The Twenty-Ninth Manchester Phonology Meeting

fəˈnɒlədʒi

ABSTRACTS BOOKLET

Wednesday 25th - Friday 27th May 2022

Not held in **Manchester,**
but still there in spirit

Organised by a collaboration of phonologists at the **University of Edinburgh**, the **University of Manchester**, and elsewhere.

This booklet contains the abstracts for all the papers presented at the **twenty-ninth Manchester Phonology Meeting**, held in cyberspace, in May 2022.

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

The abstracts for the **talk sessions** are presented first, followed by the abstracts for the **poster sessions.**

The **final programme**, available on the 29mfm website, gives the details of when presentations are scheduled.

The 29mfm website is available here:

http://www.lel.ed.ac.uk/mfm/29mfm.html

Talks

Definite Determiners in Tihaami Yemeni Arabic

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This paper analyzes the definite determiner (DET) of two Yemeni Arabic dialects using OT with the Partial Orders theory of optionality (Anttila, 1997). The underlying DET for the first dialect (the *b-dialect*) is /b-/: [θoor] 'ox'- [b-θoor] 'the ox'. In the other dialect (the *m-dialect*) it is /m-/: [m-θoor] 'the ox'. Though DET behaves differently in these two dialects, I present an analysis that treats them the same except for their underlying representation and the ranking of two constraints.

In both dialects, the determiner behaves similarly before labials (1). The DET fully assimilates to a word-initial labial, creating a word-initial geminate. So, whether the DET is underlyingly /b-/ or /m-/ it surfaces as the first part of a geminate before labials. This full assimilation is triggered by OCP-LAB, which penalizes adjacent labial consonants, even partial geminates like [mf]. Candidates (2a,b) are ruled out by OCP-LAB. But candidate (c) satisfies OCP-LAB because it is a full geminate. (2) shows the *b-dialect*, but the result would be the same for the *m-dialect* except that candidates (a) and (c), but not (b), would violate ID-SON. However, both dialects present further complications involving these geminates.

(1)	a. ward	'flowers'	**w-**ward	'the flowers'
	b. fasˤl	'classroom'	**f-**fasˤl	'the classroom'
	c. bard	'cold'	**b-**bard	'the cold'
	d. marag	'soup'	**m-**marag	'the soup'

(2)

/b - fasˤl/	OCP-LAB	ID-SON	ID-CONT
a. bfasˤl	*!		
b. mfasˤl	*!	*	
☞c. ffasˤl			*

In the *m-dialect*, if the word-initial syllable is light as in /fandim/ 'cop', gemination is attested optionally ([**f-**fandim]~[**m-**fandim]), but when the initial syllable is heavy, the gemination option is accompanied by epenthesis so that the first half of the geminate is syllabified as a coda: /m-fiiraan/ → [ʔ**af**.fii.raan] 'the mice'. This is explained if we assume all geminates, even word-initial ones, are moraic: in that case, epenthesis is compelled by a ban on trimoraic syllables, *μμμ. The alternative to geminating in the *m-dialect* [**m-**fii.raan], violates OCP-LAB. The two outputs are produced with a variable ranking between ID-SON and OCP-LAB (3). In the b-dialect, however, gemination with heavy syllables is only optional: [**f-**faanuus]~[ʔ**af**.faa.nuus], 'the lantern'. It doesn't allow the partial geminate *[mf..] realization. So, *μμμ must be low-ranked in the *b-dialect*. The epenthetic form [ʔ**af**.faa.nuus] violates DEP. The two outputs are produced with a variable ranking between *μμμ and DEP (4). The DET in this dialect also becomes nasal before pharyngeals and nasals, [**m-**ʕasal] 'the honey'. I treat this as nasal assimilation: Rabin (1951) and Khattab et al. (2016) show that Arabic pharyngeals have nasal airflow. As (5) shows, AGR-NASAL produces the proper outcome.

(3)

/m - fiiraan/	*μμμ	ID-SON	OCP-LAB	DEP
☞a. mfii.raan			* (!)	
☞b. ʔaf.fii.raan		* (!)		**
c. ffii.raan	*!	*		

(4)

/b - faanuus/	OCP-LAB	ID-SON	*μμμ	DEP
☞a. ffaa.nuus			*(!)	
☞b. ʔaf.faa.nuus				*(!)*
c. mfaa.nuus	*!	*		

Finally, both dialects show an interesting case of word-initial glottal stop deletion in the definite forms: /**ʔ**aħmar/- [m-aħmar] 'the red', /**ʔ**aχbaar/ - [m-aχbaar] 'the news', but not in [**m-**ʔaaθaar] 'the traces', [**m-**ʔinaarah] 'the lighting'. It is governed by MAX-ROOT and FAITH-MORH-TEMPELATE constraints.

(5)

/b - ʕasal/	AGR-N	OCP-LAB	ID-SON	*μμμ	DEP
a. bʕa.sal	*!				
☞b. mʕa.sal			*		
c. ʔab.ʕa.sal	*!				**

This paper claims that initial geminates are moraic in Arabic and supports existing literature on the weight of initial geminates: Muller (2001), Topintzi & Davis (2017), Davis (2011). The analysis provided treats the determiner in the two dialects as being governed by very similar grammars. It also supports the argument about the interaction of nasalization with pharyngeals and laryngeals and treats pharyngeals as a subclass within gutturals to the exclusion of uvulars.

Sensitivity to string length and feature count subverts MaxEnt universals

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- Noisy HG (NHG) and MaxEnt (ME) are often considered minor variants with comparable predictions (Alderete & Finley 2021). We show this is not so: many reasonable implicational universals that hold in NHG fail in ME because of ME's sensitivity to string length and segment count.
- A typology of probabilistic phonological grammars satisfies the **implicational universal** $(\mathsf{x}, \mathsf{y}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{y}})$ provided the probability of realizing the underlying form $\widehat{\mathsf{x}}$ as the surface form $\widehat{\mathsf{y}}$ in the consequent is always at least as high as the probability of realizing the underlying form x as the surface form y in the antecedent (Anttila & Magri 2017; AM). For instance, the implication (/cost+us/, [cos'us]) $\rightarrow$ (/cost+me/, [cos'me]) says that the probability of t-deletion is always at least as high before consonants as it is before vowels (Coetzee and Kawahara 2013). AM show (Proposition 3) that ME implicational universals require the sum of the ("discounted") violations of the consequent losers to be at least as large as the sum of the ("discounted") violations of the antecedent losers. In this paper, we derive and discuss two corollaries of AM's result.
- We focus on cases where the underlying and surface forms coincide in both the antecedent (i.e., $\mathsf{x} = \mathsf{y}$) and the consequent (i.e., $\widehat{\mathsf{x}} = \widehat{\mathsf{y}}$). The resulting implication $(\mathsf{x}, \mathsf{x}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{x}})$ says that the antecedent form x is more **marked** than the consequent form $\widehat{\mathsf{x}}$, because the probability of the latter is always at least as high as that of the former. We denote by $\overline{C}(\mathsf{x})$ the **average** number of violations assigned by a constraint C to the candidates of the underlying form x: $\overline{C}(\mathsf{x}) = \frac{1}{|Gen(\mathsf{x})|} \sum_{\mathsf{u} \in Gen(\mathsf{x})} C(\mathsf{x}, \mathsf{u})$. We deduce from AM's result this **first corollary**: if the markedness implication $(\mathsf{x}, \mathsf{x}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{x}})$ holds in ME, the consequent has average faithfulness violations at least as large as the antecedent, namely $\overline{F}(\widehat{\mathsf{x}}) \geq \overline{F}(\mathsf{x})$ for every faithfulness constraint F.
- Thus in particular, the averages of the segmental faithfulness constraints MAX and DEP satisfy the inequalities $\overline{\mathrm{MAX}}(\widehat{\mathsf{x}}) \geq \overline{\mathrm{MAX}}(\mathsf{x})$ and $\overline{\mathrm{DEP}}(\widehat{\mathsf{x}}) \geq \overline{\mathrm{DEP}}(\mathsf{x})$. Crucially, a longer underlying form has a larger average number $\overline{\mathrm{MAX}}$ of deletions (more underlying segments $\equiv$ more segments to delete), as shown in Fig. 1 for Prince & Smolensky's Extended Syllable System (ESS). The inequality $\overline{\mathrm{MAX}}(\widehat{\mathsf{x}}) \geq \overline{\mathrm{MAX}}(\mathsf{x})$ thus entails the inequality $|\widehat{\mathsf{x}}| \geq |\mathsf{x}|$ between the length of the two forms. Reverse considerations hold for the average number $\overline{\mathrm{DEP}}$ of epentheses, as in Fig. 2. The inequality $\overline{\mathrm{DEP}}(\widehat{\mathsf{x}}) \geq \overline{\mathrm{DEP}}(\mathsf{x})$ thus entails the reverse length inequality $|\widehat{\mathsf{x}}| \leq |\mathsf{x}|$. In conclusion, we obtain the **equi-length** generalization: a ME markedness implication $(\mathsf{x}, \mathsf{x}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{x}})$ can only hold between forms that have the same sheer length $|\widehat{\mathsf{x}}| = |\mathsf{x}|$. This ME equi-length generalization is problematic.

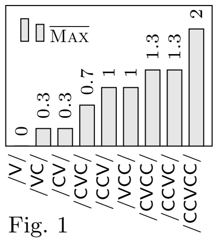

Fig. 1

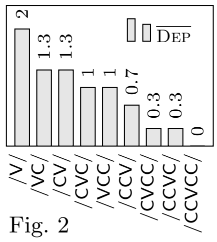

Fig. 2

- For instance, we show that it predicts that no syllable is more marked than any other syllable in the ESS: any syllable can have larger ME probability than any other syllable. Furthermore, we show how to construct a non-negative weight vector for the constraints of the ESS such that the ME probability of (/CCVCC/, [CCVCC]) is almost 1, that of (/CVCC/, [CVCC]) is smaller, that of (/CCV/, [CCV]) even smaller, and that of (/CV/, [CV]) smallest, tracking sheer length but reversing markedness. NHG is shown to be immune from such equi-length paradoxes that only arise in ME.
- As a **second corollary** of AM's result, we show that, if a markedness implication $(\mathsf{x}, \mathsf{x}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{x}})$ holds in ME, the consequent form $\widehat{\mathsf{x}}$ cannot violate any markedness constraint more than the antecedent form x. For a markedness constraint $M = *[+\varphi]$ that penalizes the marked value $+$ of some feature φ (e.g., $M = *[+\text{nasal}]$), this means that the consequent string $\widehat{\mathsf{x}}$ cannot have **more** segments with the value $[+\varphi]$ (e.g., more nasals) than the antecedent string x.
- The literature has motivated MAX-featural constraints $\mathrm{MAX}_{[+\varphi]}$ that specifically preserve the marked feature value $[+\varphi]$ (e.g. $\mathrm{MAX}_{[+\text{nasal}]}$ in Pater 1999). By the first corollary above, the averages of this faithfulness constraint satisfy the inequality $\overline{\mathrm{MAX}_{[+\varphi]}}(\widehat{\mathsf{x}}) \geq \overline{\mathrm{MAX}_{[+\varphi]}}(\mathsf{x})$. This means in turn that the consequent string $\widehat{\mathsf{x}}$ cannot have **fewer** segments with the value $[+\varphi]$ (e.g., fewer nasals) than the antecedent string x. In conclusion, we obtain the **equi-count** generalization: a ME markedness implication $(\mathsf{x}, \mathsf{x}) \rightarrow (\widehat{\mathsf{x}}, \widehat{\mathsf{x}})$ can only hold between strings that have the same number of segments with the marked feature value $[+\varphi]$ (e.g., the same number of nasals).
- It follows for instance that many reasonable implications for local nasal and place assimilation that hold in NHG fail in ME, casting doubt on ME as a theory of probabilistic phonology.

Mixed parameter settings derive asymmetrical RVA systems

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The paper assumes that Regressive Voice Assimilation (RVA) is but an epiphenomenon that occurs according to the language-specific settings of three parameters responsible for three, otherwise unrelated features of the language's phonological system underlying the surface process. For reasons still unclear, we attest a typologically dominant, "default" constellation of the parameter settings, which produces the well-known symmetrical (i.e., both voicing and devoicing) assimilation pattern (found in, for instance, many Slavic and Romance languages): in C1C2 sequences, whatever phonetic value C2 possesses will get copied onto C1. However, when one or more of these parameter settings diverge from the default, asymmetrical RVA systems arise, and it is in this event that the parameters actually reveal themselves.

The parameters are formulated in a theoretical framework that draws on the unary laryngeal primes of Element Theory (as interpreted in Harris 1994, Cyran 2014, and similar work) and the insights of both Laryngeal Realism (Honeybone 2005, etc.) and Laryngeal Relativism (Cyran 2014). Accordingly, the two source features (which are taken to exclude each other in binary systems) are H (originally, for voicelessness/aspiration) and L (for voice), and the two basic language types having VOT-based binary laryngeal systems are, then, H-languages and L-languages. (We will see that this typology is not fully compatible with Laryngeal Realism's bifurcation into voice languages and aspiration languages.)

We model the emergence of laryngeal systems as the setting of the following three parameters: (i) whether the laryngeally marked/specified obstruent series contains H or L; (ii) whether the laryngeal prime is able to spread (right-to-left); and (iii) whether the system has pre-obstruent delaryngealisation (POD) (due to which in C1C2, C1 becomes unmarked/under-specified). The default combination of these parameters to derive "RVA languages" seems to be one where spreading L is accompanied by POD: since POD produces unmarked obstruents in C1, this C1 may receive the spreading prime from C2; if however C2 itself is unmarked, no spreading can happen, therefore both remain unmarked and get realised by default phonetic interpretation. As observed by Cyran, in unusual voice languages like Cracow Polish, the spreading element is H. In contrast, the well-known Germanic-type aspiration system is claimed by the paper to have non-spreading H with no POD.

That the three are independent and freely combinable parameters is shown by typologically less frequent but nevertheless attested asymmetrical RVA systems, which emerge when parameter settings mix. Spreading L & no POD leads to voicedness-only RVA as in Ukrainian (e.g., Czaplicki 2007) or Durham English (Kerswill 1987, Harris 1994), while spreading H & no POD gives voicelessness-only RVA in languages like Meccan Arabic (de Lacy 2002) or Yorkshire English (Wells 1982, Whisker-Taylor & Clark 2019). This is because the absence of POD ensures the stability of marked obstruents in the C1 position: L-marked lenis in Ukrainian/Durham (preventing what would appear to be "voicelessness assimilation"), and H-marked fortis in Meccan Arabic/Yorkshire (preventing apparent "voicedness assimilation"). When, however, C1 is occupied by a consonant of the unmarked series but C2 is marked, L-spreading (voicing RVA) happens in the former and H-spreading (devoicing RVA) happens in the latter case.

Finally, the paper also shows that all remaining combinations are attested cross-linguistically or else theoretically uninterpretable: when spreading does not accompany POD, we get systems neutralising laryngeal features in pre-obstruent position in the unmarked value (it may well be the case that standard German is such a language); when neither spreading nor POD is part of the phonology, it becomes untestable what the laryngeal prime present in the system is, and whether it is present at all.

Do form-learning biases align with typological frequencies? A study in harmonic and disharmonic words

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The extent to which typologically frequent phonological patterns are the result of phonetically-grounded ('substantive') learning biases is a long-standing issue in linguistic research. In particular, vowel and consonant (dis)harmony patterns have been the object of much experimental research, with varying outcomes (Moreton & Pater, 2012; Do & Havenhill, 2021). For example, a learning advantage for vowel harmony (which is typologically common) over vowel disharmony (which is uncommon) has been found in some studies (e.g., Martin & Peperkamp, 2020; Martin & White, 2021) but not in others (e.g., Pycha et al., 2003; Skoruppa & Peperkamp, 2011). Other studies have shown that vowel harmony is easier to learn than consonant harmony (Hochmann et al., 2011; Toro et al., 2008), but a typologically rare rule that calls for consonant repetition can also be learned (Linzen & Gallagher, 2017; Pons & Toro, 2010). Notwithstanding their diverse results, most previous investigations share a common methodological approach in that they examine biases in *how (dis)harmony patterns are induced from different lexicons*. However, lexicons could themselves be shaped by a bias in *learning certain types of word-forms* (Ota et al., 2021). If, for example, word-forms containing similar vowels are better remembered than those with dissimilar vowels, the lexicons transmitted across speakers and generations may cumulatively acquire lexical characteristics that can be generalised as vowel harmony. The purpose of this study was to test this idea by comparing accuracy levels in learning artificial language words with 'consonant harmony' (i.e., containing identical consonants), 'vowel harmony' (containing identical vowels), and 'consonant/vowel disharmony' (no identical segments).

The stimuli in the main experiment consisted of 24 triplets of novel CVCV words, each comprising one item with a consonant repetition ('c-rep', e.g., *fifo*), one with a vowel repetition ('v-rep', e.g., *fiti*) and one with no segmental repetition ('no-rep', e.g., *fito*). Harmonic distance between the segments in no-reps was maximised by combining consonants that differed in place of articulation (e.g., /s-p/) and vowels differing in height and backness (e.g., /i-a/). All stimuli were synthesised with the voice of a native Spanish speaker. In the experiment, participants (72 native speakers of English) were trained on associations of these words with novel objects and subsequently tested on their oral recall of the labels. Typological preference for vowel harmony (as opposed to disharmony) and consonant disharmony (as opposed to harmony) predicts better learning for v-reps over no-reps, and no-reps over c-reps. However, the results revealed a significantly higher accuracy rate for c-reps than no-reps and no advantage for v-reps over no-reps.

To check the possibility that the outcomes could be due to our c-rep words being more compliant with English phonotactics, we also conducted a labelling task using the same stimuli. In this, 36 English speakers selected their preferred auditory label between one containing either a repeated consonant or vowel, and one with no repeated segments. We found that labels with both types of repetition were equally dispreferred — significantly below chance level — to those with no repetitions. These judgements show that the results from our learning experiment cannot be explained by a phonotactic effect.

Taken together, our findings indicate that form-learning biases can go against typological generalisations and do not necessarily align with pattern-induction biases. To the extent that form-learning biases could potentially affect the shape of phonological patterns through the lexicon, a complete understanding of the role played by substantive biases must include an account of why natural phonology does not always exhibit the effects of form-learning, as well as induction, biases.

Vowel quantity and syllable weight in German: A reanalysis

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The metrical system of Modern Standard German is highly complex and remains fiercely debated. Whilst it is accepted that German constructs trochaic feet from the right edge, fundamental questions of quantity sensitivity, extrametricality and the role of segmental quantity in determining syllable weight are still debated (for a comprehensive overview, see Jessen 1998, Féry 1998 and references therein). Of central interest are the underlying quantity of vowels, the weight of open syllables and the status of medial consonants in Romance loan words. Despite this complexity, a number of powerful generalisations can be identified (c.f. Vennemann 1992), in particular the following: schwa syllables are incapable of bearing stress; main stress in simplex words is required to fall within the last three syllables; stress cannot fall to the left of a closed penult; and final schwa syllables predict penultimate stress, unless onsetless, in which case stress is antepenultimate. However, explanations for such generalisations have proved elusive. This paper seeks to provide a fresh account of stress in simplex German nouns by reassessing the relationship between underlying vowel quantity and syllable weight, proposing an additional contrast between underlyingly short and long tense vowels. This analysis allows us to capture the regularities and variation in a predictable way, without excessive reliance on lexically specified feet and extrametricality (or the suspect extrametricality of -VC syllables exclusively). It also explains why superheavy finals consistently attract stress and final -VC and -VV syllables sometimes receive main stress, but more often do not.

As Wiese (1996) notes, tense vowels can surface as either long or short as a product of stress (e.g. *Musí:k~musikálisch*), neutralising length distinctions in unstressed syllables; however, lax vowels are underlyingly short and restricted to closed syllables, otherwise obligatorily closed by an ambisyllabic consonant (“sharp cut” in Vennemann’s terminology). However, this predicts that many underlyingly long vowels only ever surface as short and fails to explain the inconsistent stressing of final open syllables, as in the simplex nouns /bi.ˈkiː.ni/ (suggesting a final (σσ) foot), /ga.ʁan.ˈtiː/ (suggesting a final (σ) foot) or, worse still, /ˈaː.li.bi/ (c.f. Domahs et al. 2008 for experimental evidence for these structures). I argue instead for a three-way contrast between long tense vowels, short tense vowels and short lax vowels, e.g. /ˈkiː.mə/, /ˈkɪm̩ə/ and /ˈɛs.ki.mo/. However, this contrast is made opaque by the neutralisation of length in unstressed syllables and the fact that stressed syllables must be bimoraic. Thus, only tense vowels can appear in open syllables and the only truly light syllables in German are schwa syllables and open syllables with an underlyingly short tense vowel. The benefit of such an analysis is twofold. Firstly, it becomes possible to treat both -VC and -VV as heavy, explaining why tense vowels in open syllables sometimes behave like heavy syllables and sometimes do not (being underlyingly long or short respectively). Secondly, it accounts for the ambiguous status of medial consonants in Romance loans, as the short tense vowels are for historical reasons restricted to such loans (and thus most frequently the high vowels /i,u/).

We can thus account for the regularities observed in the language data by constructing moraic trochees from right to left with final consonant extrametricality, in combination with a constraint that requires stress to fall on a bimoraic syllable. In this way, words ending in a schwa would be predicted to be stressed regularly on the preceding syllable unless it was light, which only occurs in words ending in /iə,uə/ (where stress would fall on the preceding heavy syllable). Nor would stress ever fall leftwards of a closed penult or an open penult with a long vowel. Crucially, however, it *would* be expected to fall on the antepenult if the penult is a schwa syllable or an open syllable with a short tense vowel, accounting for the difference in stress between /ˈaː.li.bi/ and /bi.ˈkiː.ni/ (and also remaining consistent with all surface realisations of such words). It furthermore becomes possible to account for the regular stress found on superheavy final syllables (which would be able to form a monosyllabic heavy foot, even with consonant extrametricality). In contrast, final tense vowels will only attract stress if they are truly underlyingly long, accounting for what would appear to be inconsistent behaviour if all final tense vowels were underlying -VV syllables. The mixed behaviour of final closed syllables is the product of a small class of stress-attracting syllables (e.g. -/ɛt/, -/ɛl/) which are most likely lexically specified, contrasting with the regular lack of stress, given their patterning with final stressed syllables featuring marked, nonnative segments, e.g. /bal.ˈkõː/.

Against listener-oriented sub-phonemic differentiation

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Background: The English word *like* has attracted much sociolinguistic interest, but also phonetic and phonological research: Due to its many functions (Podlubny et al. 2015 report 11 in Canadian English, but we argue there may be as many as 16), it is a prime target for studies of sub-phonemic differences between near-homophones. For instance, Drager (2009) famously showed differences in segment length or realisation for different functions of *like* in New Zealand English; Podlubny et al. (2015) similarly found vowel realisation and length differences between *like* functions in Canadian English. However, these differences are small, when they are found at all – Schleef and Turton (2018) do find different vowel realisations between *like* functions in Edinburgh and London varieties of English, and argue that these are due only to prosodic contexts for certain functions favouring reduction. This possibility casts doubt on how systematic and thus how transmittable/learnable such differences would be. Therefore, we study *like* in another regional accent (or pan-regional standard, following Strycharczuk et al. 2020) in England to see if differences exist there; the questions origin and transmission routs would, of course, be one for future research.

Methodology: We recorded 11 young adult (age range: 18 to 25 years) speakers of English from the North-West of England in informal conversation with a family member or friend (as in e.g. Warner and Tucker 2011), and also reading a list of 36 sentences containing different functions of *like*. The conversations were transcribed manually; transcripts and sentence-lists were force-aligned to recordings using the self-training Montreal Forced Aligner (McAuliffe et al. 2019). We extracted all *like* tokens and calculated/annotated segmental and word-level features (namely the duration of every token and segment, average speech rate in a window extending up to 3 words either side of the token, F1 and F2 at 25% and 75% through each vowel segment, and the Euclidean distance between these formant values as a measure of diphthongisation) as well as context features (Beckman and Hirschberg 1994's ToBI break index strength following the token, position of the *like* token in the utterance, and the segments and words immediately preceding and following the token). To account for predictability effects on pronunciation (e.g. Hall et al. 2018), we extracted the bigram frequencies either side from SUBTLEX (van Heuven et al. 2014). We used mixed-effects regression models and agglomerative hierarchical clustering to investigate this data for any systematic differences.

Results: Counter to prior research, we find no systematic acoustic differences between *like*s of different functions: Four separate regression models (with the word length, /k/ segment length, ratio of /l/ segment length to vowel segment length, and the diphthongisation measure as dependent variables respectively) as well as hierarchical clustering all fail to show any reliable difference in *like* realisation by *like* function. The only strong acoustic differences we find are between male and female speakers (in pitch and formants) as well as between conversation and sentence-list tokens (longer tokens and more diphthongal vowels in sentence-list reading).

Implications: The sex and genre differences are unsurprising, but serve as sanity checks. The fact that we found no other reliable differences in *like* realisation by function shows that the North-West England accent does not differentiate between functions of *like* phonetically, despite how useful this would be given the number of functions. This, we argue, suggests that listener-oriented accounts of different mental representations for (near-)homophones are not borne out.

Fortition in Campidanese Sardinian can only be understood as Substance-Free Phonology

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Introduction The ambition of this talk is to analyze an intricate pattern of spirantization and gemination in Campidanese Sardinian (CS), where voiceless /T/ geminates or spirantizes in intervocalic positions, and where voiced /D/ spirantizes or is unaffected in parallel intervocalic contexts (Bolognesi 1998). The data are based on field-work in Sardinia and show two things: that a model of phonology needs some way of showing strength and weakness as positional effects, and that neither can be reliably understood in phonetic terms (contra for example Bauer 2008)–they must be viewed as substance-free phonology. The CS pattern resists analysis based on surface properties since spirantization is not a reliable correlate of lenition (weakness), and increased relative duration is not a reliable correlate of geminancy (strength). Thus, phonetic cues are not adequate in the discovery procedure–only phonological behavior can be used. The analysis developed here reveals a surprising and novel fact: spirant realizations of /D/ cannot be viewed as the product of lenition, and must rather be seen as the product of fortition.

Data In *some* external sandhi contexts, intervocalic /T/ and /D/ show a clear asymmetry: while /T/ is realized as a voiced spirant, as in (1):

(1)	[puɖ:a]	'hen'	[s:a βuɖ:a]	'the hen'
	[ʧivraʒu]	'durum bread'	[s:u ʒivraʒu]	'the durum bread'
	[kuat:ru]	'four'	[dɛ ɣwat:ru]	'of four'

Interestingly, while the specific intervocalic context in (1) never triggers spirantization of /D/, there are intervocalic contexts in which /D/ alternates with spirants (2):

(2)	[biɖ:a]	'village'	[a βiɖ:a]	'to the village'
	[dɔmu]	'house'	[kus:a ðɔmuzu]	'those houses'
	[gat:u]	'cat'	[trɛ ɣat:uzu]	'three cats'

Complicating the surface pattern further is the fact that in some intervocalic contexts /T/ geminates rather than leniting (3):

(3)	[tempus]	'time'	[kustu t:empuzu]	'at that time'
	[kojai]	'to marry'	[oʁia k:ojai]	'want-3ps to marry'

/T/ exhibits a disjunctive pattern, spirantizing as in (1) but lengthening as in (3). In traditional terms, these two surface patterns correspond to weakening and strengthening, respectively.

Analysis This talk proposes a non-linear analysis showing there are in fact two intervocalic contexts–one strong and one weak–distinct in their suprasegmental structure. In the weak context, /T/ lenites and is realized as a spirant, while /D/ is unaffected (1). In strong contexts, however, /T/ geminates (3); unexpectedly, /D/ is realized in this position as a spirant (2). The analysis reveals a direct link between /T/ lengthening and /D/ spirantization. That is, for /D/, the surface manifestation of strength is spirantization. To suppose otherwise is to interpret as an accident the fact that both alternations are the result of a singular process of strengthening, reflected in their representations: strengthening of both /T/ and /D/ is the spreading of melodic material into empty skeletal positions.

Consequences The consequence of this analysis for phonological theory is not just an argument that phonetic inspection is inadequate as a discovery procedure: it also shows the intricate way in which computation and representations interact to give rise to surface patterns. To approach explanatory adequacy, both must be modeled (cf. Anderson 1985: 350).

