding OT typology is idempotent? Consider two candidates $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a},\mathsf{b}})$ and $(\mathsf{b}, \mathsf{c}, \rho_{\mathsf{b},\mathsf{c}})$ such that the surface form b of the former is the underlying form of the latter, as represented in (3). Consider next the candidate $(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a},\mathsf{c}})$, whose correspondence relation $\rho_{\mathsf{a},\mathsf{c}}$ is the composition of the two correspondence relations $\rho_{\mathsf{a},\mathsf{b}}$ and $\rho_{\mathsf{b},\mathsf{c}}$ (this requires some assumptions on candidacy, which are not made explicit for brevity). The diagram in (3) generalizes the one in (1). The specific condition (2) thus generalizes to (4) in the framework described in §3. Formalizing the intuition in §2, I show that every grammar in the typology is idempotent provided each faithfulness constraint F in the constraint set satisfies (4), thus called the *idempotency faithfulness condition* (IFC).

(3)



(4) If $F(\mathsf{b}, \mathsf{c}, \rho_{\mathsf{b},\mathsf{c}}) = 0$, then $F(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a},\mathsf{c}}) \leq F(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a},\mathsf{b}})$

§5-Establishing the IFC: positive results. Which faithfulness constraints satisfy the IFC? I answer this question by proving the following positive results (complemented by the negative results in §6). **(I)** The faithfulness constraint MAX satisfies the IFC under no additional assumptions. **(II)** The faithfulness constraints DEP, UNIFORMITY, and LINEARITY satisfy the IFC as long as no correspondence relation breaks an underlying segment (namely, puts it in correspondence with two surface segments). **(III)** The identity faithfulness constraint IDENT[φ] relative to some phonological feature φ satisfies the IFC as long as correspondence relations never break an underlying segment and furthermore the feature φ is *total* (namely, defined for every segment). **(IV)** The same holds for value-restricted versions of IDENT, such as Pater's (1999) variant $\text{IDENT}_{\text{I}\to\text{O}}$[+NASAL] which is only violated by denasalization. To illustrate these results, let me show why IDENT[NASAL] satisfies the IFC. Consider a violation of this constraint by the candidate $(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a,c}})$. This means that the string a contains, say, the nasal segment η, which corresponds through $\rho_{\mathsf{a,c}}$ to, say, the oral segment g in the string c, as in (5a). Recall that $\rho_{\mathsf{a,c}}$ is the composition of $\rho_{\mathsf{a,b}}$ and $\rho_{\mathsf{b,c}}$. The correspondence relation between the segments η and g in (5a) thus means that η corresponds to some segment of the string b which in turn corresponds to the segment g. This intermediate segment could be either a nasal segment as in (5b) or an oral segment as in (5c). Case (5b) means that the candidate $(\mathsf{b}, \mathsf{c}, \rho_{\mathsf{b,c}})$ violates IDENT[NASAL], contradicting the antecedent of the IFC. Case (5c) must therefore hold, which says in turn that the candidate $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a,b}})$ violates IDENT[NASAL]. In conclusion, for each violation of IDENT[NASAL] by the candidate $(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a,c}})$, there is a corresponding violation by $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a,b}})$. Furthermore, the hypothesis that the correspondence relation $\rho_{\mathsf{b,c}}$ does not break any segment, can be shown to entail that for each violation by $(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a,c}})$, there is a *different* corresponding violation by $(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a,b}})$. The inequality $F(\mathsf{a}, \mathsf{c}, \rho_{\mathsf{a,c}}) \leq F(\mathsf{a}, \mathsf{b}, \rho_{\mathsf{a,b}})$ in the consequent of the IFC thus holds.

(5)
a. $\mathsf{a} = \ldots \eta \ldots$ | $\rho_{\mathsf{a,c}}$ | $\mathsf{c} = \ldots g \ldots$

b. $\mathsf{a} = \ldots \eta \ldots$ | $\rho_{\mathsf{a,b}}$ | $\mathsf{b} = \ldots \eta \ldots$ | $\rho_{\mathsf{b,c}}$ | $\mathsf{c} = \ldots g \ldots$

b. $\mathsf{a} = \ldots \eta \ldots$ | $\rho_{\mathsf{a,b}}$ | $\mathsf{b} = \ldots g \ldots$ | $\rho_{\mathsf{b,c}}$ | $\mathsf{c} = \ldots g \ldots$

§6-Establishing the IFC: negative results. The following faithfulness constraints do not satisfy the IFC. **(I)** Restricted versions of MAX and DEP, such as DEP[V] and MAX[C]. **(II)** The identity faithfulness constraint IDENT[φ] corresponding to a *partial* feature φ (such as the feature [STRIDENT], which is often only defined for coronals; Hayes 2009). **(III)** All the constraints considered so far (but MAX) when correspondence relations can break underlying segments. Of course, the IFC is only a *sufficient* condition for idempotency. Yet, for each of these cases where the IFC fails, I can construct a counterexample where indeed idempotency fails, suggesting that the IFC provides a fairly tight characterization of idempotency. To illustrate, consider the faithfulness constraint DEP[V]. It is easily shown not to satisfy the IFC. And indeed, a constraint set containing DEP[V] yields a typology which contains non-idempotent OT grammars, such as the one in (6).

(6)

/C_2V_1/	DEP[V]	MINSIZE	*VV	*CC	ID[CONS]
C_2V_1		*!			
☞ $C_3C_2V_1$				*	
$C_3V_2V_1$			*!		
$V_3C_2V_1$	*!				
$V_3V_2V_1$	*!		*		

/$C_3C_2V_1$/	DEP[V]	MINSIZE	*VV	*CC	ID[CONS]
C_2V_1		*!			
$C_3C_2V_1$				*!	
$C_3V_2V_1$			*!		
☞ $V_3C_2V_1$					*
$V_3V_2V_1$			*!		

MINSIZE prohibits words consisting of just /CV/. Assuming that complex onsets contribute to weight, a segment thus needs to be epenthesized in the onset. This must be a consonant, because DEP[V] is high ranked. Thus /CV/ is mapped to [CCV]. But /CCV/ can be mapped to [VCV] to avoid the consonant cluster, because the initial vowel is not epenthetic in this case.

§7-Connection with output-drivenness. Tesar (2013) introduces the notion of *output-driven* (OD) grammars. ODness entails idempotency but not vice versa. Yet, the IFC is "close" to Tesar's condition for ODness, so that they draw a comparable distinction among the faithfulness constraints. Crucially, ODness is only definable for a representational framework without coalescence, breaking, and metathesis, while idempotency can be defined in the general framework of §3. Furthermore, the analysis of idempotence is substantially simpler than Tesar's analysis of ODness.

Moraic geminates in Malayalam: evidence from minimal word effects and loanword adaptation

Authors: Savithry Namboodiripad, Marc Garellek, & Eric Bakovic (UCSD)

We present new evidence to show that, contrary to previous stress-based analyses (e.g. Mohanan 1989), Malayalam geminates must be moraic in at least some contexts. We present and discuss evidence for the moraicity of geminates in both native words and in loanword adaptations, and we provide criteria for determining which of two strategies are used in the adaptation of CVC loanwords from English.

The minimal word in Malayalam is bimoraic: free roots are minimally CVCV, CVːC, CVCː, or CVCC in shape, where vowel and consonant length are phonemic (Mohanan 1989). This suggests that geminates and consonant clusters are moraic. However, evidence from stress assignment suggests that only vowels contribute to syllable weight (Mohanan 1986; Hayes 1995; Broselow et al. 1997). If geminates and consonant clusters are weightless, how can forms like CVCː and CVCC satisfy minimal word constraints in Malayalam? These forms are realized with a following schwa (1), so one possibility is that the schwa is moraic. However, Cyran (2001) uses distributional evidence to show that schwas are both nonmoraic and not present underlyingly: e.g., schwas only appear word-finally, where they occur to resolve Malayalam's ban against obstruent codas (Mohanan 1989).

Given the bimoraic minimal word requirement, the facts above lead to specific predictions about the types of words which are licit in Malayalam. If schwas are nonmoraic, and CVC syllables are monomoraic, then words with the structure CVCə are ruled out in Malayalam – this prediction is borne out, as in (2). Further, evidence from native Malayalam words which have the structure CVCːə, as seen in (1), shows that geminates must be moraic:

(1) palːə
CVCːə
'tooth'

(2) * palə
CVCə

The contrast between (1) and (2) can only be explained if we assume that the geminate in (1) is moraic, satisfying the minimal word requirement. These examples also support Cyran's claim about the nonmoraic status of schwas; if schwas were moraic, words with the structure of (2) should be possible.

Further evidence that geminates are moraic comes from loanword adaptation. Malayalam speakers adapt CVC words from English using two different strategies: in (3), the vowel is lengthened, while in (4), the vowel stays short and the coda consonant is geminated, which results in a word with the structure CVCːə. In both cases, a schwa is epenthesized in order to resolve an illicit coda, but crucially, in order to account for examples like (4), geminates must be moraic: the schwa does not contribute a mora, and the minimal word must be bimoraic.

(3) a. /p^{h}ɑs/ *(English input)*
b. paːsə *(vowel-lengthened loanword)*
'pass'

(4) a. /bʌs/ *(English input)*
b. basːə *(geminated loanword)*
'bus'

In almost all cases[1], both strategies are not possible for a given word, and choice of

[1]For a few words, both strategies can be used – there is some evidence that this reflects different diachronic patterns of loanword adaptation, and these examples will be discussed further in the presentation.

strategy depends on perceived vowel length. English tense vowels are adapted as long Malayalam vowels, as in (5), while lax vowels are borrowed as short vowels with geminate coda consonants, as in (6). The one exception is /æ/ (7), which we assume is due to its greater phonetic length relative to other lax and non-low tense vowels in English (van Santen 1992). (8) - (10) are additional examples of the input vowel mapping onto a particular adaptation strategy, with the source vowels /ɛ/ and /ʊ/ resulting in the gemination strategy, and /ɔ/ resulting in a long vowel.

(5) a. /seɪl/ *(input)*
b. * selːə *(geminate)*
c. seːlə *(long vowel)*
'sale'

(6) a. /kʰʌp/ *(input)*
b. kapːə *(geminate)*
c. * kaːpə *(long vowel)*
'cup'

(7) a. /mæp/ *(input)*
b. * mapːə *(geminate)*
c. maːpə *(long vowel)*
'map'

(8) a. /sɛt/ *(input)*
b. sɛtːə *(geminate)*
c. *seːtə *(long vowel)*
'set'

(9) a. /mɔl/ *(input)*
b. * maɭːə *(geminate)*
c. maːɭə *(long vowel)*
'mall'

(10) a. /wʊd/ *(input)*
b. ʋuɖːə *(geminate)*
c. *ʋuːɖə *(long vowel)*
'wood'

English CVC loanwords can undergo gemination in order to satisfy minimal word constraints in Malayalam, and this process is sensitive to both phonemic length (= tense vowels) and phonetic length: English /æ/, though phonologically lax, has a relatively long inherent duration. The gemination strategy is unexpected given previous analyses claiming that Malayalam geminates are nonmoraic. Our analysis, which treats Malayalam geminates as moraic, correctly accounts for the gemination strategy for loanword adaptation, explains the presence of native words with the structure CVCːə, and preserves the inherent moraicity of geminates, as posited in Moraic Theory (Hayes 1989).

The evidence presented here points to the conclusion that final (pre-schwa) geminates in otherwise nonminimal words must be moraic; whether or not this conclusion affects Mohanan's conclusion that geminates must be nonmoraic (based on stress in longer words) is an issue that we address in the talk, where we present minimal pairs which suggest, contra Mohanan, that geminates do affect stress patterns in longer words.

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Structural Sensitivity in Phonology: Phonological Persistence
Heather Newell, UQAM

Languages vary in how disfavoured phonological strings are repaired. Hiatus, for example, may be resolved by processes such as deletion, epenthesis, glide formation, or coalescence. Each of these options is language-specific. There is no pre-theoretical motivation for a language to favour one strategy over another. Within a single language it is also not uncommon to countenance multiple resolution strategies for a disfavoured phonological string. Sometimes these different strategies are phonologically motivated, as are the three hiatus resolution strategies of coalescence, glide formation and elision in Xhosa (Casali 2011). Other times these differences are morpho-syntactically motivated. For example, CN sequences in Acholi are repaired by deletion of the nasal *with* (1b) or *without* (1a) gemination of the C (Intervocalic velar stops are lenited).

(1) a. tixa 'my chin' (tik-na = chin-my)
b. bukka 'my book' (buk-na = book-my)

Dobler (2008) argues that the morpho-syntactic differences in alienable and inalienable constructions motivate the different phonological outputs in (1). Newell (2008) and Newell and Piggott (in press) argue that an analogous distinction in hiatus resolution strategies in Ojibwe is due to the persistence of phonological structure built on inner derivational cycles. Within a cycle hiatus is resolved by deletion, while hiatus may be resolved by epenthesis if the vowels are interpreted in separate cycles (if not left unresolved). In (2a) the verb and all of its suffixes are interpreted in the same cycle (vP, a cycle within phase theory (Chomsky 1999)), while in (2b) the tense morpheme and verbal root are interpreted in separate cycles (CP and vP, respectively).

(2)a. niwe:ʒi:na:na:nig 'we paint them'
ni**-**we:ʒi:-in-**a:-i**na:n**i**-Ø-**a**g
[1 [paint-final-TS(3 theme)-1plural-Ind-3plural]$_{vP}$]$_{CP}$
b. nigà**d**a:gamòse: 'I will (probably) walk in snowshoes'
ni-ga-a:gam-ose:-Ø
[1-future [snowshoe-walk-Fin]$_{vP}$]$_{CP}$

This presentation examines what motivates different phonological repair strategies within a single language. It proposes that inter-cyclic repair is cross-linguistically more persistent than intra-cyclic repair. 'Persistence' here is the apparent dispreference within a system to delete structural relations that have been built up during a derivation. Note that there is no motivation for linking the two strategies in either (1) or (2) to the featural nature of the segments involved. It is argued here that it is, rather, the timing of rule application that motivates the distinction. It has been proposed (ex. Alderete 2001) that constraints/rules are sensitive to whether they target segments belonging to roots or affixes, and it has been amply noted that the deletion of affix segments over roots segments is cross-linguistically preferred (although not universal). This root-affix asymmetry falls out of a realizational theory of late-insertion along with the proposal that Vocabulary Insertion occurs from the inside out (Bobaljik 2000). What is of interest here, and will be argued in this presentation, is that the phonological ramifications of cyclic derivation go beyond root primacy. Phonological rules are sensitive in general to whether a morpheme is undergoing, or has already undergone, interpretation in the phonological module of the grammar. This sensitivity manifests itself as persistence, defined as follows:

(3) *Phonological Persistence* (PP): Phonological operations that apply after structure building has occurred cannot be more destructive that operations that apply during structure building.

This preservation of structure in the phonology is not absolute, however, but gradient. I propose the following constraint on Phonological Persistence:

(4) *Phonological Subset Generalization* (PhSG): If a phonological rule *X* in a language applies both early (during) and late (after structure building operations), the late application of the rule will target a subset of phonological structure targeted in its early application.

This pattern is seen cross-linguistically. It is seen in (1) and (2) above, where one segment is completely removed from the output within the first phono-syntactic cycle, but the resolution strategies in a second cycle preserve (at least some aspect of) the segments in question. I will demonstrate that this pattern also occurs in hiatus resolution in Berber and European Portuguese, and NC-cluster resolution in Malagasy, among others. The following hierarchy indicates a scale of destructiveness in phonological operations that holds cross-linguistically, and can be defined in relation to the PhSG:

(5) deletion>coalescence>glide formation~assimilation~co-articulation
>epenthesis>no resolution

Demonstrating how (5) is encoded is central to the current analysis, and has implications for the definition of phonological rules. There is nothing in current theoretical phonological frameworks (rule or constraint based) that predict a sensitivity to (5), save structural relations in general (Feature geometry, syllabification, etc) which are all based on the set-subset relation.

The existence of multiple resolution strategies for a single phenomenon within a single language raises the question of whether the language contains a single rule that applies differently depending on its timing of application, or whether the language contains two rules to accomplish the same repair. For example, in Ojibwa, is the hiatus resolution rule as in (6) (see data in (2)), or are (6a) and (6b) two separate rules in the language?

(6) Hiatus Resolution Rule: *VV
Sub-clauses: (a) deletion (b) epenthesis

It will be argued that patterns like those seen herein indicate that resolution is accomplished by a single rule that is governed by PP and the PhSG. If this were not the case, we would predict any possible pattern of language internal resolution, including those that contravene (5). The problems that arise in the implementation this proposal will be argued to have important implications for phonological theory.

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Cyclically Conditioned Prosodic Constituency in Gyalsumdo and beyond
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Background This paper puts forward a new approach to the phonology-syntax interface, on the basis of data from the Gyalsumdo language, a largely undocumented Tibetan language of Nepal. Recent work in the phonology-syntax interface can be divided into two main approaches, which may be called the 'cyclic' approach and the 'prosodic' approach. 'Cyclic' approaches tend to assume a relatively 'flat' phonological structure (Pak 2008, Scheer 2008 D'Alessandro and Scheer forthc.), attributing the role traditionally played by higher prosodic constituents in defining phonological locality domains to *phase* domains created by cyclic syntactic SPELLOUT (Chomsky 2000, 2001). 'Prosodic' approaches, on the other hand, retain the traditional prosodic hierarchy of Nespor and Vogel (1986) (albeit somewhat modified – see e.g. Ito and Mester 2013) and define locality domains for phonological processes in terms of prosodic constituents. These approaches also tend to take the complete syntactic derivation as the input to mapping processes, meaning that any role of the cyclic domains of syntax in delimiting these locality domains must be independently stipulated, for instance by violable OT constraints which map phase domains to prosodic constituents (see e.g. Selkirk 2009, 2011, Cheng and Downing forthc.).

Proposal I propose an alternative to these two approaches, and adopt a framework where prosodic constituents do delineate locality domains for phonological processes, but where these constituents are built up cyclically. Although prosodic constituents under this approach do are conditioned by the syntactic cycle, they need not be precisely isomorphic to phase domains. As an example I consider the structure of lexical category items (henceforth LCIs) items in Gyalsumdo. Gyalsumdo nouns and adjectives are, in general (and universally in the case of adjectives) bipartite, consisting of a root and a categoriser:

(1)	*Nouns*	*Adjectives*
	tá-bu 'horse'	k^{hj}ág-bu 'cold'
	√*horse*-NMZ	√*cold*-ADJ
	ʤà-mu 'chicken'	kól-ma 'hot'
	√*bird*- NMZ	√*boil*-ADJ

These items are suggestive of the structure of lexical items assumed by Distributed Morphology accounts of word-structure, under which all LCIs are assumed to be bipartite, containing a root and a categorising functional head, which are combined during the course of the syntactic derivation (Marantz 1997 et. seq.) These are argued to constitute syntactic *phases* (Marantz 2001, Marvin 2002 et. seq.), with the categoriser acting as phase *head*. This kind of structure presents a challenge to the 'cyclic' approaches discussed above – if these bipartite items constitute a phase, then the root constitutes phase *domain*. If phonological locality domains correspond directly to phase domains, we expect the root and its categoriser to stand in different locality domains for the purposes of phonological processes. However, this is not the case: returning to the Gyalsumdo examples above, the root and categoriser not only fall into the same locality domain (ɸ) for the purposes of a tone deletion process, but also form a smaller locality domain (ϖ) for the purposes of metrification, to the exclusion of subsequent elements of the tone-deletion domain.

(2)	($_ɸ$ ($_ϖ$ bì-dza)	daŋ)	($_ɸ$ ($_ϖ$ bò-mo)	go	la)
	√*boy*- NMZ	and	√*girl*-NMZ	DEF	DAT

This problem is solved if we propose that there are prosodic constituents constructed in a cylic manner which may extend beyond the phase domain. I assume (with e.g. Arregi and Nevins 2012) that there exist processes (such as linearisation processes) which apply before the operation of Vocabulary Insertion. We can observe that such operations may apply to the phase *edge* (including the head) without effecting its role as a syntactic escape hatch. I propose that *prosodification* is one of these processes, and that it applies cyclically to the whole phase, including the edge, and not just the phase *domain*. This allows us to construct prosodic constituents which (for instance) contain both the root and the categoriser of LCIs. We can refine this analysis by considering the conditions under which a constituent constructed in one phase may be modified in the next. I propose that the application of VI divides a constituent into two: an *interior*, which undergoes VI and may not be modified by cyclic operations in subsequent phases, and an *exterior*, which does not undergo VI, and is modifiable. This accounts for the distribution of tone deletion domains in Gyalsumdo – the categoriser at the right edge of a LCI lies in the *exterior* of the domain, and so the domain may be modified at this edge. The root at the left edge constitutes the *interior*, so this edge is fixed. This account explains the fact (exemplified by (2)) that roots always stand at the left edge of any phonological domain in Gyalsumdo. The processes are outlined as follows:

(3) *Cyclic Construction of Constituents*

Inner Phase:	Input:	[$_{nP}$ √*girl*	n]			
	Output:	($_{\phi}$ *bò*	n)		[interior of ϕ italicised]	
Outer Phase:	Input:	[($_{\phi}$ *bò*	n)	D	K]	
	Output:	($_{\phi}$ *bò*	*mo*	*go*	[la])	'to the girl'

The approach adopted here allows us to explain two cross-linguistic observations without further stipulation: the generalisation which Truckenbrodt (1999) calls the *Lexical Category Condition*: that prosodic alignment must make reference to LCIs but not functional items. It also allows us to capture a generalisation that is observed but not explained by Nespor and Vogel (1986) – that phonological phrases tend to only contain functional items on the 'recursive' side of a given lexical item – that is, on the right in head-final languages and the left in head-initial languages. This follows in our framework from the direction of linearization of the phase head relative to the phase domain – the modifiable exterior is always on the same side of the domain as the categorising phase head.

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Kevin M. Ryan

Weak triggers and gang effects in Sanskrit retroflex harmony

Sanskrit exhibits a consonant harmony process called *nati* by which retroflexion spreads progressively and at any distance from a retroflex continuant trigger to a coronal nasal target (e.g. 1a–b) unless a consonantal coronal intervenes to block it (1c).

(1)	(a)	√ɻaːg^{ɦ}aʋ-eːna	→ [ɻaːg^{ɦ}aʋ-eːɳa]
	(b)	√ɻug-na	→ [ɻug-ɳa]
	(c)	√ɻat^{h}-eːna	→ [ɻat^{h}-eːna]

The core facts of *nati* have been described and analyzed numerous times since antiquity (OT treatments include Steriade 1995, Ní Chiosáin & Padgett 1997/2001, Gafos 1999, Hansson 2010, Jurgec 2011). The present paper revisits the primary data (a two-million-word corpus of Vedic and Epic Sanskrit) to document and analyze two previously unrecognized (including by the grammars) morpho-prosodic conditions on *nati*. Both reveal prefixes to be weak triggers in the sense that a prefix trigger has access to a proper subset of the targets accessible to a non-prefix trigger. Specifically, a prefix trigger almost never accesses a target immediately following a plosive or immediately preceding a retroflex interval (VC$_0$), while a post-prefix trigger almost always does.

Consider the first generalization, which concerns post-plosive targets. If the trigger occupies the root-suffix complex, such targets always undergo *nati*, as exemplified in (2).[1] Furthermore, a trigger-containing prefix such as [pɻa-] normally reaches a target in the root-suffix complex, as in (3). As (4) illustrates, however, *nati* fails whenever both the target is post-plosive and the trigger occupies a prefix. This failure cannot be attributed to the particular prefix or suffix involved, nor to phonological distance.

(2)	(a)	[√gɻ̩b^{ɦ}-ɳV-]	'grasp (pres. stem)'	(v48 vs. 0)
	(b)	[√ɻug-ɳá-]	'break (pass. part.)'	(v2 e40 vs. 0)
	(c)	[√ʋɻ̩k-ɳá-]	'cut off (pass. part.)'	(v18 e2 vs. 0)
	(d)	[√ɻéːkɳas]	'inheritance'	(v14 vs. 0)
(3)	(a)	[pɻ̩-√aːp-aɳa]	'attaining'	(v1 e5 vs. 0)
	(b)	[pɻ̩-√aːp-aɳiːja]	'to be attained'	(e2 vs. 0)
	(c)	[pɻa-√ɦi-ɳV-]	'incites (pres. stem)'	(v2 e2 vs. 0)
	(d)	[pɻ̩-aː-√ɦi-ɳoː-t]	'incited (3s impf.)'	(e82 vs. 0)
	(e)	[pɻa-√miːɳ-aː-ti]	'frustrates (3s)'	(v5 vs. 0)
(4)	(a)	[pɻ̩-√aːp-nV-]	'attain (pres. stem)'	(v27 e380 vs. 0)
	(b)	[pɻa-√g^{ɦ}n-an-ti]	'kill (3pl)'	(v4 vs. 0)
	(c)	[pɻa-√b^{ɦ}ag-na]	'break (pass. part.)'	(v1 e72 vs. 0)

Both cases are analyzed in Harmonic Grammar through the 'ganging up' of the relevant independently motivated markedness constraint (*Tɳ or OCP) with CrispEdge (e.g. Ito & Mester 1999, Selkirk 2011), which in this case penalizes spreading across the

[1] For corpus counts, 'v' = Vedic, 'e' = Epic, and 'vs. 0' makes explicit that no counterexample is found in the corpus. The paper includes comprehensive statistics for all relevant forms.

left edge of a root. A simplified illustration follows, using '*nati*' as a placeholder for the harmony-inducing constraint.[2] In (5), harmony spreads from a root to an immediately post-plosive target. In (6), harmony spreads from a prefix to a target in the root-suffix complex. In (7), however, in which both the target is post-plosive and a root boundary must be breached, *Tɳ and CrispEdge collectively outweigh *nati*, and harmony fails.