Acquisition of 4-way Laryngeal Contrast by the speakers of 2-way Contrast Languages

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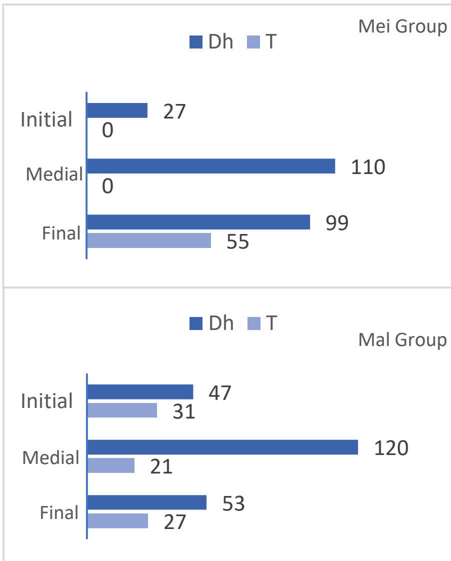
Acquisition literature shows that L1 acquirers produce lesser marked structures even though they can recognise their correct representations (Smolensky 1996, Gnanadesikan 2004) and perception literature shows that the L1 sounds "warp" the incoming L2 sounds (Best 1994, Best & Tyler 2007). We report the results of an ongoing research which shows that contrary to L1, L2 learners not only retain marked structures but also maximize them. Further, Contrary to the perceptual prediction, the L2 learners diverge from the L1 categories instead of converging to them. We show this by testing the perception of Hindi's 4-way laryngeal contrast by the speakers of 2-way contrast languages. We further discuss that the canonical methods of investigating L2 perceptual acquisition must accommodate open ended processing tasks too so that we don't route the target groups. Assuming the privative view (of Laryngeal Realism), the contrasts within the control and the test language groups is shown below.

	Hindi (Hin)	Meiteilon (Mei)	Malayalam (Mal)
Initial	Ø-[vc]-[sg]-[vc,sg]	Ø-[sg]	Ø-[vc]
Intervocalic	Ø-[vc]-[sg]-[vc,sg]	Ø-[vc](allo)-[sg]	[vc](allo)- ØØ(allo)
Final	Ø-[vc]-[sg]-[vc,sg]	Ø	---

Note:
allo=allophone
[Ø]=plain voiceless
[vc]=voiced
[sg]=voiceless aspirated
[vc,sg]=voiced aspirated

Experiment: A forced-choice nonce-word recognition task was setup. 27 Mei (Hin Fluency 59% (intermediate)), 27 Mal (Hin Fluency 56% (intermediate)) and 25 Hin (Hin fluency 91% (native)) subjects participated in this online study. The fluency was measured by averaging the scores of a sentence comprehension task and self-reported fluency (listening and comprehension) rating. Since there might be an effect of structure preservation in word-initial position, we tested it in intervocalic and final position as well. Laryngeal (4 levels: Ø, vc, sg, vcsg) and place (2 levels: labial and velar) served as factors. 8 nonce strings were produced in pre-verbal position by two native Hindi informants three times each with dummy vowels (e.g., ɑpɑ, ɑbɑ, ɑp^{h}ɑ, ɑb^{ɦ}ɑ etc. for intervocalic position). The stimuli were spliced keeping all the cues intact and were normalized for loudness.

Predictions: Mal group will recognize Th significantly more as T than Dh; the Mei group will recognize D significantly more as T than Dh.



Results: Contrary to our expectation, Mal group perceived Th significantly more as Dh than T and Mei group perceived D significantly more as Dh than T. Both results were found statistically significant in pairwise Wilcoxon tests ($p<.01$).

Discussion: Despite the voiced aspirates being an absent category for both the target groups, the subjects resorted to this more marked segment than the lesser marked one which were predicted by L1 acquisition literature and perceptual models. This highlights a crucial difference in the way contrast acquisition could proceed in an L2 scenario: the second language acquirers may prefer preserving the marked structures (FAITH[M]>>*M), contrary to the child language acquisition wherein the marked structures are typically avoided (*M>>FAITH[M]). Further, the maximization of contrast (i.e. Th/D→Dh) may be considered as a function of hypercorrective strategies, which is common in a late L2 acquisition stage (Eckman et al. 2013 and Akbar et al. 2020 among others). Lastly, besides the canonical discrimination tasks, L2 researchers must also include the tasks that offer additional insights into the phonological processing than the simplistic "perceived"/"not perceived" binary dependent measures, as it allows us to investigate more nuanced acquisitional patterns.

L1 inventory influences on L2 English plosive voicing perception: data from L1 Arabic, Flemish, Greek and Cypriot Greek listeners

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Introduction. Various studies have shown that an individual's first language (L1) could interfere with their ability to perceive speech in a second language (L2) (Kuhl, 1993; Flege, 1993; Best, 1995). L2 listeners often struggle with identifying sounds that are different from the ones in their existing L1 phonemic inventory. Demonstrating the importance of exploring online data collection in light of COVID-19, we present data from a large-scale online speech perception experiment where L2 English listeners, along with monolingual native English controls, identified plosive voicing in three English minimal pairs contrasting /b p/, /d t/ and /k g/. L2 listeners spoke either Arabic, Flemish, Greek or Cypriot Greek as L1.

Typology. Although English, Arabic, Flemish, Greek and Cypriot Greek all employ two-way laryngeal contrasts, English and Cypriot Greek differ from the other languages in their plosive realisation and specification (Harris, 1994, Honeybone, 2005). English initial singleton voiceless plosives are aspirated with positive voice onset time (VOT) while the "voiced" counterparts are realised as voiceless and unaspirated with zero VOT. This means that in English initial voiceless plosives, there is a long period of delay between the release burst and onset of voicing from the following vowel; this is not found in the "voiced" counterpart where voicing begins immediately post-release. On the other hand, Arabic, Flemish, Greek instead employ a true voicing system where their voiceless plosives are voiceless and unaspirated (zero VOT); voiced plosives are prevoiced, with negative VOT (Lisker & Abramson, 1964, and Abramson & Lisker, 1970). With our selection of L1 languages, Greek contains a full set of voiced and voiceless plosives at all three places of articulation similar to those of English (labial, dental/alveolar and velar). Crucially, Arabic lacks /p/ in its native inventory; Flemish categorically misses /g/. Cypriot Greek possesses word-initial geminate plosives realised with positive VOT similar to aspiration, [ˈpʰɛfti] '*it falls*' (Newton, 1972; Tserdanelis & Arvaniti, 2001).

Data. A total of 619 L2 English listeners and monolingual native English controls participated in our experiment to date. The stimuli consisted of three CVC word-to-word continua in English varying in place of articulation (labial, alveolar and velar). The continua were constructed and synthesised from speech produced by a monolingual British English male speaker; his initial voiced plosives were all produced with VOT close to 0*ms* and the voiceless counterparts had values between 69 to 82.5*ms*. f_0 and VOT were covaried through fifteen steps in each continuum for the pairs *bet–pet*, *dip–tip* /dɪp tɪp/ and *gap–cap* /gæp kæp/.

Results. Categorisation responses indicating voicing boundaries were estimated per participant and on a group level by fitting a logistic curve to the % of time a plosive is classified as voiceless within same-step trials. We predicted that listeners with true voicing L1s would require "less" VOT in order to identify an English plosive as voiceless. This is because their L1 voiceless categories (*e.g.* /p/ in Greek) share the same VOT as the English voiced plosive. To test whether there are L1 influences on L2 plosive voicing perception, we compared the point of subjective equality (PSE) on the logistic curve (50% threshold). PSE was significantly different between Greek L2 English listeners and monolingual English controls; a smaller amount of VOT was needed for Greek participants to consider a plosive as voiceless. The same pattern was observed when comparing Arabic L2 English listeners against English controls. Furthermore, a larger standard deviation was found in Arabic L2 English listeners only for the labial continuum. This indicates more variability in categorisation responses when a contrast is missing in that place of articulation. For the two groups pending data analysis (Flemish and Cypriot Greek), we expect similar categorisation instability in Flemish listeners but this time only in velars. This can have implications on L2/loanword phonology and typological gaps. Cypriot Greek listeners could have voicing boundaries closest to English due to exposure to aspiration. Full results will be presented at the conference.

Sound Change In-Progress: Evidence of Lifespan Change

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Regarding an area of current interest in research on the properties of language change across a lifespan, Sankoff (2019) identifies three possible trajectories for older speakers in the face of a community language change in progress: (1) Older speakers may retain a pattern acquired in their youth, even while a change continues to progress around them; (2) older speakers may become even more conservative during a change-in-progress, adopting heavier usage of an older variant; (3) older speakers may change in the direction of the change-in-progress. In this last case, younger speakers influence the older generation such that older and younger talkers alike adopt the new pattern. Sankoff illustrates the 3rd trajectory with Montreal French rhotic dorsalization. Montreal French used to exhibit apical [r], but in current Montreal French the dorsalized [ʁ] is commonplace. In a trend study that included the same Montreal French speakers recorded in different decades (Sankoff 2019 and earlier works), a fairly high percentage of adult speakers who had apical rhotics in the early 1970s had mainly dorsal pronunciations by the mid 1980s. Sankoff concludes that older speakers have been influenced by younger community members. The current paper examines a question not addressed in Sankoff (2019): specifically, when older talkers exhibit change in the direction of the community change-in-progress, do they pattern acoustically with their younger counterparts? This was not addressed by Sankoff (2019), so a possibility not considered therein is that the dorsal rhotic produced by older community members who show lifespan change may be acoustically different from the dorsal rhotic of younger speakers. That is, community members who have undergone lifespan change and those who have had the target feature from a young age may show acoustic differentiation. We investigate this possibility by examining a different community language change in progress: /aɪ/-raising in Fort Wayne, Indiana. Emergence of /aɪ/-raising (before voiceless consonants) in locales that previously did not have such raising is reported to have begun with the generation born around 1990 in places like Fort Wayne and Kansas City (Strelluf 2018, Dodsworth & Kohn 2021). Data from older speakers in Fort Wayne who display raising as a lifespan change show an acoustic pattern that is distinct from that of younger speakers who presumably had raising from an early age. Wordlist data from Fort Wayne for 27 talkers (ages 19-78) reveals that almost all younger speakers (born since 1990) display /aɪ/-raising. The young raisers are evenly split between showing Dialect B raising (no raising before t-flaps) and Dialect A raising (raising before t-flaps). All young raisers show robust F1 differences between the /aɪ/ in WRITE and RIDE. Five of the 12 talkers born before 1970 displayed raising. These 5 show a lifespan trajectory influenced by younger community members. All older raisers show a much less robust F1 difference in /aɪ/ between WRITE and RIDE. Two of the five show Dialect A raising, but the acoustic characteristics of their productions differs markedly from that of younger raisers. While younger raisers show a robust bimodal F1 distribution whereby the /aɪ/ diphthong is higher (i.e., lower F1) in WRITE and WRITING but lower in RIDE and RIDING (i.e., higher F1), for the older Dialect A raisers the diphthong in WRITE is higher as compared to RIDE, and that of WRITING is higher as compared to RIDING, but the diphthong in RIDING is higher than that in WRITE. That is, while WRITE and WRITING pattern together for younger raisers, they do not do so for the older raisers. Older Dialect B raisers show no length difference in /aɪ/ before t-flaps and d-flaps, but younger Dialect B raisers maintain a consistent vowel length difference with the diphthong on average being about 20 milliseconds shorter before a t-flap than a d-flap. We thus document acoustic differences between older and younger raisers that is consistent with a view that older community members who show lifespan change do not actually “match” younger community members acoustically.

Some empirical challenges to the PStem | 29MFM abstract

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Much debate within prosodic phonology has centered on which prosodic domains are universal, and what their properties are. The widely accepted "prosodic hierarchy" of categories, given in (1), organizes prosodic domains by their relative size: so-called "interface categories" at word-level and above are determined at least in part by the morphosyntax.

(1) [ιP > φP > ω] > {Ft > σ > μ} [interface categories] {rhythmic categories}

Downing & Kadenge (2015, 2020; henceforth D&K) have recently proposed that an additional prosodic category, the phonological stem (PStem) should have a dedicated place in the prosodic hierarchy. The PStem is an interface category below the level of the PrWd, and unlike the PrWd, references just the morphosyntactic *stem*, which need not be a fully autonomous lexical entity. D&K argue that dividing the word-level into PStem/PrWd is theoretically advantageous to a recursive PrWds account, in which a word is parsed into two prosodic word domains instead. D&K argue that 1) as PStems cannot be uttered in isolation, they should not be sensitive to conditions such as minimality, etc., which are the purview of PrWds; 2) under a recursive domains account, the two recursions of the PrWd should not have distinct behaviors; 3) recursive PrWds lead to potentially unbounded recursion, which is too powerful to admit into the theory.

In this talk, I provide empirical evidence from three unrelated languages showing that sub-word domains, though not full-fledged autonomous items under D&K's notion, may still behave as though they were prosodic words, and that supposedly multiple recursions are actually beneficial in accounting for natural language phenomena.

Guekguezian (2017) shows for Chukchansi Yokuts that minimality effects, which are typically considered to hold only of independent prosodic words (as they are usually pronounced in isolation), are instead found in certain monosyllabic roots that are augmented to fit an optimal disyllabic frame even under suffixation, despite suffixation otherwise pushing the entire (maximal) prosodic word over the disyllabic minimality threshold, e.g. /wan/ → [wa.naː-.la-t] 'just made X give'. Relatedly, in A'ingae, Dąbkowski (2021) shows that glottal accent culminativity (another phenomenon considered to hold at only the word-level) only holds at a certain sub-word domain, where a preglottalized suffix replaces an underlying glottal accent in the root; outside this domain, glottal accent is not culminative, indicating that a (minimal) prosodic word must be sensitive to this effect, e.g. /séje^{ʔ} -ʔje/ → [seje-ʔje] 'cure-IMPV' but /panza -ʔfa -ʔta/ → [panzá-ʔfa-ʔta] 'hunt-PLS-COND'. Lastly, Bennett (2018) shows that for Kaqchikel, a recursive prosodic words analysis is critical for understanding two phonological patterns at the left edges of prosodic words: [ʔ]-epenthesis and degemination. Multiple prefixation can generate multiple left prosodic word edges, as diagnosed by these phonological rules taking place. As such, there is continual recursion, since these rules are demonstrative of PrWd edges, e.g. [**ʔ**at=**ʔ**at͡ʃ=**ʔ**aχ=mak^{h}] 'you are an accomplice'.

Chukchansi and A'ingae demonstrate that sub-word domains, though not full-fledged autonomous items, do show word-like characteristics that lend themselves easily to a recursive PrWds analysis, in which minimal and non-minimal PrWds may or may not have distinct characteristics. Proposing a unique PStem misses these empirical generalizations, else renders the PStem functionally equivalent to a minimal PrWd. Kaqchikel makes it unclear how a PStem/PrWd split can account for multiple recursions, which is otherwise straightforward with recursive PrWds.

References. Bennett (2018). Recursive prosodic words in Kaqchikel (Mayan). **Dąbkowski,** (2021). A'ingae syntax conditions the representation of glottalization. **Downing & Kadenge** (2015). Prosodic stems in Zezuru Shona. **Downing & Kadenge** (2020). Re-placing the PStem in the prosodic hierarchy. **Guekguezian** (2017). Templates as the interaction of recursive word structure and prosodic well-formedness.

That's an order! Nevermind phonotactics!

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In this talk, we present and discuss new evidence in favor of an analysis of truncation as a derivational process in Modern Hebrew (MH). Bolozky (1979) reported on a new strategy of forming imperatives in MH: shortening the future form. He identified two degrees of shortening: either only the vowel of the prefix is truncated (1III), or the entire prefix is (1IV). In CC-initial stems like (1a-d), III is only possible with sibilant-initial stems, which allow for the fusion of the prefixal [t] and the sibilant. In CV-initial stems (1e,f), both strategies are possible. Bat-El (2002) proposed an Anti-Faithfulness truncation account, whereby the phonology receives an instruction to truncate the future form to achieve non-identity; due to Faithfulness considerations, it truncates as little as possible. In (1a), the entire prefix must be truncated because [tχtov] violates *CCC, but in (1e,f), truncating only the prefixal vowel is possible. In other forms (e.g., 1c), truncation is blocked by the phonotactics of the language: [nʃ] is not a possible cluster in MH (as shown by the epenthetic [e] in the standard form (1V)), and so only the future is used as an imperative form. Verbs like (1d) are parallel to (1c), in that Cʔ is not a possible initial cluster elsewhere in the language. The forms in (1e,f.IV), according to Bat-El, were borrowed from the standard register (1V).

We argue against the Anti-Faithfulness account. We claim that truncation targets the entire prefix; the forms in III are not imperatives, but instances of a more general rule of /i/-syncope (Bolozky 2009). We show that the "partially-truncated" forms in III are not imperatives, as they are licit whenever the future forms are, while the forms in IV can only be used in the imperative. For instance, in the jussive construction [ʃe-tiʃmor] 'may you guard', [ʃe-tʃmor] is possible, but *[ʃe-ʃmoʁ] is not. Also, since (1e,f.IV) feature in many colloquial utterances, they are not likely to be a borrowing from the standard register. Insofar as the Anti-faithfulness account relies on the varying degrees of truncation, it is not supported.

After arguing against Anti-faithfulness, we present experimental data that *supports* two other aspects of Bat-El's analysis: (i) truncation is synchronic, and (ii) phonotactic considerations are relevant. The forms presented as evidence for both claims are those marked with ?? in (1IV), which were described as illicit by Bat-El. In an elicitation task, speakers transformed a past sentence into an order. Several speakers provided imperatives with the otherwise illicit RC (R=any sonorant) and Cʔ initial clusters from (1IV). These, we argue, can only arise through a derivational relation with the full future form (1II).

(1)	I.PST	II.FUT	III.	IV.	V.STANDARD
a. 'write'	katav	ti-χtov	??tχtov	χtov	ktov
b. 'guard'	ʃamaʁ	ti-ʃmoʁ	tʃmoʁ	ʃmoʁ	ʃmoʁ
c. 'breathe'	naʃam	ti-nʃom	??tnʃom	??nʃom	neʃom
d. 'ask'	ʃaʔal	ti-ʃʔal	tʃʔal	??ʃʔal	ʃeʔal
e. 'improve'	ʃipeʁ	te-ʃapeʁ	tʃapeʁ	ʃapeʁ	sapeʁ
f. 'search'	χipes	teχapes	tχapes	χapes	χapes

At the same time, participants tended to use the future form more if truncation would result in one of these otherwise illicit initial clusters, indicating that phonotactic considerations are still a factor. The relation was implicational: if a speaker provided truncations with initial RC/Cʔ clusters, they also provided truncations with licit clusters, but never the other way around. Interestingly, we also found gradience among otherwise illicit forms: speakers who provided truncations with illicit RC also provided truncations with illicit Cʔ, but not vice versa. We interpret this result as the cumulative effect language-internal and universal pressures: both RC and Cʔ initial clusters are disallowed by the language, but the SSG (Clements 1990) rules out only initial RC clusters. Initial Cʔ clusters are therefore not as bad as the initial RC ones.

Finally, we identify three larger discussions for which the findings are relevant: (i) the mere existence of subtractive morphology and what can argue for or against it; (ii) the cumulative effect of language-internal and cross-linguistic considerations; and (iii) the specific formal analysis of truncation. We provide directions for further study on each front.

Extended geminates, stratum ordering, and moraic onsets in Bangla/Bengali

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Bangla is known to be a language that is rich in both phonemic and derived geminates (Kar, 2010; Khan, 2010). Most geminates in Bangla fall into three categories found crosslinguistically: lexical geminates, e.g., /konna/ → [kon.na] ‘daughter’; assimilated geminates, e.g., /rat̪ + d̪in/ → [rad̪.d̪in] ‘day-night, and concatenated geminates, e.g., /ʃat̪ + t̪ara/ → [ʃat̪.t̪ara] ‘seven star’ (c.f. Kar, 2009; Ridouane, 2010; Davis, 2011; Oh & Redford, 2012; Hayes, 1989). In this paper we extend previous research on Bangla, by describing and providing an explanation for the properties of a fourth, previously unexplored, category of geminates, which we name “extended geminates” (Hall (2003) discusses similar cases in West Germanic but does not classify them as a separate geminate type). We argue that Bangla extended geminates support Kar’s (2010) hypothesis of the three-way stratification of the Bangla lexicon: (i) Sanskrit Borrowing (SB), (ii) Native Borrowing (NB), and (iii) Other Borrowing (OB), and provides evidence for a further two-way subdivision of the SB stratum into Nativized Sanskrit Borrowing (NSB) and Non-Nativized Sanskrit Borrowing (NNSB). In addition, we argue that stem-initial complex onsets in SB are moraic.

As the examples in (1) show, extended geminates in Bangla occur in derived environments and are triggered only by complex onsets (c.f. 2):

1. (a) /bi + krom/ → [bik.krom] ‘chivalry’
   (b) /bi + gjan/ → [big.gɛn] ‘science’
   (c) /ku + kʂɔn/ → [kuk^h.k^{h}ɔn] ‘bad time’

2. (a) /bi + pot̪^{h}/ →[bi.pot̪^{h}] *[bip.pot̪^{h}] ‘wrong path’
   (b) /a + tʃala/ → [ˈa.tʃa.la] *[ˈatʃ.tʃa.la] ‘not sorted’
   (c) /upo + kar/ →[u.po.kar] *[up.pok.kar] ‘favor’

Extended gemination in Bangla is thus derived at prefix-stem boundaries when a consonant in an underlying complex onset stem, immediately following a vowel final syllable, lengthens to occupy both a coda and an onset position of two adjacent syllables. In our paper, we systematically examine a comprehensive set of data collected from the *Adhunik Bangla Avidhan* (Modern Bangla Dictionary, 2016) and the existing literature, predominantly from Kar (2010) and show that crucially, extended gemination is triggered by only three SB complex onset types: obstruent – semi-vowel (1.b), obstruent – retroflex fricative (1.c), and obstruent – liquid (1.a). Since NB does not allow any sort of complex onset either in the SR or in the UR (Kar, 2010), and none of these three complex onset types triggers extended gemination in OB (e.g., /e + treɪn/ → [e.trɛn] *[et.trɛn] ‘electric train’, or [e + pleɪn]→ [e. pleɪn] *[ep. pleɪn] ‘electric plane’), we conclude that extended gemination occurs only in the SB stratum, thus providing evidence for stratum ordering in Bangla. Moreover, the fact that the second consonant in (1b) and (1c) never surfaces by giving rise to complex onsets although in (1a) does, provides evidence for us to propose a two-way subdivision of the SB stratum: Nativized Sanskrit Borrowing (NSB) which does not allow complex onsets, and Non-Nativized Sanskrit Borrowing (NNSB) which allows complex onsets.

Additionally, since, only underlying complex onsets in SB trigger extended gemination, we propose that they are underlyingly moraic in agreement with the idea of moraic onsets introduced in the works of Topintzi and Nevins (2017), Davis (2011), Bye and Lacy (2008), Topintzi (2006), Hajek and Goedemans (2003), Hock (1986), and Hayes (1989) and argue that their moraicity plays a role in motivating extended gemination. Using the framework of Optimality Theory (OT) (c.f. McCarthy, 2001; Prince & Smolensky, 2002; and Kager, 2004) we propose a higher ranking of the OT constraints, Faith-IO-μ: no addition or deletion of a mora in the SR, for both NSB and NNSB, and *COMPLEX$^{\text{ONS}}$: syllables must not have complex onsets, only for NSB.

Metrical structure and Stratal Phonology provide a complete account of Danish stød

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In this paper we demonstrate that the patterning of stød in Standard Danish submits to a complete, non-stipulative account within an approach that embraces metrical structure as the mechanism behind accentual contrasts (Köhnlein 2019), and the main tenets of Stratal Phonology (Bermúdez-Otero 2018). Our approach maintains the empirical coverage of the 'Non-Stød Model' developed by Basbøll (2005 *et passim*), but builds on widely accepted principles of morphology-phonology interaction instead of a proliferation of bespoke domains, in addition to incorporating insights from other approaches (notably Itô & Mester 2015).

Stød is a laryngealization prosody that, in Standard Danish, is restricted to stressed syllables with heavy, high-sonority rhymes (with a long vowel or a sonorant coda). Subject to this phonotactic constraint, we formulate the following basic generalization: by default, stød is assigned to a stressed syllable at the word level unless some disyllabic domain was constructed at the stem level. Stem-level disyllabic domains arise when either the root is underlyingly disyllabic, or a suffix is attached at the stem level. We demonstrate that this simple generalization interacts with regular phonological phenomena (e. g. lexical word-final extrametricality and epenthesis in rising-sonority clusters) and morphologically specific patterns to derive precisely the attested paradigms of stød assignment.

	bil 'car'		*han* 'male'		*hus* 'house'		*ven* 'friend'		*bibel* 'bible'		*finger* 'finger'	
Level	SG	PL	SG	PL	SG	PL	SG	PL	SG	PL	SG	PL
$\mathcal{SL}$	(*bil*)	(*bil*)	(*ha*)*n*	(*ha*)*n*	(*hus*)	(*huse*)	(*ve*)*n*	(*venner*)	(*bibl*)	(*bibl*)	(*fingr*)	(*fingre*)
$\mathcal{WL}$	(*biˀl*)	(*biˀler*)	(*ha*)*n*	(*hanˀner*)	(*huˀs*)	(*huse*)	(*ve*)*n*	(*venner*)	(*biˀbel*)	(*biˀbler*)	(*fingˀer*)	(*fingre*)

The table illustrates our analysis for underlyingly monosyllabic nouns. Shaded cells show stød assignment blocked by an input disyllabic domain. The regular pattern is found in *bil*. In *hus*, the plural suffix attaches to the root, triggering a stem-level cycle and the construction of disyllabic domain. This blocks stød in the plural, but not the singular. In *han* and *ven*, the final consonant is lexically extrametrical (however this is formalized), blocking stød in the singular (Basbøll 2005). In the plural of these items, the consonant is not final and cannot be extrametrical, so the presence of stød is determined only by suffix attachment. Nouns with epenthesis like *bibel* and *finger* behave just like *bil* and *hus*, but final-consonant extrametricality is irrelevant.

The analysis sketched here relies on widely accepted principles of morphology-phonology interaction, and is consistent with relevant morphological generalizations: for instance, the unproductive plural suffix *-e* always shows root attachment, triggering stem-level phonology (Giegerich 1999, Bermúdez-Otero 2018), whilst for the productive *-er* suffix this pattern is exceptional. In the paper, we show that the basic analysis extends to disyllabic and longer nouns, nominal compounds, and simple and prefixed verbs, as well as to exceptional patterns.

Overall, we show that a metrical approach to accentual distinctions (Morén-Duolljá 2013, Köhnlein 2016, 2019) extends readily beyond 'tonal' accents to other distinctions such as stød (Iosad 2016, Morrison 2019). Furthermore, integrating the metrical, domain-based approach with the principles of Stratal Phonology yields a consistent and empirically adequate account of this phenomenon that builds on a small number of first principles. This, we suggest, reinforces the nature of both Stratal Phonology and the metrical view of accentuation as productive research programmes.

Epenthesis Reversal in Marshallese

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There is a well-known diachronic relationship between deletion phenomena and subsequent epenthesis processes, whereby X → Ø in environment Y (a deletion) is reanalyzed as Ø → X in environment Ȳ (i.e., epenthesis in the complement of Y), 'linking-*r*' providing a good Paradebeispiel (under an insertion analysis). This phenomenon is widespread and we will refer to it here as 'Deletion Reversal'. In this paper, we present an account for a rarer event, the inverse of 'Deletion Reversal', whereby an original *epenthesis* process of the form Ø → X in environment Y is reanalyzed as X → Ø in environment Ȳ (i.e., deletion in the complement of Y). We label this 'Epenthesis Reversal'. The data comes from Marshallese, whose heavily underspecified vowel system has proven a fertile ground for the exploration of phonological processes. Recall that all Marshallese vowels are underspecified along the back and round dimensions (Bender 1968), their realization along these dimensions coming from their flanking consonants. This analysis requires that all vowels *have* a consonant on their flanks. Thus synchronically Marshallese has no words which begin or end with vowels. This property was not true of Proto-Micronesian, which permitted both initial and final vowels: **ili* 'sprout', **ale* 'to sing', and **usa* 'rain'. The evolution of these forms into contemporary Marshallese reveals the glide epenthesis (insertion of *j, ɰ, w*) we'll be concerned with here — epenthesized glides are bolded: **ili* > **j**ilʲ > MRS /jVⁱlʲ/; **ale* > **ɰ**alʲ > MRS /ɰVᵃlʲ/; **usa* > **w**utˠ > MRS /wVⁱtˠ/. (We won't worry about final glide epenthesis here — everything we say holds, mirror-image, for that case.)