(5)

		√ɻug-na	$\mathscr{H}$	*nati* 3	*Tɳ 2	CrispEdge 2
a.	☞	√ɻug-ɳa	-2		-1	
b.		√ɻug-na	-3	-1		

(6)

		pɻa-√ɦi-noː-ti	$\mathscr{H}$	*nati* 3	*Tɳ 2	CrispEdge 2
a.	☞	pɻa-√ɦi-ɳoː-ti	-2			-1
b.		pɻa-√ɦi-noː-ti	-3	-1		

(7)

		pɻa-√aːp-noː-ti	$\mathscr{H}$	*nati* 3	*Tɳ 2	CrispEdge 2
a.		pɻ-√aːp-ɳoː-ti	-4		-1	-1
b.	☞	pɻ-√aːp-noː-ti	-3	-1		

An Optimality Theory analysis of these facts would require a conjoined (or similarly multi-predicate) constraint, which entails both a loss of generalization and certain empirical problems concerning locality (cf. Pater 2009). For one, such a constraint (necessarily local to the word) erroneously rules out harmony even when the violations of *Tɳ and CrispEdge come from different domains of harmony within the same word. An analysis set in Serial OT (McCarthy 2009, 2011) has the same issues.

A classical Serial HG analysis is also untenable. The issue, in brief, is that the critical violations of the two constraints needed for the gang effect come from separate steps in the derivation. The domain of harmony first spreads across the root boundary unaware of the plosive-target cluster lying in its path. In a later step, when the domain reaches the target, all of the candidates available violate CrispEdge, so the grammar has no choice but to harmonize, as it would if harmony were root-initiated.

That said, Serial HG augmented by non-local dependency constraints can handle the gang effect properly. Here, a proposal by Mullin (2011) (see also Walker 2014), namely, *Dependent-Head(W), is extended to morphological or junctural structure for this purpose. This constraint effectively allows the serial HG grammar to refer back to the origin (head) of harmony at every step to determine whether it is prefix-initiated. Empowering serial HG with such non-myopia, however, introduces certain pathologies. Relevant pathologies of classical HG are also discussed. The purpose of this paper, then, is not to advocate for a particular harmony constraint, but rather to bring to light new locality problems concerning a well-known harmony system and to argue for an analysis of them in terms of the ganging up of independently motivated markedness constraints against harmony, whatever its mechanism.

[2]In the full analyses, ∀-Harmony (Walker 2014) is employed in non-serial frameworks and Share (McCarthy 2009) in serial ones, though nothing critical here hinges on this choice.

Pre-Classical Prevarication in Latin Feet: Stratal synchronic structure and discretionary diachronic development

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The insights of both *stratal* and *optimality-theoretic* aspects of Stratal OT (e.g. Bermúdez-Otero 2006) make significant progress towards illuminating the nearly 150-year-old problem of 'iambic shortening' in Latin (light-heavy = LH → light-light = LL, where H is heavy by either vowel length or closure). The philological tradition (e.g. Müller 1869, Lindsay 1894, Drexler 1969, Questa 2007, Fortson 2008) focuses upon the likelihood of this optional early Latin phenomenon occurring in different locations within the verse line – considering rhythmical, morphosyntactic, and pragmatic factors with impressive results – but the precise synchronic metrical conditions of the process are not a concern. Conversely, the phonological tradition has identified necessary structural conditions, but a metrical structure sufficient to account for all sub-types of the phenomenon remains elusive, e.g. Mester (1994) and Prince & Smolensky ((1993)2004) do not attempt to cover the phrasal data, and Jacobs (2003), despite recognising required constraints, contains inaccuracies (e.g. the conflation of chronologically disparate phenomena) and ensuing analytical difficulties. A major problem remains that the same single-level phonology cannot account for both iambic shortening and the correct assignment of the well-known (ante)penultimate Latin word stress.

A solution emerges from the observations that (1) iambic shortening (e.g. *lé<u>go:</u>* → *lé<u>go</u>* 'I choose') may occur across certain word boundaries (e.g. <u>*se.d ŏs*</u>*.ten.de.re* 'but to show') and is sensitive to sentence stress (occurring only in unstressed elements, commonly function words; Fortson 2008: 177), and that (2) cretic shortening (e.g. *dícito:* → *dí:cito* 'let him say') and word-initial iambic shortening (e.g. *voluptá:tem* → *volŭptá:tem* 'desire (acc.)' only *before a stressed syllable*) must, we demonstrate for Latin (*contra* Prince & Smolensky 1993: 69-71), be triggered after lexical stress has been assigned. They are *post-lexical* developments which (i) are sensitive to stress clashes at the word level (CLASH » WSP), (ii) retain word-level metrical structure assigning primary stress at the phrase level (MAX-FOOTHEAD, FTBIN » PARSE-σ, WSP), and (iii) place greater emphasis on parsing syllables into feet and avoiding non-head heavy syllables at the phrase level, repairing by lightening (PARSE-σ, WSP » NONF » MAX-μ). We present new Optimality-Theoretic analyses, crucially different from earlier attempts to ensure correct stress assignment and the restriction of shortening to accurate contexts, where the interaction of the same constraints differs at word-level (NONF » FTBIN, CLASH, MAX-μ » WSP » PARSE-σ) and phrase-level (MAX-FTHD, FTBIN, » PARSE-σ, WSP » NONF, CLASH, MAX-μ).

Furthermore, we demonstrate that the shortenings are sensitive not only to stratal computational procedure, but also prosodic representational structure (a distinction discussed by Bermúdez-Otero & Luís 2009). Iambic shortening occurs in words *within a* *phonological phrase* which do not bear sentence stress, e.g. *(quo.d ăc).(ce:).(pis).(ti:)* 'that you received' (Plautus *Trinummus* 964), and never when followed by a 'full word boundary', as at the end of a clause, where the phrase conceivably bore main stress (Fortson 2008: 187). The influence of morphosyntax on phonological phrase formation – such as focus-marking, MATCH/ALIGN (XP, φ) (e.g. Truckenbrodt 2007, Selkirk 2011) – explains the philologists' observations on the sensitivity of iambic shortening to syntax/discourse-structure, e.g. focused elements do not undergo shortening as they bear sentence stress.

Finally, in the later period of classical Latin, productive iambic shortening is mostly restricted to single disyllabic words, becoming lexicalised in a handful of items (e.g. *bene:* > *bene* 'well'). The shrinking of the relevant domain (phrase → word) is precisely the prediction of Stratal OT's model of the life-cycle of phonological processes, where low-level phonetic effects may become phonologised at the phrase-level, then word-level and stem-level, and ultimately lexicalised (e.g. Bermúdez-Otero 2006).

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Surface bases and Lexical Conservatism - The case of the Serbo-Croatian -*ova*-

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Serbo-Croatian (henceforth SC) verbalising suffix -*ova*- covers a variety of functions, from the derivation of denominal verbs to the integration of loanwords. Interestingly, while both its prosody and its productivity have changed over the past 150 years (for which descriptions of standard SC prosody are available), one striking generalisation seems to hold for all the periods and uses: the prosody of -*ova*-verbs shows that the suffix always combines with bases whose surface realisations need to be taken into account. We consider three sets of bases with which -*ova*- has combined throughout its history, in the order of appearance: (1) native nouns, (2) international (mostly Latinate) stems originating from earlier contact with German and French, and (3) English stems originating from the current contact with English.

In order to formalise the way in which the surface prosody of the base gets preserved, the well-established mechanism of Lexical Conservatism (Steriade 1997) will be implemented. LC is a family of constraints which militate against the emergence of allomorphs different from the existing ones.

0. Serbo-Croatian prosody

SC has a pitch-accent system (for a recent overview, see Werle 2009) in which accents are classified as either falling or rising. The falling accents (constrained to the first syllable in native words) are monosyllabic, with both stress and tone on the same syllable. The rising accents (which in principle can surface wherever there is room) are tonal spans over two syllables, with stress on the leftmost syllable of the span. This is why the rising accents are often referred to as 'disyllabic'. While rising spans are generally analysed as the result of the spreading of the underlying H(igh tone)s onto the next syllable to the left, falling accents are considered post-cyclic: they get assigned if no tone is assigned in the derivation. In this presentation, we use capitals to mark H's, so that a single capitalised syllable nucleus in a word means a falling accent (e.g. vOdu 'water.ACC'), whereas multiple capitalised syllable nuclei mean a rising span (e.g. vOdA 'water.NOM'). Stress is not marked, as it is predictably on the leftmost syllable with a H.

1. Native bases

As the very few verbs with non-syllabic bases show, the suffix -*ova*- is itself a carrier of a tonal span, which means that its UR is /ova, H/: *ps-OvAti* 'swear', vaguely related to *ps-A* 'dog.Gen'.

The period in which -*ova*- was prevalently combined with native bases is very well described in the normative literature. In this period, the rule was that, if the base noun has a consistent prosodic pattern in its nominal paradigm, the -*ova*-verb inherits that prosodic pattern. In all cases where the prosody varies across the case forms, the suffix becomes dominant and surfaces with its rising span (Delaš 2013).

(1a)		NomSg	GenSg	LocSg	
vErovati	'believe'	vEr-a	vEr-ee	vEr-i	'belief'
Imenovati	'name'	Im-e	Im-en-a	Im-en-u	'name'
dOrUčkovati	'h. breakfast'	dOrUčak	dOrUčk-a	dOrUčk-u	'breakfast'
(1b)					
darOvAti	'present'	dAAr	dAAra	dAArU	'present'
robOvAti	'be a slave'	rOb	rObA	rObU	'slave'
hajdukOvAti	'be a hajduk'	hAjdUUk	hajdUUkA	hajdUUkU	'hajduk'

Our analysis of the implementation of this rule in the normative literature (most importantly the accent marks in recent dictionaries, e.g. Nikolić 2000) shows that the speakers/authors tend to consider the singular forms only (cf. *im-En-A* 'name.NOM.PL').

Formalising these facts, we show how LC needs to be taken into account in determining whether a noun can serve as a dominant base.

One important feature of the picture just described is that there are no cases in which the prosody of the base "crosses into the suffix" – either the base or the suffix have all the H's in the word. This regularity holds throughout the periods we observe.

2. International bases – *-ova-* becomes pre-accenting

In the intense contact with European *Kultursprachen* – most importantly French and German in the 19th and 20th century, *-ova-* was one of the loanword integration verbalisers (the other two being the ever accented borrowed suffixes *-ira-* and *-isa-*). Since the source verbs (mostly French verbs in *-er* and *-ir* and German verbs in *-ieren*) generally had no prosodic contrast/prominence to preserve, *-ova-* developed a default prosodic shape which can be analysed as an H associated with the final syllable of the base (as illustrated in 2).

(2)				(3)			
a.	σ	rImovati	'rhyme'	a.	σ	lOgovati	'log'
b.	σσ	dIrIgovati	'conduct'	b.	ˈσσ	EdItovati	'edit'
c.	σσσ	dezInfIkovati	'disinfect'	c.	σˈσ	rikvEstovati	'request'

These international verbs outnumber the verbs with native bases in modern Eastern SC many times over. This may be a reason why, in actual usage, the prosodic shape in (1a) has virtually vanished and the verbs have been assimilated into the default type in (2). Moreover, even the type *Imenovati* (1b) is often transformed into the default-conforming *ImEnovati*. There is only a dozen of native nouns which consistently have a stable prosodic pattern different from the new default (e.g. *lOOgorovati* 'camp', related to *lOOgor* 'camp'). Not surprisingly, all of these satisfy the LC condition on a single prosodic allomorph in the nominal paradigm perfectly.

3. English verbs – LC all over again

The current contact with English, in which *-ova-* is the default verbaliser (in Eastern SC, see Simonović & Samardžić 2014), generally allows the replication of the original stress position. This is why stem shapes have been introduced which are banned in native words – those with a falling accent on a non-initial syllable (3c). The class displaying this shape also shows the limitations of LC: it is confined to the stems 'sponsored' by an actual English verbal stem. On the other hand, if the same prosodic shape is created by the concatenation of an accentless prefix and a verb – *iz+lOgovati* – a rising span is created automatically and the stress is shifted: *IzlOgovati*, **izlOgovati* 'log out'.

4. LC is "demand-sensitive"

The analysis of the position of the *-ova*-verbs in the SC verbal system shows that, throughout the periods considered, the *-ova*-verbs need a surface sponsor in order to encode any kind of prosodic contrast; otherwise they display the default, which has changed from the pattern in (1b) to that in (2). More importantly, a formalisation of the LC requirements in each case shows that prosodic information which LC preserves is dependent on which contrasts the bases in question display. This in turn explains why, while SC prosody has generally remained unaltered, the suffix which is mostly dependent on surface forms for its bases, has shifted both its underlying/default prosody and the conditions under which it protects the prosody of its base.

This case study will provide a background against which the relationship between the two types of correspondences – input-output and surface correspondences – will be discussed. We shall also turn to the methodological issues which a strict distinction between the two raises for the theory of phonological representations, especially in the context of the lexicon in contact.

Closed Syllable Vowel Laxing: a strategy to enhance coda consonant place contrasts - Benjamin Storme (MIT)

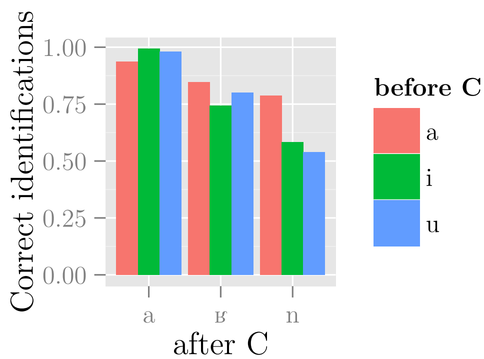
Background. Closed Syllable Vowel Laxing (CSVL) describes a common pattern of allophonic distribution where tense vowels are laxed in closed syllables (e.g., French *nous votons* /votɔ̃/ "we vote", with tense /o/ in open syllable and *il vote* /vɔt/ "he votes", with lax /ɔ/ in closed syllable). CSVL has been argued to be driven by the effect of syllable structure on vowel duration and the relationship between vowel quality and duration in tense and lax vowels. For instance, Féry (2003) builds her account of CVSL in French on the following assumptions: tense vowels are inherently long, lax vowels are inherently short; closed syllables do not allow long vocalic nuclei, open syllables do not allow short ones. Put together, these hypotheses derive the allophonic, syllable-conditioned distribution of tense and lax vowels (French /votɔ̃/-*/vɔtɔ̃/ and /vɔt/-*/vot/).

Acoustic experiment. This account predicts that if a language has tense and lax vowels in complementary distribution in open and closed syllables, then there should be a significant durational difference between the two series of vowels in this language. I present results of an acoustic experiment showing that this prediction is not borne out. The language used as a test case is a variety of Southern French spoken in Auvergne. Southern French has been argued to be a case of CSVL (Lyche 2003): tense vowels /eøo/ occur in open syllables only and lax vowels /ɛœɔ/ in closed syllables almost exclusively (open syllables followed by schwa pattern with closed syllables). Six male speakers of Auvergne French were recorded pronouncing nonce words with vowels /iyueøoa/ in unstressed and stressed open syllables, and nonce words with vowels /iyuɛœɔa/ in unstressed and stressed closed syllables. Linear mixed effects models were fit to the acoustic data. The mid vowels were found to be significantly lower in closed than in open syllables as compared to the high and low vowels ($\chi^2(9) = 77.7$, $p < 0.001$). These results support the claim that the distribution of mid vowels in this variety of French is a case of CSVL. However, the tense mid vowels were not found to be significantly longer than the lax ones ($\chi^2(1) = 0.79$, $p = 0.37$), contrary to the prediction of the duration-based account of CSVL.

Height-based account. I propose an alternative analysis of CSVL where the relationship between vowel quality and syllable structure is not derived via duration, but via the role of vowel height in the perceptibility of consonant place contrasts. I propose that vowel lowering in closed syllables (e.g., /i/→/ɪ/, /e/→/ɛ/, etc...) is used as a repair to avoid having a sequence of a higher vowel followed by a coda consonant. Having a coda consonant preceded by a higher vowel would result in poorer identification of the coda consonant place. There is evidence that place contrasts are better identified between low vowels than between high vowels (Benoit et alii 1994) and after low vowels than after high ones in word final positions (Marty 2012). It remains to be shown whether place contrasts are less perceptible (i) in medial coda positions after high than low vowels (e.g., /i{p,t,k}na/ vs /a{p,t,k}na/) and (ii) in medial coda positions than in medial onset clusters after high vowels (e.g., /i{p,t,k}na/ vs /i{p,t,k}ʁa/).

Perception experiment. To test the predictions of the height-based account of CSVL, an online perception experiment with 13 French hearers was run. 27 nonce words of the form /as{a,i,u}{p,t,k}{a,ʁa,na}/ were recorded by a French speaker, with 4 repetitions for each word. The words were embedded in a carrier sentence and played to participants with a background noise with a signal-to-noise ratio of 5 dB. The percentage of correct place identifications across speakers as a function of the preceding vowel and the following context is plotted below. A mixed effects logistic regression was run. As predicted under the height-based account of CSVL, the quality of consonant place contrasts was found to be the worst in coda positions preceded by high vowels /i/ and /u/ ($p < 0.001$).

Analysis of CSVL in Meridional French. The allophonic distribution of tense and lax vowels in Meridional French is modeled with perceptual constraints in an OT framework (see Flemming 2004). Vowel laxing in closed syllables results from the interaction of vowel dispersion constraints and a constraint requiring that vowels be lowered before coda consonants lacking clear burst or good release transitions (see *PoorlyCuedC below).



(1) *PoorlyCuedC: Penalize a vowel preceding a consonant C lacking a clear burst or good release transitions proportionally to its height: assign 4 * to high vowels (eg. /i/), 3 * to lax high vowels (eg. /ɪ/), 2 * to tense mid vowels (eg. /e/), 1 * to open mid vowels (eg. /ɛ/) and 0 * to low vowels (eg. /a/).

The inventory /ieøaou/ with tense mid vowels incurs 3 more violations of *PoorlyCuedC in closed syllables than the inventory /iɛœaɔu/ with lax mid vowels, and hence is dispreferred in this context. To derive the inventory with tense mid vowels in open syllables, I propose a ranking of OT constraints deriving a default preference for good vowel dispersion along F2: the higher mid vowels /eøo/ are more dispersed along F2 than the lower ones /ɛœɔ/ (as shown in the acoustic experiment), and then should be more distinct from each other. When the following consonant lacks a clear burst or good release transitions, this default preference is overriden by *PoorlyCuedC and mid vowels are lowered. The final challenge is to understand why CSVL does not apply across the board in Meridional French (high vowels do not have lax counterparts). From a dispersion-theoretic perspective (Lindblom 1990), maintaining some tense vowels in closed syllables could be a way not to compromise dispersion along F2 too much. This might be particularly important for a language like French which has both front rounded and unrounded vowels. From a quantal-theoretic perspective (Stevens 1989), maintaining high vowels /i,y,u/ in closed syllables could be motivated by the need to maximize the number of acoustically stable vowels across contexts. More research on the typology of partial CSVL is needed in order to decide between these explanations.

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Pre- and postaspiration: Faroese and GP 2.0

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Preaspiration of stops is mostly known through Icelandic where /pp, tt, kk/ are realized [hp, ht, hk] and /pl, pn, tl, tn, kl, kn/ surface as [hpl, hpn, htl, htn, hkl, hkn] (Rögnvalsson 1990, Keer 1998, Árnason 2011). Faroese, Icelandic's closest sister language, also displays preaspiration and it affects the same segments: voiceless stops when they are phonologically long (1a) or in clusters with sonorants (1b) (Lockwood 1964, Braunmüller 2007, Thráinsson et al. 2012, Adams & Peterson 2014).

(1) *Preaspiration of geminate stops and /stops+sonorants/ clusters in Faroese*

(a)	/knappʊɹ/	[kʰnaʰpːʊɹ]	*button* NOM.	(b)	/vɔpn/	[vɔʰpn̥]	*weapon*
	/lappɪ/	[laʰpːɪ]	*rag* NOM.		/deplaɹ/	[d̥eːʰplaɹ]	*point* PL.
	/stappɪ/	[staʰpːɪ]	*stuff* PRES. 1PS.		/fatla/	[faʰtla]	*put in a sling* INF.
	/dɛtt/	[tɛʰtː]	*dead* NEUT.		/vatn/	[vaʰtn̥]	*water*
	/grɔtt/	[grɔʰtː]	*grey* NEUT.		/ɹɪtma/	[ɹɪʰtma]	*rhythm*
	/ɔtta/	[ɔʰtːa]	*eight*		/lʊitlɪ/	[lʊiʰtlɪ]	*little one* MASC.
	/takka/	[tʰaʰkːa]	*thank* INF.		/sɔknɪɹ/	[sɔʰknɪɹ]	*sunk* MASC. GEN. PL.
	/sœkʊɹ/	[sœʰkʊɹ]	*sink* PRES. 3PS.		/jøklaɹ/	[jøʰklaɹ]	*glacier* PL.

Note that preaspiration in both languages is not exactly alike: as shown in (1a), Faroese geminates are preaspirated and phonetically long, while in Icelandic preaspiration blocks consonantal length. Both Nordic preaspirations seem different phonetically (Thráinsson et al. 2012:48), which is why they are not transcribed the same way ([hC] vs. [ʰC]). The discrepancy between Icelandic and Faroese preaspiration is also observed in the environments where it appears. In Faroese, it is possible to meet preaspiration where we find underlying intervocalic voiceless singletons (Thráinsson et al. 2012:49).

(2) *Preaspiration of intervocalic singletons in Faroese*

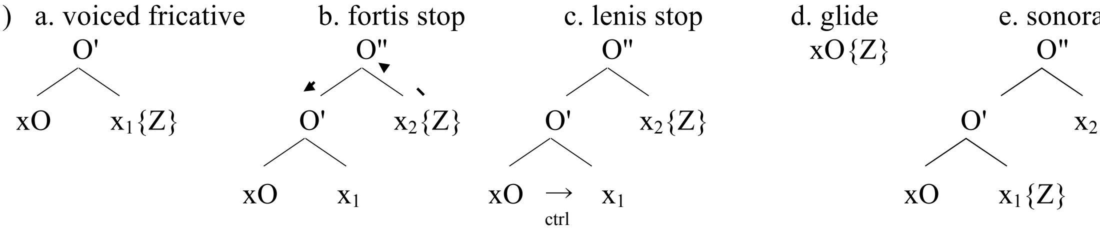
(a)	[ɛaːʰpa]	*ape*	*apa*	(b)	[kʰvʊiːd̥ʊɹ]	*white* MASC.	*hvítur*
	[d̥ɹeːʰpa]	*kill* INF.	*drepa*		[kʰɹʉuːb̥a]	*kneel* INF.	*krúpa*
	[oːʰpɪn]	*open*	*opin*		[ɹaiːd̥a]	*irritate* INF.	*reita*
	[pʰɔaːʰpɪ]	*dad*	*pápi*		[ɹɔub̥a]	*cry* INF.	*rópa*
	[b̥ɔaːʰtʊɹ]	*boat* NOM.	*bátur*		[luːd̥ʊɹ]	*thing*	*lutur*
	[eːʰta]	*eat* INF.	*eta*		[nʊiːd̥a]	*use* INF.	*nýta*
	[hɛaːʰtɪ]	*hate* PRES. 1PS.	*hati*		[ɹɔuːd̥ɪn]	*root* DEF.	*rótin*
	[staːʰtʊɹ]	*state*	*statur*		[siːd̥a]	*sit* INF.	*sita*
	[fɹeːʰkʊɹ]	*greedy* MASC.	*frekur*		[lʊiːg̊ʊɹ]	*similar* MQSC.	*líkur*
	[lɛaːkʊɹ]	*bad* MASC.	*lakur*		[mjʉuːg̊ʊɹ]	*soft* MQSC.	*mjúkur*
	[ɹeːʰka]	*drive* INF.	*reka*				
	[vɛaːʰkʊɹ]	*beautiful* MASC. SG.	*vakur*				

This context is widely neglected in the literature about Faroese and Nordic languages in general. In this presentation, we aim to investigate this particular environment. Finding the correlation between preaspiration and vocalic identity will help us identify the exact requirement for the occurrence of this phenomenon and it will also lead us to a better understanding of what preaspirated segments are.

As pointed out in (2), the quality of V_1 plays a role in the distribution of preaspiration in this particular context: preaspiration occurs on singletons after long (middle)-low vowels only (1a) – if the stop is adjacent to a high vowel then the lenis version of the stops surfaces (2b).

In order to illustrate the configuration of (preaspirated) segments and their interactions, we situate our analysis in the GP 2.0 framework, as developed in Pöchtrager (2006) and in Pöchtrager & Živanović (2010). This approach fits in the perspective introduced by Jensen (1994), aiming at the reduction of the number of phonological primes (see also Brandão de Carvalho, 2002) in the Element Theory framework (KLV, 1988; Scheer, 1996; Backley, 2011). Consequently, some properties are no longer represented with elements but with structure.