Detailed F2 tracking data reveals, however, that these glides are deleted under 'close sandhi' conditions. So after the IIIplSubj-Past marker /rˠVᵃɰVᵃrˠ/ the verb /jVᵉtˠVᵃlʲ/ 'go' loses its initial glide, the final consonant of the tense marker plus first syllable of the verb being realized as 🚺...rˠ ɤtˠ🚺 rather than as *🚹...rˠ je͡ɤtˠ🚺. The postlexical conditioning of glide deletion is clear from the glide *preservation* in 'they likewise went', where 'likewise' /pˠVᵃrˠVᵃjVⁱnʲwVᵉtˠ/ intervenes; the final C of that adverb (not in close sandhi) and the first syllable of 'go' being realized as 🚹...tˠ je͡ɤtˠ🚹 (with preservation of the glide, thus not *🚹...tˠ ɤtˠ🚹). There are several contexts in which such 'glide deletion' takes place. For example, contrast the behavior of the postposed emph. demonstr. /jVⁱnʲ/ 'this' (🚺jinʲ🚺) with that of the phonologically-identical infinitive marker /jVⁱnʲ/ 'to_{inf}'. The 'not close' juncture between 'week' (/wVⁱjVⁱk/) and emphatic 'this' (/jVⁱnʲ/) is realized as 🚹kjinʲ🚺, but the close juncture between 'ready' (/pʲVᵉwtʲVᵃk/) and 'to_{inf}' (/jVⁱnʲ/) as 🚺ku͡inʲ🚺.

Our diachronic explanation for this synchronic patterning of the data is relatively straightforward: the conditions on glide insertion were that a glide, corresponding in backness/roundness to a vowel, was inserted to the left (resp., right) of that vowel when there was no consonant to its left (resp., right) within the relevant prosodic domain. This was the environment 'Y' for our epenthesis rule. The complement of Y was when there *was* a consonant to the left (resp., right) of the vowel within the relevant prosodic domain: in this context, no epenthesis took place. The juncture between the Subj.-Tense marker and the verb put the final consonant of the marker 'within' the relevant prosodic domain, so no epenthesis was triggered. Similarly for /pʲVᵉwtʲVᵃk/ 'ready' and the infinitival marker /jVⁱnʲ/ (compare the close juncture indicated by the flapping in NAm English [rɛɾiɾə] 'ready to'). The shift from 'not meeting the conditions for glide epenthesis' to 'meeting the conditions for glide deletion' is a case of Epenthesis Reversal.

There are several implications of this analysis. First, while Bender's heavily underspecified phonemicization of Marshallese vowels has been strongly supported by static lexeme-internal phonetics (Choi 1990), we present here for the first time strong support from productive *postlexical* phenomena. Second, Epenthesis Reversal tells us that not all instances of synchronic deletion arise via perceptual misanalysis of 'weakly articulated' segments during acquisition. The Epenthesis Reversal, on the contrary, requires precise perception of the phonetic details in play.

Affixal and Default Fixed Segmentism:
New categories for fixed elements in reduplication

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It is well agreed upon that echo reduplication (ER) and fixed segmentism (FS) have much in common, but there is some debate about the exact nature of their relationship. I argue based on a typological survey of twenty-four languages that echo reduplication falls into a subtype of FS which I label “affixal fixed segmentism” (AFS).

Alderete et al. (1999) argue for two types of reduplication with fixed elements: “phonological fixed segmentism” and “morphological fixed segmentism.” In the former category, the fixed elements are phonologically motivated default segments; in the latter, the fixed elements are morphologically motivated affixes. A problem with these labels, however, is that they imply that FS is influenced *either* by morphological *or* phonological factors. I argue that there are actually phonological and morphological factors at play in *both* kinds of fixed segmentism.

As an alternative, I propose the categories “default fixed segmentism” (DFS) and “affixal fixed segmentism” (AFS). In default fixed segmentism (DFS), the fixed element is a phonological default segment which overwrites part of the reduplicant. The default segment can be a vowel (1) or consonant (2). However, it is unsuitable to call these patterns “phonological reduplication” because the reduplicant itself is a morpheme (a suffix in [1] and a prefix in [2]). The fixed element is not motivated purely by phonological or prosodic constraints on phonotactics or on the amount of structure present.

In AFS, the fixed element is an affix on the reduplicant, which is only sometimes involved in overwriting (3-4). The affix appears in different places cross-linguistically: for example, as a suffix (5) or prefix (6). AFS accounts for variation in the fixed elements within single patterns by labeling the variants as allomorphs of the affix, often conditioned by phonological factors such as anti-faithfulness constraints (Yip 1998). For example, in Khalkha Mongolian, the prefix /m/ (6) appears with the allomorph [z] when the base starts with /m/ (7); this prevents total faithfulness between the base and the reduplicant. Such phonologically motivated allomorphy is why these patterns should not be called “morphological fixed segmentism.”

With this analysis, I am able to answer the question of how ER and FS are related to each other. Because ER involves a fixed element which is not a phonological default segment but can be analyzed as an affix, it can be classified as a subtype of AFS, and therefore as a type of fixed segmentism. While most previous definitions of ER propose that the initial segment must overwrite base material, I argue that overwriting is not a requirement (3). The broader category of AFS also better accounts for the cross-linguistic variation by allowing patterns with a non-initial fixed segment to be classified in the same category as ER.

(1) Munduruku: *i-pak-p**ə́**k* ‘it’s not so red’ (Picanço 2005:382)
(2) Tubatulabal: *pɨtɨta* → ***ʔɨ**-pɨtɨta* ‘to turn over’ (Alderete et al. 1999:344)
(3) Bulgarian: *skandal* ‘scandal’ → *skandal-**m**andal* ‘scandals and such things’ (Stolz 2008:125)
(4) Bulgarian: *riza* ‘shirt’ → *riza-**m**riza* ‘any old shirt’ (Stolz 2008:125)
(5) Munduruku: *áko-ba̰-b**ḛ*** ‘there are bananas’ (Picanço 2005:382)
(6) Khalkha Mongolian: *nom* ‘book’ → *nom **m**om* ‘book(s) and other things’ (Kubo 1997:94)
(7) Khalkha Mongolian: *max* ‘meat’ → *max z̰ax* ‘meat and other things’ (Kubo 1997:69)

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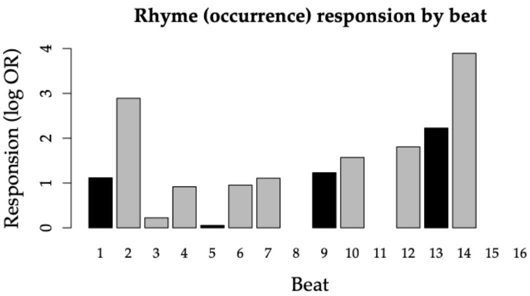
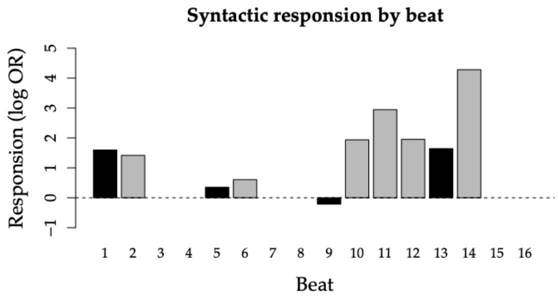
Generative textsetting and responsion in old-school hip-hop

This talk presents novel empirical results on the setting of lyrics to musical rhythms in mid-1980s hip-hop (referred to in this genre as *flow*), and sketches a generative theory to account for those results. The central empirical result is that 16-beat units referred to as 'lines' are in a local relation I refer to as *responsion*: rhythmic, linguistic, and rhyme-related structural properties internal to lines (referred to here as *boundary cues*) tend to coincide with surrounding lines, despite the lack of global 'hard' constraints on the location and existence of such cues.

As a canonical example of old-school hip-hop, I model 4 well-known songs from Run-DMC's 1986 album *Raising Hell*. The rhythmic properties of this mini-corpus are broadly similar to previous descriptions of hip-hop flow (e.g. Horn 2010, Condit-Schultz 2016). Large linguistic constituents such as clauses are aligned (but not perfectly co-extensive) with musical units of 16 low-level beats. These 'line' units group into couplets whose final stressed syllables rhyme. Line-final rhyme is always accompanied by a large syntactic phrase-ending in this early form of hip-hop, and is frequently accompanied by musical group boundaries based on long inter-onset intervals (essentially Lerdahl & Jackendoff's 1983 proximity rule).

The data suggest that levels of constituency below the line level exist, in particular half-lines spanning roughly 8 beats and quarter-lines spanning roughly 4, but their presence and metrical location varies from line to line. These lower-level constituents are inferred from the same boundary cues observed line-finally: rhymes, syntactic phrase endings, and musical group boundaries. While these cues are optional in line-internal positions, each of them is more likely to appear in a particular metrical position *if there was such a cue in that metrical position in the preceding line* than if there wasn't. This difference in conditional probabilities, expressed as a log odds ratio, is shown below for rhyme occurrence and syntactic phrase endings across all metrical positions in which it could be measured. Positive numbers indicate tendencies towards responsion: 21 of 22 comparisons here show such trends. Results are similar for the occurrence of musical group boundaries, and for whether particular beats are filled or unfilled by syllables.





I propose that responsion be modeled using templates that encode both prosodic constituency and musical rhythm. In particular, lines within a couplet or verse are constrained to match templates to a certain degree, where that degree is assessed using Lerdahl & Jackendoff's (1983) formalization of musical rhythm, *time-span reduction (TSR)*. The argument that flow has a fundamentally musical TSR structure converges on proposals from English poetry (Lerdahl 2001), French traditional song (Dell & Halle 2009, Dell 2015), and Hausa rajaz music (Hayes & Schuh 2019). Templates and correspondence are illustrated with examples from the Run-DMC mini-corpus (not shown here for reasons of space). The TSR framework also lays a foundation for analyzing later and more complex forms of hip-hop flow by weakening line-to-line templatic correspondence and alignment between templates, musical meter, and linguistic constituency.

Perceptual Study on [ɨ] Vowel Epenthesis in English Loanwords in Korean

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Perceptual studies (Kang 2003, Kim 2008) argue that [ɨ] vowel epenthesis may result from a higher degree of perceptual similarity between English inputs and Korean outputs. If [ɨ] vowel epenthesis in English loanwords in Korean has been caused by perceptual similarities to English words, the phonological factors influencing vowel epenthesis should be explained by perceptual similarities. According to previous studies (Nam & Southard 1994, Pouplier 2001), the following phonological factors affect [ɨ] vowel epenthesis in English loanwords in Korean: i) The vowel tenseness effect: [ɨ] vowel epenthesis is more likely to occur when the pre-final vowel is tense than when it is lax (e.g., English *quick* → Korean [kʰwik] vs. English *week* → Korean [wikʰɨ]). ii) The place of articulation effect: [ɨ] vowel epenthesis is more likely to occur when the final stop is coronal than when it is non-coronal (e.g., English *tip* → Korean [tʰip] vs. English *hit* → Korean [hitʰɨ]). Based on the phonological factors above, the following hypotheses are formulated: i) The vowel tenseness effect: English [CVC] forms having tense vowels are perceived as similar to Korean [CVCV] forms more often than English [CVC] forms having lax vowels. ii) The place of articulation effect: English [CVC] forms ending in coronal stops are perceived as similar to Korean [CVCV] forms more often than English [CVC] ending in non-coronal stops.

Two perceptual experiments were conducted with ten native Korean speakers (f=5 m=5). The test forms were sequenced in an ABX format. In Experiment 1 for the vowel tenseness effect, X is an English [CVC] form (e.g. [pʰVp] with V being one of tense/lax vowels). A and B are the corresponding Korean [CVCV] and [CVC] forms. (e.g. A: Korean [pʰipʰɨ] B: Korean [pʰip] X: English [pʰip]). A total of 320 ABX sequences were collected. In Experiment 2 for the place of articulation effect, X is an English [CVC] form (e.g. [pʰVC] with V being one of four lax vowels and C being one of coronal/non-coronal consonants). A and B are the corresponding Korean [CVCV] and [CVC] forms (e.g. A: Korean [pʰʌpʰɨ] B: Korean [pʰʌp] X: English [pʰʌp]). A total of 320 ABX sequences were collected. In both experiments, participants were asked to decide whether the last English form (X) sounds more similar to the first Korean form A or the second Korean form B. Based on the results of two perceptual experiments, the place of articulation effect is statistically significant (X-squared = 14.353, df = 1, p-value = 0.000032), but there is no vowel tenseness effect (X-squared = 0.29091, df = 1, p-value = 0.5773).

The results confirm the second hypothesis but not the first hypothesis. Native Korean speakers experience perceptual difficulties in distinguishing English tense and lax vowels (Lee 2011, Kim 2012) because there is no tense: lax opposition in Korean. These perceptual difficulties may cause no vowel tenseness effect on [ɨ] vowel epenthesis. Since the vowel tenseness may not be perceptually related to [ɨ] vowel epenthesis, the perceptual similarity explanation cannot account for the tendency that [ɨ] vowel epenthesis is more likely to occur when the pre-final vowel is tense than when it is lax (e.g. English minimal pair 'peak' adopted as [pʰikʰɨ] and 'pick' adopted as [pʰik]). In this case, the perceptual similarity explanation might lose its power to account for [ɨ] vowel epenthesis. Hence, future perceptual studies must examine this problem.

Pretonic lengthening in a hybrid lexical-grammatical stress system

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The metrical system of Ukrainian has recently been described in the generative literature as having both lexical stress and edge-based grammatical rhythmic stress (Mołczanow & Łukaszewicz 2021). The most salient feature of this hybrid prosodic system is that rhythmic stresses propagate from the word edges towards lexical stress, whose position within a word determines the number and the loci of rhythmic beats, e.g. *ˌkuku'rudzjaˌnyj* 'corn, adj.', *za'pamoˌročenˌnja* 'dizziness'. As argued in Mołczanow & Łukaszewicz (2021), the system poses an analytical challenge to the current foot-based metrical theories (e.g. Martínez-Paricio & Kager 2015), and necessitates rhythmic licensing mandating that lapses are located near the main stress (Lapse-at-Peak). This paper brings in new experimental data from Ukrainian, which demonstrates that the alternation of rhythmically stressed and unstressed syllables is distorted in the immediate vicinity of lexical stress, due to the pretonic position being an additional locus of increased duration. The Ukrainian data sheds light on the interaction between lexical and grammatical stress in a single metrical system, an issue omitted in theories of stress thus far.

Previous research has indicated that both lexical and rhythmic stress are cued by duration in Ukrainian (Łukaszewicz & Mołczanow 2018a,b,c). In the current study, we took measurements of the duration and formant structure of the vowel /a/ in 4 prosodic positions (σ̲σσˈσ(σ), σσ̲σˈσ(σ), σσσ̲ˈσ(σ), ˈσ̲σ). The data were collected from 11 monolingual speakers. To test the effect of position on duration, we built linear mixed effects models with fully specified random structure, speaker- and item-specific intercepts and slopes. Further, to test for the presence of vowel undershoot, correlation analyses were performed for normalized F1/F2 and vowel duration. The results point to the presence of vowel undershoot and a gradual effect of lengthening across syllables preceding lexical stress (Fig. 1). Although pretonic vowels are longer than both the vowels in the initial and the second position, significant differences were obtained for the pretonic vs. initial positions ($\beta = -10.25$, $SE = 4.26$, $t = -2.41$, $p < 0.05$), but not for the pretonic vs. second positions ($\beta = -7.31$, $SE = 4.26$, $t = -1.72$, $p = 0.094$).

It has been suggested that pretonic lengthening in Russian and in some East Slavic dialects is caused by phonological tone, associated with the syllable immediately preceding main stress (Bethin 2006, Mołczanow 2015, in press). However, the lengthening effect in Ukrainian is very subtle in comparison with that reported for the East Slavic dialects, and available F0 measurements (Łukaszewicz & Mołczanow 2018c) do not reveal any pitch rise in the pretonic syllable. Moreover, as argued in Mołczanow & Łukaszewicz (2021), the hybrid stress system of Ukrainian cannot be modelled in terms of iambic or trochaic feet, which precludes the analysis of pretonic lengthening in terms of metrical footing (cf. Crosswhite 2001 on Russian).

Fig. 1

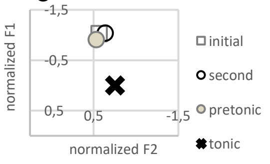


Fig. 2 (vowels)

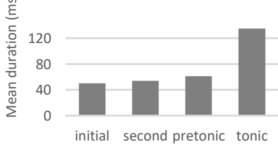
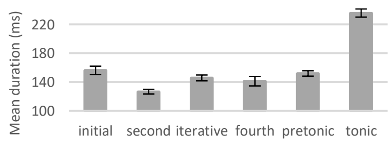


Fig. 3 (whole syllables)



We interpret the pretonic lengthening as an anticipatory effect connected with lexical stress (cf. Chitoran and Hualde 2007). The comparison of the duration patterns in words with lexical stress on the 4th syllable (Fig. 2), obtained in the present study, and on the 6th syllable (Fig. 3), obtained in the previous research (Łukaszewicz & Mołczanow 2018b), reveals that rhythmic stress appears only when sufficiently distanced from the lexical stress, so that its occurrence would not distort the temporal pattern associated with lexical stress.

(Un)Accentedness is not enough: The typology of lexical accent competition

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Main claim: We present a new typological argument that lexical accent systems are best analysed with gradient phonological representations that allow competition of accents with different strengths. **Background:** Most lexical accent analyses are based on a distinction between unaccented and accentual (=accented or triggering an accent change) morphemes. In case two or more accentual morphemes are present, either the left- or rightmost wins this competition, e.g. the leftmost in Ukrainian (1-b). Such a binary distinction into unaccented and accentual is insufficient for many patterns; an example is the 'dominant' suffix in Ukrainian (1-c) that surfaces with accent without being the leftmost accentual morpheme, and the dominant root (1-d) that again wins against this suffix since it is the leftmost dominant morpheme.

(1) Ukrainian accent: 1st noun declension (Butska, 2002)

a.	nofi-á̱m	b.	vdó̱v-a̱m	c.	vdo̱v-**á̱**	d.	osn**ó̱**v-**a̱**
	'foot'-PL.DAT		'widow'-PL.DAT		'widow'-NOM.SG		'base'-NOM.SG

(surface accent=V́, *underlying accent*=V̱, *dominance*=**V**)

Different possible explanations for such 'dominance' make different predictions about possible lexical accent patterns; examples include: Ⓐ Accent deletion on the stratum where dominant affixes are added (e.g. Kiparsky, 1982; Halle and Mohanan, 1985) predicts that all dominant affixes are added before non-dominant ones, Ⓑ Head-faithfulness (Revithiadou, 1999; Yates, 2017) predicts that all dominant morphemes are morphological heads, Ⓒ Transderivational Antifaithfulness (Alderete, 2001) predicts that dominant accentual modifications can only be base-mutating. And most existing accounts predict Ⓓ competition between maximally two accentual morpheme classes (='recessive' and 'dominant'). **Empirical results:** Although there are a multitude of proposals with different predictions and empirical case studies on lexical accent (other examples are Kiparsky and Halle, 1977; Halle and Vergnaud, 1987; Czaykowska-Higgins, 1993; Inkelas, 1998; Butska, 2002; Vaxman, 2016; Bogomolets, 2020), there is so far no large-scale typological study that tests the predictions of existing accounts. We started conducting a lexical accent database where for each language, a single parameter 'Leftmost/Rightmost' is assumed that decides the competition in case multiple accentual morphemes are present. For all contexts where this is insufficient, we assumed a hierarchy of accentual morpheme classes. So far, our database contains 17 languages where a binary distinction into unaccented and accentual cannot capture the pattern. Importantly, 8 of these languages require even more than two accentual classes and hence have different degrees of dominance, in contrast to prediction Ⓓ (marked [✧] below). In addition, we found several languages contradicting the other three predictions: ¬Ⓐ less stronger suffixes can be followed by stronger accentual ones in 6 languages ([✬]), ¬Ⓑ non-heads are stronger than heads in 8 languages ([✳]), and ¬Ⓒ post-accenting morphemes exist in 3 languages ([✽]). **Theoretical proposal:** The assumption of Gradient Symbolic Representations (Rosen, 2016; Smolensky and Goldrick, 2016) where all linguistic objects have a certain activity directly allows for such a gradient representation of accentual dominance (Zimmermann, 2018). In the default case, the accent with the highest input activity surfaces, minimizing gradient MAX violations and resulting in gradient accentual classes (e.g., we posit 7 classes for Ukrainian). In addition, we show how a GSR system easily captures all attested accentual behaviour we identified (=accentedness, pre-/postaccentuation, subtraction, and attraction) from assuming simple (defective) autosegmental structure with different activities.

Languages with more than one accentual morpheme class: 1. Hittite, 2. Lithuanian[✳], 3. Colville[✬✳], 4. Nez Perce, 5. M. Greek[✬✽], 6. Choguita Rarámuri[✬✳], 7. Shuswap[✬], 8. Parabel Selkup, 9. Sahaptin[✳], 10. Vedic Sanskrit[✧], 11. Russian[✳✧], 12. Coastal Bizkaian Basque[✧], 13. Cupeño[✧], 14. Arapaho[✬✧], 15. Japanese[✳✽✧], 16. Moses Columbian Salish[✬✳✧], 17. Ukrainian[✳✽✧]

Facial places of articulation in ASL

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Introduction. In the last few decades, there have been various proposals on which the distinctive articulatory locations are in American Sign Language (ASL). Crucially, they all differ between each other, and their claims and predictions have never been tested (see Stokoe et al. 1960, Stokoe 1965, Friedman 1977, Kegl & Wilbur 1976, Wilbur 1979, Sandler 1989, and Brentari 1998).

Research question. This study aims at testing the contrastiveness of fourteen places of articulation on the head in ASL, with both production and perception experiments. This kind of work is crucial because, due to lack of minimal pairs in sign languages, phonemic locations are hard to determine. Moreover, theoretical claims made in previous literature have never been been tested. This study proposes to investigate these claims, for example whether the locations mouth and chin, which should not be distinctive following Sandler 1989, are contrastive. The specific goal of the first experiment is to determine places of articulation are spatially different, while the aim of the second experiment is to determine if these places are phonemic, i.e., contrastive.

Production experiment. 22 ASL signers were recruited for the first experiment, conducted on Qualtrics. They were asked to click with their mouse in the exact location they would start to sign a set of 51 ASL signs on a picture of a neutral face. The 51 signs (plus 20 fillers of signs not located on the head) were distributed over 8 facial locations (cheek, chin, ear, forehead, mouth, mouth-corner, nose, temple). The output of the task was heatmaps for each sign (see Figure 1), and XY coordinates for each data point. For the analysis, the eight locations were divided into four target groups of three, based on adjacency: chin, mouth, nose (group 1); cheek, mouth, mouth-corner (group 2); cheek, forehead, temple (group 3); cheek, chin, ear (group 4). Results show that, within all groups, all location comparisons are significantly different, i.e., phonetically different, along the vertical (Y coordinates) or horizontal (X coordinates) axes, or both.

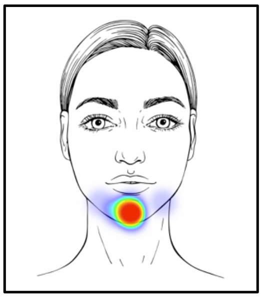

Figure 1.

Perception experiment. 8 ASL signers were recruited for the perception experiment. The first task of the experiment is an ABX task, in which participants were presented with three consecutive clips of nonce signs (made using 4 different handshapes in 14 different locations) and indicated whether the third sign is the same to the first or the second sign. The second task was a same-different task; participants watched two consecutive videos of ASL signs within a frame sentence and indicated whether the two sentences used the same signs or not. The fourteen locations consisted of the eight identified in the first experiment plus six intermediate points between major locations. All contrasts between adjacent major locations (forehead, temple, nose, chin, cheek, ear, mouth, mouth corner) and between major and relevant intermediate locations were being investigated, for a total of 15 contrasts. Results show that, in both tasks, a contrast between two major locations is discriminated significantly faster and more accurately than a contrast between a major location and an intermediate location. This suggests, also following Emmorey et al.'s (2003) results on the contrast between APPLE-ONION, that major locations straddle categorical boundaries, while intermediate locations are included within the phonological category of one of the major locations. Qualitative data on individual contrasts also confirms this.

Conclusion. The first experiment helped identify eight locations (forehead, temple, nose, chin, cheek, ear, mouth, mouth corner) that are at least phonetically different in ASL. The second experiment suggested that, perceptually, these eight locations seem to be their own phonological categories, unlike intermediate locations.

Stratification versus gradualness: opaque metrical structure in Gallipoli Serbian

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One of the central postulates of Stratal Optimality Theory (SOT; Kiparsky 2000, Bermúdez-Otero 1999), a derivational multi-level model of phonology, is that mapping procedures can only interact transparently within a morphosyntactic domain (Bermúdez-Otero 2003, 2019, Kiparsky 2015). As a corollary, phonological opacity is argued to reduce to interactions between mapping procedures applying at different levels of phonology. This paper challenges the universality of SOT's stratum-internal transparency and strengthens the case for the serial OT architecture. Crucial evidence for this move is supplied by a curious tone-stress interaction pattern in dialectal Serbian.

Gallipoli Serbian (GS; Ivić 1957) presents an interesting case of countershifting opacity (Rasin 2021) involving metrical structure. In this restricted tone system (in the sense of Hyman 2006), stress falls on the syllable containing the only High-toned mora of the word (1a), unless light and final, in which case GS stresses the penult (1b). Assuming that GS has mora-based metrification, the unstressability of light ultimate syllables follows from the prohibition against foot-level gridmarks over the word's rightmost mora (Hyde 2003). The prohibition is rendered non-surface-true by productive vowel shortening word-finally, in that final High-toned lights deriving from underlying heavies by final shortening bear stress on the surface (1c).

(1) a. Tone-driven stress

gr̩ˈdálɔ 'mirror'
puuˈtɛ́ʊi 'roads'
paˈsúuj 'beans'

b. No stress on final High-toned lights

ˈruuká 'arm' cf. ruuˈká=mi 'my arm'
ˈleepɔ́ 'nice' cf. leeˈpɔ́=jɛ 'it is nice'
ˈrɛɛkní 'say!' cf. rɛɛˈkní=mu 'tell him!'

c. Final shortening and resulting opacity (length preserved before enclitics)

ˈjá 'I' cf. ˈjáa=sam 'I am'
slaˈtkɔ́ 'sweet' (not *ˈslaatkɔ́) cf. slaˈtkɔ́ɔ=jɛ 'it is sweet'
zaʊuuˈʧɛ́ 'pulls in' (not *zaˈʊuuʧɛ́) cf. zaʊuuˈʧɛ́ɛ=ga 'pulls it in'

Under the standard SOT assumptions, the dialect's opaquely interacting procedures must be shown to apply in different morphosyntactic domains, such that final shortening selects a larger domain than stress assignment. The available evidence suggests otherwise. Long vowels are barred from occurring word-finally even in phrase-internal position (cf. <u>diˈsná</u> ˈruuká 'right arm' for underlying /<u>disnáa</u>/), implying that the shortening process applies at the word level. This is additionally corroborated by the fact that final shortening is counterfed by postlexical degemination (cf. /ʃɛɛs sutíin-aa/ → ˈʃɛɛ suˈtíin-a 'six hundred-GEN.PL'). Encliticization blocks lexical final shortening (1c), arguing that host-clitic combinations in GS form a word-level phonological domain (Booij & Rubach 1987, Bermúdez-Otero & Payne 2011). Significantly, both proclitics and enclitics are part of the stress domain, which readily indicates that stress assignment cannot be a stem-level process. Unless language-specific strata are posited for GS (see Jaker 2011 for the general idea), it must be concluded that both stress assignment and final shortening apply at the word level.

As a continuation of recent work on opaque metrical structure (Elfner 2009, 2016, Ryan 2020), I demonstrate that Harmonic Serialism (HS; McCarthy 2000) is perfectly capable of deriving stress in suboptimal environments. Pertinently to the present survey, HS does so assuming a single constraint hierarchy throughout the entire derivation. Because the gradualness requirement on HS's Gen mandates that structural changes be introduced one at a time, the penultimately stressed transparent losers in (1c) cannot be generated in a single step. Stress assignment is enforced before final shortening following LX≈PR's ranking over the shortening-inducing constraint.

The paper contributes to the ongoing debate over possible opacity types in phonology (cf. Kiparsky 2015, Broś 2016, Rasin 2021, Broś & Nazarov 2022, among others).

Vowel allophony in Ness Gaelic: Phonetic and phonological patterns of laxing and retraction

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The vowel system of the dialect of Scottish Gaelic spoken in Ness, Lewis displays a number of allophonic patterns that have never been investigated instrumentally and, in some cases, have never been reported in the existing literature. In an acoustic study of nine speakers, these patterns are investigated by measuring F1 and F2 values and verified statistically using LME modelling. By taking bimodality in the distribution of tokens as indicative of the existence of two discrete categories in a speaker's phonological grammar (Bermúdez-Otero & Trousdale 2012), it is shown that the grammatical status of these patterns varies according to speaker.

In Ness Gaelic, stressed /i e/ may be either tense [i e] or lax [ɪ ɛ] depending on the following environment. Both are (a) tense before hiatus, [h] or a preaspirated stop, while /i/ is also tense before the majority of palatalised consonants; otherwise, (b) both are lax:

(1)	a.	*nigh*	[ɲĩh]	'wash'	*teth*	[tʲʰeh]	'hot'
		fitheach	[fi.əx]	'raven'	*soitheach*	[se.əx]	'vessel'
		frithir	[fðihəð]	'impatient'	*ceithir*	[kʲʰehəð]	'four'
		miotag	[mĩʰt̪ak]	'glove'	*faic*	[fẽʰkʲ]	'see'
		bris	[pðiʃ]	'break'			
		gille	[kʲiʎə]	'boy'			
	b.	*fios*	[fɪs]	'knowledge'	*bean*	[pɛ̃n̥]	'wife'
		siud	[ʃɪt̪]	'that'	*eilean*	[ɛlan]	'island'

While some allophony in /i/ is known in other dialects (Borgstrøm 1940; 1941; Oftedal 1956; Dorian 1978; Wentworth 2005), this complementary distribution of [e ɛ] – which are generally contrastive in Scottish Gaelic – has never been reported before. For each of /i/ and /e/, tenseness is quantified by combining F1 and F2 values, and LME models confirm that environment is a significant predictor of tenseness in both vowels. It is shown that 7/9 speakers display evidence of bimodality in the distribution of tense and lax tokens of /i/, and 6/9 for /e/ (of which, respectively, 1 and 3 can be confirmed statistically using Hartigan's Dip Test). It is therefore concluded that speakers vary as to whether these patterns have undergone *stabilisation* and advanced from the phonetics to the categorical phonology (Bermúdez-Otero 2015).

Additionally, as noted by Borgstrøm (1940), stressed /a(ː)/ is retracted to [ɑ(ː)] next to velarised or before retroflex consonants in Ness:

(2)	*fannaich*	[fɑ̃n̪ˠiç]	'weaken'	*àlainn*	[ɑːl̪ˠiɲ]	'beautiful'
	blas	[pl̪ˠɑs]	'taste'	*bàrr*	[pɑːrˠ]	'cream'
	rag	[rˠɑk]	'numb'	*gàirdean*	[kɑːʈan]	'arm'

LME models confirm that both short and long /a(ː)/ display significantly lower F2 in all retracting environments than in non-retracting environments. While no speakers display any evidence of bimodality in the distribution of retracted and unretracted short /a/, it is shown that 4/9 do so for long /aː/ (of which 2 can be confirmed statistically using Hartigan's Dip Test). Again, speakers vary as to whether this process has undergone stabilisation in the latter case.

While retraction of /a(ː)/ is probably due to co-articulation, the phonetic grounding of the tense-lax opposition in /i e/ is less clear. Apart from the tensing of /i/ before a palatalised consonant, which can probably also be ascribed to co-articulation, it is noted that lax [ɪ ɛ] are found in exactly those environments where a direct transition occurs between the vowel and a following supra-glottal consonant. Following Storme's (2019) analysis of closed-syllable laxing in French, it is proposed that laxing serves to enhance the perceptual distinctiveness of a following consonant by allowing for more distinctive formant transitions, while vowels are otherwise tense by default in order to maximise their own perceptual distinctiveness.

To count or to predict: Taking arms against a sea of statistics

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A widely held view of learning in linguistics is a Pavlovian one. Learners are assumed to rely only on positive evidence and to faithfully track the statistics of occurrences (Saffran, 2020, Saffran and Kirkham, 2018). This tracking is supposed to occur long before the first lexical items are acquired. However, Olejarczuk, Kapatsinski, and Baayen (2018) provided striking evidence that learning of categorical representations is not based on raw counts, but that infrequent, and therefore surprising, tokens have an outsized influence on the representation of the type – an effect which is predicted by discriminative error-driven learning (Hoppe et al., 2022, Rescorla and Wagner, 1972). When listening to tokens of one phonetic category, the listener tries to predict the subsequent tokens (the outcomes) through previously experienced tokens (the cues). The representation of the type is then shifted to the tail of a distribution, as infrequent tokens are less expected, thus more surprising. This results in more prediction error, so that the categorical representations are adjusted accordingly. Olejarczuk, Kapatsinski, and Baayen (2018) have confirmed this in a learning experiment of a rise-fall tonal category on tokens of a /ka/-syllable.

It is unclear though, whether Olejarczuk, Kapatsinski, and Baayen's findings can be replicated. We conducted a pilot study with 14 German native speakers, which were taught a novel phonetic category: A geminated /lː/. Two groups, *right-skew* (color-coded in blue) and *left-skew* (color-coded in red) listened to 256 /alːa/-tokens, for which the /lː/-durations were manipulated in 20 ms steps; both groups had different modal values (220 vs. 340 ms), but the same mean duration (280 ms). The tail of the right-skew group had longer durations, while the tail of the left-skew group had shorter durations. Both groups were tested with the same tokens after the exposure-phase, and were asked to judge how well a token represented the type on a 7-point Likert scale. Afterwards they were asked to 3 /alːa/-tokens, representative of their type. The results are illustrated in Fig. 1.

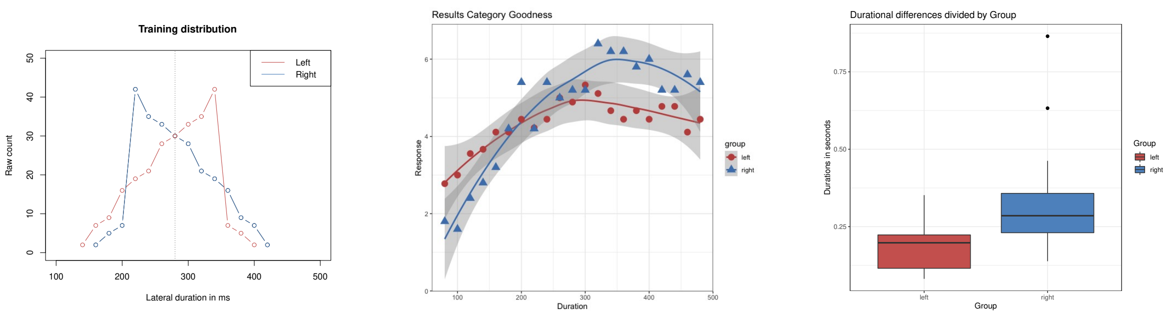

Figure 1: Distributions (left), goodness-results (middle) & production-results (right)

Both category-goodness and production data replicate the findings in Olejarczuk, Kapatsinski, and Baayen (2018), with the shape of the ratings being shifting towards the tails Although these results were obtained outside of a careful laboratory setting, they support the notion of distributional learning being based on prediction and prediction-error, instead of raw statistical counting.

Indexation helps! Under- and overfitting in lexically specific phonology

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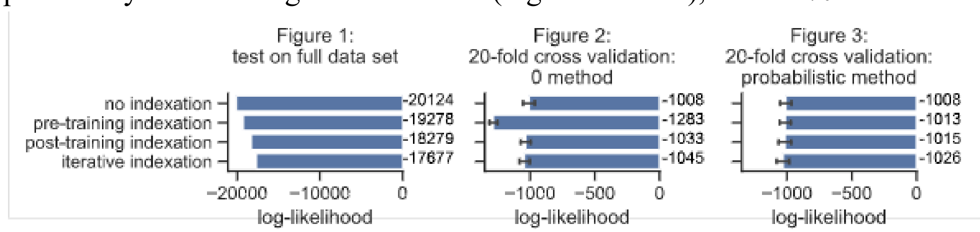
In modeling lexically specific phenomena, there is a tradeoff between underfitting and overfitting. Balancing this tradeoff is especially challenging for Optimality Theoretic models that use lexically indexed constraints (e.g., Kraska-Szlenk 1995, Pater 2000) when the learning algorithm can create new indexed constraints (e.g., Becker 2009, Round 2017), or cophonologies (Inkelas & Zoll 2007) when the learning algorithm can create new grammars. If a model is more complex, it better accounts for the differences between individual words but generalizes less well to novel items. If a model is simpler, it generalizes better, but fails to capture differences between existing words. In this paper, we evaluate three models of constraint indexation with respect to this tradeoff, showing that constraint indexation can yield a better fit to data than no indexation, while maintaining generalization to new words.

We consider three MaxEnt-based (Goldwater & Johnson 2003) models, which differ in how they determine which words to index to which constraints. The **pre-training** model uses constraint violations and candidate frequencies to estimate whether a word should be indexed to a constraint; the **post-training** model first trains a model without indexation, then uses that model's fit to determine which words to index; and the **iterative** indexation model is trained multiple times, adding one indexed constraint at a time until the learner stops improving. We also consider two ways to generalize to novel forms: the **0 method** (no indexed constraint violations for novel inputs), and a **probabilistic method** (violations for new inputs are proportional to the number of training inputs indexed to that constraint; cf. Becker 2009).

To compare these models, we used French schwa deletion, a process which is mediated by both lexical and phonological factors. We used deletion frequencies for 456 words based on judgment experiments from Racine (2008) and a simple constraint set based on Kaplan's (2011) analysis of French schwa. We trained four models, one with no indexation and three with different indexation strategies. To test underfitting, we trained and tested each model on the full dataset. To test overfitting, we used 20-fold cross-validation, dividing the data set into 20 chunks, with 19 chunks to train the model and the remaining chunk to evaluate it (repeating 20 times in total). Model performance is shown below in terms of data log-likelihood, the probability of the data given the model (higher is better), with 95% CIs.



As shown in Figure 1, the likelihood of the full dataset goes up as model complexity increases. For the cross-validation results in Figures 2 and 3, all of the models seem to generalize equally well (except for the pre-training model in Figure 2). Thus, while the models (save one) cannot be distinguished by generalization, the more sophisticated the indexation procedure, the better lexically specific patterns are captured. We conclude that (machine-determined) constraint indexation can indeed provide a better fit to phonological data while still retaining the ability to generalize to new forms.

Is onset-consonant lengthening a universal word beginning cue? A cross-linguistic study of English and French listeners

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Recent work suggests that listeners cross-linguistically tend to interpret longer syllable-onset duration as a word beginning cue during speech segmentation (Ou & Guo, 2021; White et al., 2020). Meanwhile, their segmentation behavior also exhibits language-specificity. When prosodically prominent syllables are signaled by pitch movement on vowel, English and French listeners use them to locate word-initial and word-final positions, respectively, consistent with the tendency for lexical stress to be word-initial in English and phrasal prominence to be word-final in French (Tyler & Cutler, 2009). Since onset consonants may be temporally expanded under prominence (e.g., Cho & Keating, 2009), it is possible that longer onsets are exploited to segment speech in line with the language-specific prominence distribution. That is, English and French listeners would perceive onset lengthening as cueing word-initiality and word-finality, respectively. Alternatively, both English and French listeners should treat onset lengthening as a word beginning cue if such use represents a universal segmentation solution.

We tested these two hypotheses in an artificial language (AL) learning experiment. First, participants learned the trisyllabic CVCVCV words of an AL (e.g., /banume/) by listening to continuous repetitions of the words. The words were presented under a no-lengthening (NL) condition with an equal duration for all segments, an initial lengthening (IL) condition in which the onsets of all word-initial syllables were lengthened (by 1.5 times), or a final lengthening (FL) condition in which the onsets of all word-final syllables were lengthened. Next, participants identified the AL words in a two-alternative forced-choice test, with higher response accuracy suggesting better segmentation during the learning phase. Ninety native English and 90 native French listeners recruited from the online participant platform Prolific were randomly and equally allocated to the three conditions. Their test responses were analyzed with Bayesian hierarchical logistic regression. For the English group, recognition accuracy was significantly higher in the IL condition (mean: 61%) than NL (mean: 55%) (95% HDI: [0.04, 0.46]), with no significant difference between FL (mean: 52%) and NL (95% HDI: [–0.34, 0.09]). In contrast, for the French group, recognition accuracy was significantly higher in the FL condition (mean: 59%) than NL (mean: 52%) (95% HDI: [0.08, 0.50]), with no significant difference between IL (mean: 56%) and NL (95% HDI: [–0.08, 0.34]).

The findings suggest that onset lengthening improved segmentation for English listeners only when occurring word-initially whereas it did so for French listeners only when occurring word-finally. These support the hypothesis that onset lengthening is perceived and exploited by reference to native-language prominence distribution. Thus, although longer onset has been argued to be a universal word beginning cue potentially due to its being a correlate of domain-initial strengthening across languages, its association with language-specific prominence patterning seems to take precedence in guiding the use of onset lengthening in segmentation.

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The Weak Vowels of English: Openness as Structure

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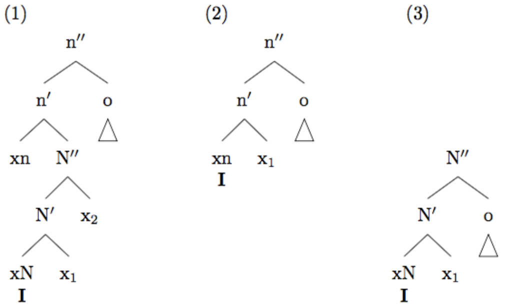
Problem. In unstressed position, English allows schwa (*bitter*, *sofa*) and the high vowels [ɪ/iː] (*attic*, *pony*), [ʊ/uː] (*album*, *issue*; often in variation with [ə]), and [ɨ] (*roses*; some varieties). The final syllable of *rabbi*, *essay* etc. is debated: Does it bear (secondary) stress (Giegerich 1992), or is it unstressed but unreduced (poorly defined in Ladefoged & Johnson 2010)? Szigetvári (2017, 2020) links vowel quality and prosody (but only descriptively), and Burzio (1994) stipulates syllables with high vowels/schwa/syllabic rhotic to be extra-prosodic when peripheral (pre-antepenultimate stress in *áccuracy*). *How* vowel quality relates to prosody or *why* the set 'high vowels plus schwa' is special remains unaddressed. I argue that the link follows from the internal structure of vowels in Government Phonology (GP) 2.0 (Pöchtrager 2006, 2018, 2020, Kaye & Pöchtrager 2013, Živanovič & Pöchtrager 2010).

Background. GP 2.0 reinterprets as structural certain properties commonly taken as melodic. This includes the element **A** (vowels: aperture/consonants: coronality; Broadbent 1991, Cyran 1997, Goh 1997). One quirk of **A** is its interaction with (constituent) structure, allowing for bigger structures than otherwise possible. Fudge (1969), Selkirk (1982), Vaux & Wolfe (2009) assume syllabic positions reserved for coronals, since the upper size limit of English monosyllables (VVC/VCC; *seek*, *late*/*sink*, *left*) can be exceeded (VVCC) if both final consonants are coronal: *fiend* (**fiemp*, **fienk*), *feast* (**feasp*, **feask*) etc. But special syllabic positions do not explain coronal privilege. Similar "excesses" occur with vowels: S. Brit. English has long *a* (**A**) in *draft*, *clasp* with the vowel making up for a missing second coronal. Hungarian allows long vowels before clusters with vowels containing **A** (Polgárdi 2003) etc. Thus, GP 2.0 replaces **A** by structure (Pöchtrager 2006, 2010, 2012, 2018, 2020, 2021a, b), with part of the structure unused and available to adjacent segments. (In *fiend* the vowel "borrows" space from the coronals to be long.) Coronality/aperture *are* structure in GP 2.0.

Proposal. Nuclei have a bipartite structure (Pöchtrager 2018, 2020, 2021a) involving up to two heads (xn, xN), with xn on top of xN. Each head projects maximally twice (xN–N'–N'', xn–n'–n''). The more open a vowel, the bigger it is (more precisely: the more empty positions it has). Thus: *Being unstressed implies being small in size.* The converse does not hold; small vowels (like *i*) are not necessarily unstressed (*litter*). This can be captured: Unstressed high vowels (plus schwa) involve a full projection of the lower head xN (unstressed [ɪ/iː] in 3), but their stressed (primary/secondary stress; Giegerich) or "unreduced" (Ladefoged & Johnson) counterparts are fully contained in the projection of the higher head xn (2, stressed/unreduced [ɪ/iː]). Vowels bigger than that have no choice: they extend across the projections of xN *and* xn (1, stressed [æ/ɛː]) and are therefore barred from truly unstressed position. Thus: **1.** We establish a link between prosody and quality while **2.** maintaining a distinction between size (aperture) and stress/"unreducedness". **3.** Prosodic prominence is identified as the head xn, which for high vowels (plus schwa) can (but does not have to) be involved; hence stressed and unstressed [ɪ/iː]. (Schwa has a structure like [ɪ/iː] without the element **I**; the additional empty position makes it mid. Stressed schwa = [ʌ].)



Generalisability. 1. High vowels (plus [ə]) are often (prosodically) weak: They avoid secondary stress in Finnish (Anttila 2008) and are typical reduction outcomes in Brazilian Portuguese (Cristófaro Alves da Silva 1992) or Eastern Catalan (Wheeler 2005), analysable as loss of structure (Pöchtrager 2018). **2.** Italian or Estonian (Pöchtrager 2006) bar long (and overlong) unstressed vowels. Again, prosodically weak position puts a cap on structure: That expressing length (Italian, Estonian) or that expressing aperture (English).

Nasalization in Atchan: morpheme-specific harmony

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Systems involving unbounded, or iterative, feature spreading are relatively common cross-linguistically, and have formed the basis for many frameworks in phonology: in such systems, a feature spreads and applies to all possible targets within a given domain (e.g. van der Hulst and van der Weijer 1995). Recently, more attention has been paid to bounded spreading patterns, in which the spreading of a feature is limited in some way (e.g. Jurgec 2011, Kavitskaya & McCollum 2018, McCollum 2021). However, such analyses do not predict the coexistence of both iterative and non-iterative patterns involving the same feature within a single language. In Atchan [Kwa: Côte d'Ivoire], we find such a case: based on data collected with native speakers, I show that the domain of nasalization is dependent on the identity of the triggering morpheme, as well as the lexical category of the target. Following a nasal subject pronoun, progressive nasalization takes place: whether that nasalization applies locally or iteratively, however, depends on the identity of the trigger (2-3). Only subject pronouns trigger the nasalization of following material: other morphemes with nasal vowels, like proper nouns or possessive pronouns, never do. Nasality is contrastive only for vowels in Atchan: nasal consonants are in complementary distribution with oral sonorants. As demonstrated in (1-3), the bilabial implosive alternates with [m] and the lateral approximant with [n]. Surface nasalization is determined not only by the morpheme identity of the trigger, but also by the target: in (3), the vowels of auxiliaries nasalize, to the point that /e/ surfaces as [ɛ̃], presumably due to the lack of *[ẽ] in the language. However, the vowel of a verb never nasalizes.

(1) aká ɓa le ɓá
Aka FUT NEG come
'Aka will not come.'

(2) **ɔ̃́** **m**a le ɓá
2PL FUT NEG come
'You will not come.'

(3) **ã** **mã** **nɛ̃́** **m**á
3SG FUT NEG come
'He will not come.'

Following a second person plural subject pronoun, nasalization is strictly local (5). After a third person singular subject pronoun, however, we observe what I term long-distance nasalization: the initial segment of each verb nasalizes (6).

(4) aká gɛ lo ɓɔ wo
Aka can go greet 3PL
'Aka can go greet them.'

(5) **ɔ̃́** **ŋ**gɛ lo ɓɔ wo
2PL can go greet 3PL
'You can go greet them.'

(6) **ã** **ŋ**gɛ **n**o **m**ɔ wo
3SG can go greet 3PL
'He can go greet them.'

This data supports a view in which the presence of a certain morpheme triggers a particular constraint reranking or reweighting. In the case of Atchan, this results in the application of harmony across distinct amounts of material, with effects beyond the word level. In this paper, I propose that the difference in domains of nasalization is best accounted for using Cophonologies by Phase (Sande et al. 2020), a framework of the phonology-syntax interface in which particular morphemes can trigger specific operations at syntactic boundaries. This work contributes to the current discussion of iterative and non-iterative harmony: prior literature (e.g. Kaplan 2008) has argued that non-iterative harmony is epiphenomenal, and can instead be derived from independent phonological constraint interactions. In this work, though, I demonstrate that the source of apparent non-iterativity in nasal harmony in Atchan must be the identity of the triggering morpheme, necessitating an approach with makes reference to morphosyntactic features as well as phonological ones. Drawing on an ongoing collaboration with native speakers of Atchan, I investigate the morpheme specificity of nasalization patterns in the language and conclude that the surface realization of this phonological process is deeply tied to the morphosyntactic features of the trigger.

Testing length effects in Japanese apophonic compounds

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In Japanese, some lexemes may show an alternation of their final vowel when they are the first element (E1) of a compound (Arisaka 1931, Martin 1952).

(1) a. am**e** "rain" → am**a**-gappa "raincoat"   b. k**i** "tree" → k**o**-kage "shade of the trees"

This apophony is not systematic and recent studies have found that +apo forms (*ama-*, *ko-*, etc.) are more frequent when E2 is shorter. However, there is some debate on the type of length effect. Labrune & Irwin (henceforth L&I) (2021) reported a categorical effect between 1μ and 2+μ E2s, whereas Salingre (2022) observed a gradient decrease of apophony with length. Both studies looked at databases made from dictionaries. L&I (2021) used a large database of all parts of speech, and Salingre (2022) looked at a smaller database of only compound nouns.

In this study, I conducted an experiment to test the length effect of E2 in apophonic compounds. Seventeen native Japanese speakers from the Kanto region were presented with novel compounds and their definition, and were asked to choose between a +apo and -apo reading. The E1s were selected because of their high apophony rates and high frequency in compounds: *ame/a* "rain", *hune/a* "boat", *sake/a* "alcohol". Each E1 was combined with two 1, 2, 3 and 4μ E2s (one with /o/ as the first vowel and another with /u/ to avoid any OCP effect of the vowel), giving 24 items. The E2s are frequent in compounds and cannot undergo rendaku.

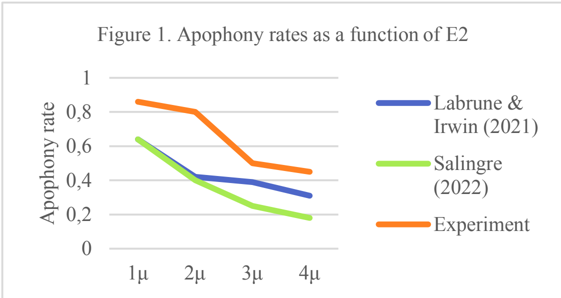

Figure 1. Apophony rates as a function of E2

As shown in Figure 1, the length effect appears to be categorical, with a gap between 2 and 3μ. This differs from the categorical effect in L&I (2021) between 1 and 2μ, that may have come from deverbal compounds. However, in the context of Japanese compounds, this is reminiscent of Rosen's Rule for *rendaku* (Rosen 2001): *rendaku* is more likely to occur when at least one element is 3 or 4μ. Rosen argued that, since prosodic words are maximally binary in Japanese, there is a prosodic word boundary between E1 and E2 in a 2μ+3μ compound, and that prosodically strong positions favor rendaku. Here, we find the opposite for apophony: as initial combining forms, +apo forms are avoided not only in word final position but also in prosodic word final position. Meanwhile, there is also a decrease between 1 and 2, and 3 and 4μ, showing that there may be some gradient effect as well.

It is possible to capture the length effects found in our experiment in a MaxEnt grammar using the APOPHONY and ALIGNRIGHT(+apo, Wd) constraints proposed in Salingre (2022) and a NONFINALITY(+apo, PrWd) constraint.

Tableau 1 MaxEnt grammar

/ame+hubuki/	APOPHONY 2.085	NONF 0.898	ALIGNR 0.360	H
a. ama-hubuki		*	***	1.979
b. ame-hubuki	*			2.085

Table 1 Apophony rates predicted by the MaxEnt grammar

E2	1μ	2μ	3μ	4μ
Predicted	84.9%	79.6%	52.6%	43.7%
Observed	86.3%	80.4%	50%	45.1%

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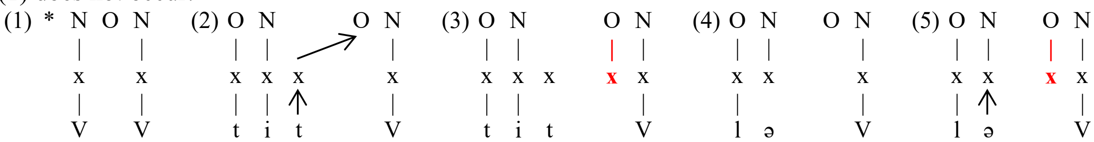
Hiatus in French: a unified analysis of liaison and elision

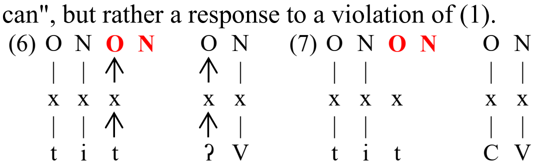
In the regular autosegmental analysis of French liaison, the reason why the floating liaison consonant associates to the empty onset of following V-initial words is that floaters "want" to associate: association is automatic. There is evidence that this association is non-automatic, though. It is argued that its driving force is hiatus avoidance (nothing new, overview in Morin 2005: 8), and that the same anti-hiatus constraint is also responsible for elision in French. This unification makes the added value of the talk.

Workings. Hiatus is defined at the syllabic, rather than at the melodic level, as under (1): a structure where an onset that is not associated to an x-slot occurs between two nuclei that are associated to x-slots is ill-formed. (1) occurs in the lexical makeup of liaison as in *petit [t] évier* (2) and is repaired by the association of the the floating t to its own skeletal slot and the empty onset (arrows). It is crucial that this onset comes without a skeletal slot since otherwise (1) would not be violated. The difference between regular V-initial and h aspiré words (which are also V-initial but refuse liaison and elision) is that the latter do come with an associated x-slot (3) (in red, Encrevé 1988). As a result, there is no liaison (*petit *[t] hublot*) because nothing needs to be repaired: under (3) the floating C does not associate since (1) does not occur.



The other major sandhi phenomenon of the language, elision, concerns monosyllabic function words like the def. art. *le / la* whose vowel is present when followed by a C-initial word (*le café*), but absent when followed by a V (*l'arbre*). Authors have concluded that, being like liaison Cs unstable, vowels subject to elision are also lexically floating (Tranel 1987, Encrevé 1988). Thus in elision context (4), the floating V does not associate (*l'arbre*) because this would create a violation of (1). As before, a following h aspiré word (5) escapes such a violation since its onset comes with an associated x-slot (in red): the floating vowel can happily associate (*le hublot*) just as, of course, with a C-initial word where the onset is filled (*le café*). Thus (1) is responsible for both liaison and elision: liaison is a repair when the lexical situation violates (1), while it prevents the association of the floater in elision. Note that unlike liaison Cs which do not appear sentence-finally (*il est petit *[t]*), elision Vs do (*regarde-[lə]*): this, it seems, is because the floating elision V comes with its own constituent, while liaison Cs need an onset of the following word to parachute. Do both floating items thus "associate whenever they can"?

Benefits. The answer is no when considering liaison without enchaînement (LWE), a type of (optional) liaison that is typical of formal registers where the liaison C is not pronounced in the onset of the following word, but rather in its own word. Its locus is evidenced by the existence of a pause and glottal stop following it (Encrevé 1988): *j'avais [zʔ] un rêve* (against [z] in regular liaison). There must thus be an onset at the right edge of the word (red under (6)) that in case of LWE receives the liaison C (while the glottal stop sits in the onset of the following word). The option to link to a position in its own word raises the question why this does not happen when the following word is C-initial (7): there is no LWE in *petit *[t] café*. The answer is that (1) is not violated under (7) and hence nothing needs to be repaired (unlike under (6) where it is violated). Thus association of liaison Cs is not automatic "whenever they can", but rather a response to a violation of (1).