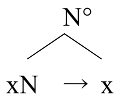
(3) a. voiced fricative b. fortis stop c. lenis stop d. glide e. sonorant



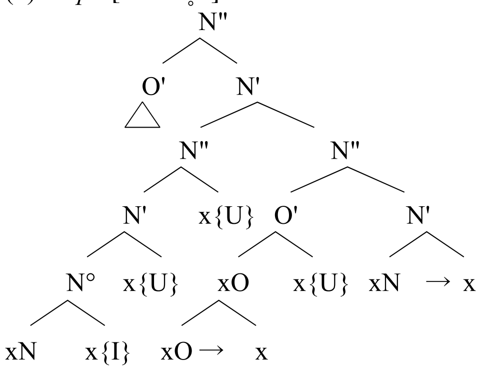
In this model, stops have a more complex structure than fricatives, i.e. they have an extra level of

projection. Glides do not contain any projection. Sonorants are the only segments where the material is associated to the lowest x of the structure. Fortis and lenis are distinguished by the number of positions that they use for their interpretation: while fortis express their content in two spots of the structure, lenis need only one node. Arrows in (3b) represent the melodic interpretation command, also called *m-command*: the prime {Z} associated to the commander (x_2) is interpreted at two places in the structure (x_2 and the projection below O'). Conversely, when an unannotated non-head terminal is controlled ($\rightarrow_{ctrl}$), it does not receive any interpretation. <h, ʔ, H> are now excluded from our prime inventory - only melodic primes remain.
We claim that preaspirated stops, which also count as fortis, need two slots to express – the distinction is made on the location of this extra space: while postaspirated occupy two nodes of their own structure, preaspirated expand to the preceding nucleus to find the extra space they need. In other words, it has to expand its own maximal projection. This slot is however not available in every vowel: those which contain {A} ([ɛaː, eː, oː, ɔaː, aː] do, while those which consist of {I/U} only ([ʊiː, ʉuː, ɔuː, aɪː, iː]) don't. Following Pöchtrager & Živanović (2010), we assume that the prime {A} should also be replaced by structure: namely a nuclear projection with no content at all but a control relation, as illustrated in (4). The non-head node being unannotated, it can receive the interpretation of another segment from the chain: in (6) it serves to the expression of the following onset.

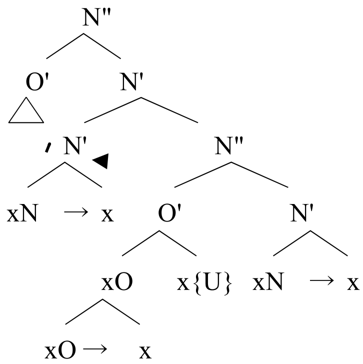
(4) [aː]



(5) *krúpa* [kʰɹʉuːb̥a]



(6) *statur* [staːʰtʊɹ]



Vocalic length however does not seem relevant for our concern – the quality of V_1 is already a sufficient condition. The length of the preceding vowel looks much more like a consequence than a cause of preaspiration. Vocalic length is positionally determined in Faroese (a vowel is long iff it is stressed and followed by no more than one consonant, see Thráinsson et al. 2012:30) – in similar cases as the one in (6), preaspirated stops, even though they occupy several spots, are singletons. Nothing stands in the way of lengthening here.
Some examples of preaspiration following a high vowel are given in (1b). All these cases show that when there is a sonorant at the right of the stop, preaspiration always occurs with no consideration for the vowel quality. This leads to the hypothesis that sonorants have an empty space in their structure (Pöchtrager 2006:86f), allowing the stop to expand and hence to preaspirate.
We will demonstrate the whole mechanism of preaspiration and explore the formal properties and predictions of this approach for the phonology of Faroese.

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Sonority-driven stress in Paiwan: phonological or phonetic factors?

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Sonority-driven stress (de Lacy 2004) or quality-sensitive stress (Kenstowicz 1997), in which vowel sonority/quality affects the location of stress within the metrical domain, can be observed in languages such as Kobon (Davies 1981), Takia (Ross 2002) and many others. The analyses of this stress type are mostly built on phonological grounds, involving metrical peak- or trough-specific constraints (Kenstowicz 1997, de Lacy 2004); however, Hargus (2001) considers such stress to be conditioned by phonetic factors, mainly durational difference of vowels. This paper investigates the sonority-driven stress pattern in Paiwan, and shows that peak-specific phonological constraints decide the location of stress; however, when the two vowels in the metrical domain are equally bad, a phonetic constraint sensitive to duration is then activated.

Paiwan is an Austronesian language spoken in the southern mountainous area of Taiwan. The data in this study are collected from two village dialects of Paiwan, Piuma and Kazangiljan, which differ from most Paiwan dialects in the assignment of stress. Stress in Piuma (Chen 2006) and Kazangiljan Paiwan favors peripheral vowels [i u a] over central schwa [ə] within the two syllables at the right edge, while stress in most Paiwan dialects is regularly penultimate (Ho 1977, Ferrell 1982). For words without the central vowel schwa [ə], the natural, unmarked pattern is penultimate, as shown in (1). Stress shifts to the final syllable when the penultimate nucleus is a schwa and the final one a peripheral vowel, as shown in (2). Stress never seeks out /ə/ if any peripheral vowel /i u a/ is available. Strangely, stress falls on the ultima when identical schwas occur within the domain such as *CəCə́C*, as shown in (3), whereas the unmarked penult stress is assigned when identical peripheral vowels appear in the domain, as in (4).

In an Optimality-Theoretic account, a fixed hierarchy of peak-specific constraints referring to the peripheral/central distinction (Kenstowicz 1997, de Lacy 2004) are employed, e.g. *PEAK/*ə* >> *PEAK/ *i, u, a*, showing that stress prefers peripheral vowels over schwa in the foot. When no central vowel schwa is involved, penultimate stress is the most unmarked pattern. The constraint ranking so far works: ALL-FT-R, TROCHEE >> *PEAK/*ə* >> FT-BIN, *PEAK/ *i, u, a*. Nevertheless, it fails to account for the occurrence of final stress rather than penultimate stress in words with both schwas. This knot can be disentangled by simply adding a phonological constraint *FT/*ə*, to ban schwas in feet; however, this study suggests a solution based on phonetic grounds—vowel duration. A primary phonetic measurement shows that the duration of a vowel is longer word-finally than that of the identical phoneme in the penultimate syllable, even when the penultimate vowel bears stress. Therefore, a phonetic constraint avoiding stress on a shorter schwa is needed, overriding the unmarked penultimate stress when both vowels in the foot are schwas. To sum up, this study displays the pattern of sonority-driven stress in Piuma and Kazangiljan Paiwan, and provides a possible account which employs both phonological and phonetic constraints. The fixed ranking of peak-specific constraints predicts the preference for stressing peripheral vowels over the central one, and the phonetic constraint favoring final longer schwa overwhelms the unmarked stress pattern in words with two schwas in the foot. Thus, phonological and phonetic factors run parallel in the stress assignment of these two Paiwan dialects.

(1) General penultimate stress

a.	[k**í**.na]	'mother'	e.	[p**á**.naq]	'bow and arrow'
b.	[[ɭ**á**.vu]	'ash'	f.	[sa.v**í**.ki]	'betel nut'
c.	[q**í**.ɭas]	'moon'	g.	[ku.ɭ**á**.vaw]	'rat'
d.	[v**á**.ɭi]	'wind'	h.	[t͡sa.ɭ**í**.ŋa]	'ear'

(2) Final stress with penultimate schwa

a.	[va.kə.ɭ**á**]	'arrow'	c.	[cə.v**ú**s]	'sugarcane'
b.	[kə.r**í**]	'small'	d.	[t͡su.qə. ɭ**áʎ**]	'bone'
e.	[qa.pə.d**ú**]	'gall'	f.	[qə.ʀ**íʎ**]	'sparrow'

(3) Final stress with both schwas

a.	[ɭə.ʎə́t]	'lip'	c.	[t͡sə.kə́**ʎ]**	'spouse'
b.	[və.t͡sə.qə́ɭ]	'short necklace'			

(4) Unmarked penultimate for identical peripheral vowels

a.	[ka.má.ja]	'mango'	c.	[ɭ**ú**.kut͡s]	'bird's nest fern'
b.	[sa.ɭ**í**.ɭim]	'midnight'			

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POLISH PALATALIZATIONS AS ELEMENT ADDITION

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The current paper will argue for an alternative approach to Polish segmental alternations. Polish palatalizations will be treated as an addition of the pieces of autosegmentalrepresentations to the stem-final segments. The contexts for palatalizations will be defined morphologically: the autosegments that undergo addition will be argued to be the result of the translations of the pieces of morpho-syntactic vocabulary into phonological vocabulary. This approach makes particular predictions as to the exponenceof the case-number-gender nodes in Polish nouns and adjectives: since the morphemes that 'induce'palatalizations are rewritten as phonological features, the nodes hosting the said morphemes should be realized by the default exponents. I will show that this prediction is indeed borne out.

The main part of the paper will address the question as to how the relevant pieces ofautosegmental representations are integrated into the stem-final segments to yield the attested outputs of palatalizations. The theory of segmental architecture that will be assumed is Element Theory (Harris 1994, Backley 2011).

(1) presents the Element Theory analysis of the underlying system of Polish consonants.

/p/-{U.ʔ.h} /b/-{U.ʔ.h.L} /f/-{U.h} /v/-{U.h.L}/m/-{U.ʔ.L}

/p^j/-{U.I.ʔ.h} /b^j/-{U.I.ʔ.h.L} /f^j/-{U.I.h} /v^j/-{U.I.h.L} /m^j/-{U.I.ʔ.L}

/t/-{A.ʔ.h} /d/-{A.ʔ.h.L} /s/-{A.h} /z/-{A.h.L} /n/-{A.ʔ.L}

/t͡s/-{A.I.ʔ.h} /d͡z/-{A.I.ʔ.h.L} /ʃ/-{A.I.h} /ʒ/-{A.I.h.L}

/t͡ʃ/-{A.I.ʔ.h} /d͡ʒ/-{A.I.ʔ.h.L} /ɕ/-{A.I.h} /ʑ/ - {A.I.h.L} /ɲ/-{A.I.ʔ.L}

/t͡ɕ/-{A.I.ʔ.h} /d͡ʑ/-{A.I.ʔ.h.L} /x/-{(_).h}

/k/-{(_).ʔ.h} /g/-{(_).ʔ.h.L}

/r/-{A} /l/-{U.I} /w/-{U} /j/-{I}

Following Nasukawa and Backley (2008) I will assume that affricates are plosives with complex specification for the place of articulation. Since Polish has three series of coronal affricates it utilizes three logically possible combinations of elements A and I to represent the affricates. However, Polish uses only three series of coronal fricatives. The dental fricatives /s/ and /z/ will be argued to possess only one resonance element, since only such segments undergo Anterior Palatalization. The laminalpalato-alveolar fricatives /ɕ/ and /ʑ/ must beheaded by element I, as only such segments in Polish may be followed by the close front vowel /i/. Since phonology utilizes asymmetrical relations between elements only if the symmetrical relations have been used, the post-alveolar apical fricatives /ʃ/ and /ʒ/ will be represented as a symmetrical combination of I and A. Consequently, the representation {A.I.h.(L)} will not be utilized by the system at all. I will show that there are two principles which influence the integration of relevant elements into the stem final representations. The first of them is the Mutation Enforcement Principle (MEP) presented in (2a and b):

(2a) If an element E-head is added to an expression containing E-operator, the result is E-head.

$$E + \underline{E} = \underline{E}$$

(2b) If an element E-operator is added to an expression containing E-head, the result is E-operator.

$$\underline{E} + E = E$$

As the added E(lements) are translated morpho-syntactic features,MEP may be viewed as aparticular instantiation of the constraint Realize Morpheme (van Oostendorp 2005, Trommer2008).

The example of the working of MEP is the Spirant Palatalization which turns post-alveolar/ʃ/-{A.I.h} and /ʒ/-{A.I.h.L}into /ɕ/-{A.I.h} and /ʑ/ - {A.I.h.L} by the addition of the I which realizes the Nominative and Vocative of the masculine-personal gender.

The second relevant constraint is the Structure Preservation principle known from the Lexical Phonology and Morphology (Borowsky 1990). The adopted version of the Structure Preservation (SP) is found in (3):

(3) Morpho-phonological element addition may not create phonological expressions and configurations which are not underlying in a given system.

Structure Preservation (SP) is understood here as an inviolable constraint working on the outputs of element addition. If the expression arrived at through addition violates SP, the grammar induces non-ordered repair operations that derive grammatical outputs.

SP is attested in the application of the 2nd Velar Palatalization, where the mappings /k/→/t͡s/ and /g/→/d͡z/ are arrived at by the addition of A.I to velars. The addition of the same combination of elements to the velar fricative /x/ results in the representation {A.I.h}, which is unattested underlyingly and has to be repaired by demoting A to the status of an operator.

The two palatalizations that must be discussed in detail are the 1st Velar Palatalization and Affricate Palatalization. The former turns /k/ into /t͡ʃ/, /g/ into /ʒ/ and /x/ into /ʃ/. The latter changes the dental affricates /t͡s/ and /d͡z/ into /t͡ʃ/ and /ʒ/, respectively. The question that I will address is why the voiceless /k/ and /t͡s/ are mapped onto the voiceless /t͡ʃ/, but the voiced /g/ and /d͡z/ are turned into the continuant /ʒ/ instead of the expected /d͡ʒ/.

I will show that the post-alveolar /d͡ʒ/ is found underlyingly in the native vocabulary onlyin two stems: <dżdż-> /d͡ʒd͡ʒ/ as in *dżdż-ow-nic-a* 'earthworm, nom, sg, fem.', *dżdż-u* 'rain, gen, sg.' *etc.* and <drożdż-> /drɔʒd͡ʒ/ *drożdż-e* 'yeast, nom, pl.'. Consequently, when /g/'s and /d͡z/'s in other contexts are turned into /d͡ʒ/'s the Structure Preservation filter detects the configurations as absent underlyingly and induces repairs which either de-link the ʔ-element or assimilate the preceding spirant to /d͡ʒ/ by a general rule of Spirant Assimilation.

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Exocentric mutation as argument for Genealized Nonlinear Affixation

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Main Claim The existence of exocentric mutation is unexpected given paradigmatic accounts; a prediction that is explicitly formulated as the principle of 'Strict Base Mutation' (=SBM; Alderete, 2001*b*,*a*). It states that affix-triggered mutation can only affect a morphologically more inward base, never a more outward morpheme. In this talk we discuss different types of exocentric mutation in the domain of segmental length and hence extend the typology of existing counterexamples to the SBM principle. We show that exocentric mutation is expected under an analysis assuming that mutation is an epiphenomenon that follows from the affixation of (non-segmental) phonological elements. **Background** According to the SBM, mutation only affects the base of affixation, illustrated in (1). Morpheme-specific phonology triggered by the affixation of specific segmental morphemes or non-concatenative morphology can hence only affect the base to which the morphological category in question is added. The SBM is a central prediction in Transderivational Antifaithfulness Theory (Alderete, 2001*b*,*a*) and also in, for example, the Realize Morpheme-based theory proposed in Kurisu (2001): only a mutation can be demanded that distinguishes the output form from a morphologically less complex base. An autosegmental approach in line with the 'Generalized Nonlinear Affixation' framework assuming that all mutation and non-concatenative morphology is the result of affixation (Lieber, 1987; Bermúdez-Otero, 2012), does not make this prediction. A non-segmental phonological element that is part of the representation for a morpheme is realized via association to higher/lower nodes and these nodes can, in principle, belong to either a following, the same, or a preceding morpheme. Wolf (2005), Wolf (2007), and Apoussidou (2003) discuss counterexamples against the SBM that involve feature mutation (Chukchee and Celtic) and stress (Modern Greek). Extending this typology of 'exocentric mutation', we discuss several cases of length-alternating mutation that are problematic for the SBM. **Exocentric mutation** The distinction between transitive and intransitive verbs in Tamil (Dravidian) involves gemination of either the stem-final consonant (=C) or the initial C of a following suffix (Schiffmann, 1999; Sundaresan and McFadden, 2014). The alternations in (2-a) all involve gemination of the stem-final C in the intransitive form and the allomorph /in/ as past tense marker (there are no voiced geminates in Tamil, hence devoicing is involved). In the forms in (2-b), a different allomorph for the past tense /ndʒ/ can be found and interestingly, gemination now affects this past tense suffix (or any suffix in this position) and not a stem C. (Compounding in Malayalam (Mohanan and Mohanan, 1984; Mohanan, 1989; Asher and Kumari, 1997) can be analysed as a similar case where gemination affects either the last C of the first part of the compound or the first C of the second part of the compound.)

(1) *Strict Base Mutation*

Prf$_2$– [Prf$_1$– [**Stem**] –Suf$_1$] –Suf$_2$

(2) *Gemination in Tamil (Sundaresan and McFadden, 2014, 2+3)*

	Trans.Stem	Pst		Intr.Stem	Pst	
a.	uu**d**(u)$_{epenth}$	uu**d**-in-	'blow'	uu**tt**(u)$_{epenth}$	uu**tt**-in	'pour'
	tirum**b**(u)$_{epenth}$	tirum**b**-in-	'return'	tiru**pp**(u)$_{epenth}$	tiru**pp**-in-	'return'
b.	oɖæ	oɖæ-**ndʒ**-	'break'	oɖæ	oɖæ-**čč**-	'break'
	vaɭar	vaɭar-**nd**-	'grow'	vaɭar	vaɭar-**tt**-	'grow'

Tamil is hence an example where an affix triggers a mutation on either the more inwards base or a more outwards affix. Another pattern of mutation that is predicted under an autosegmental analysis but is highly problematic for the SBM are instances where an affix triggers mutation on either a more inwards base or alternates itself. Exactly such a pattern can be found in the Cushitic language Dhaasanac (Tosco, 2001; Nishiguchi, 2007, 2009) where plural formation for certain nouns involves suffixation of /an/ and gemination of the stem-final C (3-a) that is not expected from any regular phonological processes in the language. If, however, the stem is polysyllabic, gemination is blocked (a recurring phenomenon in Dhaasenach) and the suffix surfaces as /aːn/ instead. This patters is interestingly different from the pattern in Tamil since it involves an alternation between lengthening of a vowel (=V) or a C. Again, however, a morphologically triggered lengthening process affects either a segment of the stem or of a following suffix, summarized abstractly in (4).

(3) *Dhaasanac (Tosco, 2001, 87)*

	Base		Pl
a.	kur	'knee'	kurːam
	ʃar	'a kind of stick'	ʃarːam
b.	ʔarːoŋoɗ	'clearing-stick'	ʔarːoŋoɗaːm
	deger	'barren'	degeraːm

(4) *Location of the length mutation*

/stem/ – /suffix/

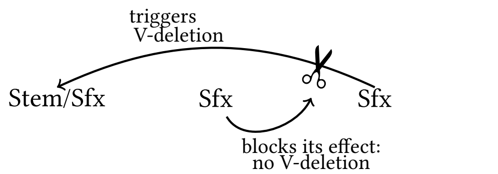
…V C   C/V

↑   ↑

Length.   Length.

A final interesting challenge for the SBM are mutation patterns that involve the interaction of different affixes. In Muylaq' Aymara (Coler, 2010), a particular morphological length-alternation can be characterized as the blocking of an expected other morphological length-alternation. There is a class of lexically marked suffixes in Muylaq' Aymara that trigger phonologically unexpected deletion of a preceding V (/muna–t̠–χa/ → /muntχa/, */munatχa/ 'I want' (Coler, 2010, 165)). If now the verbalizer morpheme that is ø-marked in all other contexts, is followed by a suffix that is expected to trigger V deletion, the V that is expected to be remain unrealized, unexpectedly surfaces. Due to this peculiar property, one can call the verbalizer the 'rescuer morpheme': its only surface effect is to bleed an expected morphological V deletion (/mara–ni–$ø_{VB}$–$t̠_{1.SG}$–wa/ → /maranitwa/, */marantwa/ 'I am…years old' (Coler, 2010, 361)). This is now a problem for SBM since an affix manipulates/blocks an effect of a more outwards affix and this 'blocking mutation' has no surface effect that can be represented as part of the base in a theory based on surface correspondences to morphologically less complex forms, illustrated abstractly in (5).

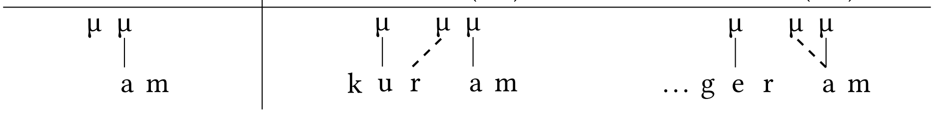
(5) *Blocking mutation in Muylaq' Aymara*



Analyses assuming non-linear affixation The exocentric mutation in Tamil follows under an autosegmental analysis assuming that a length-inducing μ as exponent for the intransitive is suffixed to the stem. This μ preferably associates to affix C's but cannot associate across V's due to standard locality restrictions: if the past tense suffix starts with a V, then lengthening affects a stem-final C. Absolutely parallel, the length-inducing suffix in Dhaasenach can be assumed to contain an extra floating μ in its representation. This μ strives to dock unto the preceding stem and if such a lengthening of stem segments is impossible, the μ associates to the V of the suffix itself. And the outward 'blocking mutation' in Muylaq' Aymara can be represented as a floating autosegment as well: if the V-deletion is the non-realization of a μ, an additional floating μ as a representation for the verbalizer can block this effect since it can provide an additional μ that already satisfies the μ-removal. Such an analysis, however, is only possible in a theory where the phonological effect of all affix representation is calculated simultaneously and affixes can hence have mutation effect on neighbouring morphemes to their left or their right.

(6) *Lengthening in Dhaasenach: autosegmental analysis*

underlying	Surface	
Pl-Suffix	Context 1: (6-a)	Context 2: (6-b)



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The contextual allomorphy and paradigmatic pressure of the prepositions **a, en** *and* **amb** *in Catalan*

Cristina Albareda

In most Catalan varieties, the prepositions *a* 'to/in', *en* 'in' and *amb* 'with' present similar allomorphs, a situation that may provoke some confusion. Here we show all the possible allomorphs of each preposition, without making distinctions between the dialectal varieties.

-*a* {/a/, /an/ or /am(b)/, /ana/ or /am(b)a/}

(/n/ and /m(b)/ vary according to the variety)

-*en* {/en/, /am(b)/, /am(b)a/}

-*amb* {/am(b)/, /am(b)a/, /en/}

In most cases, the allomorphy of the preposition *a* has a phonological basis. It is a phonologically conditioned allomorphy, since the allomorph /an/ or /am(b)/ avoids vocalic contact (ex. *Viu an/am(b) aquesta casa* 'He/she lives in this house'). The preposition *amb* also presents a phonologically conditioned allomorphy in the Northern and the Alguerese dialects since /am(b)a/ avoids consonant codas (ex. *Viu am(b)a gent* 'He/she lives with people'). In these cases, the markedness constraints *VV and *CODA are the most relevant in the analysis in Optimality Theory.

In contrast, the allomorphy of the prepositions *en* and *amb* has no phonological basis because their exchanged allomorphs do not improve the phonological structure (e.g., the allomorph /am(b)/ of the preposition *en*, *Penso am(b) això* 'I think in that': in Central, Balearic and Northern Catalan; e.g., the allomorph /en/ of the preposition *amb*, *Vindrà en ell* 'He/she will come with him': in Valencian and in two North-western subdialects), and they are the result of paradigmatic pressure under the consideration that the prepositions *a*, *en* and *amb* form a paradigm due to their phonetic, semantic and etymological similarities, in which certain allomorphs exert pressure on the others. In some varieties of Central and North-western Catalan, the allomorphs of the preposition *a* are also the result of paradigmatic pressure, and the consequence is that /an/ or /am(b)/ appears in front of a consonant. The paradigmatic pressure is represented by the faithfulness constraint OO-PARADIGM (Bonet & Lloret 2002), framed in the parallel Correspondence Theory.

For their part, the allomorphs /ana/ and /am(b)a/ are the result of diachronic processes of paradigmatic pressure. They appear exclusively before pronouns and the definite article, phonologically very short elements that achieve more phonological entity with these longer allomorphs. At the same time, they appear particularly frequently in front of interrogative pronouns, which are especially prominent pronouns as they occupy the first position in the sentence. The analysis of these cases is based on the lexical specifications of pronouns and the definite article for these allomorphs, specifications which are preserved by the faithfulness constraint RESPECT (Bonet & Lloret & Mascaró 2007).

Finally, the quantity of allomorphs and their distribution may vary depending on the syntactic context. This allomorphy is syntactically conditioned and is especially visible in the preposition *a*: the lesser the semantic motivation of the preposition (e.g., lexicalized expressions, verbal periphrasis, adverbial manner and prepositional direct object) and the higher the extent of the derivation from the main meaning of the preposition (e.g., a prepositional phrase complement and temporal adverbial), the lesser the allomorphy in terms of numbers of allomorphs or in contexts of appearance, compared with a more semantic motivation (e.g., locative adverbials and indirect object). However, in the prepositions *en* and *amb*, the effect is the opposite: the lesser the semantic motivation of the preposition, the greater the presence of allomorphs. This is because the origin of the allomorphy in the preposition *en* and *amb* is the result of paradigmatic pressure; if the preposition loses its semantic motivation it means that it is less similar to the original preposition, thus allowing the allomorphs to expand. Over the syntactic context, the specific contexts prevail. These contexts select the preposition *a* and, from among its allomorphs, the allomorph /a/. The analysis in optimality theory of the allomorphy conditioned by syntax and by specificity is based on the Subcategorization model (Paster 2005, 2006, 2009; Bye 2007, to appear).