The talk shows that (1) is also responsible for a subtle difference regarding h aspiré- generated glottal stop and schwa insertion. Either epenthesis may occur in C+H (stable C followed by h aspiré, *quel [ʔ] / [ə] hêtre*), but only ʔ may when the preceding C is a liaison C that remains unpronounced LC+H (*un gros [ʔ] / *[ə] hêtre*). Of all four configurations, only the insertion of schwa in LC+H produces a violation of (1) and is therefore ruled out. The same goes for LWE where a glottal stop may be inserted (6), but the insertion of a schwa (into the red N, in absence of the glottal stop) is impossible (*j'avais *[zə] un rêve*). Here as well, insertion of schwa produces a violation of (1), but insertion of ʔ does not.

Finally, note that (1) only rules over floating material: the prohibited configuration occurs without any repair with lexically associated segments (V+V *un joli arbre*). The complete pattern can thus be described by the interaction of violable constraints.

Phonological Categorization of Korean Stops by Heritage and Second Language Speakers

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Laryngeal contrasts in Korean and English stops have both similarities and differences in their acoustic implementation. Although voice onset time (VOT) and onset f0 are involved in cueing laryngeal contrasts in both languages, VOT plays a primary role in defining the voicing contrast in English stops, while onset f0 is a primary acoustic cue in distinguishing between lenis and aspirated stops in Korean (Silva, 2006, among others). This difference in the acoustic structure of the phonological contrasts in the two languages creates conditions for crosslinguistic interference in bilinguals and second language learners. The present study investigates whether such interference can affect phonological categorization of the Korean lenis-aspirated contrast by heritage speakers of Korean in the United States (N = 20) and American learners of Korean as a second language (N = 20), as opposed to L1-immersed native Korean speakers (N = 20).

Both heritage speakers and second language learners have native or near-native English proficiency and are English-dominant. In contrast, their familiarity and experience with Korean is very different both in quantity and quality. Therefore, they can be subject to a different degree of interference from English in their processing of Korean phonological categories.

To investigate the varying extent of crosslinguistic interference from English in heritage and second language speakers, the present study implemented an AX discrimination task, via an online Gorilla interface. 72 monosyllabic CV words produced by four female speakers of Korean (two laryngeal settings (lenis or aspirated) x three places of articulation, (/p/, /t/, /k/) x three vowels (/a/, /i/, /ɯ/)) were adapted from Schmidt (2007) as stimuli for the task. An equal number of 'same' and 'different' trials was used, different pairs were presented in both orders (lenis first/aspirated first), and each unique pair of stimuli was presented twice, for a total of 288 trials per participant. During the task, participants listened to pairs of the stimuli differing in the word-initial stop (lenis/aspirated) only and judged whether the two word-initial stop consonants were the same or different by clicking on a button using a mouse. The binary responses were coded as 'correct answer' or 'incorrect answer' and submitted to statistical analyses.

The results of a mixed-effects logistic regression model and a post-hoc analysis using multiplicity adjustment showed that heritage speakers performed with high accuracy comparable to that of L1-immersed native speakers. In contrast, L2 learners were significantly less accurate than heritage or L1-immersed speakers. The results suggest that both the quality and the quantity of heritage speakers' language use and exposure during early childhood were sufficient for them to develop and maintain a native-like phonological system in Korean, while developing and maintaining a separate phonological system in English. The current study concludes that the extent of crosslinguistic interference from English was imposed on the phonological categorization of Korean stops in heritage speakers to a lesser degree than in L2 learners due to the acquisitional advantages of heritage speakers from birth.

Headed Spans and Asymmetric Non-Triggers in Vowel Harmony

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Main Claim: Headed Span Theory (McCarthy 2004) provides the representations to solve the Richness of the Base problem associated with Asymmetric Non-Triggers in Vowel Harmony.

Asymmetric Non-Triggers in Vowel Harmony: In Assamese (Indo-European, India), regressive, dominant-recessive [+ATR] harmony, the [+ATR] mid vowels [e, o] are only licit if they result from the application of vowel harmony (VH,1a,1b). They do not occur in isolated roots (1c) or in affixes and cannot trigger VH (1d). I will term this pattern the Asymmetric Non-Trigger (ANT) problem, i.e. a VH pattern where a certain vowel quality occurs as the result of vowel harmony but never as a trigger or in isolation. [e,o] thus show an ANT pattern in Assamese vowel harmony, cf. Clements (1984,1985) for a similar pattern with [a̘] in Akan.

(1) ANTs in Assamese (Mahanta 2008)

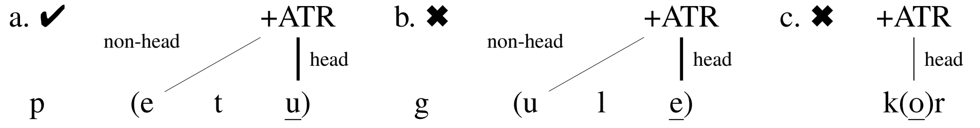
a. /pɛt/-/u/→[petu] 'pot bellied'
b. /b^hut/-/ɛ/→ [b^hutɛ] 'ghost'
c.*/kor/ →*[kor]
d. /gʊl/-*/e/→*[gule]

(2) Failure of simplistic SPOT analysis

I:	/kɔr-o/	VH(ATR)	*e,o	ID(ATR)
a.	kɔro	∗!		
☛b.	koro		∗	∗
✌c.	kɔrɔ	∗!		∗

Such a pattern poses a challenge to a phonological theory employing the Richness of the Base principle, such as Optimality Theory (Prince & Smolensky 1993). The Richness of the Base principle bans any language-specific restrictions on the input to phonology. This precludes a solution, where /e,o/ are banned from the input in Assamese and can only be derived later by vowel harmony. A simple OT analysis can never derive the correct data (2). It predicts /e,o/ as trigger of vowel harmony (2b) under the ranking of a vowel harmony trigger constaint above *e,o (2). The reversed ranking would incorrectly ban /e,o/ as the result of vowel harmony. The problem lies in the symmetry of vowel harmony in a strictly parallel framework. **Headed Spans Analysis:** Headed Spans Theory (McCarthy 2004) is one of several theories that adjusts autosegmental representations (Leben 1973, Goldsmith 1967) for use in Optimality Theory. A set of segments linked to the same phonological feature — called a feature span — has exactly one span head. Constraints can specifically refer to such a span head. McCarthy (2004) introduces this mechanism to account for blocking effects and the sour grapes problem. The same constraint family can account for the ANT pattern if used to ban [e,o] from a span head position. Vowel harmony undergoers are non-heads. Triggers of vowel harmony need to head a span. This is also trivially true for isolated vowels. Banning [e,o] from the span head position by the constraint in (3) accounts for their distribution. They occur as the result of vowel harmony (3a), but not as a trigger (3b) or in isolation (3c). This constraint can be ranked above a vowel harmony triggering constraint without banning [e,o] from occuring as undergoers and thus provides a simple solution to the ANT problem by introducing representational asymmetry. Headedness distinguishes triggers and undergoers.

(3) *SPANHEAD(e,o)(+ATR): Count one violation for each [e,o] as a [+ATR] span head.



A small-scale typological study of 56 languages, based on Casali 2003, van der Hulst 2018 and Rolle et al. 2020, reveals that the majority of ANTs in [ATR] harmony are some subset of [e,o,ɪ,ʊ,a̘], which are independently marked for articulatory reasons (cf. Archangeli & Pulleyblank 1994). *SPANHEAD constraints can be seen as a positional version of general markedness constraints (Smith 2004), banning these segments from the prominent head position.

A Diachronic Path for Non-Assimilatory Initial Nasalization in Lakes Plain

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University of Deusto

The aim is to introduce a perhaps unique sound change *non-assimilatory initial nasalization* and propose its diachronic path (a) putting it in a theoretical context and (b) explaining its rarity.

East Tariku (ET) is a sub-group of the Lakes Plain language family spoken on the bird's head peninsula of the island of Papua. Proto-Lakes Plain is reconstructed without phonemic nasality (ibid:138): *p, *t, *k, *b, *d, *(w), *(j). Languages in the ET sub-group are nearly unique in not having any nasal segments, even allophonically (Clouse 1997:138). Elsewhere in the Lakes Plain language family, we do find phonetic nasality, however, in none of these languages is nasality phonemically contrastive. In the Lakes Plain languages that do have allophonic nasality, we see a vanishingly rare diachronic development named *non-assimilatory initial nasalization.* Voiced stops spontaneously (for non-assimilatory reasons) become nasal sonorants in initial position. According to the *Index Diachronica* database of sound changes, this change appears to be vanishingly rare/perhaps unique to this language family (West Tariku languages are named by their initials):

(1)	Saponi	*#d > #n	West Tariku	*#ba > #ma
	Awera	*#d > #n	Ki Fa Fy Se	*#da > #na
			Ki Fy Se Ta De	*#b > #b/^{m}b
			Ki Fy Ta	*#d > #d/^{n}d

Using a Substance Free interpretation of Dresher's Contrastivity Hierarchy (using Element Theory), it will be shown that voice/nasality is actually one of only two (or three) contrasts present in the consonantal inventories of the whole language family. Sometimes this is expressed as voicing and sometimes as phonetic nasality (cf. Ploch 1999, Botma 2004).

The path that leads to this change proceeds in two-steps. Firstly, there is a stage of prenasalisation that presumably occurs due to cue enhancement (Stevens & Keyser 1989; Hall 2011) and to reinforce voicing (Stampe 1979). Secondly, there is a stage of initial weakening, which is areally common. This second step, the loss of initial occlusion, leads to the word-initial sonorisation of prenasalised stops producing initial nasal sonorants: #d > #nd > #n. Traces of both these steps can be found in individual languages of this group.

(2)	Kirikiri (Clouse 1997:149)	p → ɸ/h	ti → s / _V (inc. initially)
		b, d → b/^{m}b, d/^{n}d OR b, d → m, n / #_a	

The rarity of the initial weakening contributes most to the rarity of the whole phenomenon.

The theoretical implications of this process is twofold. Firstly, from a diachronic perspective, since the pathway proposed is a two-step process, it means that a one-step *non-assimilatory initial nasalization (from stops to nasals)* is still in the class of unattested processes (Honeybone 2016). Secondly, from a theoretical perspective, the unification of voicing and nasality is easy to achieve in ET, since it avoids universal articulatorily grounded features of *SPE* (Chomsky & Halle 1968) or the deterministic phonetics/phonology mappings of Concordia *Substance Free Phonology* (Volenec & Reiss 2020). The situation in Lakes Plain is a good demonstration of ET's core principle of isomeric contrast (AB)/((AB)A)/((AB)B) and non-deterministic phonetic interpretation of phonological features (Harris & Lindsey 1995), Scheer (2019). It also points to the broader relationship between phonetic contrasts and phonological representations, where isomeric contrast can be used in place of positing spurious natural classes, as is encouraged in *Radical Substance Free Phonology* (Odden 2022). Phonologically identical combinations can be duplicated isomerically, purely to provide further phonetic contrasts for interpretation.

Epenthetic Vowels at the Phonology-Morphosyntax Interface in Mohawk

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1. Epenthetic vowels. Mohawk (Iroquoian) exhibits three epenthetic vowels which differ in quality and function throughout individual words (underlined):

1a) *wakényaks* /wak-nyak-s/ 1P-get.married.HAB 'I get married' (Rowicka 2001:112)

1b) *íktats* /k-tat-s/ 1P-offer-HAB 'I offer it' (Michelson 1989:45)

1c) *kaná:waku* /ka-naw-ku-Ø/ 'In the swamp' (gloss unavailable) (Hagstrom 1997:14)

In 1a) is shown epenthetic *e*, which breaks up illicit surface consonant sequences (*k_ny). Insertion of prothetic *i* in 1b) is necessary to assign penultimate stress on the word. 1c) exhibits the 'stem-joiner' *a*, which is inserted between inter-morphemic CC sequences within the verbal stem, i.e. the incorporated noun (if any), the verbal root and the derivational suffix.es.

2. Morphosyntactic complementary distribution. Rawlins (2006) suggests that epenthesis targets different morphological domains within the word. In fact, it appears to be so:

2a) [CP[IP wak-*e*-[vP -nyak- [AspP -s]]]]

2b) *í*-[CP[IP -k- [vP -tat- [AspP -s]]]]

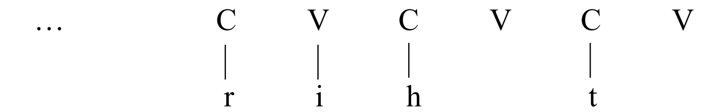
2c) [CP[IP ka- [nP -naw-*a*- [vP -ku- [AspP –Ø]]]]]

As can be seen in 2), -*a*-'s domain of insertion lies within the vP and at its left edge (2c), *i*- targets the outer left edge of the CP (2b), while -e- is operative everywhere else (AspP, IP) (2a).

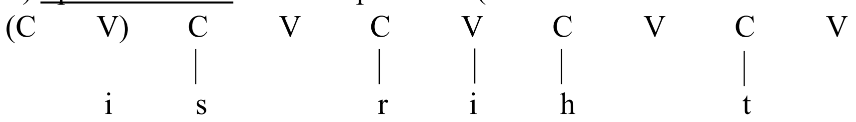
3. Computation at the interface with PF. In order to account for the complementary distribution between these three vowels while dealing with their apparent distinct functions, I rely on several theoretical approaches: Direct Interface (Scheer 2012), Government Phonology (with its strict-CV variant; Lowenstamm 1996, Scheer 2004) and cyclic spell-out (Chomsky 1998). I hypothesize that *e*-epenthesis, *a*-epenthesis and *i*-prothesis consist in a unified phenomenon occurring concomitantly with the spell-out of some phases (namely *v*P and CP) and their cyclic interpretation at PF:

3) Derivation of *íseriht* /s-ri-ht-Ø/ 2A-be.ripe-CAUS-IMP 'Cook!' (Rawlins 2006:31):

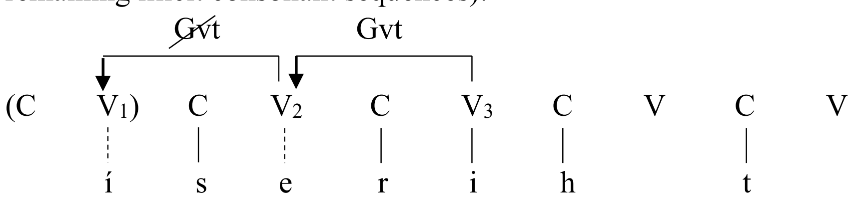
i) Spell-out of *v*P: *a*-epenthesis between C_C(C) clusters



ii) Spell-out of CP: virtual *i*-prothesis (insertion of an initial CV with a floating *i*-)



iii) Linearization (Government applies to determine stress placement and *e*-epenthesis fixes remaining illicit consonant sequences):



When /s-ri-ht-Ø/ enters the derivation, no *a*-epenthesis occurs in stage i) since no CC sequence in the *v*P is attested. In stage ii) the remaining material in the CP /s-/ is sent to PF, and an extra initial CV is inserted. When linearization occurs, -*e*- is inserted in V_2 because *[sr] is an illicit cluster. Yet V_2 being governed by V_3, it cannot receive stress and the latter shifts to the left, forcing the association of floating *i*-, triggering prothesis.

Lexical accent systems as scalar weight-sensitive systems: the case of Nxa'amxcin

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Introduction. Linguistic theory must allow for a uniform account of regularities and exceptions. In this talk, I present a novel approach to morpheme-specific exceptions in lexical accent systems on the example of Nxa'amxcin (Interior Salish, British Columbia), henceforth N.
Background. In a classic study, Czaykowska-Higgins (1993) identifies 5 exceptional morpheme classes in N: chiefly, dominant (D) suffixes win over strong (S) roots (1a), D* suffixes win over D, and exceptional roots (SE, WE) win over D, but lose to D* (1b,c). (Prefixes are unaccented.)

(1) a. *S-^{1}D*	b. *^{1}SE-D*	c. *SE-^{1}D**
/k-√ʔim'x = ikn/	/na-√maʕ'ʷ = ikn/	/kɬ-√xar = lwas-tn/
[k̓im'ˈxikn]	[naˈmaʕ'ʷkn]	[kɬxarləˈwasn]
LOC-√move=back	LOC-√break=back	LOC-√cover=chest
"camp up high"	"he broke his back"	"bib"

Goal. To provide a simple, uniform account for all morpheme-specific exceptions in N.
The approach. Accent-attracting abilities of morphemes are viewed here as *diacritic weight*. This allows for *diacritic weight scales* that order morphemes according to their weight. The Scales-and-Parameters (S&P) theory (which I have proposed) accounts for morpheme-specific exceptions, in particular for dominance, by augmenting the parameter system of PAF (van der Hulst et al. 1996) with diacritic weight scales. In S&P, accent in a given language is assigned mainly with reference to the weight scale of the language and two binary parameters, Select (resolving accentual conflicts) and Default (supplying a default accent).
Results. The patterns of N. are captured with a 4-level diacritic weight scale, Select (Right) and Default (Left). Morphemes are split into 6 classes along the scale. Two of these trigger a local *weight-decreasing* ("Lightening") rule that reduces the weight of the following morpheme by 1.
Sample derivations. First, weight of each morpheme is represented on the Weight Grid according to the weight scale. Then, Lightening, triggered by lightening morphemes (marked with an "^{L}" superscript), decreases the weight of the morpheme to its right. The heaviest weights are projected onto the Accent Grid and the rightmost heaviest one is assigned accent by Select (Right).

(2) a. *S-D*	b. *SE-D*	c. *SE-D**		
n-√ptix̣ʷ = atkʷ-n-t-ø-n	ciq = alqʷ	ciq + q-nun-t-ø-n		
3 3	3^L 3	3^L 4		Weight Grid
N/A	3 2	3 3	Lightening	
* *	*	* *	Weight Projection	Accent Grid
*	*	*	Select (Right)	
[nptiˈx̣ʷatkʷn]	[ciˈqalqʷ]	[ciqqˈnunn]		

Conclusion. The proposed approach treats lexical accent systems as weight-sensitive, dispensing with lexical accent. Being ordinal, weight allows for diacritic weight scales. The mechanism contains a scale that, together with a parameter system, correctly and uniformly assigns accent to *both* regular and exceptional forms of N. By contrast, lexical accent theories treat those differently, while making complex additional assumptions, such as cyclicity, Stress Erasure, morpheme EM (Czaykowska-Higgins 1993) and gradient surface representations (Zimmermann 2017).

Epenthesis and vowel intrusion in Central Dhofari Mehri

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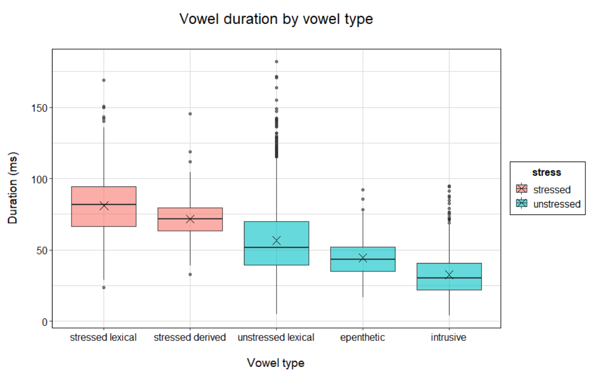
This paper presents a theoretical and quantitative analysis of epenthesis and vowel intrusion in Central Dhofari Mehri. One of six endangered Modern South Arabian languages indigenous to southern Arabia, Mehri is spoken by members of the Mahrah tribe in southern Oman, eastern Yemen, parts of southern and eastern Saudi Arabia and in diasporic communities in parts of the Gulf and East Africa.

The data for this paper were collected in the field between 2016 and 2021 from 15 speakers: 2 female, 13 males, aged between 22 and 55. The speakers include 3 Mehri–Shehret speakers, who have been bilingual in Mehri and Shehret (a sister language of Mehri) from birth, learning Arabic at school. The remaining 12 speakers were brought up speaking Mehri and learnt Arabic at school. The speakers come from three Dhofar-based tribes: Bit Thuwār (10 speakers), Bit Samōdah (3 speakers), Bit al-Afāri (2 speakers).

Data for epenthesis were elicited by four male speakers from the tribes of Bit Samōdah (1) and Bit Thuwār (Bit Ḳhōr sub-tribe) (3), Central Dhofar, between the ages of 22 and 37 producing the bare noun or verb stem followed by the stem with consonant-initial suffix (*-kəm* 'you m.pl.', *-kən* 'you f.pl.', *-həm* 'they/them m.' or *-sən* 'they/them f.'), repeating each target word three times. Word-list items were selected in consultation with the third author. Data for intrusive vowels were extracted from these and from other word lists drawn up by the first and third authors and collected by the first author from the remaining speakers mentioned above.

We show that epenthesis is motivated principally by constraints on syllable structure, while vowel intrusion is motivated by the phonotactics of the language. Contra Johnstone (1987) and others (e.g. Rubin 2010, 2018), we show epenthesis in C_1C_2C clusters in Central Dhofari Mehri typically occurs to the left of the unsyllabified consonant (C_2), as for Arabic VC-dialects (Kiparsky 2003), as in: *baḳṣ́-kəm > a'baḳəṣ́kəm* 'your m.pl. running', resulting in stress opacity as in the majority of Arabic VC-dialects. Following Kiparsky's (2003) analysis of Arabic VC-dialects, stress opacity in Central Dhofari Mehri is attributed to assignment of stress at the word level and of epenthesis at the post-lexical level. Intrusive vowels are highly variable in duration, depending on the consonantal environment, position in the word, number of syllables in the word, rate of speech, and the individual; within our database, however, intrusive vowels exhibit an overall duration that is significantly shorter than that of epenthetic vowels. One crucial difference between epenthetic and intrusive vowels lies in the fact that epenthetic vowels are recognised as syllable heads by Mehri native speakers, while intrusive vowels are not.

The figure below shows the duration of short vowels in Mehri. (N = 4846; 1222 lexical (stressed), 250 derived (stressed), 2139 lexical (unstressed), 854 intrusive, 153 epenthetic).



Languages do not favour large sonority distances

Ruihua Yin (The University of Queensland) & Jeroen van de Weijer (Shenzhen University)

Background: An underlying assumption in relation to the sonority distance between two consonant clusters is that clusters with a high sonority distance are preferred by languages, as captured in the unmarked status of onset OG or coda GO clusters. The unmarked status of such clusters is formalised in terms of sonority constraints on consonant clusters realised through local conjunction (Prince & Smolensky, 1993/2004), e.g., $[*\text{ONS/obs}+*\text{ONS/fric}]_{cl}$ >> ... >> $[*\text{ONS/obs}+*\text{ONS/gl}]_{cl}$, or in terms of sonority distance, e.g., *DIST0 >> *DIST1 >> ... >> *DIST5 (Baertsch, 2002; Gouskova, 2004). The cross-linguistic prediction of these sonority distance constraints imposed on clusters is that "If a language allows a cluster of high sonority distance, it also allows a cluster of low sonority distance", i.e., a sonority distance of higher value is more likely to occur. The cross-linguistic prediction is then that OG-/-GO are mostly attested compared with relatively unmarked clusters like OL-, ON-, -NO, and -LO etc. This cross-linguistic preference towards high sonority distance has also been observed by Clements (1990) and is put forward as the Sonority Dispersion Principle. To what degree will this unmarked status of OG- or -GO hold against a large-scale database? The current study aims to test this theoretical status of the unmarkedness of clusters on empirical data.

Methods: 1) Phoneme sequences from 496 languages were obtained from two large lexical databases, CLICS2 (List et al., 2018) and AusPhon-Lexicon (Round, 2017); 2) then sonority distance permitted in each language was calculated, by adopting two widely accepted sonority scales, [gl(4)>nas(3)>liq(2)>obs(1)] (sonority is phonologically defined as a derived notion from binary features (Clements, 1990)), and [gl(10)>rho(9)>...>vcl plo(1)] (sonority is phonetically defined as intensity (Parker, 2002)); 3) the number of languages with each sonority distance was counted; 4) lastly, sequential polynomial regression was performed to investigate the correlation between the number of languages and attested sonority distance.

Results: A significant correlation is attested between sonority distance and the number of languages attested: the number of languages attested generally increases as sonority distance increases, however, it does not monotonically keep increasing, i.e., the correlation between the number of languages and sonority distance does not show linear model, rather, the highest significant value in the correlation is attested when a quadratic component is added. Specifically, at the sonority distance value of 4/5, the highest number of languages is attested. This trend stands true, both in onsets and codas, regardless of sonority scales or assumption made on complex segments (see this general trend in Figure1 and statistical details in Table1).

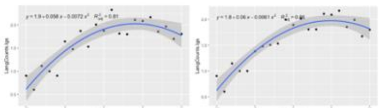


Figure 1 ***Onset*** *(left–/t s, m p/ as sequences; right–/ts, mp/ as complex segments): Correlation between sonority distances (sonority value of seg2 (right) minus the sonority value of seg1 (left)) and the number of languages attested (lgs.) when sonority is phonetically defined as intensity (Parker, 2002)*

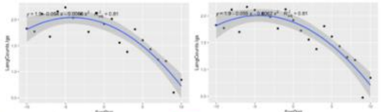


Figure 2 ***Coda*** *(left–/t s, m p/ as sequences; right–/ts, mp/ as complex segments): Correlation between sonority distances (sonority value of seg2 (right) minus the sonority value of seg1 (left)) and the number of languages attested (lgs.) when sonority is phonetically defined as intensity (Parker, 2002)*

Table 1 Onset position (& /t s, m b/ as sequences): Increase in the fit of the model as the power of the independent variable (SonDist) is added when sonority is phonetically defined as intensity (Parker, 2002)

Step	ΔR^2	F for ΔR^2	df	p
1. Linear	.550	25.44	1, 19	=.001
2. Quadradic	.807	42.71	2, 18	< .001
3. Cubic	.803	28.25	3, 17	= .412

Table 2 Onset position (& /ts, mb/ as one segment): Increase in the fit of the model as the power of the independent variable (SonDist) is added when sonority is phonetically defined as intensity (Parker, 2002)

Step	ΔR^2	F for ΔR^2	df	p
1. Linear	.655	38.99	1, 19	< .001
2. Quadradic	.864	64.58	2, 18	< .001
3. Cubic	.880	49.70	3, 17	= .086

Table 3 Coda position (& /t s, m b/ as sequences): Increase in the fit of the model as the power of the independent variable (SonDist) is added when sonority is phonetically defined as intensity (Parker, 2002)

Step	ΔR^2	F for ΔR^2	df	p
1. Linear	.558	26.25	1, 19	= .005
2. Quadradic	.814	44.77	2, 18	< .001
3. Cubic	.804	28.25	3, 17	= .857

Table 4 Coda position (& /ts, mb/ as one segment): Increase in the fit of the model as the power of the independent variable (SonDist) is added when sonority is phonetically defined as intensity (Parker, 2002)

Step	ΔR^2	F for ΔR^2	df	p
1. Linear	.587	29.41	1, 19	= .008
2. Quadradic	.811	43.90	2, 18	= .000
3. Cubic	.800	27.65	3, 17	= .940

Discussion: OG- and -GO have long been regarded as the most unmarked clusters, as formulated in sonority (or sonority distance) constraint hierarchies, or the Sonority Dispersion Principle. However, the finding that there is an optimal sonority distance where the largest number of languages are attested shows that not high sonority distance is always favoured by languages. Rather, there is optimal sonority distance cross-linguistically. The finding indicates languages do not only put restrictions on minimal sonority distance, but also on maximal sonority distance, motivating a markedness constraint of *MAXSONDIST.

**Acquiring the Australian English phonemic vowel length distinction:
L2 production and perception evidence from Mandarin-speakers**

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Cross linguistic differences in phonological inventories and phonetic realizations are often assumed to influence the acquisition of L2 phonemic contrasts in perception and/or production. For example, non-rhotic Australian English has phonemic vowel length (VL) distinctions, e.g., /ɐ/ vs. /ɐː/ as in *duck* vs. *dark*. Mandarin, on the other hand, does not have phonemic VL distinctions, where all vowels are long, though shorter in closed syllables (Wu & Kenstowicz, 2015). Interestingly, Mandarin-speakers are sensitive to English vowel duration differences between tense and lax vowels in perception (Flege et al., 2019). This suggests some sensitivity to vowel duration difference in the L2, but it remains unclear how such sensitivity might help Mandarin L2 learners of Australian English (AusE) acquire phonemic VL categories in either production or perception. This study therefore explored this issue.

The production study included 25 monolingual AusE speakers, and 27 Mandarin-speaking L2 learners of AusE (living in Australian for an average of 5;1 years). The stimuli included 5 minimal-word pairs in a CVC frame containing /ɐː/-/ɐ/: *carp-cup; cart-cut; dark-duck; heart-hut; tarp-tup*. Productions were elicited through a carrier sentence 'I heard *TARGET*' following a picture displayed with its auditory label. The results of a linear mixed effects model showed a significant group by VL interaction. While both groups produced significantly different vowel durations for short vs. long vowels, the difference was larger in the L1 (132ms vs. 251ms) than the L2 group (177ms & 255ms).