To sum up, there is a hierarchy between the different types of contextual allomorphy of the prepositions *a*, *en* and *amb*: specificity >> syntax >> morphology / phonology.

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Save Harmony! – Rebellious roots troubling GP

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There is general consensus on the existence of external (suffix) harmony in Turkish (henceforth, EVH), a phonological process where suffix vowels agree with the last stem vowel in terms of frontness (high vowels also agree in rounding, but rounding harmony is irrelevant to the current analysis). However, a total number of 317 roots in Turkish seem to trigger *disharmonic suffixation*. The last stem vowel in such rebellious roots seems to be back, but any suffix attached is realized with a front vowel. Some examples are saat 'hour' > saat-i 'hour-Acc', gol 'goal' > gol-ü 'goal-Acc', dikkat 'care' > dikkat-siz 'care-less'. (The reverse situation never happens in Modern Turkish, i.e. no root with front vowels is followed by a suffix with back vowels, except in a few non-alternating suffixes.) This presentation aims to show that the behavior of such roots is predictable, once standard -and generally unquestioned- assumptions on the phonological system and especially on the vowel inventory of Turkish are abandoned.

In a Government Phonology (GP) analysis (Charette & Göksel 1996), Turkish suffixes are assumed to be of two kinds: those that are underlyingly empty ({ }_) and those that are underlyingly low, ({ }A). EVH is then explained by spreading of the I element (and also of U in the case of rounding harmony) from the stem onto the suffix vowel. However, in rebellious roots, an additional I element seems to emerge in the suffix vowel unexpectedly, i.e. not spreading from the preceding stem vowel. This seems to pose a problem for any theory that wishes phonological processes to be both non-arbitrary and exceptionless, such as GP. Most accounts prior to GP have proposed that the exceptional behavior of rebellious roots is due to their final -palatalized- consonant, which harmonises with the vowel. A detailed analysis of such roots, however, reveals that it is the vowels of such roots which makes them rebels.

Turkish is traditionally assumed to have eight vowel phonemes, which was recently challenged by Pöchtrager (2010). The analyses of spectrograms of rebellious roots support this challenge. The last vowels in these roots are spelled as a, o, or u in the orthography, and are assumed to correspond to the set of back vowels in Turkish phonology, leaving ı aside. Sound analyses, however, prove this assumption wrong. Spectrograms of pairs like kat 'layer', which regularly receives back vowel suffixes, and the rebellious root dikkat 'care' show that the final vowels in those words are different, while the final consonants are the same, hence refuting the main assumption forming the basis of previous analyses. Similar analyses with samples containing orthographic o (kol-u 'arm+Acc' vs. gol-ü 'goal+Acc') and u (kul-u 'servant+Acc' vs. usul-ü 'manner+Acc') show that Turkish has at least three more vowels than the standardly assumed eight, by including the fronted versions of a, o, and u, which contain an I element yet are different from the truly front vowels e, ö, and ü. (The final l in rebellious roots is palatal, which regularly occurs in the environment of front vowels.)

Charette & Göksel (1996) proposed the licensing constraints (LCs) active in Turkish to preclude certain combinations of elements: 1) Operators must be licensed. 2) A cannot license operators. 3) U must be head. Their analysis could account for the eight vowels in Turkish: a, e, ı, i, o, ö, u and ü. In order to allow three more, a modification of the LCs is required. It will be argued that this can be done by combining the last two LCs into one: A cannot license U.

With this revision, a total number of eleven vowels can be accounted for in Turkish, which is the number necessary to render the rebellious roots as obedient to the rules of EVH. The challenging status of Turkish Vowel Harmony for Government Phonology (GP) is, however, not yet overcome. According to GP, a phonological process must follow the two requirements: It must be non-arbitrary and it must be exceptionless. Hence, the challenge continues for GP due to the consequence derivable from the following factual premises:

1) Harmony, in general, is considered to be a non-arbitrary operation in that a clear connection can be established between the process and the environment it occurs in. In other words, harmony is expressible by spreading of elements between adjacent positions.
2) As is shown above, the so-called *External* Vowel Harmony in Turkish is exceptionless, once we agree that there are more vowels in Turkish than the traditionally assumed eight.
3) Internal Vowel Harmony (IVH), or Root Harmony, is assumed to be governed by the same principles as EVH, but is quite different from it in that there seem to be plenty of disharmonic roots in Turkish.

It is incompatible with GP to claim that EVH is phonological while IVH is not, if we want to hold on to the central assumption called *Minimality Hypothesis* (MP) requiring phonological processes to apply *whenever* their conditions are met (Kaye, 1992). Furthermore, although it is a fact that the overwhelming majority of disharmonic roots and rebellious roots are loanwords, MP does not allow for a phonological phenomenon to apply to native words only, without having any affect upon loans. Hence there seem to be two possible options without giving up the two central principles (non-arbitrariness and MP) lying at the heart of GP. Either we can give up on harmony altogether, even though it is non-arbitrary and regularly applies in suffixes; or we may try to show that the so-called exceptions to IVH can be handled in a similar fashion to the rebellious roots seemingly resisting EVH. This option thus requires an in-depth analysis of the quality of vowels found in words that are considered to be exceptions to harmony. Thus the next step towards a comprehensive account of Turkish Vowel Harmony will be to investigate whether the three fronted back vowels found in rebellious roots can save internal harmony from being ruled out as non-phonological by Government Phonologists.

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How to represent the Korean consonants: A GP2.0. Perspective

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Whether Korean tense consonants are underlyingly geminates (*i.e.* a tense consonant occupying two skeletal timing slots) is a highly controversial issue in Korean Phonology. The purpose here is to introduce a novel representation of the ternary laryngeal system of obstruents. Adopting GP2.0. Framework (Pöchtrager 2010, 2006), we argue that this system is due to structural properties rather than the internal melodic makeup. We will show that, in order to fully illustrate the mechanisms at play, Post Obstruent Tensing (POT) needs to take morpho-syntactic categories and word boundaries into account (Lowenstamm 2010, 2007, 1999).

Two competing proposals have been put forward: *the feature analysis* and *the bipositional analysis* (Ahn & Iverson 2003 ; Avery & Idsardi 2001; Choi 1995; Kim R. 1974; among others). *The feature analysis* focuses on identifying the laryngeal features that represent the three-way laryngeal contrast (Kim-Renaud 1974; Kim Hyunsoon 2011; among others), *e.g.* [±aspirated],[±tense] and [±spread glottis]. Despite the well defined laryngeal distinction, there remains a need for syllable-segment interaction to be taken into consideration.

The bipositional analysis develops the underlying representation of the three-way obstruent system (Choi 1995; Ahn & Iverson 2003) in a syllable-segmental perspective. However, both analyses disregard morphological processes that are at work in Korean phonology, namely POT variation due to morpho-syntactic categories.

We will first show how the new representations naturally explain typical Korean phonological processes (Coda Neutralisation and Palatalisation of coronals). We will then argue that POT relies on the same principle and that variation results from the structural proximity of the interacting consonants.

1. Coda Neutralisation (CN). [±anterior] coronal stops are neutralised to [+ant, -cont] in coda. Regardless of their laryngeal specification, aspirated and tense stops become plain (1).

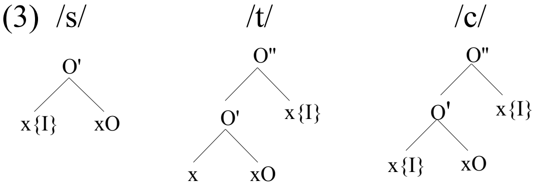
(1) **a.** /na**c**/ → [na**t**] *day* **c.** /sa**s'**/ → [sa**t**] *past form of verb buy* **f.** /p^hat^h/ → [p^ha**t**] *red bean*
b. /s'i**s**/ → [s'i**t**] *to wash* **d.** /pic^h/ → [pi**t**] *light*

Palatalisation. In Korean, /t, t^h, s/ are palatalised to [c, c^h, s^j] before a morphological /i/.

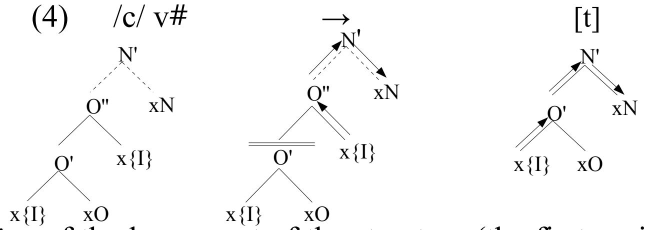
(2) **a.** /ma**t**+i/ → [ma**c**i] *the oldest son* **d.** /ku**t**+i/ → [ku**c**i] *stubbornly (to be firm ADVL)*
b. /pat^h+i/ → [patc^hi] *field-Nom* **e.** /kat^h+i/ → [kac^hi] *together (to be same ADVL)*
c. /**s**i/ → [s^ji] *poem* **f.** /o**s**+i/ → [os^ji] *clothes-Nom*

Using a revised version of GP2.0 (Tifrit & Voeltzel 2014), we will use the elements |I, U| to define coronals{I}, labials{U} and dorsals{IU}. In this framework, x can be annotated and thus m-command heads. The fricative/stop distinction relies on the number of projections: fricatives have only one projection (o') while stops have two (o'', o'). An annotated x m-commanding a head xO shares the same interpretation. Hence, the following representations in (3).

(3) /s/ /t/ /c/

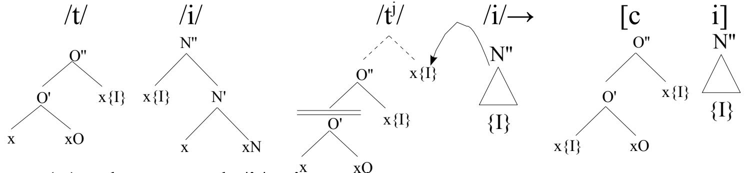


(4) /c/ v# → [t]



Neutralisation, in (4), is explained by *pruning* of the lower part of the structure (the first projection O'). The CN proceeds from left to right *e.i.,* m-command that goes from x{1} to xN. Note that concerning fricatives, the structure does not need to be pruned because it is a well formed structure.

(5) /t/ → [c] /t/ /i/ /t^j/ /i/→ [c i]



In palatalisation (5), the vowel /i/ gives the target consonant a non projecting onset x{I} which is interpreted as [j] (Pöchtrager 2006:91). The intermediate structure /t^j/ (which can be produced by some speakers) is then reduced to [c] by pruning of the lower projection as in CN.

2. ***Post Obstruent Tensing (POT) and variation*.** (6) provides examples of POT where an obstruent becomes tense when preceded by another obstruent.

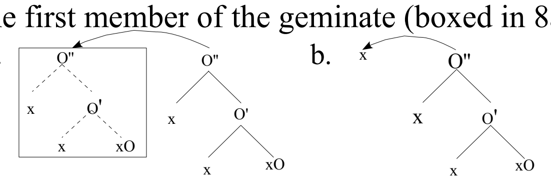
(6) **a.** /hak+**k**yo/ → [hak**k'**yo] *school* **d.** /kak+**p**aN/ → [kak**p'**aN] *individual room*
b. /pak+**s**u/ → [pak**s'**u] *clapping* **e.** /mit+**t**a/ → [mit**t'**a] *to believe*
c. /ap+**t**o/ → [ap.**t'**o] *front too* **f.** /mas+**c**ip/ → [mat**c'**ip] *good restraurant*

This process of tensification of the second consonant is considered as the usual result of the contact of two obstruents. However, there are many exceptions where POT is unapplied even if the same phonological conditions are met, especially when the first consonant is sonorant. For example, compare (7a-c) and (7d-f).

(7) **a.** /pɔm+**k**aɨl/ → [pɔm**k**aɨl] *spring and autumn* **d.** /pam+**k**@ri/ → [pam**k'**@ri] *night street*
b. /san+**t**ɨl/ → [san**t**ɨl] *mountain and field* **e.** /sɔn+**t**ɨŋ/ → [sɔn**t'**ɨŋ] *back of the hand*
c. /kaŋ-**s**an/ → [kaŋ.**s**an] *river and mountain* **f.** /cɔŋ-**s**ɔri/→ [cɔŋ.**s'**ɔri] *sound of bell*

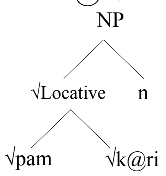
It has been suggested that tensing results from gemination (at least the association to two positions). How to represent POT in GP2.0? There are two possible scenarios: creation of a structure *ex nihilo* for the first member of the geminate (boxed in 8a) or using a pre-existing position (8b).

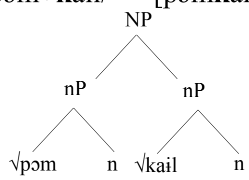
(8) a. b.



With this in mind, let us consider the cases where POT is not applied. Phonology does not seem to be responsible for it. Rather, morphology is to do with the exceptions. Following Lowenstamm (1999, 2012), we argue that POT is triggered by the presence of boundaries in compounds formation (Khym 1998). Variation falls into two categories. *Co-compounds* (as in 9b) which refer to [N_1+N_2] words that still maintain their own meaning (*i.e.*, each noun forms nP). As a result, there is no place for N_1 and N_2 to interact, which explains the non application of POT . On the other hand, *Subcompound* allows phonology to operate tensification. The latter refers to [N_1+N_2] where N_1 has a functional category (*e.g.,* Genetive, Locative, Beneficiary) and changes the meaning of N_2. Therefore, the functional head (N_1) takes the root (N_2) as its complement and projects to √P. The fact that they are under the same projection (√P) allows them to interact phonologically. The result is the application of POT as exemplified in (9a).

(9) a. /pam+**k**@ri/ → [pam**k'**@ri] *night street* b. /pɔm+**k**aɨl/ → [pɔm**k**aɨl] *spring and autumn*





Therefore, we will retain the representation in (8b) and we will show that the right word boundary #_ in Korean is an initial CV unit hosting the first part of the tense consonants (Lowenstamm 1999).

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Stress, Suffixes and Domain Boundary in Turkish

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1. Aim: In the present study, I aim to discuss the relationships between phonology and morphology in terms of Turkish suffixes following Kaye (1995). Specifically, I will focus on the implications of "exceptional stress" on domain boundary in Turkish**.** Following Newell (2008), who argues that "exceptional" stress is not really exceptional but *phasal* (vP, CP) and cyclic, I claim that phonology sees syntactic phases and the differences in phases correspond to differences in bracketing within Government Phonology (Kaye, 1995). This creates no problem for vowel harmony process.

2. Theoretical Background: Kaye (1995) points out that some morphological structure can have effects on phonology. He refers to two types of morphology: (i) analytic morphology – visible to phonology and (ii) synthetic (or non-analytic) morphology – invisible to phonology. Compounds (*blackboard*) and regular past tense morphology (*seeped*) are instances of analytic morphology. In this case, phonology knows that both words are parsable: [[black][board]] and [[seep]ed]. The irregular past tense morphology (*kept*), however, is an example of non-analytic morphology. In this case, *kept* is similar to a simplex word *adapt* or *apt*. It is not parsable.

3. Problem(s): The regular stress falls on the ultimate vowel of the word in Turkish even if a suffix is attached.

(1) a. kurt-l'ar 'wolves' b. ev-l'er 'houses'
wolf-Pl house-Pl

But, in some cases, stress falls on the penult.

(2) a. k'urt-lar '(These are) wolves.' b. 'ev-ler '(These are) houses.'
wolf-Agr. 3rd Pl. house-Agr. 3rd Pl.

⇨ Does stress imply any domain boundary?

⇨ If yes,

(4) a. **[**kurt-l'ar**]** 'wolves' b. **[[**k'urt**]**-lar**]** '(These are) wolves.'
wolf-Pl wolf-Agr. 3rd Pl.

(5) a. **[**ev-l'er**]** 'houses' b. **[[**'ev**]**-ler**]** '(These are) houses.'
house-Pl house-Agr. 3rd Pl.

⇨ **Although the plural marker in (4a-5a) has the same phonological shape with 3rd plural marker, stress assignment is different.** Why are *k'urt-lar* in (4b) and *'ev-ler* in (5b) initially stressed? What is common among these structures?

⇨ COPULA ⇨ Ø (or y)

(6) a. kurt-l'ar 'wolves' b. k'urt-Ø-lar '(These are) wolves.'
wolf-Pl wolf-COP-Agr. 3rd Pl.
c. ev-l'er 'houses' d. 'ev-Ø-ler '(These are) houses.'
house-Pl house-COP-Agr. 3rd Pl.

⇨ The insertion of the copula is a **syntactic/morphological requirement** (Kornfilt, 1996; Kahnemuyipour and Kornfilt, 2006; Göksel, 2001; Kelepir, 2001, 2003; Enç, 2004; Sağ, 2013).

⇨ Copula creates **two separate (phonological) domains** (Kornfilt, 1996; Kahnemuyipour and Kornfilt, 2006; Göksel, 2001)

⇨ How does copula create two different domains in a single "word"?

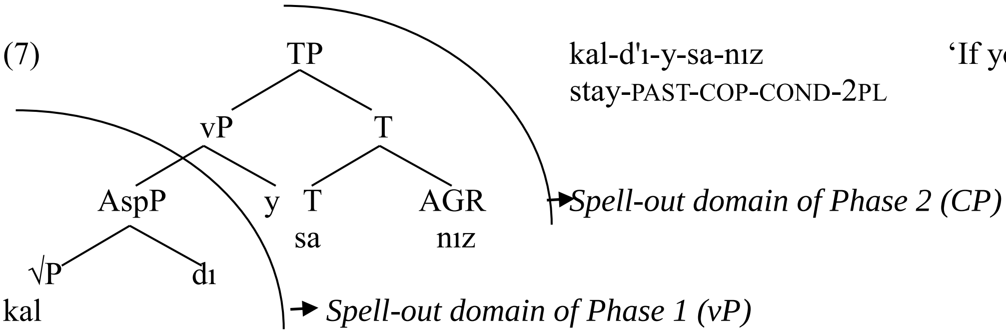
⇨ How does the existence of a copula affect stress?

Göksel (2001) states that copula creates two phonological domains. Göksel (2001) notes that there are two basic criteria for identifying a phonological domain in Turkish: **stress and vowel harmony (VH).** Kornfilt (1996) argues that there is a null copula which marks the beginning of a new domain. Null copula assigns stress to its left. **Stress is assigned to small word (i.e. *ev* in (5b)), VH applies to word (*evler* in (5b))**.

⇨ **If there are two different domains in the existence of the copula, how come VH applies across the two domains? (Contrast compounds like [[demir][kapı]]).**

4. Analysis: Newell (2008) puts forward "Phase Idea" and she argues that Turkish "exceptional" stress is not really exceptional. It is *phasal* (vP, CP) and cyclic.

(7) kal-d'ı-y-sa-nız 'If you stayed…'
stay-PAST-COP-COND-2PL



Adapted from Newell (2008:83) Example (45b)

➡ *kaldı(y)* and *sanız* are in different phases. According to Newell (2008:212), main stress is assigned in the innermost (vP in (7)) phase (Cinque's 1993 Null Theory of Stress Assignment; Inkelas & Orgun's 2003 Innermost rule; "no look ahead" requirement of Bobaljik, 2000). Although phasal analysis explains different domains, there is no principled explanation for the difference between the full copula *i*- and its reduced form(s) *–y/Ø* (*kal-dı* ***i̲****-se-niz* vs. *kal-dı-****y̲****-sa-nız)* in terms of VH by Newell (2008). The full copula *i*- blocks vowel harmony while the reduced forms *–y/Ø* does not.

5. My Proposal ⇉ Phase Analysis+ Government Phonology

(8) a. [araba-sın-d'a]	b. [[araba-s'ı]-y-dı]	c. [[araba-s'ı][i-di]]
car-POSS.3SG-LOC	car-POSS.3SG-COP-PAST	car-POSS.3SG COP-PAST
- Single phase	- Two phases	- Two phases
- Non-analytic morph.	- Dependent analytic morph.	- Independ. analytic morph.
- No morphology, no syntax	- Phonology sees morpho-syntax (phase)	- Phonology sees morpho-syntax (phase)
- [AB]	- [[A]B]	- [[A][B]]
	- VH	- No VH across the domain

☑ Three different structures (8a-c)⇨ Three different ways of bracketing [AB], [[A]B], [[A][B]]

➡**My Proposal**➦Phonology sees syntactic phases in (8b-c).The differences in phases and vowel harmony correspond to differences in bracketing.

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In search of the default Spanish vowel – evidence from perception

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Unlike some of its related languages (e.g. Catalan or Portuguese, cf. Mateus & Andrade 2000, Mascaró 1978), Spanish seems to have a stable, not particularly crowded, vowel inventory. While a vast majority of Spanish dialects present significant consonant weakening, vowel reduction is particularly rare. The only instances of vowel weakening reported by linguists involve devoicing in certain parts of Mexico and the Andes, interestingly with no accompanying consonant lenition (Lope Blanch 1972, Sessarego 2012, Delforge 2008). Given this asymmetry, it is worth examining whether there is a correlation between stress and reduction processes.

The primary assumption contemplated here is that a language's stress pattern and the nature of its vowel inventory are strictly connected with the freedom of reduction. This, in turn, is related to the well-known distinction between stress-timed and syllable-timed languages. In the latter case, it is assumed, a disruption of the stress pattern might inhibit comprehension and speech perceptibility, vowels being the principal stress and melody carriers. Limited or inexistent vowel reduction levels are less costly in the process of communication, hence vowel weakening remains largely unattested in such languages.

To account for the limited perceptibility of (non-native) vowel contrasts and Spanish speakers' sensitivity to stress shift and unstressed vowel quality and duration changes, a series of perception tests have been conducted on Spanish speakers. The interpretation of the reduced vowel signal by Spanish native speakers was of special interest here. Particularly, it was speculated to what degree the changes in quality and duration of the unstressed vowel would affect its perceptibility and how the reduced vowel would be interpreted with respect to the native inventory. Given the fact that Spanish lacks centralised vowels, its inventory being limited to corner + mid vowels /i, e, a, o, u/, it is interesting to investigate whether centralised vowels are perceived by native speakers and if so, how they are identified with respect to native vocalic segments. Another important question is whether Spanish words modified in terms of stress and vowel reduction are identifiable i.e. retrievable from the lexicon.

The preliminary study of these questions involved the use of both Spanish native words with vocalic modifications and nonce words imitating Spanish syllabification and stress pattern. The results of both parts of the experiment suggest a possible emergence-of-the-unmarked effect. Although the perception of schwa follows the patterns reported by researchers studying ESL acquisition (e.g. Gómez Lacabex & García Lecumberri 2005, Diettes 2010) in that many instances of the centralised vowel are simply inaudible for the average native speaker (with a mean 62% success rate in a group of 32 individuals), an intriguing tendency toward identifying schwa as the mid front vowel /e/ was revealed (70% of the cases). Several variables seem to indicate the existence of a default vowel across all contexts. The gathered data suggest that schwa is not simply perceived as the mid front vowel *per se,* given certain inconsistencies in pretonic syllables as opposed to word-final position. What is more, apart from the highly predictable context of pre-/s/ final position (which has been reported as the default word-final, and especially plural value by numerous researchers investigating Spanish varieties), /e/ was identified in some unpredictable environments, which cannot be justified by retrieval from the lexicon or other native speaker bias. This is confirmed by the results from the nonce word test that outright excludes lexical identification. Thus, while perception tests confirm that changes in stress and vowel quality inhibit comprehension and word identification in Spanish speakers, they also suggest that unknown phonetic categories are interpreted as default segments.

The status of /e/ as a default vowel in Spanish is further confirmed by morphology, as well as a series of historical and synchronic phonetic and phonological phenomena, especially vowel epenthesis. The latter takes the form of prothesis (Harris 1969) to repair marked cluster structures in words such as *estadio* 'stadium' or *escándalo* 'scandal' (SSG violations), as well as *esmaltar* 'to enamel' (minimal sonority distance) or *eslavo* 'slave'. Most of these changes are historical, but new words and loanwords undergo the same process, which is not always reflected in spelling (e.g. s*nob, esnob* 'snob', *status* 'status', Alfaro 1964). The same applies to second language acquisition: Spanish speakers consistently insert /e/ before sC clusters (although exceptions of dialectal nature can be found in Latin America, but see Carlisle 1998). The mid front vowel is also the epenthetic plural marker in words ending in consonant (e.g. Colina 2006a). Certain dialectal processes also point to its default status, Dominican 'double plural' being an especially prominent example: *mujeres* 'women' is realised as [muherese], *palomas* 'pigeons' as [palomase] in this dialect (Jimenez Sabater 1975, Nuñez-Cedeño 1980, Colina 2006b).

The aim of this paper is to present the results of the preliminary perception experiment together with the results of a follow-up experiment focused specifically on the perception of schwa and word identification in correlation with centralised reduction (changes in both duration and quality). The experiment has been designed with the possible counterindications in mind, namely consonantal contexts, syllable position (initial, pretonic, post-tonic), morphological and lexical predictability, word frequency effects as well as auditory and acoustic similarity between schwa and the mid front vowel. The test will also be controlled for possible multilingual or L2 effects (e.g. command of Catalan and similar languages). As with the first experiment, the stimuli will be collected in a silent room setting and manipulated in PRAAT (Boersma & Weenink 2010). The results will show whether the hypothesised existence of a default vowel in reduction contexts is confirmed by native speaker perception.

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Segmental representation of Livonian stød

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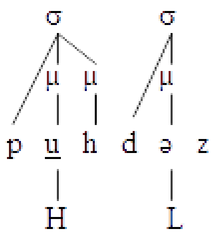
0. Livonian (Finnic, Latvia) shows a well-known phenomenon called stød (= /ˀ/) and realized as: **i.** a falling tone, or **ii.** a glotal stop (Kettunen, 1938). Kiparsky (2006) suggests that this stød is a tone derived from stress. In this paper, I bring some new data to show that, in a specific category of words (i.e. words like puuˀdəz 'pure'), it is a lexical segment ʔ. The analysis that I propose accounts for the two possible realizations of stød mentioned above.

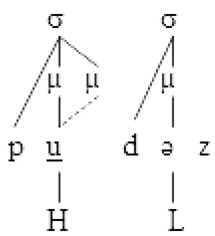
1. Two categories of Livonian words show a stød: words like kaˀllə 'fish' and words like puuˀdəz 'pure'. The støds occuring in these categories respectively show two ranges of opposite phonological properties. In words like puuˀdəz, the stød is contrastive (e.g. j**uˀo**də 'lead' ~ j**uo**də 'drink'), and it is always preceded by a branching nucleus (e.g. v**ii**ˀri 'yellow').

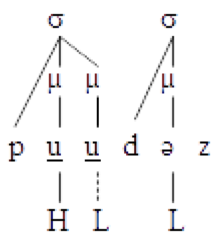
2. Despite the fact that stød is contrastive in words like puuˀdəz, Kiparsky (2006) assumes that it is systematically derived from stress (which is not contrastive in Livonian). To this, he supposes that words like puuˀdəz show an underlying consonant that is neutralized in surface, and which conditions the emergence of a low tone. Indeed, all Finnic words showing a h as a coda of the stressed syllable (underlined) became words like puuˀdəz in Livonian (1).

(1) p**uu**ˀdəz *pure* (Finnish pu**h**das) — n**ææ**ˀdə *to see* (Finnish nä**h**dä)
v**ii**ˀri *yellow* (Finnish vi**h**reä) — k**ɔɔ**ˀdəks *eight* (Finnish ka**h**deksan)
n**ɔɔ**ˀgə *skin* (Finnish na**h**ka)

Kiparsky proposes the following derivation. First, tone-bearing segments are high-toned in stressed syllables, but low-toned otherwise (2a). The voiceless h is not tone-bearing. Second, h dropped in Livonian. Consequently the stressed vowel spreads by compensatory lengthening (2b). Finally, the resulting long vowel being tone-bearing, it receives a default low tone (2c). This analysis accounts for both the contrastive property of stød in words like puuˀdəz (low tone is assigned because of h), and the preceding branching nucleus.

(2)a.


b.


c.


3. However, this analysis faces two difficulties. First, it is provided only for the historical derivation of stød: the presence of an underlying h is not confirmed in synchrony. Second, not all words like puuˀdəz previously had a h in stressed syllable. Indeed, the table in (3) shows that words like puuˀdəz can also stem from Latvian roots which don't have any h in stressed syllable (transcription is from Kettunen [1938]).

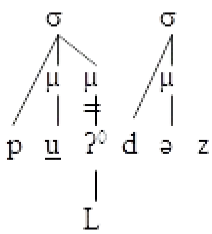
(3) n**ii**ˀdə *to hate* (Latvian n**î**dêt) — p**ii**ˀnə *to plait* (Latvian p**î**t, pinu)
b**ææ**ˀdə *worry* (Latvian b**ẹ̀**da) — **ɔɔ**ˀrən *dress* (Latvian **â**rene)
n**ɔɔ**ˀvə *death* (Latvian n**â**ve) — spr**ɔɔ**ˀgə *bursting* (Latvian spr**â**gt)

This data invalidates the diachronic basis of the proposition made by Kiparsky (2006). In this case, stød is not derived by h-dropping and stress. Thus, I point out that the null hypothesis would analyse the stød of these words as a contrastive unit originally.

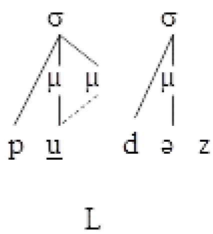
5. Now, I propose a new derivation which accounts for the two possible realizations of stød: falling tone and glotal stop. Following Kiparsky (2006), I assume that the systematic preceding branching nucleus results from an assimilation or a compensatory lengthening. Accordingly, I argue that stød is a segment ʔ which stems from h in Finnic cognates, and from *broken tone* in Latvian cognates (Kettunen, 1938).

I assume the underlying representation in (4a). The segment ʔ contains two elements: ʔ^0 (occluded) and L (voiced/low) (Harris, 1990). Two solutions are possible. In the first case, ʔ^0 drops and involves a spreading of the preceding nucleus by compensatory lengthening (4b). Accordingly, the element L associates to the second part of the resulting branching nucleus, leading to a tonal realization of stød (i.e. [púùdəz]) (4c).

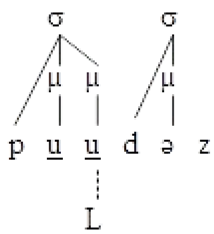
(4)a.



b.

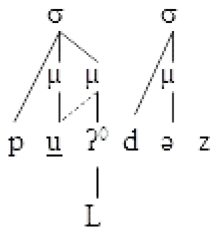


c.



In the second case, ʔ^0 doesn't drop (5), but it involves a spreading of the preceding nucleus by assimilation. It results a glotal realization of stød (i.e. [puuʔdəz]).

(5)



This hypothesis is confirmed by the following data. All short codas with no element h^0 (noise) in their internal structure (i.e. sonorants and glides) involve a spreading of the preceding vowel (e.g. aambaz 'tooth', paanda 'take', niin 'town'). ʔ is one of these consonants: it doesn't contain any element h^0 (Harris, 1990). Consequently, this phenomenon is expected.

As a conclusion, I brought new data to argue that the stød occuring in words like puuˀdəz is a segment ʔ, not a tone. This proposition accounts for the variation of Livonian stød, both diachronically and synchronically.

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The prosodization of neoclassical elements in Brazilian Portuguese: evidence from vowel reduction

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Neoclassical elements (NCEs), such as *agro* in *agronomy* and *psycho* in *psychology*, have been assigned different morphological classifications: from affixes, to stems, to combining forms (see [2], [6]). Assuming that NCEs belong to any of these categories implies that they present a consistent behavior throughout the language. However, not only do NCEs combine with distinct types of structures (e.g. other NCEs, such as in *psycho-logy*, or independent words, such as in *psycho-linguistics*), but they may also exhibit different phonological aspects according to the element to which they attach. In this paper, we argue that differences in vowel reduction (VR) in the NCE-final /o/ indicate that NCEs in Brazilian Portuguese (BP) are prosodized in two ways: as regular prosodic words (PWds) when combined with another NCE (1a), and as compounds (recursive PWds) when combined with an independent PWd (1b).

(1) NCE + NCE (a), and NCE + PWd (b) sequences
a. '**agr-o**-nomia' (*agro-nomy*), '**psic-o**-logia' (*psycho-logy*)
b. '**agr-o**-negócio' (*agribusiness*), '**psic-o**-terapira (*psycho-therapy*)

Our hypothesis is that BP speakers recognize the PWd boundary in constructions such as those in (1b). In this case, the NCE-final vowel would correspond to a post-tonic vowel, thus being more subject to reduction ([5],[7]). The NCE-final vowel in constructions such as (1a), on the other hand, would correspond to a pre-tonic vowel, which is less susceptible to reduction.

Methods

Two independent preliminary tests were conducted to investigate whether morphological construction had the predicted effect on VR in the NCE-final vowel /o/. The production test involved carrier sentences containing constructions from both groups (1a) and (1b). Target (n=32) and filler (n=32) sentences were randomly presented to BP speakers (n=5) in both focus and non-focus positions. Speakers' production of target items (n=320) was analyzed in terms of formant values (F1, F2) of the NCE-final vowel. The experiment also controlled for duration, preceding and following vowel and consonant, focus/non-focus position, and distance from target syllable to stressed syllable in the construction.

The perception test was developed on Praat [3] and involved an almost identical set of target words (n=30), which were recorded by a native speaker of BP—production data were not used in the perception test due to the subtle differences in F values involved. Each construction had reduced and unreduced versions, and was replicated twice during the test. Speakers (n=10) judged items on a 10-point scale, based on what sounded more frequent/natural to them. A pre-test containing common and unattested reductions (n=10) was used to verify speakers' understanding of the task. Each subject judged a total of 402 items (272 fillers). Perception and production data were analyzed in R and modelled with Ordinal Regression and Linear Mixed-Effects Regression, respectively.

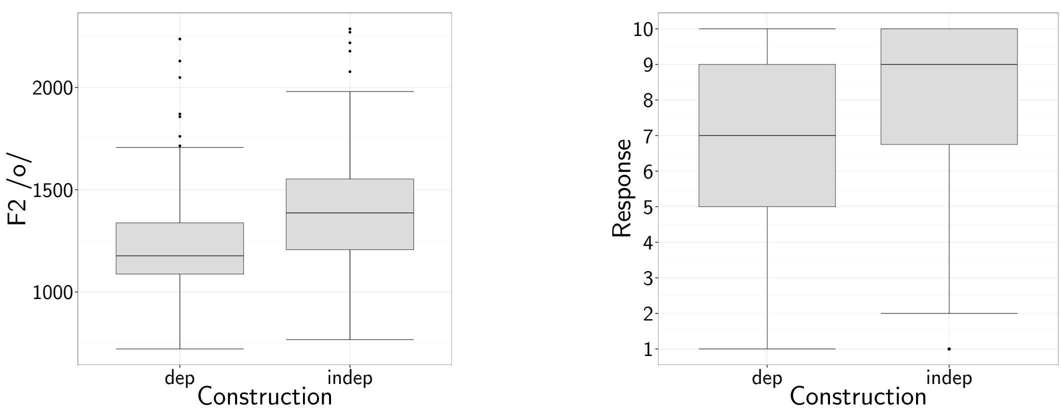
Results

In the production test, only F2 values of the NCE-final /o/ were significantly affected by morphological construction. As predicted, NCE + PWd sequences (1b) yielded more vowel reduction in terms of F2 ($\hat{\beta} = 105$, $p < 0.01$, with by-speaker and by-item random effects). These results are consistent with what has been cross-linguistically observed ([4],[1]).

In the perception test, VR in NCE + PWd sequences was judged significantly better than in NCE + NCE constructions ($\hat{\beta} = 1.18$, $p = 0.004$, with by-speaker and by-item random effects). In other words, speakers judged VR in PWd-boundary position as significantly more natural, which follows from our predictions. Results of both tests are shown in Fig. 1—perception test results refer to items with VR.

Figure 1: Production and perception tests

Production test: F2/construction Perception test: response/construction



The preliminary results confirm the hypothesis that speakers do seem to identify a prosodic boundary between an NCE and the following form in NCE + PWd constructions. Thus, we argue that distinct prosodic representations are empirically motivated for NCEs in BP: NCE+NCE → PWd, whereas NCE+PWd → compound (recursive PWd).

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On the realization, representation, and prosodic function of Somali topic-marking

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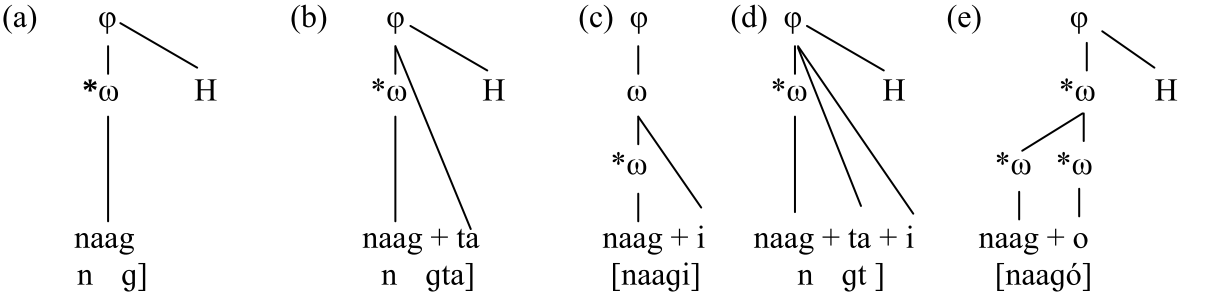
There is little mention of topic-marking in the descriptive literature on Somali. This is due, in part, to the fact that some instances of topic-marking have heretofore been cited under the heading of “subject-marking” given earlier assumptions that Somali has a grammatical case system (e.g., Le Gac 2003; Saeed 1993, 1999). Regardless of the term used to refer to it, both the structure and functions of topic-marking in Somali remain poorly understood. From a phonological perspective, topic-marking is interesting because at first glance it does not appear to be manifested in an overtly consistent way. As we illustrate below, this is because one way that Somali indicates topical material is with a clitic, and the various surface realizations of this clitic are largely dependent on the prosodic and segmental structure of its host, as well as the presence of other clitics. By taking a closer look at the characteristics of Somali prosodic structure, however, we illustrate that the various surface realizations of topic-marking emerge in principled and predictable ways. Our goals are two-fold.

First, we aim to provide a more thorough description of the segmental and prosodic realizations of topic-marking via cliticization in Somali, focusing on the process from both phenomenological and representational points of view. Somali topic-marking is a phrase-level phenomenon with a range of surface realizations. Any phrase-final word in a noun phrase can host a topic marker clitic (TMC); this includes a verb in instances where a noun is modified by a relative clause. Describing Somali topic-marking is challenging because the TMC affects what we refer to as the citation form of a word, and its overt effects can be i) prosodic; ii) segmental; or iii) both prosodic and segmental. In the simplest cases, topic-marked words lose their high (H) tone; every Somali prosodic word (PWd) has one and only one surface H tonal accent. For example, the noun **nín** ‘man’ is **nin** when topic-marked. We can illustrate segmental topic-marking by adding the definite determiner clitic **–ka** to this noun; the phrase **nínka** ‘the man’ is **nínku** when topic-marked. Here, the tonal accent of the noun is not affected by topic-marking. Finally, a noun like **náág** ‘woman’ is topic-marked both segmentally and by the removal of its tonal accent, i.e., **naagi**. These are among the simplest illustrations of topic-marking; the examples that follow in (1) show several more complex realizations that will be dealt with in this presentation.

(1)	Non-topic-marked	Topic-marked	Gloss
a.	madaxweyníhíí	madaxweyníhii	‘the president’
b.	tuuládóó	tuuládooyi	‘that (distant) village
c.	lin ga	lin g	‘m pen’
d.	wíílkíí wanaagsán	wíílkíí wanaagsani	‘the good bo ’
e.	wíílka dh er ee w n	w l a dh er ee we ni	‘the big tall bo ’
f.	nínka imáneyá	nínka imáneyaa	‘the man who is coming’

We will propose that the Somali topic marker is an affixal clitic that preferentially binds to the PWd domain. It also binds directly to the phonological phrase (PPh) domain in some instances, as a last resort; several representations are given in (2). We illustrate that the TMC has different segmental realizations when it binds to the PWd vs. PPh domain. In addition, we show that the TMC has an overt tonal effect by default, but this is realized only when it adjoins directly to the PWd domain. A typical Somali noun has a H tonal accent (2a) and its tone is unaffected by the addition of a definite determiner, which is a free clitic, bound directly to the PPh domain (2b). We show that, as an affixal clitic, the TMC introduces a recursive PWd domain, which effectively blocks access and association of phrasal H tones to accents assigned in the lower PWd (2c). Because topic-marking must occur phrase-finally, other clitics may intervene, thereby affecting the realization of the TMC. When a free clitic intervenes, the TMC must adjoin to the PPh; there is no tonal effect on the noun (2d). In these and other examples it becomes clear that resyllabification to add the TMC occurs only at the PWd level; coalescence occurs instead at the PPh level. Importantly, the outcomes of cliticization are notably different from those resulting from adjunction in derivation (2e).

(2) Representation of cliticization vs. adjunction



Our second goal is to explore the correlation between these phonological realizations of topic-marking alongside the current state of the science on Somali information structure. We assume that a focus-marked subject is the 'defa l t' state. We show that while topical (given, discourse-old) information in a sentence is indicated at a broader level by movement of a noun phrase away from a focus marker, topic-marking via the TMC, as described above, is another degree of topicalization used only to indicate a topical subject. Secondary topic-marking via the TMC is primarily deaccentuating, and its segmental reflexes are predictable from the shape of the host. The overall relationship is schematized as follows:

	+Topic	**-Topic**
- Subject	cvcv]$_\varphi$ … focus + OP	cvcv]$_\varphi$ focus + OP
+ Subject	[cvcv]$_\varphi$ (-i)]$_\varphi$ ... focus +/- OP	cvcv]$_\varphi$ focus

Topicalization via deaccentuation aligns with leading perspectives on the relationship between givenness and prosodic marking (e.g., Baumann 2006; Büring 2011; Ladd 1996). The literature shows a cross-linguistic tendency for discourse-new or focused information to be prosodically-marked or accented, while given, topicalized information is deaccentuated. We suggest that this is in line with the prosodic function of topic-marking in Somali, where the most topicalized material (a topical subject) is deaccentuated, unless another clitic intervenes.

With these data and observations explained, we argue that an analysis centered on two degrees of topicalization is superior to earlier analyses referring to the morphophonological phenomenon described above as subject-marking. Primary topic-marking is consistently in relation to movement, and prosodic topic-marking is reserved for topicalized subjects. Previous analyses centered on subject-marking fail to explain why only a specific type of subject can, in fact, be marked as such.

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Prosodic recursion and the Composite Group: can they reconcile?

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There are two conflicting views about the configuration of the prosodic hierarchy, namely, [1] that there is a Composite Group (CG, a modified version of the Clitic Group) between the Prosodic Word (PWd) and the Phonological Phrase (PPh) (Nespor & Vogel, 1986; Hayes, 1989; Vogel 2009), and [2] that prosodic domains admit recursion (Inkelas, 1990; Selkirk, 1996). This paper argues that these views are in fact compatible.

I show that pronominal clitics (object pronouns) in Brazilian Portuguese (BP) exhibit morpho-phonological behavior that can be identified neither with the PWd nor with the PPh. This supports the idea that a constituent between the PWd and the PPh is needed. Given that pronominal clitics differ from non-pronominal clitics (conjunctions, prepositions, articles) concerning morpho-phonological behavior, I suggest that these two types of clitics are not prosodized at the same domain: pronominal clitics at the CG, and non-pronominal clitics at the PPh. Additionally, internal relations observed in sequences of non-pronominal clitics seem to require recursion in the hierarchy.

Two assumptions regarding prosodic constituency are made: [i] prosodic domains are defined on the basis of phonological and mapping rules they present (Vogel, 2009), which implies that recursive levels cannot serve as domain of application of rules other than those verified in the lowest level of the constituent (cf. e.g. Peperkamp, 1997; Vigário, 2001); and [ii] recursion accounts solely for the mapping of dependency relations within a given constituent onto the prosodic hierarchy. Although recursive levels have been regarded as domain of certain phonological phenomena (e.g. Ito & Mester 2007, 2013; Elfner to appear), the processes that are attributed to recursive levels are usually related to prominence, which may indicate that recursive levels are subject not to specific segmental processes, but to boundary phenomena.

Regarding phonological behavior, vowel raising (VR; /e, o/ → [i, u]) is expected between a clitic (pronominal and non-pronominal) and its host (e.g. *s[i] chama* 'calls himself'; *s[i] quiser* 'if (he) wants') in most BP varieties. VR is *not* expected to apply word-internally (e.g. *c[o]nf[o]rtável*, not *c[u]nf[u]rtável 'comfortable'*), nor between a prefix and a stem (e.g. *r[e]-fazer*, not *r[i]-fazer* 're-do') (Bisol, 2000). Furthermore, VR does not seem to be morphologically conditioned: it applies regardless of whether the final vowel is a verbal or a nominal suffix. Thus, pronominal clitics are not prosodized at the PWd, but at a higher prosodic constituent – one that corresponds to the domain of VR.

Pronominal clitics differ from non-pronominal clitics primarily in three ways:

(a) while non-pronominal clitics undergo fusion in BP (e.g. *casa da* (de+a) *tia* 'the aunt's house'), pronominal clitics do not (e.g. **ele mo* (me+o) *deu* 'he gave it to me'. The 3 per direct object is usually omitted, or it appears after the verb as a full pronoun/NP.);

(b) while non-pronominal clitics can form strings in BP (e.g. <u>*o de que*</u> *falamos* 'that of which we-spoke'), pronominal clitics cannot (e.g. **te a comprei* 'I-bought it to you');

(c) in a BP variety in which VR is a variable phenomenon, VR is significantly more frequent in non-pronominal than in pronominal clitics (Guzzo, in prep).

This indicates that, although BP clitics in general are not prosodized at the PWd, they adjoin their hosts at two distinct domains, depending on their type: (i) pronominal clitics are prosodized at the CG, the first prosodic domain where VR applies (Fig. 1); and (ii) non-pronominal clitics are prosodized at the PPh, the domain where clitic fusion applies and clitic sequences are allowed (Fig. 2).

Regarding prosodic recursion, I suggest that it is a feature in the representation of sequences of non-pronominal clitics in BP. In the case of clitic sequences (e.g. <u>*o de que*</u>

falamos ‘that of which we-spoke’), two options for clitic adjunction seem possible: (a) as clitics are always on the left side of the host, adjunction occurs from left to right; or (b) the clitic that is closer to the host adjoins it first.

Option (a) leads to a problem: the first clitic of the sequence should be able to predict that there is a host PWd after the string of clitics, or else it should be admitted that the host to the first clitic is the following clitic. In either case, the prosodic representation derived from option (a) is linear, in the sense that all elements of the structure are directly linked to the PPh (Fig. 3). Option (b), on the other hand, assumes that, as clitics depend on a host in order to be instantiated, the projection of the host is required first. Clitics are adjoined to the structure one at a time, with each clitic being able to access only the projection that is closer to them (Fig. 4). In fact, the recursive representation in Fig. 4 captures (a) the host-dependent relationship established by the host and the clitics that adjoin it and (b) the fact that prosodic structure has a relatively direct correspondence with syntactic structure, which suggests that syntactic boundaries are maintained in prosodic representation (Selkirk, 2011). In figures 3 and 4, the host is a PWd, and all clitics correspond to syllables.

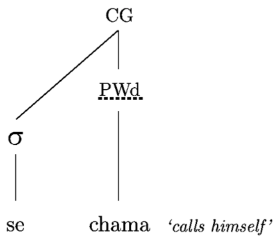

Fig. 1: Prosodization of pronominal citics

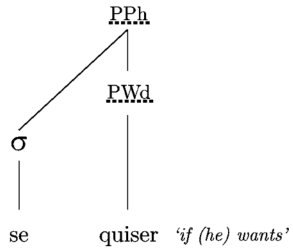

Fig. 2: Prosodization of non-pronominal clitics

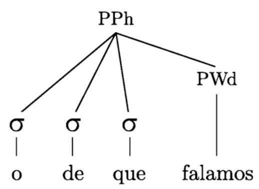

Fig. 3: Clitic sequences – recursive representation

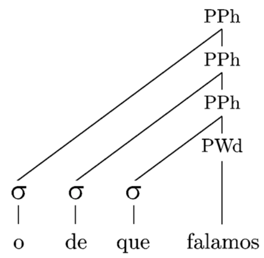

Fig. 4: Clitic sequences – recursive representation

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Aspiration as a Temporally Coordinated Gesture: Evidence from Icelandic

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Introduction

Results of several speech studies have suggested a need for including temporal properties in a phonological model of glottal activity in speech production (see e.g. Löfqvist and Yoshioka, 1981; Browman and Goldstein, 1986; Kingston, 1990; Iverson and Salmons, 1995; Ridouane, 2006). The goal of this paper is to propose a new interpretation of data involving patterns of aspiration and give a formal Optimality Theory analysis that captures the temporal orchestration of speech gestures. Crucially, I suggest that dialectal patterns in Icelandic, that have traditionally been attributed to loss of aspiration in certain contexts, should be accounted for in terms of different timing relations of glottal gestures with accompanying oral gestures.

Analysis

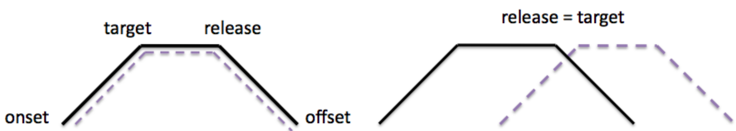
There are two main dialects of Icelandic, Southern (SD) and Northern (ND), which differ with respect to aspiration of stop consonants. Word-internal 'fortis' stops are postaspirated in ND (1-a) but lack aspiration in SD (1-b).