The perception study then used a word mispronunciation task with 23 monolingual AusE speakers and 29 Mandarin-speakers (living in Australian for an average of 5;1 years). In each trial, two pictures were presented side by side (a known vs. a novel object) with the auditory prompt "look at the *TARGET*". The stimuli were 12 monosyllabic CVC items: 4 Correct pronunciations (e.g., *duck*), 4 Vowel length mispronunciations (e.g., *pup -> parp*), and 4 Novel pronunciations (e.g., *horse* -> *dirk*). We expect looks for the VL condition to be at chance based on past research on single feature mispronunciations; above chance indicates reduced sensitivity to mispronunciations. Both groups looked to the *familiar* object after the Correct pronunciations and to the *novel* object after Novel pronunciations. For VL mispronunciations, looks to the *familiar* object were at chance for the AusE-speakers, but above chance for the Mandarin-speakers, showing *persistent looking to the familiar object after hearing a VL mispronunciation*.

These results show that Mandarin-speakers *can* produce phonemic vowel length contrasts for these L2 AusE categories, though the difference is smaller than for monolinguals. However, they are less sensitive to VL contrasts in perception. The results suggest that the lack of L1 phonemic duration differences leads to challenges in learning new L2 phonemic contrasts both in production and perception. Implication for existing L2 theories will be discussed (Best & Tyler, 2007; Flege, 2003).

OPM Rhythms

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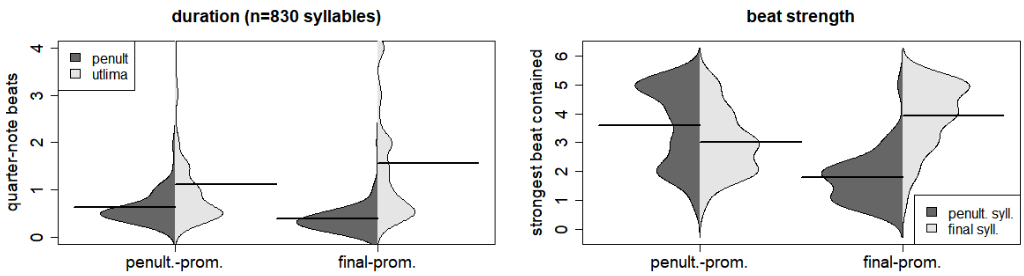
This talk investigates text-setting in OPM (Original Pilipino Music), or Filipino pop music. We believe ours is the first study to quantitatively investigate word prominence in music of a Philippine language. Using a preliminary corpus of 9 Filipino/Tagalog-language songs, we find that stressed syllables are set to longer and stronger musical notes. Moreover, this is true for both penults and ultimas, despite differences between the two stress types.

The great majority of words in Filipino/Tagalog fall into two types, summarized in the table (Anderson 2006; Constantino 1965; French 1988, 1991; Gonzalez 1970, Klimenko & al. 2010, Llamzon 1966, Schachter & Otanes 1972). Previous works have differed on whether they should be treated symmetrically (underlying-stress analysis), or asymmetrically (underlying-length analysis) with ultima prominence only an epiphemenon of default phrase-final pitch accent.

	penult-prominent	**ultima-prominent**
examples	á:bot ‘power, capacity’	abót ‘arrival’
duration	penult long, ultima long	penult short, ultima long
intensity	penult louder than ultima	penult and ultima similar
pitch accent, citation form	falls on penult	falls on ultima
pitch accent, phrases	stays in place	moves to end of phrase
underlying-stress analysis	/ábot/, stressed penult V lengthens	/abót/, additional mechanism for pitch-accent in phrases
underlying-length analysis	/aːbot/, long V attracts pitch accent	/abot/, default phrase-final pitch accent

The bean-plot on the left shows that ultimas generally have longer duration; but, in penult-prominent words the ultima is only a bit longer (penult mean length = 0.6 beats, shown by horizontal line; ultima 1.1), while in ultima-prominent words the ultima is much longer (penult 0.4; ultima 1.6). Another way to describe this plot is that both penults and ultimas are longer if stressed than if unstressed. The plot on the right shows that in penult-prominent words, the penult tends to contain a somewhat stronger beat than the ultima; whereas in ultima-prominent words, the ultima tends to contain a much stronger beat than the penult (top of vertical axis is strongest beat type). Monte Carlo testing (Gunkel & Ryan 2011) estimates these differences to be significant.



(Long-vowel syllables before the penult—which have been described as secondary-stressed—are also set to longer and stronger notes.)

Our results support analyses like the underlying-stress analysis, in which penults and ultimas bear a similar type of prominence.

Posters

***The Parametric Hierarchies and (Sub-)Parametric Choices* in Word Final Lenition**

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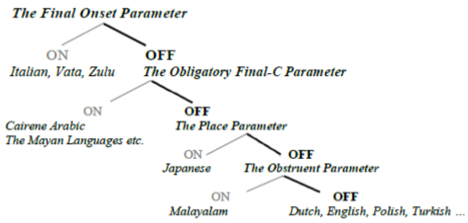
<u>Proposal</u>: The present study puts forward *the Parametric Hierarchical System* and the parametric networks for phonology and analyzes the word-final variations/restrictions among/within languages under this account. We argue that there are macro-parameters and sub-parameters in phonology which are connected to each other in a hierarchical way similar to the starting point of the *Parametric Hierarchy* developed by Biberauer (2011), Biberauer and Roberts (2012) for syntax. We propose that the different (sub-)parametric settings and connections for each language cause the language-specific word final variations in phonology.

<u>Data</u>: The touch of morphology on phonology gives rise to various phonological restrictions on the word final position(s) of languages: i.e. ***(i) Italian***: A consonant or consonant clusters are possible word initially ([***<u>tr</u>***]ota 'trout') / medially (la[***<u>dr</u>***]o 'thief') but no consonants are allowed word finally (*_C(C)#) (Morandini, 2007). ***(ii) Japanese:*** The only possible word final consonant is the placeless /N/ (*hoN* 'book') (Nasukawa, 2005). ***(iii) Malayalam:*** Obstruents are totally prohibited from the word final position (Mohanan, 1989). ***(iv) Spanish:*** CC clusters are possible word initially ([pl]aya 'beach') / medially (die[nt]e 'tooth') but only one single consonant (one of /l, ɾ, d, n, s/) may appear word finally (Bedore, 1999). ***(v) Dutch, Polish, Turkish:*** The voiced ((non)-continuant) obstruents are prohibited from the word final position (i.e. Dutch: kwa[d]-ə 'angry (ATT)' - kwaa[t] 'angry (PRED.)' (van Oostendorp, 2007)). ***(vi) English:*** The branching onsets such as *tr, br*, etc., are banned from the word final position (*_br#) although they can occur in word initial ([br]ight) / medial positions (alge[br]a) (Dziubalska-Kołaczyk, 2005).

<u>Description</u>: The types of the word final restrictions are definitely not limited to the ones given in (i-vi) and many languages (or group(s) of languages) come(s) with some (other) specific word final restriction(s). In general terms, languages let a richer and wider set of consonants appear in word initial and medial positions compared to the word final position which is *restricted* to a smaller set of consonants or even to one single consonant depending on the language (or no final consonant(s) appears as in the case of Italian, Vata, Zulu etc.).

<u>Hypotheses and Explanation</u>: We describe these various word final restrictions among languages as lenition and give a theoretical account for them under the *Parametric Hierarchical System*. In this regard, we have three claims: (i) the word final lenition/weakening stems from *the lack of the final onset licensing;*

(ii) the cross-linguistic diversity in the word final restrictions are specified as a result of *the different parametric* and *the sub-parametric choices* of each language;



(iii) the (sub-)parametric choices regarding the word final onset are also connected to the other (sub-)parameters in phonology through the intersection areas as a result of which the parameters form a network. In this regard, as the first step, we argue for four macro parameters (*the Final Onset Parameter, the Branching Rhyme Parameter*, *the Devoicing Parameter* and *the Pointed Empty Nucleus Parameter*) for phonology within the limits of the present study. Then we propose that there are intersection areas for these macro parameters, which are connected to each other via the floating sub-parameters (*meso*, *micro* and *nano*).

<u>Conclusion</u>: To conclude, the macro and sub-parameters work together (not in isolation) in word final variations among/within languages by forming a network similar to neural connections in the brain, which means that just ON/OFF status of a single parameter (i.e. the domain final p-licensing parameter) is not sufficient to explain all these cross-linguistic variations.

A Q-THEORETIC SOLUTION TO A'INGAE POSTLABIAL RAISING

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I document and analyze the typologically unusual process of postlabial raising (PLR) in A'ingae (or Cofán, an Amazonian isolate, ISO 639-3: `con`), whereby postlabial *a* raises to *ɨ* or *o* if it is a part of a diphthong. Monophthongal *a* is not affected. I account for this pattern in Q-Theory, where one vocalic target of a diphthong corresponds to fewer subsegments than a monophthong. This predicts that diphthongs might show an emergence-of-the-unmarked (TETU) effect, while monophthongs surface faithfully. The prediction is borne out by the A'ingae PLR. Data were collected by the author.

1 DESCRIPTION A'ingae has 5 monophthongal vowels (*i*, *ɨ*, *e*, *a*, *o*) and 10 diphthongs: *ao̯*, *o̯a*, *o̯e*, *o̯i*, *ai̯*, *i̯a*, *ɨi̯*, *ei̯*, *i̯e*, *i̯o*.

(1)	a.	b.	c.	d.
	/ *ko̯ehefa-ite* /	/ *bai̯lar* /	/ *sema-ẽ* /	/ *sema* /
	[*ko̯ehefɨi̯te*]	[^{m}*bɨi̯ra*]	[*semo̯ẽ*]	[*sema*]
	summer-PRD	dance	work-CAUS	work

Any diphthong may follow a non-labial C, including *ai* (e.g. *ʤai̯* 'sit') and *ao* (e.g. *ʦao̯ʔpa* 'nest'). The *a*-initial diphthongs may not follow B (*m*, p^h, *p*, ^{m}*b*, *f*, *v*), i.e. sequences *B*aV̯* are not licit. Underlying /B*ai*/ and /B*ae*/ in derived (1a,c) and borrowed (1b) words surface as [B*ɨi̯*] (1a-b) and [B*o̯e*] (1c), respectively. However, monophthongal /*a*/ surfaces faithfully as [*a*] (1d).

2 ANALYSIS I model PLR with a language-specific markedness constraint *BA, which *assigns a violation mark for each low vowel* (A) *after a labial consonant* (B). (The phonetic motivation for *BA is not obvious, perhaps articulatory: The relatively closed jaw of B may be incompatible with the open jaw of A. Alternatively, A'ingae postlabial raising may be a phonetically unnatural phonological process, such as postnasal devoicing, e.g. Hyman, 2001.) Yet, as it stands, *BA penalizes diphthongs and monophthongs equally. To address this challenge, I adopt Q-Theory (Inkelas and Shih, 2017), which holds that each segment (Q) consists of multiple (commonly three) subsegments: closure (q^1), hold (q^2), and release (q^3). E.g., the low vowel *a* (Q) has three q's: (a^1,a^2,a^3). I model diphthongs with four q's, two for each vocalic target, e.g. *ai̯* = (a^1,a^2,i^3,i^4). This correctly predicts that while diphthongs are longer than monophthongs, one vowel of a diphthong is shorter than a monophthong. *BA interacts with IDENTITY F constraints, which *assign a violation mark for each unfaithfulness to feature* F. The assumed vowel features are given to the right.

	i	*ɨ*	*e*	*a*	*o*
H(igh)	+	+	−	−	+
B(ack)	−	+	−	+	+
R(ound)	−	−	−	−	+

I propose that unfaithfulness to a feature of one q incurs only ⅓ of an IDENTITY violation. I.e., unfaithfulness to a feature of a monophthong incurs a full violation (3×⅓=1), but unfaithfulness to a feature of one target of a diphthong incurs only ⅔ of a violation (2×⅓=⅔). This predicts that a monophthongal vowel may surface faithfully (3), while the same vowel in a diphthong exhibits a TETU effect (4-5). The prediction is borne out by the A'ingae PLR. Lastly, PLR has different outcomes depending on the input: /B*ai*/ → [B*ɨi̯*] (4) but /B*ae*/ → [B*o̯e*] (5). This is modeled with relative weights of IDH and IDR (as determined with the Maxent Grammar Tool). (I assume that (i) candidates where identical input q's differ in the output, e.g. B(*ɨ*,*a*,*a*) in (3), are ruled out by ABC (Rose and Walker, 2004) and (ii) that candidates where different input q's are identical in the output, e.g. B(*e*,*e*,*e*,*e*) in (4-5), are ruled out by OPC.) Thus, Q-Theory successfully captures the facts of the A'ingae PLR.

(3)	B(*a*,*a*,*a*)	*BA 11.8	IDH 14.2	IDR 6.9	IDB 3.6	$\mathcal{H}$
☞ i.	B(*a*,*a*,*a*)	1				11.8
ii.	B(*o*,*o*,*o*)		1	1		21.1
iii.	B(*ɨ*,*ɨ*,*ɨ*)		1			14.2

(4)	B(*a*,*a*,*i*,*i*)	*BA 11.8	IDH 14.2	IDR 6.9	IDB 3.6	$\mathcal{H}$
i.	B(*o*,*o*,*e*,*e*)		1⅓	⅔		23.5
ii.	B(*a*,*a*,*i*,*i*)	1				11.8
☞ iii.	B(*ɨ*,*ɨ*,*i*,*i*)		⅔			9.5
iv.	B(*e*,*e*,*i*,*i*)	1			⅔	14.2

(5)	B(*a*,*a*,*e*,*e*)	*BA 11.8	IDH 14.2	IDR 6.9	IDB 3.6	$\mathcal{H}$
☞ i.	B(*o*,*o*,*e*,*e*)		⅔	⅔		14.1
ii.	B(*a*,*a*,*i*,*i*)	1	⅔			21.3
iii.	B(*ɨ*,*ɨ*,*i*,*i*)		1⅓			19.0
iv.	B(*e*,*e*,*i*,*i*)	1		⅔	⅔	18.8

The morpho-phonology of an English diminutive

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1 Introduction. I analyze some aspects of the English diminutive suffix /-i/ (<-(e)y/-ie>). While English has several diminutives which are not productive (*-let, -ette, -(l)ing*, etc.), the diminutive /-i/ is entirely productive. It is, however, subject to certain morpho-phonological restrictions, as I discuss here. In brief, I argue that this suffix is 1: subject to a **stress-sensitive alignment** constraint (McCarthy & Prince 1993, 1998, a.o.) and 2: **blocks the application of regular allomorphy rules**, as expected under a theory where allomorphy requires adjacency between the alternating element and its trigger (Embick 2010, Bobaljik 2012, a.o.)

2 The alignment constraint. This diminutive is essentially always compatible with mono-syllabic nouns, as (1) shows. This particular diminutive entails that the noun in question is small and endearing, and is natural with animate nouns, but also compatible with some inanimates:

(1) *Compatibility with mono-syllabic nouns*
- a. dog ⟶ doggy
- b. frog ⟶ froggy
- c. bird ⟶ birdy
- d. horse ⟶ horsie
- e. house ⟶ housie
- f. tooth ⟶ toothie

Mono-syllabic nouns are necessarily stress-bearing. Multi-syllabic nouns with final stress (though less common in English) are also compatible with the diminutive, as (2) shows:

(2) *Compatibility with multi-syllabic nouns with final stress*
- a. giraffe ([ʤɪ.ˈræf]) ⟶ giraffie
- b. raccoon ([ræ.ˈkun]) ⟶ racoonie
- c. baboon ([bæ.ˈbun]) ⟶ baboonie
- d. gazelle ([gə.ˈzɛl]) ⟶ gazellie

In contrast, this diminutive is incompatible with multi-syllabic nouns that do not end in a (primary) stressed syllable, as (3) demonstrates:

(3) *Incompatibility with non-final-stress nouns*
- a. elephant ([ˈɛ.lə.fnt]) ⟶ *elephanty
- b. ostrich ([ˈɑ.stɹɪʧ]) ⟶ *ostrichy
- c. parrot ([ˈpɛ.ɹət]) ⟶ *parroty
- d. turtle ([ˈtɹ.təl]) ⟶ *turtley

I take these facts as evidence for the following Optimality Theoretic constraint:

(4) Align(ˈσ-DIM): Assign a * if the diminutive /-i/ is not right-adjacent to a stressed syllable.

3 Allomorphy interruption. While some otherwise-conceivable diminutive forms are ruled out by the above phonological constraint, others are banned due to a morphological issue, which is particularly straightforward in plural forms. With nouns that use regular plural morphology, we can clearly see that the diminutive sits between the noun and the plural suffix (5).

(5) *Diminutive with regular plurals*
- a. dogs ⟶ doggies
- b. pigs ⟶ piggies
- c. birds ⟶ birdies

However, we find that the inclusion of the diminutive suffix blocks irregular plural morphology, meaning that any special form of the noun stem or plural affix that would otherwise occur is absent, with regular morphology used instead:

(6) *The diminutive blocks irregular plural morphology*
- a. mice-$\varnothing_{\text{PL}}$ ⟶ ✓mous-ie-s / *mice-ie-$\varnothing_{\text{PL}}$
- b. ox-en ⟶ ✓ox-ie-s / *ox-ie-en
- c. geese-$\varnothing_{\text{PL}}$ ⟶ ✓goos-ie-s / *geese-ie-$\varnothing_{\text{PL}}$
- d. sheep-$\varnothing_{\text{PL}}$ ⟶ ✓sheep-ie-s / *sheep-ie-$\varnothing_{\text{PL}}$

4 An integrated account. Following works arguing for the interleaving of phonology and morphology (Wolf 2008, 2009, Pertsova 2015, a.o.), I provide an analysis that integrates both of the above facts. In brief, by ranking the alignment constraint in (4) below faithfulness constraints in order to prevent unattested epenthesis or deletion, and simultaneously including constraints governing the application of allomorphy rules and their adjacency (following Wolf), it is possible to predict the above set of facts in a simple and unified way. I also relate this account to relevant literature on the morpho-phonology of allomorphy (such as Moskal 2015, Moskal & Smith 2016).

Implementing jaw movement constraints in the syllable architecture

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Many theoretical proposals have been made in predicting cross-linguistic patterns of phonotactic distribution. Phonologists have long noticed that the division of segment strings into syllables are determined by two key generalizations that sonority and place of articulation can account for a large portion of phonotactic patterns; however, while theories of sonority abound, e.g., sonority (Clements 1990, Foley 1970) or licensing by cue (Steriade 1997, 2001), few theories incorporate observations about place of articulation into syllable architecture. Nevertheless, coronals are observed to have a freer distribution than other segments of the same manner and there are correlations in consonant co-occurrence consistent with a production-based pressure on syllable shape (Vallee et al, 2009). I argue that restrictions on jaw movement and coupling between the jaw and segmental articulators account for patterns in segmental distribution and predict differences in segmental distribution dependent on place of articulation. Using typological data, articulatory data, and a case study of phonotactic frequency in English, this paper implements three constraints on jaw movement within a MaxEnt framework; these constraints interact with perceptual phonotactic restrictions, capturing a wide range of patterns.

Jaw movement directly corresponds to syllable structure, where jaw opening movement corresponds with the syllable onset to nucleus phase of the syllable and jaw closure corresponds with the nucleus to coda (MacNielage 1998). Some sequences of segments thus better correspond to these jaw phases than others. For instance, a sequence of onset segments that proceed from front to back, e.g., /p/+/l/, better correspond with jaw opening than a sequence of segments that proceed from back to front, e.g., /k/+/l/. In addition, movement also corresponds with manner of articulation; for example, nasals, which require a high degree of closure have a relatively more closed jaw posture than approximants. Finally, segmental articulators, i.e., the lips and tongue, have varying degrees of coupling with the jaw, such that segments like /t/ and /s/ have relatively high independence of movement compared to segments like /k/ and /p/.

These observations motivate three constraints on jaw movement and phonotactic distribution. JAW-PLACE captures restrictions on place of articulation, where a violation is assessed for sequences of segments that do not correspond to the jaw opening phase for onsets, e.g., velar+alveolar, or the jaw closure phase for codas. JAW-MANNER captures restrictions on manner, where a violation is assessed for sequences that do not correspond to the jaw opening phase for onsets, e.g., approximant+stop, or the jaw closure for codas. The final constraint, JAW-COUPLING, assesses a violation for segments that trigger a change in direction of jaw movement based on freedom of movement between jaw and segmental articulator.

This paper provides an MaxEnt analysis of these constraints in conjunction with constraints on perception to capture gradient acceptability in clusters based on manner and place of articulation. While there are a few borrowings and examples of metathesis in English that show the effect of these constraints, phonotactic distribution is largely an example of the emergence of the unmarked (TETU). However, typological patterns, articulatory data, and frequency all demonstrate the role of the jaw in shaping the phonological grammar. Articulatory data shows that word medial sequences are more likely to be syllabified in the same syllable onset when they adhere to jaw opening phase. Frequency effects likewise show the role of these constraints in the grammar where, /st/ is more common than /sp/ and /sk/ sequences in onset position and /ks/>>/ts/>>/ps/ and /st/>>/sp/>>/sk/ in coda position (Vitevitch & Luce 2004). Thus, this paper presents a framework for capturing both place of articulation and sonority patterns in distributional phonotactics.

Label free prosody

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Brackets and parentheses are widely used across mathematics, formal logic, and the natural sciences to group potentially ambiguous elements. These brackets are universally unlabeled in these fields, so that we do not find e.g., (SUM 6+7). Since its inception, however, Generative Grammar has used labeled brackets, not just as a convenience but as a dedicated theoretical device (Chomsky 1956, Zwicky & Isard 1963). Bare Phrase Structure (Chomsky 1995) and the possibility of label-free syntax (Collins 2002) make building prosody from syntax highly problematic. We therefore argue for prosody with no labeling.

Based on domain-initial strengthening and final lengthening, we suggest that the prosodic hierarchy arises through alignment to high surprisal words and syntax.

Prosodic words, ω, we propose, arise from surprisal, the high Shannon-information value of low frequency words (N, V, Adj). High frequency, closed class words with low surprisal get no stress. No reference to part of speech is required for this, nor is a bracket labeled ω. Only frequency is required, explaining rather than stipulating why ω is category neutral w.r.t. N, V, A. Phonological phrases, φ, are just pairs of high frequency items that are not in an adjunction relation (saw friends). They are the unmarked case, with no label. The ι level we attribute to what Selkirk 2005 calls CommaPhrases, following Potts 2002. These include conjoined phrases (dogs, cats, rats), particles (yes), appositives (Pat, Terry's friend), and parentheticals (like this). Conjoined clauses are separate CommaPhrases without further stipulation. We note that these are all adjuncts (sensu Munn 1993 and Zoerner 1995) and derive their prosody from that: adjuncts are marked.

None of this refers to syntactic labels or results in prosodic labels. Sounds are articulated more forcefully at the beginnings of prosodic units than at middles or ends (Fougeron & Keating 1997; Keating, Cho, Fougeron & Hsu 2003, Cho & Keating 2009). There is also less coarticulation between adjacent sounds across prosodic boundaries than within (Hardcastle, 1985; Holst & Nolan, 1995; Byrd, Kaun, Narayanan, & Saltzman 2000).

Final lengthening (Berkovitz 1993, Byrd & Saltzmann 2006, Turk & Hufnagel 2007) does not require labeled brackets either: the bigger the domain, the more the lengthening. Embedded right and left brackets model this straightforwardly. The single right bracket following a high surprisal word yields less lenghtening than the two brackets following an adjunct, which in turn give less lengthening than the three preceding the utterance-final silence. Strengthening corresponds to left brackets while lengthening corresponds to right brackets; the more brackets, the greater the effect.

Modeling rate of speech with a syntax-based prosody is difficult because the grammatical structure of a sentence does not change when it is pronounced quickly; the a-temporal nature of syntactic structure, we argue, is ill-suited to the inherent temporal nature of speech. By building the prosodic hierarchy from surprisal and adjunction, we are able to capture this mismatch.

Sonority Sequencing Principle Is Perceptual Not Phonological

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A person's linguistic competence consists of language-dependent or language-specific knowledge and language-independent, unlearned, or universal knowledge (Chomsky, 1965). Cross-linguistically, onset clusters with sonority rises are systematically preferred over plateaus, which are preferred over falls—the Sonority Sequencing Principle (SSP) (Greenberg, 1965; Parker, 2011). The question of the current paper is whether and in what way the SSP is language-independent. By combining acceptability ratings and transcription tasks, I concluded that the SSP is a language-independent effect and it is likely to be perceptual.

Mandarin arguably has no or only consonant+glide onset clusters (Duanmu, 2007; Wang and Chang, 2001), so there is no or little opportunity for Mandarin speakers to learn the SSP based on their linguistic experience. Therefore, if Mandarin speakers show knowledge of the SSP, then the SSP is language-independent. In the current study, acceptability ratings were used to learn about well-formedness or ill-formedness. Transcription task was used to understand what participants actually perceived and based their acceptability ratings on.

The stimuli of the experiment were 243 noncewords formed by 27 unattested onset clusters and 9 licit Mandarin rimes, and their onsets were of sonority rises, plateaus, or falls. All the stimuli bear a high tone to eliminate tone as a separate variable. A native speaker of Beijing Mandarin produced stimuli with medial schwas between the first two consonants before these medial vowels were spliced out in Praat (Boersma and Weenink, 2021). Thirty-two monolingual speakers of Beijing Mandarin selected the unnaturalness of each nonce word on a seven-point Likert scale, immediately after transcribing it with Pinyin, the Mandarin alphabetical writing system (Duanmu, 2007). Perceptual illusions were identified by comparing the transcription responses with the actual stimuli. Misperception-excluded acceptability ratings were used to probe phonological knowledge, and accurate perception rate as well as vowel illusion rate were used to estimate perceptual effect. Mixed effects modelling was conducted by the *lme4* package (Bates et al., 2014) in R (R Core Team, 2017). When perceptual illusions were eliminated, people judged stimuli of different sonority categories similarly. This suggests that the SSP probably comes from sources other than phonological knowledge. When accurate perception rates of different sonority categories were compared, sonority falls induced significantly more misperception than sonority plateaus, while sonority plateaus and rises introduced a similar amount of misperception. Moreover, sonority rises had less vowel illusion than plateaus, which had less vowel illusion than falls. These suggest that the SSP is a language-independent perceptual effect. A separate experiment confirmed that the transcription task did not bias the acceptability judgments.

The current study adopted an experiment paradigm that could tease apart the confound of perceptual illusion in nonce words acceptability experiments. In fact, when misperceived stimuli were included in the current analysis, sonority fall was judged to be worse than sonority plateau, which was worse than rise. This could have mistakenly led to the conclusion that the SSP is phonological. Therefore, perceptual illusion should always be controlled when conducting nonce words experiments. Furthermore, the study showed evidence against Berent et al. (2007) that argued the SSP is phonological based on perceptual evidence. More generally, the study contributes to the discussion concerning the distinction between phonological knowledge versus phonetic effect, as well as illusions in the human cognition.

Typological Absence of Prefix-Controlled Consonant Harmony Not Due to Learning Bias

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A notable cross-linguistic gap exists in the typology of consonant harmony: stem-controlled and suffix-controlled systems are known, but prefix-controlled consonant harmony remains unattested (Hansson, 2001; Finley & Badecker, 2009). Little is known about the cause of this gap: several artificial grammar learning (AGL) studies have considered how the learning of various harmony processes varies by direction (Finley, 2009, 2011; McMullin & Hansson, 2014) and have found that stem-controlled systems are learnable in either direction. Less attention has been paid to affix control: Finley & Badecker (2009) found that suffix-controlled vowel harmony is more easily learned than prefix-controlled, but no studies have investigated the interplay of both locus of control and direction in the relative learnability of consonant harmony.

In order to understand the degree to which typological preferences surrounding directionality and locus of control are shaped by innate learning biases, we conducted an AGL study of sibilant harmony. 103 native English monolinguals (61 female, 20-69 years old, M = 37.84, SD = 13.11) completed an initial training session in an artificial language under one of four conditions (Regressive Stem Control, Regressive Affix Control, Progressive Stem Control, or Progressive Affix Control). After the training session, participants completed a two-alternative forced choice task with corrective feedback. In addition to the two between-subjects factors of Direction and Locus of Control, a third within-subjects variable manipulated the number of transparent syllables separating the target and trigger segments (0, 1, 2, or 3 intervening syllables, balanced across stems of varying lengths). This third variable is of particular relevance in considering the role of learning biases in consonant harmony because unlike vowel harmony, consonant harmony processes frequently apply across relatively long distances.