(1)	a.	*gata*	[kaa.t^{h}a]	'road'	ND
	b.	*gata*	[kaa.ta]	'road'	SD

Aspiration is contrastive in word-initial position in both dialects.

(2)	a.	*týna*	[t^{h}ii.na]	'lose'
	b.	*dýna*	[tii.na]	'mattress'

Aspiration arises in consonants when oral constriction is accompanied by glottal opening (see e.g. Löfqvist and Yoshioka, 1981). Thus, the difference between aspirated and plain consonants has been defined in terms of presence or absence of [spread glottis] (Iverson and Salmons, 1995). A priori, we might assume that this is the case with the Icelandic data, i.e. that intervocalic [spread glottis] stops are simply absent in SD. However, on the basis of their presence in initial position and due to the close relationship between the Icelandic dialects, I argue that the two dialectal patterns do not in fact contrast with respect to the *presence* of [spread glottis]. Rather, the contrast lies in different timing patterns in the coordination of glottal gestures with oral gestures in [spread glottis] consonants. Partial overlap of the two gestures produces a postaspirated stop (picture on right), a complete overlap results in an acoustically unaspirated stop, i.e. in reduced VOT (left).



An implication of this analysis is that stops can look identical in surface structure despite contrasting for the feature [spread glottis]. However, a difference in glottal activity might be reflected in the duration of a preceding vowel (see e.g. Goldstein and Browman, 1986). Preliminary results of a phonetic study suggest that vowels are significantly longer in duration ($p < 0.05$) before non-native stop consonants than corresponding native stops in SD. Intervocalic loanword stops lack postaspiration in both dialects of Icelandic:

(3)	*radar*	[raa.tar]	'radar'

This is unexpected in ND where word-internal stops are otherwise neutralized in the direction of postaspiration. The lack of aspiration in ND indicates that the underlying form of these words is different from that of native words, despite the seemingly identical surface structure in SD speech. I argue that borrowed stop consonants lack a [spread glottis] gesture altogether in Icelandic, whereas the gesture is always present in native vocabulary, but masked in SD.

Formal Optimality Theory Account

I view glottal opening as a subordinate speech gesture, tied to a superlaryngeal head gesture (suggested by Gafos, 2002, to account for the relationship between velum lowering and oral constriction in nasals). The temporal relationship between a subordinate gesture and its head gesture is governed by phonological constraints. They will either overlap completely, as is the case in e.g. aspirated fricatives and nasal stops (note, however, that velum lowering gestures can be aligned in such a way that nasalization carries over to an adjacent vowel), or issues of recoverability will drive them apart, as is the case with postaspirated stops. The key constraints are COEXTENSION, which requires subordinate gestures to be coextensive with their head gestures, and RECOVERABILITY, which requires a subordinate gesture to coordinate with its head gesture in such a way that it is perceptually recoverable, i.e. the glottal gesture may not be masked completely by the oral closure. For SD, I propose the following ranking: COEXTENSION » RECOVERABILITY.

Input: /kat$_{[sg]}$a/	MAXASP	COEX	RECOV
a. ☞ kaa.t$_{[sg]}$a			∗
b. kaa.ta	∗!		
c. kaa.t^{h}a		∗!	

For ND, the ranking is reversed: RECOVERABILITY » COEXTENSION.

Input: /kat$_{[sg]}$a/	MAXASP	RECOV	COEX
a. kaa.t$_{[sg]}$a		∗!	
b. kaa.ta	∗!		
c. ☞ kaa.t^{h}a			∗

The idea that glottal gestures are migratory rather than transient in intervocalic SD stops is reflected in the behavior of word-internal clusters of sonorants followed by [spread glottis] stops. Like singleton stops, postconsonantal stops surface without audible aspiration in SD. However, the aspiration is not lost but rather shifted to the preceding sonorant (4-a). Aspiration remains on the stop in ND (4-b).

(4)	a.	*vanta*	/vant^{h}a/	[van̥.ta]	'lack'	SD
	b.	*vanta*	/vant^{h}a/	[van.t^{h}a]	'lack'	ND

Conclusion

Phonological patterns of aspiration cannot be be modeled adequately without appealing to the temporal properties inherent in the coordination of speech gestures. I have shown how distinct stop consonants may be derived in a phonological system by applying constraints on the degree of overlap between a glottal gesture and an oral gesture. Furthermore, I have proposed that alternations that appear to involve loss of aspiration may be better explained as a shift in the temporal coordination between different speech gestures.

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Position-sensitive sandhi: a case study of Jinan Tone 4 sandhi

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The Jinan dialect is spoken in a northern area of China. Like Mandarin, it has four tones, and tone sandhi (A+A→B+A) may be triggered by some sequences of tones. However, under closer scrutiny, the sandhi in the Jinan dialect shows much more complex characteristics than Mandarin tone sandhi. As is common in studies of Chinese tones in other dialects, previous work (Qian, 1963) on this dialect consists only of subjective description (Zhang, 2010). Based on a case study in Jinan Tone 4 sandhi, this paper will provide novel empirical data. It shows that this sandhi is blind to morphosyntactic structure and that it is position-sensitive.

Traditionally, Chinese tones are transcribed on a scale from 1 to 5, where 1 is the lowest. Tone 4 (henceforth T4) in the Jinan dialect is a falling contour tone that would correspond to 4 to 1 on the same scale. When it precedes another T4, it becomes a sandhi tone (henceforth S4) featured by a falling pitch followed by a raising pitch (Fig. 1). However, Tone 4 sandhi only applies to the penultimate syllable in a large phrase and no other positions (e.g. T4+T4+T4+TX, where X stands for any tone other than T4; T4+T4+T4+T4→T4+T4+S4+T4).

Unlike Mandarin Tone 3 sandhi where sandhi application is sensitive to morphosyntactic structure (Chen 2000; Cheng 1987; Duanmu 2007; Shih 1986 a.o.), the Tone 4 sandhi in the Jinan dialect is blind to morphosyntactic information. Take trisyllabic units as an example, Tone 4 sandhi does not apply to the initial syllable of a trisyllabic unit ending with a syllable that is not characterized by T4, no matter whether this unit is left-branching ([[σσ]σ]) or right-branching ([σ[σσ]]). A more detailed comparison shows that the pitch range of the initial syllable of a trisyllabic left-branching phrase is not significantly different from that of a right-branching tree ($t = -0.48$, p-value = 0.63 for maximum pitch; $t = -0.27$, p-value = 0.79 for minimum pitch). In addition, the pitch range of penultimate syllables of the left-branching phrases does not differ from that of the right-branching phrases ($t = -0.098$, p-value = 0.92 for maximum pitch; $t = 0.015$, p-value = 0.99 for minimum pitch). When the trisyllabic unit has only T4 syllables, only the middle T4 undergoes T4 sandhi (i.e. to result in T4+S4+T4) regardless of its morphosyntactic structure. Therefore, the non-application of T4 sandhi in trisyllabic units cannot be explained by the interaction between phonology and morphosyntax. It also cannot be accounted for by the correspondence between derivationally related forms (Steriade 2000, Kenstowicz 1996), because the same morpheme has different tonal outputs in bisyllabic and trisyllabic units.

The cases of T4+T4+T4 as the input show that the directionality of this sandhi is right-to-left. Otherwise, the sandhi result should be S4+S4+T4 instead of T4+S4+T4. It is argued that some sandhi phenomena in Chinese dialects are affected by different stress patterns (Duanmu, 2007). The sandhi, as has been shown above, always targets the penultimate syllable, parsing from right to left; it is insensitive to morphosyntactic structure. A possible explanation to the non-application of T4 sandhi on the initial syllable of a trisyllabic unit would be that, the penultimate syllable is stressed so the sandhi targets that particular position (positional markedness). However, whether a tonal language like the Jinan dialect has stress is controversial, and a phonetic analysis does not show that the penultimate syllable carries and significant stress.

In the experiment, a comparison is made between two groups with the form ABC and DAB where the same letter stands for the same morpheme. Paired t-tests show that the duration of the initial A is shorter than that of the penultimate A ($t = -7.48$, p-value <0.05) and the penultimate B is shorter than the final B ($t = -3.31$, p-value<0.05). The intensity and pitch comparisons only show a significant intensity difference between the final and penultimate positions (intensity paired B: t =

2.46, p-value = 0.038); no other significant difference is detected in any other tests (intensity paired A: t = -1.94, p-value = 0.087; pitch paired A: t = 1.08, p-value = 0.34; pitch paired B: t = 1.45, p-value = 0.22). To sum up, the penultimate syllable may be phonetically stronger than the initial syllables but it is weaker than the final syllables. Therefore, were there to be stress, it is not expected that the stress is placed on the penultimate syllable.

In conclusion, this paper provides novel data from Jinan Tone 4 sandhi. It examines the empirical data from a phonetic perspective and argues that this sandhi is blind to morphosyntactic structure. The data shows that this sandhi is constrained by the position of the target syllable; only the penultimate syllable will undergo sandhi. However, the sandhi is not triggered by any phonetically observable stress.

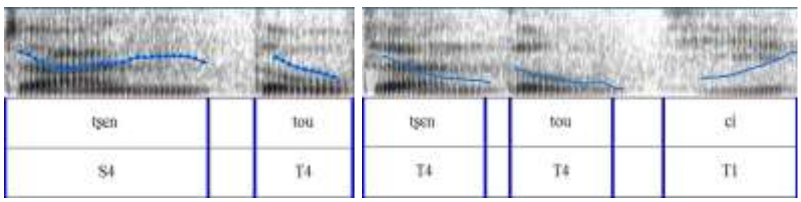

Fig. 1

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On the representation of empty categories

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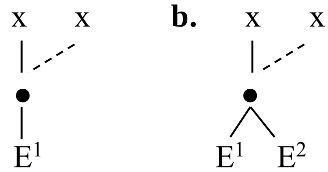
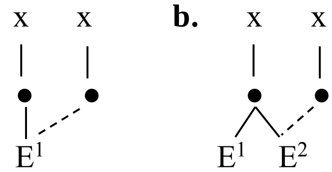
This paper argues that cross-linguistically two representations are attested for empty syllabic categories: either the empty category (onset, nucleus or coda) contains only a timing slot, or else it contains a timing slot plus unspecified root node. Evidence for a distinction based on presence versus absence of a bare root node comes from processes whereby content is supplied to the empty category from a neighbouring segment. It is not crucial whether such processes are captured via local spreading (the analysis I opt for) or via co-indexation. What is vital is that two patterns are instantiated: in some cases, the source for spreading (or co-indexation) always shares the entirety of its content with the empty target; in others, the source shares select subsegmental units. Remarkably, these two patterns hold regardless of whether the empty category is an onset, a nucleus or a coda. Such recurrent patterns of total versus partial sharing constitute compelling evidence for the representational distinction proposed.

I adopt a view of subsegmental organization involving privative elements grouped under a root node (as in Harris & Lindsay 1995), with important consequences for how the two patterns of local spreading are captured. On the one hand, when the source always shares the entirety of its content with the target constituent, spreading involves double association of the source root node to two timing slots (1a,b). In this case, the target need contain only a receptive timing slot.

(1) a. **b.**



(2) a. **b.**



On the other hand, individual elements from a source root node may be shared with an adjacent empty constituent (2a,b). In this case, the target necessarily contains its own root node since the doubly linked element would otherwise lack a docking site. When the source is simplex (2a), source and target have identical melodic content, an outcome indistinguishable from (1a). When the source is complex (2b), however, source and target show partial identity, an outcome requiring that the target contain its own root node.

To demonstrate, empty onsets are at times realized with a glide, the identity of which is determined by an adjacent vowel. Languages diverge, however, in whether glides are formed only from a high vowel [i, u] or also from a mid vowel such as [e, o]. According to element theory, [i, u] contain the elements I and U, as do the glides [j, w]. The mid vowels [e, o], on the other hand, are complex vowels composed of the elements IA and UA respectively. When glide formation is permitted only after high vowels [i, u], the root node dominating I or U under the nucleus is doubly linked to the empty onset (as in 1a). When glide formation occurs after mid vowels [e, o], on the other hand, it is the element I or U itself that is doubly linked (as in 2b), and necessarily the target empty onset contains a receptive root node.

The former pattern is exemplified by French, as shown in (3a) (see also Faroese, Polish, Malay, and Takestani). In fact, French is particular in instantiating the formation of the glide [ɥ] after the complex high vowel [y]. The vowel [y] is composed of the elements IU, as is the glide [ɥ], so [gly.**ɥ**ã] constitutes an instance of the representation in (1b). The latter pattern of a doubly linked element occurs in Dakota, as shown in (3b) (see also Japanese, Madija, Fula, and Shona).

(3) a. <u>In French</u>			**b. <u>In Dakota</u>**		
<u>After high vowels</u>			<u>After high vowels</u>		
prier	[pri.**j**e]	'to pray'	ni-ate	[ni**j**ate]	'your father'
clouer	[klu.**w**e]	'to nail'	hu-o-kaxmi	[hu**w**okaxmi]	'knee joint'
gluant	[gly.**ɥ**ã]	'sticky'			
*<u>After mid vowels</u>			<u>After mid vowels</u>		
créer	[kre._e]	'to create'	we-o-t^{h}a	[we**j**ot^{h}a]	'blood clot'
boa	[bo._a]	'boa'	ho-a-sap	[ho**w**asapa]	'catfish'

Similarly, two patterns emerge in spreading processes associated with empty nuclei, which can be targets either of so-called copy epenthesis or of vowel harmony. In Selayarese, words ending in [r, l, s] are realized with a final vowel identical to the preceding vowel: *sahal*[a], *sussul*[u], *lamber*[e], *potol*[o]. The fact that the source nucleus always shares the entirety of its content with the target points to a process of double association of the source root node. Copy epenthesis thus applies to an empty nucleus that lacks its own root node (1a,b). In Turkish, vowel harmony targets both empty nuclei and nuclei specified only for the A element (Charette & Göksel 1996). When empty nuclei are targeted, the elements I and U spread selectively from the source. For example, the possessive suffix *-(s)Ø* can be realized as *-(s)i, -(s)u* or *-(s)ü*, depending on whether the preceding nucleus contains the elements I or U or both. These realization patterns hold whether the source contains only these elements (*tilki-s**i**, boru-s**u**, ütü-s**ü***) (as in 2a) or whether the element A is also present in the source (*dere-s**i**, son-**u**, köy-**ü***) (as in 2b). Importantly, the latter forms require the presence of a bare root node in the target.

Finally, the process of *raddoppiamento syntattico* in Italian likewise involves total sharing of the content of an onset with an empty coda. Since this gemination process is best captured via double linking of the root node under the source onset, the target empty coda can be assumed to contain only a timing slot. Cases where empty codas are the target of partial sharing are comparatively rare. One example comes from Huariapano, where an epenthetic coda [h] appears before voiceless obstruent onsets: [po**h**.ʂoj], [pa**h**.tsaj.ni**h**.k. j]. Drawing on insights from Davis and Cho (2003), I argue that both [h] and aspiration are determined by the element H. Assuming voiceless obstruents to be aspirated in Huariapano, coda [h] is thus generated via regressive spreading of H, which associates to an empty coda endowed with a bare root node.

In sum, evidence from processes of spreading point inexorably to empty categories being represented cross-linguistically with two degrees of degeneration: i) with only a timing slot or ii) with a timing slot and unspecified root node.

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Tone and syllable structure in Akebu Polar Questions

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Intro

This paper presents an analysis of tone (pitch) in polar questions in Akebu language ([keu], GTM, Kwa, Niger-Congo). Since Bolinger (1978), Ohala (1984) final high-pitched polar question prosody was often considered (almost) universal. In recent works (Rialland 2007, Clements & Rialland 2008) it was shown that the significant number of African languages also have falling final pitch in polar questions. Rialland (2011) has further introduced a cluster of various "lax prosody" utterance-final pitch effects. Akebu demonstrates a subset of these effects. Note that in Akebu the change in pitch in the final syllable of an utterance is the only difference between a statement and a polar question. In this talk I show that polar question tonal change effects in Akebu are closely tied up to the structure of a syllable and features of a vowel. Basing on systematic acoustic analysis of a few native speakers, I argue that at some level of representation there is only one tonal marker of a polar question in Akebu, namely H tone with a preceding downgrade (ꜜH).

Data

Akebu distinguishes three level tones: high, mid, and low. Contour tones do not occur on vowels with [-ATR] feature. Contour tones are solely bitonal. The tone-bearing unit is the syllable. The structure of a syllable is (C)V(N).

The H tone vowel in an open final syllable is prolonged (1, 3). The sonorant in coda, if present, takes pitch (2), but not in syllables with [-ATR] vowels (4).

(1) a. lə̄ fé.
PRF.3SG buy
'She has bought.'
b. lə̄ féé?
PRF.3SG buy.Q
'Has she bought?'

(2) a. lā náŋ.
PRF.3SG wash.hands
'He has washed her hands.'
b. lā náŋ́?
PRF.3SG wash.hands.Q
'Has he washed his hands?'

(3) a. lā cí.
PRF.3SG be.sick
'He was sick.'
b. lā círí?
PRF.3SG be.sick.Q
'Was he sick?'

(4) a. lā mɔ́ŋ.
PRF.3SG count
'She has counted.'
b. lā mɔ́ɔ́ŋ?
PRF.3SG count.Q
'Has she counted?'

The M and L final tones in open syllables both adjust a downgrade in questions (6), while in closed syllables with [+ATR] vowels the pitch raise on the coda (7).

(5) a. lə̄ kpɨ̀.
PRF.3SG boil
'It has boiled.'
b. lə̄ kpɨ̀ꜜ?
PRF.3SG boil.Q
'It has boiled?'

(6) a. lə́ pə̄lə̄.
PRF.3SG moulder
'It has mouldered.'
b. lə́ pə̄lə̄ꜜ?
PRF.3SG moulder.Q
'Has it mouldered?'

(7) a. lā fàŋ.
PRF.3SG believe
'She has believed.'
b. lá fàŋ́?
PRF.3SG believe.Q
'Has she believed?'

Both falling and rising contour tones shows no change (8, 9). Optional register change is possible but not obligatory with all contour tones (cf. Patin (2008) where similar effects were reported for Shingazidja). Contour tones in the syllables with coda are not attested.

(8) a. lə̄ pə̂.
PRF.3SG understand
'She has understood.'

b. lə̄ pə̂?
PRF.3SG asked.Q
'Has she understood?'

(9) a. lā ɲǎ.
PRF.3SG yawn
'He has yawned.'

b. lā ɲǎ?
PRF.3SG yawn.Q
'Has he yawned?'

Analysis

I argue that in Akebu the question marker is adjusted to the end of the tonal tier and causes realignment. The tones are aligned with the left edge of a prosodic word. Every syllable takes at most two level tones. To account for the discussed data I propose the following set of constraints:

MAX-T: Input tones are realized in the output (i.e. no deletion).
*CODA-T: Coda should be toneless.
*IDENT$_{[+ATR]}$: Do not lengthen vowels with [+ATR] feature
*IDENT$_{[-ATR]}$: Do not lengthen vowels with [-ATR] feature

The hierarchy of constraints is as follows:

IDENT$_{[+ATR]}$ ›› MAX-T ›› *CODA-T ›› IDENT$_{[-ATR]}$

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From babbling to first words in Tashlhiyt Berber: A longitudinal two-case study

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This paper presents preliminary results of a longitudinal study that focuses on the developmental trajectory of speech production capacities in two Berber children acquiring Tashlhiyt from the babbling period to the emergence of early grammar. There are very few studies on Berber language acquisition, and Tashlhiyt, the variety spoken in South-west Morocco, presents very interesting phonetic and phonological characteristics to study in a developmental perspective. For instance, unusual complex consonant clusters are very common in the language, which challenges classical approaches to syllable structure.

Background A large number of crosslinguistic studies on early acquisition have shown that independent of the characteristics of their ambient language, children follow the same developmental trajectory. In addition, strong similarities in sound types sound combinations and syllable type preferences across different communities have been frequently documented across the babbling and early word periods suggesting a universal foundation for early production patterns. These preferred trends in the babbling and first word periods have been explained by articulatory constraints and structural factors as well. But language acquisition is also linked to perceptual learning from input. It has been proposed that input from the ambient language may also influence the shaping of children's production preferences at some point in the late babbling and first word period, influencing common production system tendencies by the child's learning of precise ambient language regularities.

Methods Two Moroccan children acquiring Tashlhiyt Berber language were recorded every two weeks in their home from 7 to 24 months. 60 hours were broadly transcribed using IPA. Transcribed data was then entered into the Logical International Phonetic Programs software designed for describing phonetic patterns. Collected data was divided in two periods: period 1 from 7 to 12 months and period 2 from 13 to 24 months. Frequency of segments, syllable types, intra- and inter-syllabic associations in babbling, and first words were calculated for both periods.

Results Our data provide evidence for universal tendencies in babbling and first words: the subjects produced more stops, nasals and glides than other types of sounds; more coronals and labials than dorsals and gutturals; more vowels belonging to the lower left part of the vowel space than other vowels. Duplicated babbling was more frequent than variegated babbling. In variegation, both children variegated much more on the height dimension than on the front-back dimension as well as more on the manner than on the place dimension. Open syllables and more precisely the CV syllable type are predominant in both babbling and words. Concerning CV co-occurrences, a general tendency arises which associates within syllables coronal consonants to front vowels, dorsals to back vowel and labials to central vowels. These trends were particularly strong in words produced between 7 and 12 months. Only very few exceptions emerged and could be considered as evidence for ambient language patterning.

As to consonant clusters, one of the salient properties of Tashlhiyt adult grammar, a few emerge in period 1, starting at the age of 10 months old: [nd], [nkk], [nt], [qx] and [dss] are found in Reda's data. Some others emerge lately in period 2. They are mainly composed of two consonants one of which is often geminated: e.g. [ħkk], [dssi], [stti]. However, the general rule consists in simplifying consonant clusters by means of consonant deletion, syllabic truncation or vowel epenthesis. The following examples illustrate the situation:

Reda

Age	*Gloss*	*Target*	*Production*
18 months old	give me wash my hands	aradssirdɣ	alædssi
	pen	stilo	llju
	this one	ɣwwa	æbiwwa
	put it there	srstɣin	astti
	ball	takurt	æ:kkukku
	it is pulled	ikkis	əkkikki
19 months old	here the shoes	ha sbbatˁ	ha bbae:
	proper name	kawtar	kækækkæ
	Brahim went out	iffuɣ brahim	izzuppaehi:
	milk	lħlib	əllili

money	lflus	allu
bread	aɣrum	awwu

Some simplification processes used in these examples seem to obey prosodic constraints. That is, the final syllable which is stressed in Tashlhiyt Berber, is kept while the initial syllable is often deleted. Furthermore, some syllables which are assumed to function as syllabic consonants in adult phonology are deleted in child productions: for instance, the first /l/ in *lħlib*, which is be syllabic in Dell & Elmedlaoui's model (2002) is deleted in Reda's productions. Likewise, in the form *aradssird*ɣ, /ɣ/ would be analyzed as a syllabic consonant. This suggests the absence of syllabic consonants in child language.

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Resolving Contradictions in the Puerto Rican Spanish Syllable Coda

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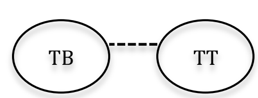
Coronals don't surface in the Puerto Rican Spanish (PRS) coda outside careful speech. Among other processes that target coda coronals, stops and word-final nasals velarize (1-2) while coda coronal fricatives debuccalize (3). Laterals are the only coronal segments to appear freely in the coda, surfacing both faithfully (4) and as a result of coda tap lateralization (5). The presence of a lateral's coronal component in the coda conflicts with the restriction against coronals in that position.

	PRS	*Other Spanish*	*Gloss*	
1.	pik.sa	pit.sa	pizza	Morgan 2010
2.	paŋ	pan	bread	Navarro 1948
3.	ah.ma	as.ma	asthma	Navarro 1948
4.	al.ma	al.ma	soul	Navarro 1948
5.	al.ma	aɾ.ma	weapon	Navarro 1948

I propose that a single markedness constraint (OT; Prince and Smolensky 1993/2004) can account for the different ways coda coronals are repaired in PRS. Coda laterals are spared in my analysis because it references the representational primitives developed in Articulatory Phonology (AP; Browman and Goldstein 1992). The highly-ranked constraint against tongue tip (coronal) gestures in anti-phase coupling with a preceding vocalic tongue body (dorsal) gesture drives the processes documented above (1-3) and others that have as a combined result the lack of coronals in coda position. Coda laterals do not violate the proposed constraint, accounting for their abundance in PRS codas. They are not protected; they simply do not violate the constraint, which defines markedness over the *coupling relations* or temporal coordination between gestural primitives. A key insight of AP is to assume that patterns of temporal coordination or coupling do form part of phonological knowledge. It is not clear how accounts of lateral representation couched in traditional featural terms (cf. Rice and Avery 1991, Blevins 1994, Rice 1996, Walsh-Dickey 1997) will allow for laterals to be shielded from a unified coda condition which bans coronals in that position, given that in the feature/segmental view, laterals are assumed to be [+coronal] and segments atomic.

The Spanish-speaking subjects in Proctor (2009) consistenly produced the coda lateral with a bi-gestural pattern where the tongue body gesture preceded the tongue tip gesture. That author proposed anti-phase coupling as the stable relation between the components of Spanish laterals. In (6), ovals surround the tongue body (TB) and tongue tip (TT) components of the segment and a dashed line represents anti-phase coupling between them.

6. Simplified AP representation of Spanish laterals: 

I define the PRS markedness constraint as follows:

7. *TB---TT : Assign a violation mark to <u>any tongue tip</u> gesture that is coupled anti-phase to a <u>vocalic tongue body</u> gesture.

(7) amounts to high-ranked markedness of the structure TB_V --- TT_C , where subscripts on each gesture signal whether it composes part of a vocalic or consonantal segment. This structure is acceptable to other Spanish varieties, as illustrated in (1-3), but does not surface in PRS. Because the TT gesture in (6) is coupled anti-phase to the lateral's own TB gesture rather than the TB gesture of a preceding vowel, laterals do not violate (7), accounting for their presence in the PRS coda (4-5).

Speech production studies (Browman and Goldstein 1995, among others) concur that an anti-phase coupling relation captures the sequential triggering of gestures characteristic in syllable rhymes. PRS exhibits a dispreference for coda TT gestures, but only if those TT gestures are anit-phase coupled to the vocalic TB gesture. Laterals have a TT gesutre that is anti-phase coupled to their own TB gesture. Their TT gesture does not enter into a coupling relation with the vowel gesture. Etymologically expected TT gestures in PRS whose available coupling relation would result in a violation of *TB---TT, such as those forming part of coronal coda stops, fricatives and nasals, can be **supplanted** by TB gestures (1-2); they they can also be **removed** without concomitant replacement (3). Other processes are further shown to result from high-ranked (7) as well. Work is underway to explain the preference for laterals over taps in this position, which is not accounted for here.

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Phonological gradience in Greek #CC and grammatical modeling

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Gradient well-formedness intuitions usually arise both from structural constraints and typological frequencies. In the former case, the speakers' sensitivity to phonotactic legality is due to the distribution of sound patterns in their language (Chomsky & Halle 1968), whereas in the latter, speakers' behavior is assumed to be guided by knowledge of lexical statistics (Coleman & Pierrehumbert 1997). However, gradience also occurs when speakers have to choose between variable (or even conflicting) patterns of alternation. In this case, gradience can be revealed by both the statistics of the lexicon and the speakers' linguistic behavior. In this paper, we examine gradient distinctions of initial cluster (#CC) phonotactics in Greek and explore ways in which they can be modeled into machine-learned grammars by exploiting the findings of lexicostatistic and experimental research.

We focus on phonotactic gradience exhibited by a peripheral cluster subset, namely O(bstruent)O(bstruent)[-sibilant/-voice], i.e., /ft, xt, pt, kt, fθ, xθ/ (1). These clusters co-exist in Standard Greek although this has not always been the case, since dissimilated (Fricative-Stop) clusters are a fairly recent (demotic) development (Newton 1972; Joseph & Philippaki-Warburton 1987). Thus, same manner clusters (Fricative-Fricative, Stop-Stop) are assumed to be the faithful ones (2). For instance, *ptoxós* (SS) and *ftoxós* 'poor' (FS) are both grammatical outputs but the former has a strong archaic flavor (e.g., *ptoxokomío* 'workhouse', *ptoxí to pnévmati* 'of poor spirit (lit.), unwise, thoughtless' – archaic/fossilized expression).

A count of the target words in the Dictionary of Standard Greek (1998) [type frequency] indicates that there is a slight preference for dissimilated manner clusters F(ricative)-S(top) with the general preference scale being shaped as follows: MoA: FS ≥ SS □ FF; PoA: LAB □ DOR. This scale also implies that within the archaic set, the SS clusters are considered to be more frequent and probably more well-formed than the FF ones. A closer examination of lexical probability (3) suggests that the diffusion of diachronic change is inversely proportional to the clusters' synchronic occurrence. For instance, initial /pt/ and /kt/ have been vastly (but not completely) dissimilated historically and exhibit less variation synchronically. That is, they either appear faithful (/pt, kt/) or dissimilated (/ft, xt/), whereas variation (pt~ft, kt~xt) is rare. On the other hand, clusters that have been strongly resistant to change (e.g., /fθ, xθ/), exhibit intense variation in Modern Greek. This conclusion is further strengthened by the findings of the Google search (conducted on 15.12.2012) [token frequency] which aimed at measuring which variant (e.g., the archaic /pt/ or the demotic /ft/) is favored by native speakers in everyday (written) use. More specifically, the cluster /xθ/ appears to be systematically faithful, archaic /kt/ is equally used with its dissimilated variant /xt/, whereas /fθ/ is mostly dissimilated to /ft/ (4). The situation described so far suggests that speakers mainly prefer the faithful variants for DOR-initial cluster pairs (e.g., /kt, xθ/ instead of /xt/), but the dissimilated variant for the LAB-initial ones (e.g., dissimilated /ft/ [< /fθ/] is favored over /fθ/). An exception is /pt/ which is preferred in its faithful version, a finding that can be easily interpreted if one takes into account that this cluster appears in extremely archaic words that resisted variation. We conclude, therefore, that PoA is crucial in determining the shaping of the gradience pattern in the clusters at hand. It remains to be seen whether other parameters are also at play.

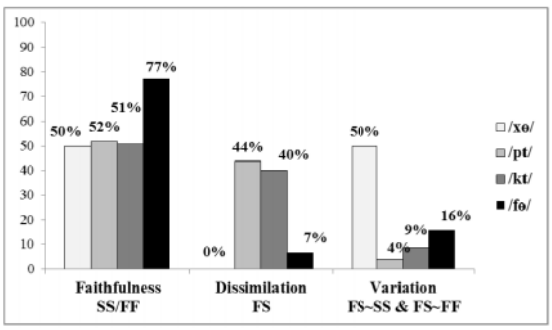
In pursuance of this line of research, we constructed a Stochastic OT grammar (Boersma 1997, 1998; Boersma & Hayes 2001) in which lexicostatistic information is dynamically involved in the computation by determining the numerical value of the constraints along a ranking scale and thus predicting the probability of a cluster's faithfulness and/ or variation. In order to test whether the constructed grammar guides the speakers' acceptability judgments, we also conducted (a) a scalar rating task and (b) a comparative judgment task (40 participants, Mean age: 19 years old, 18♀, 2♂; all native speakers of Greek). Both experiments revealed that information regarding probability of lexical patterns partially affects the perception and processing of spoken stimuli, which in turn suggests that phonotactic effects cannot be reduced to mere statistics; grammatical principles are highly pertinent to modeling gradience. For instance, in terms of MoA the dissimilated clusters proved to be more acceptable than their faithful counterparts, a result which (partly) confirms the findings of the lexicostatistic investigation. However, in terms of PoA, DOR-initial clusters appear to be more well-formed compared to the LAB-initial ones in sharp contrast with what the Dictionary search has disclosed.

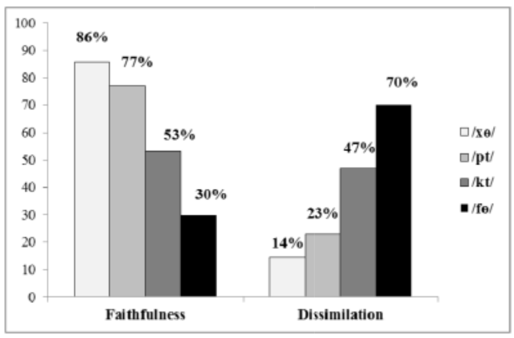
To conclude, the experimental findings support a multi-faceted account of phonological knowledge, i.e., one in which phonological and probabilistic parameters go hand-in-hand and are together encoded in the speakers' grammar. Furthermore, they also bring to light the motivation for the DOR-initial preference in clusters, i.e. the maximization of distinctiveness and the higher perceptibility of structures. We take these very principles to also constitute the driving force for the direction of linguistic change and the variation attested in synchrony, and, therefore, we incorporate them in the native speakers' *perceived* gradient grammar developed within the framework of Functional Optimality Theory and Harmonic Grammar (Boersma 1998, 1999, 2000, 2009; Escudero 2005; Pater 2008; Potts et al. 2010).

Data

(1)	**FS**	**SS**	**FF**	*Note*:
a. **LAB-COR**	ft	pt	fθ	Manner of Articulation: FS, SS, FF
b. **DOR-COR**	xt	kt	xθ	Place of Articulation: LAB-COR, DOR-COR

			demotic		*archaic*		
(2)	a.	/ktístis/	[xtístis]	~	[ktístis]	'builder'	*kt ~ xt*
	b.	/ptoxós/	[ftoxós]	~	[ptoxós]	'poor'	*pt ~ ft*
	c.	/fθáno/	[ftáno]	~	[fθáno]	'I arrive'	*fθ ~ ft*
	d.	/xθés/	[xtés]	~	[xθés]	'yesterday'	*xθ ~ xt*

(3)


(4)


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Vowel Raising and Positional Privilege in Klamath- Charlie O'Hara- USC

Overview In Barker's grammar of the Klamath (Southern Oregon) language (1964), several opaque alternations are explained through abstract phonemes. In particular, a set of verb stems which sometimes surface with [i] in their last syllable, are marked by a phoneme /i̲/. Since this phoneme only shows up in the final syllables of verb stems, having it as part of our underlying representations creates more questions than it answers. Why do we never see /i̲/ in nouns, or stem-inital syllables? This limited distribution of /i̲/ matches nicely with an otherwise unexplained gap in [e]'s distribution. I argue following Beckman (1998); Crosswhite (2004) and Barnes (2002), we can reanalyze this /i̲/ phoneme as /e/, which is not licensed in unprivileged positions.

The Alternation The /i̲/ phoneme is only found at the end of verb stems, and deletes (1-(a)), unless its deletion would create a phonotactically illicit cluster, in which case it surfaces as [i] (1-(b)). This could seem like simple epenthesis, but in Klamath the epenthetic vowel is [a], (2-(b)). Many other verbs show glottalization only when the [i] does not surface, a pattern which would not occur with epenthesis, since the vowel could just epenthesize after the floating glottalizer and be more faithful to the input (3). Further, this phoneme could not be underlyingly /i/, because verb stems that end with /i/ never experience deletion, as seen in (4).

(1) *Verb Stem With /i̲/*
- (a) /ʔeːw̥**i̲**-a/ [ʔeːw̥a], *[ʔeːw̥**i**] 'is deep, shallow' (Barker, 1963, p. 31)
- (b) /ʔeːw̥**i̲**-tkʰ/ [ʔeːw̥**i**tkʰ], *[ʔeːw̥tkʰ], *[ʔeːw̥**a**tkʰ] 'deep, shallow'

(2) *Simple Consonant Final Verb Stem*
- (a) /taq'-a/ [taq'a] 'is sharp-edged' (Barker, 1963, p. 109)
- (b) /taq'-tkʰ/ [taq'**a**tkʰ] 'sharp-edged'

(3) *Glottalization with i̲*
- (a) /n-tʰeːwi̲ˀ-tkʰ/ [ntʰeːwitkʰ], *[ntʰeːw'itkʰ] 'broken' (Barker, 1963, p. 403)
- (b) /n-tʰeːwi̲ˀ-a/ [ntʰeːw'a], *[ntʰeːwiʔa] 'breaks'

(4) *Simple /i/ Final Verb Stem*
- (a) /stupw̥**i**-a/ [stupw̥**i**] 'has the first menstrual period' (Barker, 1963, p. 258)
- (b) /stupw̥**i**-tkʰ/ [stupw̥**i**tkʰ] 'a girl who has reached womanhood'

i̲ = e I argue that the mid vowel [e] is only licensed in privileged positions in Klamath. Previous work has shown the positional privilege of long vowels (Beckman 1998), stem-initial syllables (ibid.), and nouns (Smith 2011, 1998). Conveniently, [e] only surfaces in these positions in Klamath, and /i̲/ only appears in non-initial positions in verb stems. Following Crosswhite (2004); Barnes (2002), I argue that the mid-vowel [e] is more marked than the other vowels of Klamath, thus in unprivileged positions, the vowel inventory is reduced from [i e a u] to [i a u]. When possible, /e/ deletes (5-(a)), but if it cannot it raises to [i] (5-(b)).

(5) *Short /e/ are subject to deletion and raising*
- (a) /ʔeːw̥**e**-a/ [ʔeːw̥a], *[ʔeːw̥**e**], *[ʔeːw̥**i**] 'is deep, shallow'
- (b) /ʔeːw̥**e**-tkʰ/ [ʔeːw̥**i**tkʰ], *[ʔeːw̥tkʰ], *[ʔeːw̥**a**tkʰ] 'deep, shallow'

(6) *[e] surfacing in protected positons*
- Initial-σ /tejuːw-a/ [tejuːwa] 'dares to do' (Barker, 1963, p. 113)
- Noun /sqʰul'e/ [sqʰul'e] 'meadowlark' (Barker, 1963, p. 390)

Implications This analysis simplifies our underlying representations and puts the burden of the work on Eval, which is preferable in OT analyses. Since most of these verb stems also feature the floating glottalizer, a better understanding of these can help us understand that phenomena as well. Long /eː/ exhibits similar deletion in non-stem initial positions, but not raising, which is predicted if long vowels are more privileged than short vowels.This lends more evidence to theories of positional privilege and shows that vowel reduction can occur in psycholinguistically unprivileged positions, not just those with a phonological basis.

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Progressive and regressive metaphony in an Upper-Southern dialect of Italy: some implications for phonological theory.

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Metaphony is one of the many assimilatory processes that concern vowels in the Italo-Romance dialects (see Sánchez-Miret 1999 for an exhaustive outlook on these processes). Of these assimilatory processes, regressive metaphony is doubtlessly the more pervasive and the one to which the literature has dedicated more attention (Rohlfs 1966, Maiden 1991, Calabrese 1985, 1998, 2011, Walker 2005, Russo 2007 among others). As is well known, in regressive metaphony, word-final unstressed high vowels, which in some dialects have eventually disappeared, influence the stressed word-internal vowels causing raising or dypthongisation, as exemplified in (1) with data from the Abruzzese dialect of Colonnella (Maiden 1991: 206):

(1) *Colonnella* NOVA(M) > ˈnɔ:və ‘new’ (fem.)

NOVU(M) > ˈnu:və ‘new’ (masc.)

Progressive metaphony has so far received less attention, perhaps because it concerns a much more restricted area, in the Abruzzi and Molise, while regressive metaphony regards almost all the Italian pensinsula, with the well known exception of the Tuscan area.

In progressive metaphony it is word-internal unstressed high vowels that cause raising of a following stressed /æ/, before undergoing reduction in some dialects (Rohlfs 1966 § 25, Giammarco 1979:29, Sánchez Miret 1999), as exemplified in (2):

(2) a) *Bellante* FILARE > fəˈli ‘to spin’ *Teramo* FATI(C)ARE > fatəˈji ‘to work’

SUDARE > səˈdi ‘to sweat’ RAUBARE > rʊbˈbi ‘to steal’

Generalized vertical adjustments in vowel height, according to Maiden (1991:136), are the graveyard of binary features analyses. According to Clements (1991), on the other hand, vowel raising is a phenomenon that seems to call for an analysis in terms of features, since height cannot be expressed as such in element theory, where subsegmental primes enjoy autonomous interpretation and are thus fully pronounceable. Harmonic processes involving raising have been expressed in terms of I addition (Colman & Anderson 1983 among others) or A demotion (Maiden 1991, Harris and Lindsay 1995) in element theory and as spreading of [+high] in feature theory (Calabrese 1985 et seq.). Therefore, progressive metaphony, which has never been analysed in formal terms to the best of my knowledge, can provide a testing ground for competing theories regarding the representation of the internal structure of segments and analyses of harmonic processes. Since an account in terms of I addition must be excluded for progressive metaphony, which is also triggered by /u/, lacking the element I, this contribution compares an element-based analysis of this process in terms of A demotion to a feature-based analysis in terms of height assimilation. The analysis is based on the dialect of Teramo in the Abruzzi (Upper-Southern), for which a vocalic inventory is proposed to refine previous descriptions that I show to be incomplete. Most relevant to the discussion on progressive metaphony, this inventory includes two series of high vowels, tense and lax, and also opposes tense and lax low central vowels.

This contribution shows that both an analysis in terms od spreading of [+high] and one in terms of A demotion may account for the data on progressive metaphony in the dialect of Teramo. However, despite the linearity of a feature-based analysis, an element-based account in terms of A demotion may clarify some diachronic and synchronic aspects of the phenomenon, which I show as having originated as breaking and being reanalysed as raising. An analysis in terms of A demotion, it is shown in addition, can help clarify why only one segment of the inventory, namely [æ], is targeted by the process. A raising process in terms of spreading of [+high] would predict the mid-vowels to raise as well, while the analysis proposed interprets regressive metaphony as a demotion of A only in the case this element is the head of a phonological expression. This account also opens a path of research that connects A demotion to breaking, since it has been suggested that A has a structural more than an elemental identity (Pöchtrager 2006, Carvalho & Russo) so its demotion can hinge on structural space.

This contribution also suggests a representation for tense vowels in the dialect of Teramo that is grounded in diachrony and is synchronically consistent with respect to the phonological inventory and phonological processes of progressive as well as regressive metaphony.
The analysis of progressive metaphony in terms of demotion of A from the role of head is then tested on regressive metaphony in the same dialect and in the dialect of Casalincontrada, which arguably coincides with an earlier stage of the dialect of Teramo, prior to monophthongisation (De Lollis 1890-92). On the one hand, these data support the previous findings about the relationship between A demotion from the role of head and the creation of structural space leading to diphthongisation and argue against an analysis in terms of [+high] spreading, since metaphony also target /u/ in this dialect; on the other, they show that metaphony in the dialects of Italy does not always consist uniquely of A demotion, as maintained by Maiden (1991). The data of Casalincontrada are best analysed as I addition (cf. Anderson & Durand 1986, Colman & Anderson 1983 for the analysis of I-umlaut in Old English), with a component of A demotion, as shown in (3) where I addition, A demotion from the role of head and diphthongisation are shown:

(3)

Latin vowel	**Proto-Romance outcome**	**Casalincontrada outcome in context of final A, E, O, U** (non metaphonic)	**Casalincontrada outcome in context of final I** (metaphonic)
Ă,Ā travem 'beam'	*Open syllable :* a	travə | <u>A</u>	treivə | / A / | / <u>I</u>

In the final part of the work, the new elements surfaced from the analysis of progressive and regressive metaphony in different stages of the dialect of Teramo, namely the importance of A-headedness in triggering its demotion and diphthongisation and the possibility of analysing some processes of metaphony also in terms of I addition, are exploited to sketch a tentative analysis of the essence of the general process of metaphony as it took place in late Latin and early Romance, and its spreading and evolution in a series of different processes in (Italo-)Romance.

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Alveolars on the verge of a nervous breakdown

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This paper presents a new analysis of affrication of *d/t* in Japanese, (various dialects of) Brazilian Portuguese, and Québec French, as well as a general theory of affrication.

Problem. In Japanese (Labrune 2012, Yoshida 1996, 2001), *t–tʃ–ts* stand in a special relationship with each other, such that *t* occurs before [a, e, o], *tʃ* before [i] and *ts* before [ɯ]. (Analogously for the triplet *d–dʒ–dz*.) The distribution of *tʃ–ts* (and *dʒ–dz*) can easily be modelled as the spreading of the element **I** from a nucleus onto the onset in the case of *tʃ/dʒ*. What is less clear is why an alveolar stop is only allowed before a non-high vowel, but breaks down into an affricate before high vowels. The problem becomes even more vexing once other, slightly different affrication patterns are brought in. Several dialects of Brazilian Portuguese (Cristófaro-Silva 2003) have *tʃ/dʒ* before [i] but *t/d* elsewhere. Again, palatalisation is readily explicable as the spreading of **I**, but affrication is not. Lastly, Québec French (Kaye 1989) has *ts/dz* (not *tʃ/dʒ*) before [i/ɪ] and [y/ʏ] but *t/d* elsewhere. What is particularly instructive is that affrication occurs without palatalisation.
This paper argues that those three cases can be unified and that the affrication/palatalisation patterns are derivable from general principles. The analysis is couched within Government Phonology (GP) 2.0 (Pöchtrager 2006, Kaye & Pöchtrager 2013).

Proposal. From the above facts we can extract a descriptive generalisation: Affrication (though not necessarily palatalisation) occurs before a nucleus that contains **I** by itself, [i], or one that is empty, [ɯ]. This is true of all three languages. The following questions ensue:

(a) What do these two kinds of nuclei (or their complement set) have in common?
(b) What singles out alveolar stops for affrication, while labials or velars stay unaffected?
(c) What is the link between (a) and (b) that explains affrication?

P1, ad (a). Pöchtrager (2009, in press) and Živanovič & Pöchtrager (2010) presented a theory of phonological binding that restricts the distribution of elements within phonological representations. Crucially, positions annotated with **I** and those without any annotation (empty positions) have the same binding requirements, i.e. they cannot be bound. This was argued for on the basis of an in-depth analysis of Putonghua, where the sequences **(d)ya*/**(d)wa* as well as **(d)way* are out, while *(d)yaw* is grammatical. The argument runs as follows: Onglides sit in a higher position than offglides, i.e. onglides can bind offglides. In **(d)ya*/**(d)wa*, the offglide position is empty (no glide following *a*) and bound by the onglide (*y*/*w*), hence both forms are out. In **(d)way* the onglide *w* binds the offglide *y*, ruling out **(d)way*. Empty offglides and the offglide *y* (element **I**) function alike. In *(d)yaw* the onglide *y* binds the offglide *w* (element **U**), but since there no binding restrictions on **U**, the structure is licit. The same asymmetries come back in English (diphthong *oy* but **ew*), cf. Pöchtrager (2009, in press). This is exactly what we need for grouping [i] and [ɯ] together.

P2, ad (b). In many earlier versions of GP, alveolars were characterised by the element **A**. In GP 2.0, **A** is replaced by structure, based (amongst other things) on data like these: In English, long vowels before clusters only occur if both members of the cluster are alveolar: *haunt* vs. **haump*, **haunk*. That is, longer structures are made possible by (the "alveolar element") **A**. Examples like those are also found in German, Finnish, Hungarian etc. (Pöchtrager 2012, 2013). Since **A** consistently interacts with structure, it must be structural itself. Under such a reinterpretation, objects that contained old **A** are now structurally bigger than those without. Thus, alveolars are bigger than velars or labials, readily explaining why in English it is *d/t* that undergo lenition (tapping): They are the biggest objects and thus easy targets. This also extends to vowel reduction (typically of non-high vowels) in unstressed position as e.g. in Portuguese or Catalan (Harris 1997): Unstressed *o/e* is reduced to *u/i*. Again, this is expressible as the loss of structure in the weak part of the foot. Lastly, extra size is the key to affrication as well.

P3, ad (c). Given that positions annotated with **I** and empty positions form a set for binding, cf. (P1), I will argue that in the case of affrication we are dealing with a violation of binding. Without going into the exact shape of the tree, it is clear that the additional structure characterising *d/t* must contain a position that can bind following [i]/[ɯ]. In order to remedy this violation, affrication occurs, which, I submit, consists in the removal of one layer of that extra structure in *d/t*. (Another layer remains to guarantee that *ts/dz* are alveolar.) Following [u] will be unproblematic as **U** has no binding requirements, cf. (P1). Whether the resulting affricate *ts/dz* palatalises to *tʃ/dʒ* will depend on whether the following **I** spreads or not, but that is independent of affrication. Note also that mid-vowels like [e] do not trigger affrication, i.e. the **I** contained in [e] must be located in a position that does not violate binding.

Further issues. The present proposal bears a certain similarity to one by Yoshida (2001), who arranges elements in a feature geometrical tree and links affrication to structural properties of that tree. There are at least three differences to the present proposal, however. **1.** The constraints that apply in Yoshida's tree seem rather ad-hoc and tailormade for Japanese, while the current proposal attempts to integrate affrication patterns in several languages into a larger theory of melodic distribution that was originally conceived for distributional patterns in diphthongs, i.e. binding. **2.** Yoshida's account fares well for *tʃ/dʒ* but remains rather unclear for *ts/dz*. **3.** Yoshida's account is able to express changes from *k/g* to *tʃ/dʒ* which the present account – correctly, I submit – excludes. In order to go from *k/g* to alveopalatal *tʃ/dʒ*, not only do we need to add an **I** element (the source of which could be in the environment), but we also need to add extra structure for alveolarity, and this extra structure can neither simply come out of nowhere nor can it come from the environment (typically a following [i]). The prediction is then that such changes are not phonological, and as such we would expect them to be highly idiosyncractic and exceptional. Italian and Polish have such alternations, and of course the prediction that they are subject to a host of exceptions is correct, cf. Italian *di*[k]*o*/*di*[tʃ]*i* 'I/you say' but *evo*[k]*o*/*evo*[k]*i* 'I/you evoke'. This incorrect prediction is avoided by the present model, which also has a larger empirical fit than its predecessors.

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First approach to Phonological Phrase in Spanish Prosodic Hierarchy

Abstract

Although Prosodic Hierarchy was well established in phonological theory for several years now (Nespor and Vogel 1986), very little work was done about Spanish. Specifically, authors have been doing a lot of research on the Phonological Phrase constituent in other languages (Truckenbrodt 1999, Selkirk 2011, among others), but in Spanish there is no recent work that pays attention to this constituent. It is true that in traditional literature about Spanish Phonology Navarro Tomás recognized the existence of the 'grupo de intensidad' or 'grupo tónico' and Gili Gaya proposed the concept of 'sirrema', but they are not fully equivalents to Phonological Phrase. Moreover, recent authors are not even sure about its existence in Spanish (Prieto, 2006). Therefore, the aim of this study is to research on the Phonological Phrase in Spanish and to find proofs of its existence.