Data analysis was carried out using mixed effects logistic regression: the best-fitting model found significant effects of Direction and Target-Trigger Distance, with the progressive harmony group outperforming the regressive one and shorter target-trigger distances yielding better performance than longer ones. Notably lacking was any effect of Locus of Control or interaction between Direction and Locus of Control, which would have indicated if the prefix-controlled group differed from the suffix-controlled one.

The two main findings of this study indicate that consonant harmony does not behave analogously to vowel harmony with regard to learnability by direction and locus of control. While Finley & Badecker (2009) found a learning bias against prefix-controlled vowel harmony, the present study found that learners were able to acquire the prefix-controlled sibilant harmony pattern – indeed, the prefix-controlled learner group outperformed the regressive stem control group. We argue that the typological preference against prefix-controlled harmony is not due to a general learning bias and propose explanations for the asymmetry between vowel and sibilant harmony in this regard. Additionally, we consider why the learners of progressive harmony outperformed the regressive group. This finding is striking because the greater ease of learning for progressive harmony opposes a typological preference for regressive systems, signaling that easy learnability is not the strongest motivator of this cross-linguistic trend. Our discussion explores the disparity in communicative advantage between regressive and progressive harmony, the potential influence of the left-edge biases of our native English-speaking participants on our results, and broad implications of our findings for theoretical representations of harmony.

Parasitic OCP and Constraint Dependence: Evidence from Russian

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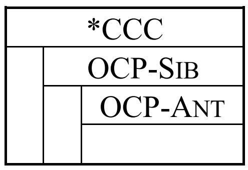
One of the most well-known examples of parasitic behavior across features is the co-occurrence restriction on homorganic consonants in Arabic roots (Greenberg 1950; McCarthy 1988, 1994). In Arabic, verbal roots consisting of homorganic consonants are underattested compared to roots with heterorganic consonants. Subsidiary features such as sonorancy, voice, or contiuancy contribute to the degree of restriction. The non-place features are "parasitic" on place features in the sense that they take effect only when a given pair of consonants are homorganic. Such co-occurrence restrictions have been mostly modeled through modifications of Place OCP so that its effect varies as a function of shared subsidiary features (Frisch et al. 2004, Coetzee & Pater 2008, Anttila 2008, Wilson & Obdeyn 2009). I introduce a new way of modeling parasitic behavior: Constraint Dependence (CD). CD is a relationship between constraints such that the violation of one constraint depends on the violation of another. I provide evidence from Russian vowel epenthesis in triconsonantal clusters that supports CD.

In Russian, when a monoconsonantal preposition is cliticized to a cluster-initial noun, a vowel is variably epenthesized after the preposition. When the preposition itself and the first consonant of the cluster are both sibilants (/**s st**olom/ with a desk'), epenthesis occurs at a very high rate (***so*** *stolom* 97.8% (*N*=45); *s stolom* 2.2% (*N*=1)). In contrast, when the preposition and the following consonant are both sibilants but followed by a vowel (/**s so**bakoj/ 'with a dog'), epenthesis never occurs (****so*** *sobakoj*). Here we observe parasitic OCP: The violation of the constraint against adjacent sibilants (*OCP-SIB) depends on the violation of a constraint against triconsonantal clusters (*CCC). I model this pattern by applying CD.

Constraints necessary to explain the Russian data are as follows: DEP-V ("Do not insert a vowel"), *CCC ("No triconsonantal cluster"), OCP-SIB ("No two adjacent sibilants"), and OCP-ANT ("No two adjacent anterior consonants"). The Russian data can be modeled by imposing CD on some of these constraints. In Harmonic Grammar (HG), the analysis involves a superordinate constraint and a subordinate constraint, such that the subordinate constraint is violable only when its superordinate constraint is violated. Reflecting the patterns observed in the data, I impose CD to *CCC, OCP-SIB, and OCP-ANT, such that OCP-SIB is dependent on *CCC, and OCP-ANT is dependent on OCP-SIB. OCP-SIB is violable only when *CCC is violated, and OCP-ANT is violable only when both *CCC and OCP-SIB are violated.



To evaluate model fit, I apply CD to MaxEnt Grammar (Goldwater & Johnson 2003, Hayes & Wilson 2008). I also model two alternatives to CD: simple HG (the same constraints without CD) and Local Constraint Conjunction (LCC, simple HG *plus* conjunction constraints for the "subordinate" constraints). For training, I use data collected from the Russian National Corpus (N = 151,691; for frequency > 10, N = 130,629).

The results of MaxEnt learning (Hayes 2009) revealed that the CD model fits the data better than the simple HG model. Using AIC as a measure of goodness of fit, the CD model is better than the simple model (AIC, CD = 541.8187, AIC, S = 553.3987). In addition, the LCC model learned zero weights for the constraints that correspond to the "subordinate" constraints in CD (OCP-SIB, OCP-ANT). This indicates that these constraints in fact do not have any effect without their "superordinate" constraints, expressed as conjunction constraints in LCC. In sum, the CD model generated more precise predictions with fewer constraints than the competing models.

Based on this evidence from Russian, I conclude CD is an appropriate way of modeling parasitic OCP.

Hypocoristics in Chilean Spanish: a Stratal OT Analysis

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This poster presents an analysis of hypocoristic formation (HF) in Chilean Spanish. A key argument is that, within an optimality-theoretic framework, a stratal architecture is necessary to capture the core patterns adequately. In other words, phonological derivation must be reintroduced into a constraint-based grammar to account for the data. To that end, I also present a critique of the recent work that has approached the question of hypocoristics through a classic OT architecture with the addition of output-output constraints (Piñeros, 2000a,b, 2016; Alber, 2009; Alber & Arndt-Lappe, 2012; Martínez Paricio & Torres-Tamarit 2019) by demonstrating that a stratal model provides for a superior analysis.

(1)	Rightmost elision (apocope)				Leftmost elision (aphaeresis)				
a. Ceci~~lia~~	[se.sí.lja]	→	Chechi	[t͡ʃé.t͡ʃi]	f. ~~Ig~~nacio	[ig.ná.sjo]	→	Nacho	[ná.t͡ʃo]
b. Anto~~nia~~	[an.tó.nja]	→	Anto	[án.to]	g. ~~Gon~~zalo	[gon.sá.lo]	→	Chalo	[t͡ʃá.lo]
c. Agu~~stín~~	[a.ɣus.tín]	→	Agu	[á.ɣu]	h. ~~Mar~~celo	[maɾ.sé.lo]	→	Chelo	[t͡ʃé.lo]
d. Edu~~ardo~~	[e.ðwáɾ.ðo]	→	Edu	[é.ðu]	i. ~~Gus~~tavo	[gus.tá.βo]	→	Tavo	[tá.βo]
e. Joaqu~~ín~~	[xwa.kín]	→	Juaco	[xwá.ko]	j. ~~Ale~~jan~~dr~~o	[a.le.xán.dɾo]	→	Jano	[xá.no]

In (1) we can distinguish two patterns that, in relatively theory-neutral terms, can be considered left- and rightmost elision of the proper noun. We see that the template for HF is a disyllabic trochee with non-branching margins. A segmental process repairing obstruent-yod sequences via palatalisation is also observable in examples like (1f), and the alveolar fricative /s/ palatalises through the same mechanism in (1g-h). Both of these processes are subject to socio-linguistic variation, and the forms listed here are standardised ones. Finally, we can observe a prohibition against branching rhymes in the second syllable, demonstrated by the division of the diphthong [wá] in (1d) whose glide /w/ is realised as [u] in the hypocoristic. This prohibition is further evidenced by (1c) where a coda /s/ is deleted. Thus, we may conclude that the first syllable may optionally close, as exemplified by (1b), but the second must remain open.

A stratal architecture incorporates the phonological cycle (Kiparsky 2000; Bermúdez-Otero 2011, 2017; Ramsammy 2013, 2017), and as such, it has recourse to stratification effects for the analysis of the data that are not available in classic OT. The version of Stratal OT I adopt is limited to three strata or levels. Consequently, each process in (1) can be accommodated within a single phonological grammar but is localised to distinct strata, in which the constraints of EVAL may be differently ranked to account for the divergent patterns in the data. I argue, therefore, that rightmost elision (or apocope) is a stem-level process of HF in Chilean Spanish. During the computation, the optimal stem-level candidate is aligned with the leftmost segment of the input and contains a disyllabic foot which constitutes the hypocoristic. Any remaining input material is discarded, while the segmental processes described above also apply.

I further show that leftmost elision (or aphaeresis) is best considered a word-level process of HF. In this case, the proper noun itself is syllabified and prosodified at the stem level, and so the input to the GEN at the word level contains foot structure and has undergone primary stress assignment. The computation at the word level can then reference this prosodic structure. The word-level grammar therefore requires that the a well-formed output has its left edge aligned with the left foot boundary present in the input, resulting in a disyllabic hypocoristic. As with examples formed through stem-level apocope, segmental repairs are also effected at the word level to hypocoristics formed by aphaeresis.

Class Polarity and the Italian Subjunctive: A phonological item-and-arrangement account

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Aim: The Present Subjunctive (PRES.SUBJ) in Italian appears to operate via class feature polarity. See table (1). We offer a fully phonological, non-class-feature driven analysis of the paradigm.

		Class I	Class II	Class III
INF		cant-a-re	ved-e-re	dorm-i-re
PRES.SUBJ	1sg	cánt-i	véd-a	dórm-a
	2sg	cánt-i	véd-a	dórm-a
	3sg	cánt-i	véd-a	dórm-a
	1pl	cant-iámo	ved-iámo	dorm-iámo
	2pl	cant-iáte	véd-iáte	dorm-iáte
	3pl	cánt-i-no	véd-a-no	dórm-a-no
INF > PRES.SUBJ		I → III	II → I	III → I
		a → i	e → a	i → a

Background: Polarity is a non-concatenative phenomenon, which is inherently problematic for any linguistic framework that aims at being entirely *item-and-arrangement*, such as (but not limited to) *Distributed Morphology* (Bonet 2008). In recent years there have been concerted efforts across frameworks to find analyses that reclassify the classical non-concatenative morphological phenomena such as umlaut and stem vowel shifts (Lowenstamm 2012; Hermans & van Oostendorp 2008), subtractive and additive morphology (Zimmermann 2017). The phenomenon of polarity has already been determined to be spurious in some cases (Trommer 2008). Moreover, class features are incompatible with a fully Minimalist linguistic architecture; and in Italian they are entirely invisible to the syntax (Acquaviva 2009). We propose a fully phonological reanalysis without class.

Proposal: We will extend Fabregas' (2017) account of Spanish theme-vowels into Italian. (1) Suffixal theme vowels are, in fact, light verb type predicates, removing the unnecessary polysemy: *rosso* (CL: I) *a-rross-a-re* 'to *redden' vs. rosso* (CL: III) *a-rross-i-re* 'to blush'. (2) Stated in Element Theory (Harris & Lindsey 1995; Backley 2011) and using evidence from Italian's unstressed vowel reduction, we will identify two phonological natural classes: Class I -are = {A}-headed. Class II and III –ere –ire are {I}-headed. (3) We propose that the PRES.SUBJ is a two-headed structure: ({A},{I}).

Mechanism: The 'polarity' emerges via an OCP operation called Head-deletion, where identical heads are both removed from the representation. Class I: (~~{A}) + ({A}~~, {I}) = I = *cant-i* 'sing-PRES.SUBJ' vs. Class II and III: (A, ~~{I}) or ({I}) + {I}~~{A} = A = *dorm-a* 'sleep-PRES.SUBJ'.

Evidence: This analysis, with its peculiar exponent (double headed PRES.SUBJ: ({A},{I}), is supported by two key observations. Firstly, looking at the irregulars, whenever there is actual root suppletion, the PRES.SUBJ appears as two independent vowels, I and A: *essere* > st-ia / *stare* > st-ia / *sapere* sa[pː]ia. Secondly, in the 1PL and 2PL, which uniquely has stress falling on the PRES.SUBJ, we also see it show up as two independent vowels: cant-**iá-**mo cant-**iá-**te. These seem to be cases where extra skeletal structure (for instance as given by stress) allows for the full expression of the PRES.SUBJ double headed exponent, unlike in the positions where it competes for association and triggers head-deletion.

A Phrasal Tonology of Ogbia
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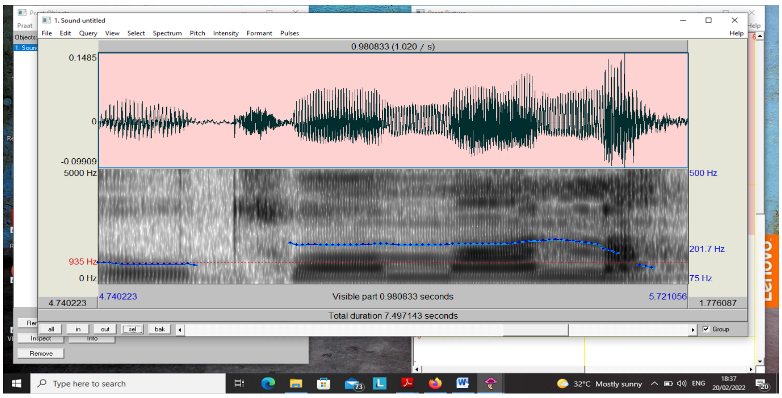
The rich tonal alternations in African languages can be observed at both word and phrasal levels of tonal analysis, as most African languages tend to have more grammatical functional tones than they have lexically (Yip 2002). This has given room for more tonal observations in languages whose tonal systems are yet to be described. This study takes a view at the phrasal tonal structure of Ogbia, a Central Delta language, spoken in the South of Nigeria.

The data for the study show the different behaviours of tones based on the environment in which they find themselves. One of the arguments in this study is that not all contour tones are found domain finally in Ogbia and this specifically applies to the rising contour tone /ˇ/. For example, in the **Num**+**N** +**Poss** construction, the contour tone can be accepted to be a concatenation of a low (L) and high(H) tone at boundary which is common with contour tones in African languages, but it does not occur at the final position in the derived form. E.g; sàrì + ípó+ zátìm → sàrǐpó zátìm 'my three masks'. The rising contour tone (LH) is however not frequently occurring as its falling (HL) / ˆ/ counterpart. The HL contour tone occurs on words in isolation as well as in larger constructions. It seems to be default tone for the singular definite marker /â/ or /ə̂/ which occurs at final positions but becomes simplified to a low (L) tone when it becomes pluralized as /zà/ or /zə̀/. For e.g; òtù → òtúə̂ → ìtúzə̀ (pl) 'house'→ 'the house' → 'the houses'.

A rare observation in the data is the occurrence of the upstep tone. One of the domains of the upstep tone in Ogbia, is in the environment of the demonstrative modifier. The illustration below is an example of the derivation of the upstep in Ogbia with the pitch indicating the tonal height. Input +MOD   V-deletion Labialisation Upstep Output

òtù→òtù+ɔ̀mánà→òtùɔ̀mánà→otɔ̀mánà→òtwɔ́mꜛ ánà→ òtwɔ́mꜛ ánà
'house'→'this house'



The analysis of phrasal tones in this study is guided by the autosegmental framework.

On the Interaction of "Obligatory Contour Principle" & "Principle of Ups and Downs" in Mandarin Tone 4 Alternation

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Traditionally, the Tone 4 (T4) alternation is categorized as a tone sandhi phenomenon, where the pitch value changes from '51' to '53' when it is followed by another T4 (Chao, 1968, 1981; Yin, 2021). Alternatively, some scholars claim that the T4 alternation occurred either before all the full tones (Lin, 2007; Shen, 1990a, 1992; Shih, 1988) or only before T4 and Tone 1 (T1, pitch value '55') (Shen, 1990b). In addition, in either case, the phenomenon is categorized as a tonal coarticulation, motivated by the need of articulation easiness. Differences in viewing the nature of the T4 alternation (i.e., tone sandhi vs. tonal coarticulation) result in different views of the interactions of Obligatory Contour Principle (OCP) (Leben, 1973; Goldsmith, 1976) and Principle of Ups and Downs (PUD) (Hyman, 1978, 2007) in the mental grammar. To probe into this issue, the current study employed a *wug* test, creating disyllabic words where the T4 syllable was followed by either a T1, Tone 2 (T2), Tone 3 (T3) or T4 syllable. Thirty native speakers of Taiwan Mandarin (female = 15) were invited to look at the prompted pictures (with a monosyllabic traditional character in a certain color) and recite the words such as *lǜ-yì* 'the character "easy" in a green color' (T4-T4), *lǜ-cāi* 'the character "guess" in a green color' (T4-T1) etc. Acoustical analyses of the first syllables in the disyllabic words (i.e., T4) included fundamental frequency (f0) contour, vowel length, and f0 slope. The results are summarized in **Table 1** and **Figure 1**. Growth curve analysis and one-way repeated measures ANOVAs showed that the f0 contours, f0 slopes and vowel lengths between the first T4 syllables in the T4-T1 and T4-T4 conditions were similar, supporting Shen's (1990b) observation that the T4 alternations took place when the T4 syllables were followed by either a T4 or a T1 syllable. In this case, the PUD effects must outrank the OCP effects in the mental grammar. Additionally, the experimental results further indicated that, instead of adjusting the offset pitch value of the first syllable, the participants adjusted the onset pitch value of the first syllable, giving rise to the coarticulation rule in (1). The constraints NO-JUMP (Hyman & VanBik, 2004; Lin, 2011; Hyman, 2018), PRESERVE(T) / IDENT-T (Zhang, 1998; Chen, 2008) and a typologically-driven constraint IDENT-T-R (c.f., Xu, 1997; Chen et al., 2018) were used to depict the mental grammar of disyllabic T4 co-articulation in Taiwan Mandarin.

Table 1: σ1 F0 Slope and Vowel Length(m.s.)

	T4-T1	T4-T2	T4-T3	T4-T4
F0 Slope	-0.310	-0.345	-0.356	-0.299
Vowel Length	179	185	178	177

(1) Tone 4 Coarticulation in Taiwan Mandarin (Represented in Tone Values)

51 → 41 / ___ {51, 55}

The tone values of T4 changed from '51' to '41' when it is followed by either T1 or T4.

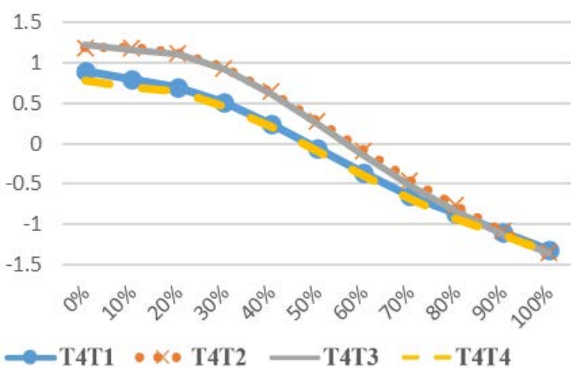

Figure 1: F0 Contour of σ1 (X = Time-normalized time; Y = Z-scored values)

Acoustic Cues in Nasality Adaptation

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Nasal vowels are known to be unpacked as VN in adapting languages that lack such vowels (Paradis & LaCharité, 1997); adaptation as V has also been reported. French nasal vowels are borrowed in Moroccan Arabic (MA) as VN, V or zero. I focus on preconsonatal nasal vowels. Data of 522 loanwords reveal a great deal of irregularities:

	French	MA	Gloss	French	MA	Gloss
a-	kɔ̃ba	komba	fight	kɔ̃tã	konta	Happy
b-	plãʃ	blaɲʃa	plank	kɔ̃ʒɛ	kuɲʒi	holiday
c-	kɔ̃vwa	Kufa	convoys	gɔ̃flɛ	gufəl	Swell
d-	ãpul	bola	bulb	ɛ̃spɛktœr	zbiktur	inspector
e-	ãkʁ	Loŋkər	ink	ãplwa	lomplwa	timetable

The goal of this study is twofold. First, I explain the factors leading to this asymmetry. Second, I propose a unified constraint-based analysis adopting the Parallel Bidirectional Phonology framework (BiPhon) (Boersma and Hamann 2009; Boersma 2009) to demonstrate that the adaptation is governed by cue constraints that analyze acoustic cues present/absent in the input (phonetic form) and interpreted according to L1 phonological structural constraints.

Research show that perception of nasality is related the relative weakening of F1 peak, vowel quality, vowel context, vowel duration and language specific properties (Maeda 1993, Beddor 2003). Given that postnasal processes are the result of acoustic cues (Downing & Hamann, 2021), carryover nasalization in French (Cohn, 1990) is simply prenasalization of consonants following nasal vowels (a - b). This acoustic cue is analysed by the borrower as an illusionary nasal consonant -by virtue of the undominated constraint *[+nasal]/-cons, +nas/- which is stored as a placeless nasal and produced homorganically with the following consonant.

This pattern is found before stops and sibilants (a- b), but never before non-sibilants (c). Krämer and Zec (2020) state that nasals barely co-occur with fricatives due to their incompatible features. Velopharyngeal opening and frication result in the perceptual sacrifice of one or the other (Walker 2011, Shosted 2006, Carignan 2018). Weak carryover nasality on /f/ and /v/ in the phonetic form decreases nasalization acoustically and perceptually. Hence, the MA borrower perceives no illusionary nasal consonant. The same results are reported for final nasal vowels (2nd example in a). A discrimination experiment is used to support the findings. Four MA monolingual participants are reported deaf to vowel nasality when the acoustic cues cannot be analysed as nasal consonants. This supports the findings by Zellou (2012) who reports that MA listners interpret nasality on vowels as a cue for a subsequent nasal consonant.

French initial nasal vowels are deleted in (d) but adapted as VN in (e). The incentive seems to be purely phonological since the syllable is required to have an onset. It is not the case of deletion, though. I will explain how cue and structural constraint guide the borrower to parse the word with/out the initial nasal vowel.

Thus, since all adaptations depend on acoustic cues in the input, the following ranking of cue constraints and structural constraints can generate all outputs in the loanword data:

[˜,–]/-cons, +nas/, onset>>[-cons,+nas]>> Parse>>MaxNas>> Max-Place.

Neighborhood density distinguishes historical lexical strata in Turkish

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This study considers what happens phonologically over time when languages are in long-term contact. It is well known that the lexicons of languages have a certain structure in terms of neighborhood density, i.e., lexical frequency is correlated with the number of neighbors, where neighbors are, roughly, words that are differ by one phoneme. Additionally, it is well known that languages adapt borrowed words to the native phonology and that older borrowings can become less recognizable as borrowings as they become more integrated into the lexicon. That is, these borrowed words become more like the native language vocabulary. These facts make a prediction with respect to neighborhood density. In particular, older borrowings should look more like the native vocabulary with respect to neighborhood density, while newer borrowings should appear more distinct. This work considers this hypothesis for Turkish, which is an especially good case because it has a well understood history of intense contact with a variety of languages, namely: French, English, Persian (Farsi), and Arabic. We show that the hypothesis is correct. As we can see in Figure 1, The longer a language has been in contact with Turkish, the more integrated borrowings from that language have been integrated into the lexicon of Turkish as measured by neighborhood density.

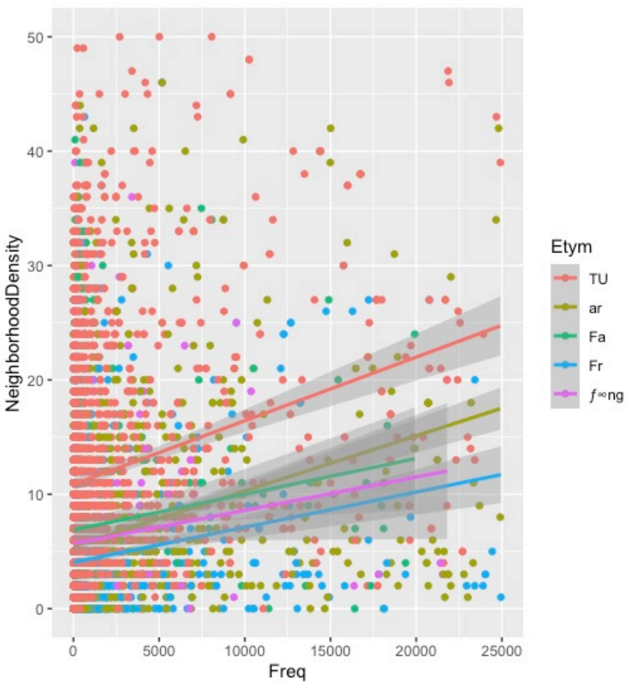


Fig.1

The paper concludes by considering how similar techniques can be used to clarify the status of pidgin and creole languages and estimate the degree of intensity of contact between languages for which there is otherwise little historical record of their contact.

Gradient opacity in Uyghur backness harmony: A large-scale corpus study

Connor Mayer (University of California, Irvine)

This paper demonstrates on the basis of a large corpus study that an opaque phonological interaction in Uyghur (Turkic: China) displays variability in rates of opacity that is conditioned by root frequency. This relationship can be accounted for if this opacity is modeled as a type of lexical exceptionality, rather than an ordered interaction between phonological processes.

Background. Uyghur displays *backness harmony*, whereby certain consonants and vowels in suffixes must agree with the final front /æ ø y/ or back /ɑ o u/ root vowel (e.g., k**ø**z-d**æ**/*-dɑ 'eye-LOC'; **ɑ**t-t**ɑ**/*-tæ 'horse-LOC'). The vowels /i e/ are transparent (e.g., **ɑ**mil-**ʁɑ**/*-gæ 'element-DAT'; m**æ**st͡ʃit-**kæ** 'mosque-DAT'). Uyghur also has a vowel reduction process that neutralizes /æ ɑ/ to the harmonically neutral [i] in medial, open syllables (e.g., bɑl**ɑ** 'child', bɑl**i**-lɑr 'child-PL'; sæll**æ** 'turban', sæll**i**-lær 'turban-PL'). The interaction of these processes in disharmonic roots can produce opaque harmonizing behavior (e.g., /ɑp**æ**t-i-GA/ → [ɑpiti**gæ**] 'disaster-3.POS-DAT'; /ʃæjt**ɑ**n-i-GA/ → [ʃæjtini**ʁɑ**] 'devil-3.POS-DAT'). In other cases, surface-true harmony may be obligatory (e.g., /ærz**ɑ**n-i-GA/ → [**æ**rzini**gæ**] 'cheap-3.POS-DAT') or optional (e.g., /æz**ɑ**n-i-GA/ → [æzini**ʁɑ**] <u>or</u> [**æ**zini**gæ**] 'call to prayer-3.POS-DAT').

Methodology. This study uses two large news corpora: *Uyghur Awazi* (6.1m words) and *Radio Free Asia's* Uyghur-language website (9.6m words). Data were collected using webscrapers, and parsed using a morphological transducer (Washington et al. 2020) that decomposes words into their roots and suffixes, and detects suffix backness and whether vowel reduction occurs.

Results. 195 disharmonic roots exhibited reduction of their second vowel. 140 displayed only opaque harmony, while 55 displayed some surface-true harmony. A logistic regression model fit to individual tokens of the 195 roots shows log token frequency is a significant predictor of rates of opaque harmony. Raised /æ/ was also more likely to harmonize opaquely (cf. Vaux 2008).

Analysis. If opaque harmony is modeled as a serial process where harmony precedes reduction, this requires lexically-conditioned variability in the order of rule application (under a rule-based analysis) or ordering of phonological strata (under, e.g., Stratal OT; Bermúdez-Otero 2003), both of which are unexpected. The relationship between frequency and rates of opacity also cannot be straightforwardly accounted for in such models. We adopt a parallel MaxEnt OT model (see tableau below) which treats opaque harmony as a type of *lexical exceptionality* to surface-true harmony. Uyghur speakers' grammars contain general preferences for surface-true harmony (modeled using simple Agree constraints) as well as a set of lexically-indexed constraints (Pater 2009) that mandate the harmonizing behavior of particular roots (Rebrus & Törkenczy 2017). Larger weights on these indexed constraints correspond to higher rates of opaque harmony. When the model is fit to the corpus data, we observe a positive correlation between the log frequency of a root and the weight of its indexed constraint, aligning with the established relationship between frequency and exceptionality (e.g. Bybee 1985, Morgan & Levy 2016).

Conclusion. The representational challenges opacity poses for parallel models of phonology have been used as support for serial models. Although serial analyses of these patterns are usually straightforward, they may simply recapitulate the historical processes that led to the opacity, rather than modeling speakers' synchronic representations. Treating opacity in Uyghur as lexical exceptionality provides a better account of the patterns observed in the corpus data and allows it to be represented in a strictly parallel model. This approach may be fruitful for cases of opacity in other languages.