To do so, an acoustical study on the Phonological Phrase has been proposed as an objective way to procure such evidence: To examine two well-known segmental processes in Spanish (voiced-stop spirantization, Hualde et al. 2011, and alveolar fricative voicing in coda position, Campos-Astorkiza, to appear) as empirically accurate parameters in the delimitation of Phonological Phrases. Steady prosodic boundaries that could be detected from the effects of these two segmental processes have been looked for in order to find out the boundaries of the Phonological Phrase constituent. That is, when spirantization or voicing assimilation is not taken place, this fact is assumed as a proof of the existence of a boundary. For this purpose, 334 stimuli have been made up with /b/, /d/, /g/ and /s/ utterances, which were analyzed from one of the each four Centropeninsular Spanish speakers recorded. After data recordings, Praat software was used for the acoustical analysis and data were subject to a series of subsequent statistical analyses.

Preliminary results indicate that the structure [subject+verb] does not constitute a single Phonological Phrase, instead of two, since a steady prosodic boundary was found between its formatives. Furthermore, other structures could be prosodically licensed by smaller or bigger prosodic constituents: [deter+noun] and [clitic+verb] could be attached at Prosodic Word level since no prosodic boundary has been found between them; and bigger structures could be prosodified as Intonational Phrases. Further work is needed to determine whether or not structures such as [noun+adjective] and [verb+object] form a single Phonological Phrase since the results found here are not enough clear.

To conclude, the analysis carried out supports the idea that prosodic structure and syntax structure are not isomorphic. It seems that Phonological Phrase is also a constituent in Spanish Prosodic Hierarchy, but future research is needed to confirm these preliminary findings.

Key words: Prosodic Hierarchy, Phonological Phrase, voiced-stop spirantization, voicing assimilation, Spanish

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Variation and subpatterns of disharmony in Hungarian

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If we view variation in phonology as differential behaviour under identical conditions (rather than multiple outputs corresponding to the same input), then we can distinguish two types: *lexical variation* (when different lexical items that have the same relevant phonological properties behave in different ways under identical conditions) and *vacillation* (when the same lexical item behaves in more than one way in the same context).

Both these types occur and show intricate patterning and subpatterning in Hungarian front/back harmony, specifically in disharmony after roots that contain neutral vowels (Szigetvári et al. 2012). In this paper we discuss these and show that they conform to the requirement of monotonicity/contiguity of patterning that we claim constrains disharmony in harmonic systems.

Hungarian has three vowels that behave neutrally to a different degree: i(ː) > eː > ɛ, to simplify matters here we focus on i and iː, which are “strongest” in neutrality.

Anti-harmony (AH) shows lexical variation. AH occurs when an all-neutral root requires the back alternant of an alternating suffix. Some roots with i(:) show this behaviour, but most roots of identical vocalic structure have the front (i.e. non-disharmonic) alternant: [N]B *ʃiːr-toːl* ‘grave-ABL’ but [N]F *hiːr-tøːl* ‘news-ABL’ . See (1) below where roots are shown as harmonic contexts to which the harmonic values back or front are assigned in suffixes:

(1)	contexts	[...B]_	[N]_	[...F]_
	values	B	**B**|**F**	F

This pattern is modified by what we call the ‘Polysyllabic Split’, which inhibits lexical variation for polysyllabic all-neutral roots: there are no anti-harmonic roots longer than one syllable (context [NN^{+}]_):

(2)	contexts	[...B]_	[N]_	[NN^{+}]_	[...F]_
	values	B	**B**|**F**	F	F

The neutral vowels i(:) are transparent in Hungarian: *koʧi-toːl* ‘car-ABL’, øʧi-*tøːl* ‘lad-ABL (the other neutral vowels are variably transparent in accordance with their degree of neutrality; this is the ‘height effect’ we abstract away from (Hayes and Londe 2006)). Thus:

(3)	contexts	[...B]_	[...BN]_	[...FN]_		[...F]_
	values	B	B	F	F	

Transparency to backness shows vacillation when there is more than one neutral vowel in the context [...BNN^{+}]_; compare *madrid-toːl* ‘Madrid-ABL’ and *martinik-toːl/tøːl* ‘Martinique-ABL’. This is called the ‘count effect’ (Hayes and Londe 2006):

(4)	contexts	[...B]_	[...BN]_	[...BNN^{+}]_	[...FN]_	[...F]_
	values	B	B	**B%F**	F	F

Interestingly, both variable patterns are modified by a paradigmatic uniformity constraint 'Harmonic Uniformity' (HU) which requires that the harmonic class of a suffixed stem must be identical to the harmonic class of its root.

HU and anti-harmony: *ind-* 'start' is an antiharmonic bound root, accordingly, it takes the back alternant of the intransitive suffix: *ind-ul*. The same root can also take the transitive suffix *-iːt* which invariable and has the neutral vowel *iː*. The form *ind-iːt* 'start-TRANS' is all-neutral and polysyllabic and cannot be antiharmonic according to the Polysyllabic Split - but it is because of HU: *ind-iːt-oː* 'start-PART' not **ind-iːt-øː*. This means that there is lexical variation after polysyllabic stems and thus there are different subpatterns in anti-harmony for roots and polymorphemic stems:

(5)	contexts	...B_	N_	NN_	...F_
	roots	B	**B**|**F**	F	F
	polym. stems [[...]N]_	X	X	**B**|**F**	X

HU and transparency: the *i* is transparent in *madrid-toːl*. If we add the locative suffix *-i*, variation should occur according to the count effect, but because of HU only *madrid-i-toːl* 'Madrid LOC DAT' is possible **madrid-i-tøːl* is not. Again, there are different subpatterns for roots and polymorphemic stems:

(6)	contexts	...B_	...BN_	...BNN_	...FN_	...F_
	roots	B	B	**B**%**F**	F	F
	polym. stems	X	B	B	F	X

We have argued elsewhere that the typology of disharmony in front/back harmony systems (Kiparsky and Pajusalu 2003) can be given a simple analysis with reference to the principle of monotonicity requiring that the patterns of values assigned to harmonic contexts must be contiguous (assuming a universally fixed scale of harmonic contexts). In the talk we show that (i) both transparency and anti-harmony in Hungarian are best analysed as coexisting subpatterns ('co-phonologies'); (ii) both types of variation in Hungarian front/back harmony and (iii) the intricate subpatterns conform to monotonicity and thus fit into the general (cross-linguistic) picture.

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The acquisition of non-native contrasts at first exposure

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While numerous models have been proposed in the study of the acquisition of second language (L2) phonology, the focus of these models has primarily been on the classification of native and non-native contrasts (e.g., Flege, 1995). Far less focus has been placed on the time course of adult phonological acquisition. The current study tackles this issue by examining the perception of non-native contrasts at first exposure, offering a unique opportunity to examine the development of perceptual sensitivity in adult learners in the very first hours of exposure to the L2 sound system.

The Polish language boasts an unusually rich inventory of fricatives and affricates and therefore provides an excellent testing ground for the acquisition of non-native phonemic contrasts. In this study, 36 native speakers of French took part in a 10-day Polish course and received a total of 14 hours of oral Polish input from a native-speaking instructor. None of the participants had previously been exposed to Polish or another Slavic language and the input included no explicit phonological instruction. Participants were tested on their ability to distinguish the three-way place distinction in Polish sibilants (alveolar /s, z/, alveo-palatal /ɕ, ʑ/, and retroflex /ʂ, ʐ/). French, in contrast, distinguishes only two places of articulation in sibilants (alveolar /s, z/ and palate-alveolar/ʃ, ʒ/).

Participants completed an AX discrimination task at three time intervals throughout the course: prior to any exposure to Polish (T1: 0 hours of input), after 4.5 hours of input (T2) and after 10.5 hours of input (T3). The test stimuli consisted of pairs of CV non-words including six fricatives from the Polish phonemic inventory: /sa/, /za/, /ɕa/, /ʑa/, /ʂa/, /ʐa/. The experiment consisted of 240 trials; in each trial, one of the six CV syllables was paired with either one of the other CV syllables or with a different version of the same CV syllable.

Discrimination of the non-native phonemes only (/ɕa/, /ʑa/, /ʂa/ and /ʐa/) showed a main effect of Test (T1, T2, T3) in a repeated-measures ANOVA: $F(2, 35)= 8.202$, $p = .0006$, indicating that participants' discrimination of the unfamiliar sibilants improved significantly as a function of input. Post-hoc analyses showed, however, that there was no significant difference between T1 and T2, suggesting that 4.5 hours of input was not sufficient for participants to begin to establish new phonemic categories. Significant differences in performance were observed between T1 and T3 ($p = .0009$) and between T2 and T3 ($p = .0261$). The current results therefore show a rapid and significant increase in the ability of participants to discriminate non-native sounds after just 10.5 hours of input in the target language, shedding light on the developmental course of adult phonological acquisition. Our results will be discussed in light of current theories of implicit language learning.

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Processing liaison in L2 French: the case of non-traditional learners

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The misalignment of syllable and word boundaries in spoken French poses significant challenges for spoken word recognition processes in learners of French as both a first and second language (L1 and L2, respectively). Liaison, for example, is a phonological phenomenon in French that involves the surfacing of a latent coda consonant before a vowel-initial word (e.g. /n/ in *un enfant* [ɛ̃nɑ̃fɑ̃] 'a child' versus *un livre* [ɛ̃livʁ] 'a book'). The liaison consonant (LC) is subsequently resyllabified as the onset of the following word (e.g. *un enfant* 'a child' is syllabified as [ɛ̃.nɑ̃.fɑ̃] instead of [ɛ̃n.ɑ̃f.ɑ̃]), in effect masking the vocalic onset. The difficulties posed by the misalignment of boundaries are evident in L1 production errors, which reveal that children initially segment the nominal group incorrectly by interpreting the resyllabified LC as a lexical onset consonant. They detach the determiner from the noun without taking into account the special prosodic status of the LC, producing for example [le.nuʁs] instead of *les ours* [le.zuʁs] 'the bears'.

Production errors observed in the current L2 literature differ from child errors in that adult learners appear to be influenced by the orthography of individual words and, therefore, may fail to internalize the underlying prosodic position of the LC (Thomas, 2004). Subsequently, many adult learners produce L2 French on a word-by-word basis without taking into account the phonological processes that occur across word boundaries. Observed L2 errors include a lack of resyllabification of the LC (e.g. [ɛ̃n.ɑ̃fɑ̃] for *un enfant* [ɛ̃.nɑ̃fɑ̃]), production of the graphic form of the underlying LC (e.g. [ɛ̃gʀɑ̃dami] for *un grand ami* [ɛ̃gʀɑ̃tami]), or omission of the LC entirely, often coupled with the insertion of a glottal stop (e.g. [ɛ̃.ʔɑ̃fɑ̃] for *un enfant*). However, as Wauquier and Shoemaker (2013) note, currently available production data on the L2 acquisition of liaison offer but a partial picture of acquisitional strategies in that adult learners in the currently available literature all have a systematic orthographic knowledge of French, which can influence spoken productions. Furthermore, participants in the current literature are primarily speakers of Germanic languages (English, Dutch, Swedish), languages which mark word boundaries with relatively salient acoustic cues. To our knowledge, no available data take into account how learners of L2 French from other language families perform in a learning situation based predominantly on oral input without systematic orthographic support, i.e. a learning situation that more closely mirrors child learning.

In the current study, native speakers of Mandarin Chinese (N=5) and Bengali (N=5), who were beginning learners with primarily oral exposure to French, were tested on their productions of determiner (Word1) + noun (Word2), a case of obligatory liaison in spoken French. Participants first saw an image and heard a sentence produced by a native speaker such as *Voici un ours* [vwa.si.ɛ̃.nuʁs] 'Here is a bear'. They were instructed to repeat the sentence they had heard and then to produce the corresponding plural, e.g. *Voici deux ours* [vwa.si.dø.zuʁs] 'Here are two bears'. This paradigm allows us to investigate whether learners have internalized the particular prosodic position of the LC in that it requires them 1) to recognize that /n/ in *un* in the first sentence is a resyllabified LC and not a lexical-initial consonant and 2) to produce a liaison with the latent /z/ in *deux* in the second sentence. Participants heard in total 90 words, of which 45 were consonant-initial distractors. Of the 45 vowel-initial test words, 22 were masculine and 23 were feminine. The test items and distractors were further divided as to word-length, comprising one-, two-, and three-syllable words.

Preliminary analysis of the production data from these learners points to a mixture of both L1 and L2 processing strategies previously observed in the literature. For example, we observed several production errors that have been previously documented in L2 learners such as a total omission of the LC [vwa.si.dø.uʁs] and/or the insertion of a glottal stop as the onset of Word2 [vwa.si.dø.ʔuʁs] for *Voici deux ours* [vwa.si.dø.zuʁs], suggesting the use of a lexical strategy in which *ours* [uʁs] 'bear' is produced without resyllabification. This implies that these learners have not internalized the particular prosodic position of the LC.

However, the majority of production errors included instances of surface segmentation in which /n/ was produced as the lexical onset of Word2 in the plural (e.g. [vwa.si.dø.nuʁs] for *Voici deux ours* [vwa.si.dø.zuʁs]), an error only previously observed in child learners. In these instances, participants seem to be implementing a syllabic segmentation strategy in that they are relying solely on the surface input as children initially do, without taking into account the prosodic position of the LC. This particular error has not previously been observed in L2 learners and suggests that adult learners with relatively little written input rely more heavily on syllable boundaries and surface input, whereas adult learners with primarily written exposure rely more heavily on a lexical strategy that involves the processing of individual items on a word-by-word basis as has been seen in the existing literature.

The intention of the current study is to remove as much as possible the influence of orthography in the processing of liaison and resyllabification in adult learners of L2 French in order to investigate whether L2 learner strategies and phonological development differ fundamentally from those of children as has been proposed (Thomas, 2004; Wauquier, 2009). Interestingly, all of the above strategies were often observed in the same learner, suggesting that adult learners with little written exposure have some intuition that syllabic segmentation is not reliable in French, however the prosodic position of the LC is not yet established in their phonological grammar. The data will further be discussed in relation to both word length and participants' familiarity with the individual test items in order to elucidate the apparent contradiction between the use of both syllabic and lexical strategies. Typological differences between Mandarin Chinese and Bengali will also be examined in an attempt to explore the influence of phonotactic constraints as well as constraints on syllable structure on L2 productions.

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Grammatical restrictions on lexical avoidance in children's phonological acquisition

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Introduction Many case studies of phonological acquisition report evidence of *lexical avoidance* (or *lexical selection*), whereby early learners avoid words with difficult or marked phonological structures – meaning that they not only repair such structures in production, but also fail to attempt target words that contain them (e.g. Ferguson and Farwell, 1975; Menn, 1983; Vihman, 1993; Schwarz and Leonard, 1982; Schwarz *et al*, 1987.) A few longitudinal studies have documented this avoidance through statistical comparison with the lexicon: for instance, Adam and Bat-El (2009) report a Hebrew-learning child at 1;02-1;05 who most often attempted multi-syllabic words with penultimate stress (e.g. *banána*) even though the ambient lexicon's most common stress pattern is word-final (e.g. *todá*, 'thank-you').

Questions and Hypotheses One appealing pre-theoretic idea is that young children avoid words that their current linguistic system deems too complex overall – but what are the potential sources of complexity that can interact with a child's lexicon in this way? This paper advances the claim that lexical avoidance is derived directly within the phonological grammar, captured here using OT constraints, and that lexical avoidance can only occur when forced by the conflict between high-ranking phonological constraints (see below).

To support this claim, we present initial analyses of spontaneous English speech from Rowan (a child in PhonBank's Davis corpus), comparing one-word vs. multi-word utterances. Some early studies suggested that a child's restricted phonological system can delay the appearance of multi-word phrases (see especially Donahue, 1986, also Waterson 1978). Here, we consider whether longer utterances *themselves* can drive avoidance – that is, whether Rowan avoids marked phonological structures in multi-word utterances as compared to one-word utterances – and whether any observed avoidance is attributable to the interaction of typologically-established phonological constraints.

Data and Methods Beginning with Rowan's first multi-word utterances at 1;03.25, the corpus provides 26 sessions up to age 2;10 with a total of 3,059 utterances. These were divided into two analyzeable groups – one-word utterances (1WUs, e.g. *car*) and multi-word utterances (MWUs, e.g. *fast car*) – and a third group of reduplicated utterances (e.g. *car car car*), which were excluded as ambiguous. From initial inspection of the data, we further focused on the early development of MWUs between 1;05 and 2;3; we removed the 251 reduplicated utterances from this period, leaving 1377 1WUs and 561 MWUs to analyze.

For each age range and utterance type, we compared the frequency with which Rowan attempted targets containing various complex or marked structures, including longer words, larger syllables and difficult consonants and seuquences. We then calculated what proportion of the target words in the 1WU vs. MWU groups contained each structure; chi-squared tests of 2x2 contingency tables were used to examine whether the frequency of each structure was significantly different between the two utterance groups at each age.

Results Across all potential sources of complexity examined, the only clear source of lexical avoidance was target word length. Between 1;05-2;1, MWUs were less likely to contain multi-syllabic targets compared to 1WUs (1a). In contrast, the proportion of e.g. attempted complex onsets (1b) was unaffected by utterance size (note small sample at 2;2).

(1) *Raw data*		*1;5-1;7*	*1;10*	*1;11*	*2;0*	*2;1*	*2;2*	*2;3*
a) 1WU	Multi-σ words/ total words	139/403	47/255	158/468	27/105	16/67	2/13	8/49
MWU	Multi-σ words/ total words	5/64	17/145	104/351	28/237	35/283	5/79	65/382
b) 1WU	CompOnsets/ total words	24/403	33/255	56/468	14/105	4/67	3/13	2/49
MWU	CompOnsets/ total words	4/64	18/145	57/351	18/237	19/283	2/79	17/382

Grammatical restrictions on lexical avoidance in children's phonological acquisition

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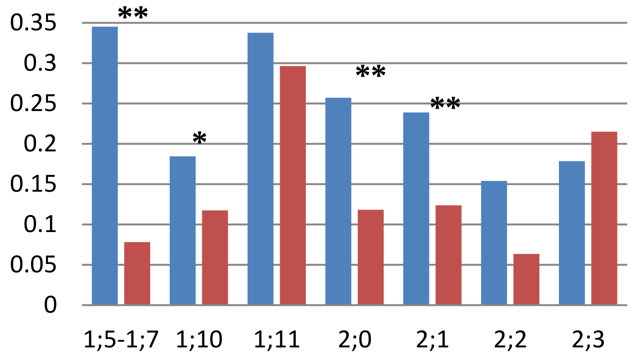
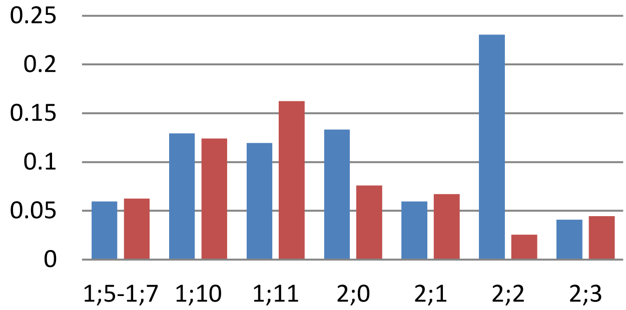
The graphs below illustrate the proportion of multi-syllabic words (2) and complex onsets (3) by utterance group: at each age, 1WUs are shown on the left and MWUs on the right. Comparisons marked with ** are significantly different ($p < 0.01$) in the expected direction.

(2) *Proportion of multi-syllabic words*



(3) *Proportion of complex onsets*



Analysis The notion of lexical avoidance has been captured in the (adult) OT literature using the notion of a *null parse* candidate [⊙] (Prince and Smolensky, 1993, McCarthy and Wolf, 2007): an output with no phonological correspondence at all, which violates a single constraint M-PARSE (for use in child phonology, see van Oostendorp, 2009). MPARSE can conspire with constraints that align word and phrasal edges (abbreviated below as 'PHRASE=FOOT') to drive avoidance of multi-syllabic words just in MWUs (5), as in (2):

(4) /fæst kaɹ/ *fast car*	PHRASE = FOOT	MAXσ	MPARSE	(5) /kɪɾi kaɹ/ *kitty car*	PHRASE = FOOT	MAXσ	MPARSE
☞ (dæ.da)				(dɪ.ɾi)(da)	*!		
(da)		*!		(da)		*!*	
⊙			*!	☞⊙			*

(A current follow-up study appears to rule out the confounding possibility that more mono-syllabic words are chosen in MWUs because they include more functional items.)

On the other hand, syllable structure constraints like *COMPLEXONSET are violated equally by structures in utterances of any size. As seen in the unranked tables below: any ranking will choose the same onset cluster treatment for a 1WU (6) as for a MWU (7), so *COMPLEX cannot cause avoidance only in the MWU scenario, in line with (3)'s result:

(6)/tɹʌk/	*COMP ONSET	MPARSE	MAX-C	(7)/kɪɾi tɹʌk/	*COMP ONSET	MPARSE	MAX-C
tɹʌk	*			dɪ.ɾi.tɹʌk	*		
tʌk			*	dɪ.ɾi.tʌk			*
⊙		*		⊙		*	

Overall, this study provides evidence that children's lexical avoidance arises through grammatical means, via a phonology equipped with the null parse – and that for learners, phonological complexity is not always created equal.

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Alex Vaxman

Diacritic weight scales: a novel approach to lexical accent systems

In this paper, I provide a novel theoretical approach to lexical accent based on the Primary Accent First (PAF) theory (van der Hulst 2010, Goedemans and van der Hulst 2014) and the *diacritic weight scale* introduced below. The PAF theory is a non-metrical parametric approach which separates the representation of word accent (primary stress) and rhythm and does not use feet. While the PAF theory correctly accounts for stress location in a wide number of languages, including the weight-sensitive ones, it encounters difficulties in lexical accent systems. Building on the notion of "diacritic weight scale", I extend the PAF theory in order to let it account for word accent in languages of this type and illustrate how accent is assigned in the case of Central and Southern Selkup (Uralic).

In the Napas dialect of Selkup (Samoyedic, Uralic), for certain accented morphemes (1a), stress falls on the leftmost one; if both morphemes are unaccented, stress falls on the leftmost morpheme in the word (1b). Both patterns can be straightforwardly captured by a PAF grammar, assuming that lexical accents are projected as gridmarks just like syllable weight.

(1) a. ˈʔapt-e smell b. ˈam-a mother
ˈkomd-e money ˈloɣ-a fox

However, in certain cases, as in (2), stress does not fall on the leftmost morpheme.

(2) taˈp-ol-gu kick (*of an animal*)-SEMEL-INF
koˈb-al-gu scour-SEMEL-INF

Therefore, the PAF theory fails to capture this pattern. This calls for a different approach to lexical accent.

Recall now that "syllable weight" is the ability of *syllables* to attract stress which is based on their phonological properties. It is then reasonable to view the ability of *morphemes* to attract stress also as a manifestation of weight which has been called "diacritic weight" (van der Hulst 1999:19), with this difference that it lacks phonological sources (e.g. Rhyme structure, sonority).

Diacritic weight should be preferred over lexical accent because accent is a categorical variable, while weight is an ordinal one: this property of diacritic weight allows us to order morphemes in a language-specific *diacritic weight scale*, by analogy with phonological weight scales (see Gordon 2006: 27-28).

Thus, I will show that Central and Southern dialects of Selkup have the diacritic weight scale (3) with the superheavy morphemes being stressed in any word containing them:

(3) superheavy > heavy > light

We can now formulate an *accent assignment mechanism* for Central and Southern Selkup which consists of the scale in (3) and of the set of PAF parameter settings (4):

(4) {Domain (Unbounded), Weight (Yes), Select (Left), Default (Left), Extrametricality (No)}

In addition, I assume that only the heaviest morphemes in a word (according to the language-specific scale) project their weight in derivation.

Sample derivations are provided below, drawing on data from Normanskaya (2011). Consider the form [aˈvʲeʃpugu] ("burn.down-INF") involving the diacritic weights in (5). The derivation for the UR /avʲ-eʃ-pu-gu/ runs as in (6), resulting in an initial stress:

(5) /av/: light; /-eʃ/: heavy; /-pu/: light; /-gu/: heavy

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(6)      *                      Select (Left)
         *      *               Project weight
   /avʲ-eʃ-pu-gu/
```

The stress on /-ol/ in [taˈp-ol-gu] ("kick (*of an animal*)-SEMEL-INF"), which contains the superheavy semelfactive suffix /-ol/, preceded by a heavy root and followed by a heavy suffix /-gu/, is derived as in (7).

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(7)     *                       Select (L)
        *                       Project weight
   /tapolgu/
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Summarizing, while the PAF theory alone cannot account for stress location in lexical accent systems, it can do so if it is enriched with the diacritic weight scale. It was also shown (Vaxman 2014) that the PAF theory can account for stress systems sensitive to both phonological and diacritic weight (Mari, Uzbek) if it is enriched with a "hybrid weight scale", along which the diacritic and phonological weight are ordered.

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