/sahabæ$_k$-lAr/	Pred. Freq.	Obs. Freq.	*H*	VAgreeB $w = 7.37$	VAgreeF $w = 7.82$	*Unreduced $w = 31.02$	HarmFront$_k$ $w = 7.11$
sahabæ-lær	0	0	31.02			1	
sahabæ-lar	0	0	45.95		1	1	1
sahabi-lær	0.44	0.44	7.37	1			
sahabi-lar	0.56	0.56	7.11				1

Representing nasal vowels in Precedence-free Phonology

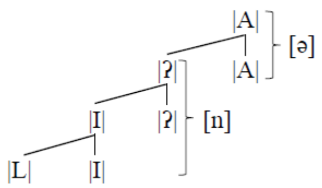
Kuniya Nasukawa and Phillip Backley (Tohoku Gakuin University, Japan)

This paper proposes how to represent contrastive nasal vowels using the model of Precedence-free Phonology (PfP)—an approach in which phonological structures (both melodic and prosodic) refer only to melodic primes called elements. In PfP, traditional prosodic constituents such as nucleus, mora and syllable are replaced by melodic elements which project to successive levels of prosodic structure, where they concatenate via head-dependency relations to form (mora-sized, syllable-sized, etc.) prosodic domains.

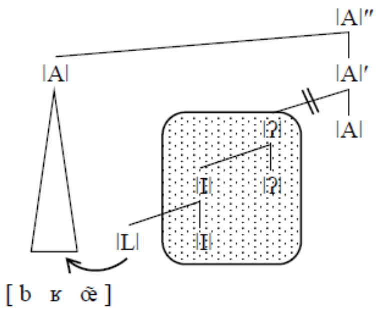
The focus is on nasal vowels in French. The status of French nasal vowels (FNVs) has been debated extensively in the phonology literature. One area of contention has centred on whether FNVs are lexical or derived, as described in Tranel (1981). The lexical view taken in Martinet (1971) and Trubetzkoy (1967) treats FNVs as distinct phonemes, since they are thought to contain a nasality feature which allows them to contrast with oral vowels. On the other hand, the derived view taken in Dell (1970) and Schane (1968) sees FNVs not as single segments but as sequences of an oral vowel plus a nasal consonant. By using PfP to represent FNVs, however, the issue of lexical versus derived can be disregarded altogether, since PfP is a non-derivational approach.

PfP assumes that French takes |A| as its base element, which is pronounced as [ə] (baseline resonance in French); this is the result of phonetically interpreting the base element |A| on its own. By contrast, the dental nasal [n] in (a) has the relatively complex structure |ʔ I L|. In (a), |ʔ| (the C-domain's base element) has two dependents, |L| and |I|, with |L| contributing nasal resonance and |I| providing the (dental) place specification for [n].

(a) [nə]



(b) *brun* (masc.) /bʁyn/ [bʁœ̃]



The same structure for [n] is also present in the structure for FNVs, as shown in (b). The difference in intepretation between (a) and (b) is determined by an externalisation rule that (i) makes *the highest base element |A|* phonetically silent by the requirement of the Ultimate Head Parameter (cf. Kaye, Lowenstamm & Vergnaud, 1990; Harris 1994), and (ii) suppresses a *dependent of the highest base element in the word* (excluding the nasality element |L|, which is realized when it merges with the stem vowel, as indicated by the arrow in (b)). In the corresponding feminine form *brune* ([bʁyn]), on the other hand, this suppression does not take place. It is therefore the occurrence/absence of suppression that creates the masculine/feminine distinction.

The PfP model also allows us to capture a similarity between FNVs and syllabic nasals in languages such as Pali and Japanese.

Boomerang Constraints: A Mechanism for Duke-of-York Mappings in Harmonic Serialism

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Introduction: Recent work (Gleim 2019; Rasin 2019) has argued against *Harmonic Serialism* (*HS*; McCarthy 2000) because it lacks the expressive power to represent *feeding Duke-of-York* mappings (*fDoY*; Pullum 1975). Here I show that a novel family of constraints can provide this framework with the ability to successfully capture fDoY.

Background: Whenever three phonological processes (*A*, *B*, *C*) interact such that *A* creates the environment for *B* to apply, *B* does apply, and then *C* erases that environment later in the derivation, an fDoY mapping is created. McCarthy (2003) used a hypothetical version of Hebrew ("Quasi-Hebrew") to illustrate how such an interaction could arise from relatively common rules:

(A) Epenthesis: /qarbi/→qarəbi ***(B) Spirantization:*** qarəbi→qarəvi ***(C) Syncope:*** qarəvi→[qarvi]

It has been argued that the expressive power to capture fDoY mappings is needed for languages such as Polish (Rubach 2003), Arapaho (Gleim 2019), and Palestinian Arabic (Rasin 2019). Vanilla versions of HS fail to capture fDoY derivations because HS requires *harmonic improvement*. That is, intermediate forms must be more harmonic than their predecessors, which prevents processes (like *C* above) that reverse a change made earlier in the derivation.

Boomerang Constraints: To allow HS to capture fDoY mappings, I propose a novel family of constraints: *boomerang constraints* (*BCs)*, which introduce a temporary structure into an intermediate form. BCs ("BOOM" below) include both a structure ("ə" below) and a context for that structure ("Coda_" below) and are violated by any form that does not create a temporary version of that structure ("ə̂" below) in that context. The tableau demonstrates this using Quasi-Hebrew as an example. As always in HS, intermediate forms are fed back into the same grammar until the input is mapped faithfully onto itself. Crucially though, once the final step in the derivation is complete, all temporary structures introduced by BCs (in this case, just "ə̂") disappear.

	UR: /qarbi/	**BOOM(ə/Coda_)**	**MAX**	***V[-cont]V**	**IDENT(cont)**	**DEP**
Step 1	qarbi	W*		L		L
	qarəbi	W*		*		*
	☞ qarə̂bi			*		*
Step 2	**qarə̂bi**	**BOOM(ə/Coda_)**	**MAX**	***V[-cont]V**	**IDENT(cont)**	**DEP**
	qarə̂bi			W*	L	
	qarbi	W*	W*		L	
	☞ qarə̂vi				*	
Step 3	**qarə̂vi**	**BOOM(ə/Coda_)**	**MAX**	***V[-cont]V**	**IDENT(cont)**	**DEP**
	☞ qarə̂vi					
	qarvi	W*	W*			
Final SR: [qarvi]						

Discussion: The tableau above demonstrates that BCs allow HS to capture fDoY mappings and do so while preserving many of the advantages of HS (see, e.g., Kimper 2016; Lamont 2019). While BCs can likely be used to represent pathological patterns, this is true of any framework that allows fDoY mappings (see Prickett 2019 for discussion of this), meaning that further work (for example, on how the correct rankings in these competing frameworks are learned) is needed to know which one best predicts phonological typology.

Lenition and Locality in Phonology: Voicing and Gorgia in Tuscan dialects

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Locality in phonology is generally defined as a strict adjacency condition on related units (Piggott & van der Hulst 1997, van der Hulst 2018). Lenition can modify an onset when it is in postvocalic position V [$_{\sigma}$ C V … (weak position), while an onset is not lenited in initial position (strong position) : # [$_{\sigma}$ C V … or after a coda … C [$_{\sigma}$ C V ... This typological sketch questions if the syllable (and its sub–constituents C and V) clearly expresses locality in phonology for lenition (weak positions), always described as a unitary object: the intervocalic vCv position. vCv refers to constituency, since it concerns an onset, but it also concerns the adjunction of this constituent to a preceding vocalic nucleus with which it does not have a syllabic ([$_{\sigma}$) constituency relation. The theory called *The Coda Mirror* (v2) (developed within Strict–CV by Ségéral and Scheer 2001; Scheer and Zikova 2010) insists on the disjoint contexts of the strong position {# / C}__. According to it the strong position requires a modification of the UR which allows to define {# / C}__ as the unitary object: ∅Cv (with the empty nucleus before the onset). It is possible to refer to the anti–coda (= *Coda Mirror*) in a specified way if and only if a pre–initial CV is given. Nonetheless, it is the reverse disjoint context __{# / C} which has motivated the introduction of the syllable and the coda in phonology. In this theory, lenition is expressed by intervocalic Cs governed (damaged), whereas codas are not governed; and consonants in the *Coda Mirror* (initial or post–coda consonants) are ungoverned but licensed.

The intervocalic position and lenition arise the question of the locality in phonology and the relevance of syllabic constituents. In our talk we propose a novel solution to the locality problem by advancing a theory in which lenition always spreads locally either at a non–oriented (structural) adjacency upstream of syllabic constituents' construction or it is a foot–sensitive lenition.

We discuss two lenition processes in Tuscan dialects (phonological voicing and *Gorgia*) through original medieval dataset selected from the TLIO corpus online (http://tlio.ovi.cnr.it/TLIO/), which contains Italo–Romance vernacular texts prior to 15th century. Although consonant voicing should not occur below the well–known *La Spezia–Rimini* line (which distinguishes the Western Romance languages from the Eastern ones), it is not always the case that /p t k/ remain in their previous phonological status also throughout Tuscany (Giannelli 2000):

vCv	Florentine 13th	Latin	
fuogo	[ˈfwɔgo]	FOCU	It. fuoco 'fire'
scodella	[skoˈdɛlla]	SCUTELLA	It. scodella 'bowl'

Tuscan feet are moraic (bimoraic or uneven) trochees. Singleton /p t k/ do not lenite only when the onset is a weak branch of a trochaic foot (after VV [ˈri:va] $_{Ft}$(ri$_{\mu\mu}$va$_{\mu}$) 'shore') but also foot initial after unlengthened V [sco $_{Ft}$(ˈde$_{\mu}$l$_{\mu}$la$_{\mu}$)] or foot medial [$_{Ft}$(ˈla$_{\mu}$gri$_{\mu}$ma$_{\mu}$)] 'tear'. Lenition can also be understood as shortening or pre–deletion, like in medieval Tuscan <amistade> 'friendship' (from Latin *AMICITATE) amis$_{Ft}$(ta$_{\mu\mu}$de$_{\mu}$), which becomes amis(tà$_{\mu\mu}$). Next to this phonological voicing, in most part of Tuscany there exists a distinctive intervocalic lenition process known as Tuscan *Gorgia* (Bafile 1997; Sorianello 2001; Marotta 2008; Dalcher 2008; Russo 2015; Ulfsbjorninn 2017). It is a weakening of stops (also involving vCv deaffrication, fricatives and sonorants, Marotta 2008), typical of the Florentine area (attested since 16th century), which occurs word–internally or across word boundaries. Sound change can reach up to laryngeal fricatives [h/ɦ]. According to some linguists, cases of *Gorgia* exist during the 13th century at least those starting from dorsal stops /k/. In vCv position, graphical <h> could indicate the lenition of stops intervocalically: … V [$_{\sigma}$ C V … [aˈmi$_{\mu\mu}$:ho$_{\mu}$] (ho$_{\mu}$) Weak branch of the Foot

<amico> = *<amiho>* (Medieval *Pratese*)

Structural patterns of lenition have been observed in different languages. In Franconian dialects consonant voicing depends on foot–structure and it is foot–sensitive (see Kohnlein & Smith 2021; see Honeybone 2012; 2019; Iosad 2021 for north Germanic). Thus, in these languages the locality of lenition is defined at a trochaic structured templatic level. Locality in phonology refers to something other than syllabic constituents alone, this other thing is either a structural adjacency in syllable–based constituency analysis or in a foot–based analysis. We claim that a structural–based model of the syllable (based on a recursive conception and a 'maximal' hypothesis, Levin 1985; Yu 2021) and of a structural locality is relevant for Tuscan vCv lenition. It seems to us that lenition requires that phonology refers to locality other than through linear syllabic constituents (___ {C / #}) and that locality is structural (a local relation of identification creates 'chains') whose inter–interpretation is constrained by the constituency.

What do headphone checks gain us?

Chelsea Sanker, *Yale University* (chelsea.sanker@yale.edu)

Headphone checks have rapidly become an assumed part of best practices in online perception studies. Do they improve our ability to find phonological patterns? Headphones can reduce environmental noise, but are not always better than other speakers, e.g. in producing low frequencies. Moreover, it is not clear that controlling for this aspect of the participants' listening setup will decrease overall variation or produce better results.

This study attempts to replicate three phonological patterns that depend on different aspects of the acoustic signal, testing whether excluding participants based on headphone checks make the results clearer. The Huggins check improves results for how spectral tilt influences perception, but no other results were improved by either headphone check.

120 native English speakers completed a set of online tasks. Three phonological perception tasks replicating previous in-person work: (1) higher following F0 should increase the perception of onset stops as voiceless (cf. Haggard, Ambler, & Callow 1970), (2) exposure to raised/lowered F1 in /ɛ, ʌ/ should produce a corresponding shift in subsequent perception of ambiguous items on /ɛ-ɪ/ continua (cf. Ladefoged & Broadbent 1957), (3) lower spectral tilt should increase perceived vowel duration (cf. Sanker 2020).

Two headphone checks: (1) Huggins Pitch (Milne et al 2021), (2) loudness perception based on dichotic phase-cancellation (Woods et al 2017). Accuracy thresholds for both were 5/6 correct. One audio/attention check based on identification of naturally produced English minimal pairs (e.g. *bud, bug; theft, heft*); the threshold for accuracy was 85%.

Results were analyzed with logistic mixed effects models, including a by-participant random slope for the factor of interest, with data subsetted based on each of the three checks and matched in number of participants (Table 1). All tasks replicated the predicted results using just the audio/attention check for exclusions (9 participants); this restriction mostly seems to exclude participants who were not listening to the stimuli.

For perception depending on intensity by frequency, which can vary substantially by device, the Huggins check is helpful; participants who passed this check had a larger effect of spectral tilt on perceived vowel duration. The other effects tested here – perception of F0 as a cue to onset voicing contrasts and effect of exposure to manipulated F1 on subsequent category boundaries – did not exhibit any benefits of the headphone checks beyond what was also achieved by the audio/attention check. Variability, evaluated by the standard error in the logistic models and the variance explained by the by-participant random slopes, did not decrease with either of the headphone checks.

Headphone checks can be useful for tasks that depend on certain acoustic characteristics, but not for all tasks, and not all headphone checks will have the same effects. There are many sources of variation across participants; headphone checks generally will not decrease the number of participants necessary for reasonably powered online studies.

	f0 on voicing	F1 manip exposure	tilt on duration
consonant ident accuracy > 85%	0.468 **	-1.69 ***	0.49 *
Huggins check pass	0.554 **	-1.53 ***	0.98 ***
dichotic loudness pass	0.41 *	-1.84 ***	0.48

Table 1: Results of logistic mixed effects models for the factor of interest in each task using: (1) participants with > 85% identifying consonant-distinguished minimal pairs, (2) participants who passed the Huggins check, (3) participants who passed the dichotic loudness check. Each cell gives the estimate for the factor and the significance. All models used 49 participants, to match the number who passed the Huggins check.

ROOT-first deletion in Harmonic Serialism

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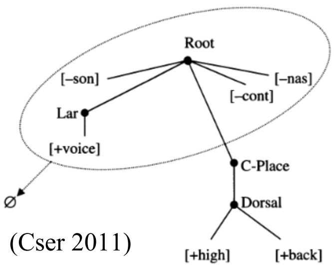
It is well-established in Harmonic Serialism (HS) research that deletion is a two-step process, with the PLACE node being deleted in one step, and the ROOT node in a following step (McCarthy 2008, 2019). This can be seen in the alternation /pat.ka/→[pa.ka], which in McCarthy's analysis has an intermediate form of [paʔ.ka] (*ibid*). This process has many interesting implications for HS, such as the prediction that where full deletion exists glottal deletion will necessarily occur as well, not all of which have yet been properly explored. One of these is an outstanding question which seems to have not been discussed at all: the possibility of deleting the ROOT node first.

As discussed in McCarthy (2008, 2019), in HS the PLACE node is deleted first, then the ROOT node. This makes intuitive sense, and is borne out in the data from which the assumption was developed, which focused on cluster simplification and the universal tendency for coda, rather than onset, reduction. The ROOT node should be deleted last, since it is the foundation of the segment, and can be pronounced without the presence of a PLACE node, as demonstrated by the existing of the glottal segments. McCarthy (2019) provides the evidence that PLACE nodes can be observed to be deleted first, with ROOT deletion always occurring second. This pattern holds synchronically and, quite importantly, diachronically. It also leaves open a logically possible alternative: ROOT-first deletion. In such a situation, the ROOT node would be deleted in the first step, leaving behind a bare PLACE node. In a following step the PLACE node could be deleted, leading to the same output as PLACE-first deletion, albeit with different implications for the intermediate form. The other option is for the PLACE node to be left behind 'stranded' by the deletion of its ROOT node.

Such a rootless segment is functionally impossible to pronounce: a segment which consists only of a PLACE node lacks any kind of manner of articulation. Rather, the vocal tract would only have the information for where the sound should be produced, but have no means by which to produce the sound, or even to articulate (since even the slight raising of the tongue for an alveolar segment would be disallowed, due to a lack of information as to the stricture of the segment). It would, however, exist for phonological purposes: it could in theory trigger spreading or assimilation, which would only manifest in other segments which still have intact ROOT nodes.



(Cser 2011)

This proposed process has, in fact, some empirical grounding. It has been argued that in Latin, the word-initial sequence [gn] underwent ROOT deletion in the [g], leaving behind a rootless dorsal PLACE node (Cser 2011). This rootless PLACE node then can attach to preceding segments after affixation: *in+gnoscere→ignoscere*, while *re+gnoscere→ renoscere*, lacking the velar place. Note that in *ignoscere*, the <g> would have been pronounced as [ŋ], which more clearly demonstrates the place-assimilation process. Unless there is some preceding segment susceptible to PLACE-assimilation, the stranded PLACE node is left unpronounced. This project provides an HS analysis of Cser's (2011) Latin data, demonstrating how it fills the niche of ROOT-first deletion. It will investigate why the rootless PLACE node remains unpronounced, as it could either be forced to delete or could simply remain unparsed.

This analysis could have useful implications for floating features in HS, allowing them to be analyzed in terms of PLACE nodes being stranded after ROOT deletion. It also provides insight into the function of feature nodes in phonology, implying that the ROOT node is responsible for pronunciation in the output. As well, it furthers the reintegration of feature geometry and HS by adapting a feature-geometric analysis into an HS context, demonstrating how the two models can interact.

What makes KIT HAPPY?

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HAPPY tensing is a well-documented development in English: in weak position the short (alternatively lax) high front vowel was replaced by its long (tense) counterpart (Wells 1982, Cruttenden 2001, Fabricius 2002). The standard interpretation of this phenomenon is spurious. Segmentally this appears to be fortition, not lenition, the latter of which is what one would expect to occur in weak position. Also, HAPPY tensing occurs word finally (*happy*) and before a vowel (*create*), but not before a consonant. This paper shows that both the change and its environment follows from general phonotactic constraints of English and the unusual, but not novel assumption that the word *happy* ends in a consonant, not a vowel.

In HAPPY tensing KIT has become FLEECE. FLEECE is not a long vowel, it is transcribed as [iy] by Batchelor (1809), Trager & Smith (1957), Chomsky & Halle (1968) or [ij] — as the IPA dictates — by Sweet (1900) and Lindsey (2012). A truly long vowel (like PALM, NURSE, or THOUGHT) does not occur prevocalically in British English, but FLEECE does (*neon*), like all other diphthongs (*chaos, lion, loyal, vowel, Bowie*). Since it also occurs prevocalically, GOOSE is also not a long vowel (*ruin,* transcribed [uw] by the above authors.) Furthermore, long vowels do not occur in weak (unstressed) position in English, but both FLEECE and GOOSE do, which suggests that they are not long vowels. However, a short vowel turning into a diphthong still looks like fortition.

Batchelor and Trager & Smith propose that diphthongs in English are vowel+consonant sequences. If this is so, HAPPY tensing means the **insertion** of a consonant, [j], after KIT. But (i) why is this consonant inserted after short [i], (ii) why only in weak position, and (iii) why only word finally and prevocalically, but not preconsonantally?

It is of textbook orthodoxy that stressed short (lax) vowels occur only preconsonantally in English (hence their name, checked vowels). The scope of this constraint has been extended to vowels in weak position, rendering word-final KIT ungrammatical. To repair the situation the vowel could be lengthened (though weak vowels cannot be long otherwise), dropped, or replaced by schwa, which is the only short vowel possible word finally (but both of these latter changes would lead to extensive neutralization: *city = sit = sitter, lusty = lust = lustre, inky = ink = Inca,* etc.). The least obtrusive solution is the insertion of a consonant minimally different from the vowel: this is HAPPY tensing. Crucially, the insertion of a word-final consonant does not add to the weight of the syllable (unlike lengthening), since word-final consonants are extrametrical in English. This makes it the preferred option to repair the ungrammaticality in weak position, explaining (i). The insertion of a consonant preconsonantally would create a heavy syllable, which is undesirable in weak position (Hayes 1995), explaining (iii). Finally, a stressed short vowel, like KIT, does not occur word finally, only preconsonantally, explaining (ii). The same considerations hold for HAPPY tensing in prevocalic position.

The analysis above is partly contradicted by PRESUME tensing (Wells 2008, Nádasdy 2013, Jánosy 2018): the insertion of [j] after what looks like a prefix-final KIT. Before free stems (*preheat, demagnetize*), i.e., before a word boundary, and before vowel-initial stems (*preempt, preamble*) this can be interpreted as HAPPY tensing. However, the change occasionally also occurs preconsonantally before a bound stem (*presume*) or even in morphological simplex words (*presidium, December*). It is not clear if PRESUME tensing is a result of the reanalysis of the morpheme-initial sequence due to its similarity to a productive prefix (thus before a word boundary) or the stressing of the pretonic vowel in an open syllable (stressed FLEECE occurs freely before consonants), or some combination of the two. In any case the fact that PRESUME tensing is the least frequent preconsonantally before a bound stem or within a morphologically simplex word follows from the above assumptions.

Consonant variation as feature typology: A view from Arabic

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One approach to phonological typology is to classify languages or dialects according to the type of sounds they contain; however, this has been criticized for proposing oversimplified groupings with no explanatory value for synchronic or diachronic facts (see e.g. Kiparsky 1965, Dresher et al. 2018). A more theory-informed, "property-driven" approach to typology, advanced by Hyman (2007, 2018), has the individual phonological traits, not language varieties as such, as the primary objects of comparison. In this paper, we aim to establish a new division to this line of research, by which segmental typological variation is expressed within theories of phonological representation. We demonstrate this by exploring the featural makeup of some consonants that exhibit variation in modern Arabic dialects, namely **q, * ʤ,* and **θ-*ð*. Representational typologies of these consonant prototypes, given their attested phoneme reflexes, are formulated in a highly-abstract model of feature geometry, the Parallel Structures Model (PSM; Morén 2003, 2007, *inter alia*). The advantage of this framework is that it optimizes a minimum number of contrast-relevant features to express complex typologies – in line with Unified Place Theory (Clements and Hume 1996) and its related principles of strict contrastivity (Clements 2001) and feature economy (Clements 2003).

Table 1 illustrates how we formalize a property-based typology of Arabic **q*, which mirrors its four recognized cognates with distinct geographical distributions. These cognates are characterized using combinations of only three privative features and building structures from less to more complex. The various specifications reflect each segment's phonological behavior in terms of minimal-pair contrasts and active participation in processes such as labialization and nasal place assimilation, among other considerations.

Table 1: PSM feature typology of the major **q* phoneme reflexes

**q*	C-place [dorsal]	C-manner [closed]	C-[voice]	Geographical distribution *(based on Bahloul 2007 and Edzard 2009)*
/q/	✓			Various sedentary: North Africa, Mesopotamian *qəltu*
/ʔ/		✓		Urban Egyptian and Levantine & sporadic Maghrebi
/k/	✓	✓		Ruralite Levantine dialects
/g/	✓	✓	✓	Bedouin(-origin) dialects

By embracing this property-driven approach to phonological typology, we are able to make some important predictions, both empirical (for Arabic) and theoretical. First, the contrastive-feature differences between various reflexes will correlate with their distinct phonological patternings across varieties. Second, although exclusively synchronic in essence, the analysis also sheds light on processes of sound change and phonologization, by offering linguistic explanations for how such processes might have taken place. Third, this approach affords a concrete scheme to correlate phoneme reflexes of genealogically related Arabic dialects, and hence a new tool for their categorization away from traditional classificatory systems that conflate multiple extra-linguistic factors (see e.g. Holes 1995, Kaye & Rosenhouse 1997, Watson 2011). Finally, we illustrate that the PSM is well suited to capturing intricate typological distributions, and that the typology is enhanced, rather than constrained, by the architectural properties of the model. We conclude that typological generalizations are inevitably theory-dependent (Kiparsky 2018), and that contrastive-feature taxonomies provide a valuable insight on the relations that exist among varieties of the same language (see Dresher et al. 2018).

Representational Strength and the Internal Logic of Vowel Reduction

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Phonological strength is often assimilated to perceptual prominence, while weakness is associated to non prominence calculated generally at the level of the syllable (Everett & Everett 1989; Davis 1989). In metrical phonology strength is additionally associated to headedness within a metrical foot (Hayes 1995) while in GP, strength is a correlate of association to structural positions. Strict CV (Scheer 2004) is yet more explicit defining weak vs strong positions. This type of strength by position is seemingly uncontroversial.

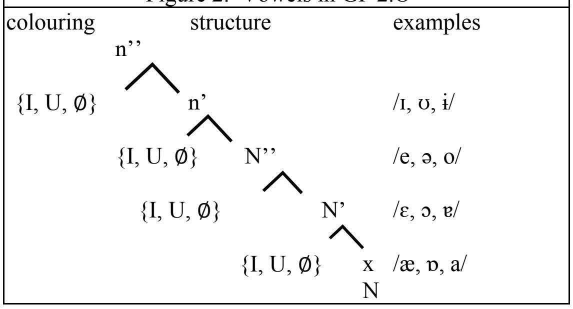
Less unanimous are opinions considering the internal strength of segments. Though long vowels are generally considered stronger than their short counterparts, classical auditory (Jakobson and Halle 1956) and articulatory *SPE* feature sets have no internal mechanism to separate apparently strong from weak segments, though [+TENSE] or [+ATR] vowels are commonly perceived as stronger than their [-TENSE/-ATR] counterparts. Labov (1994) conceptualizes this difference in prominence as one of peripherality, i.e., distance from *schwa*, which is classically considered the weakest vowel.

Element theory in contrast defines segments by their melodic complexity whereby typologically frequent vowels such as /i/, /u/, /a/ are representationally simple, thus potentially weak, while slightly rarer vowels such as /e/ |I.A| and /o/ |U.A| and typologically rare vowels such as /y/ |I.U| and /ɔ̃/ |U.A.N| as found in German or French are combinatorially complex. It has also been noted by Schane (1984), Van der Hulst (2015) and others, that the |A| element corresponding to vowel aperture and rump energy behaves distinctly from the colouring |I| and |U| elements (though see Pimenta 2022 for asymmetry of the colouring elements), suggesting that |A| is a correlate of strength. This is born out directly in GP 2.0 (Pöchträger (2015, 2020) where the elemental strength of |A| is transformed into representational size (i.e., the number of internal structural positions). Though Classical ET and GP 2.0 make the same predictions about the "weakness" of short /ɪ/ |I| and /ʊ/ |U|, different conclusions are born out about the nature of the system internally weakest vowel: /ə/ or /ɨ/ (also see Carvalho & Klein 1996). These apparent differences may in fact be parasitical remains of different traditions.

Figure 1. Vowels in ET

i |I|				u |U|
	ɪ |I|		ʊ |U|	
ẹ |IA|		ə |@|		ọ |UA|
ɛ |IA|				ɔ |UA|
		ɐ |A|		
	æ |AI|	a |A|		

Figure 2. Vowels in GP 2.O



Here, I present case studies from British English (cf. Szigetari 2021), North American English and from Romance to argue that in these languages the subset of vowels found in unstressed syllables is predicted by the internal representation of these segments. Only the weakest segments are attributed to the weakest syllables as born out by Harris (2006)'s claim that vowel reduction involves the movement from more complex to less complex vowel representations. Admitting that segmental strength effects do exist, I argue that the two types of vowel reduction identified by Crosswhite (2004) (1) *prominence reduction* and (2) *contrast enhancing reduction* can both be modeled in ET and GP 2.0 as a uniform process governed by language specific constraints on well formedness and that in languages with vowel reduction, the segments which appear in non-prominent positions are always of a certain representational simplicity that is not easily accounted for in feature-based models.