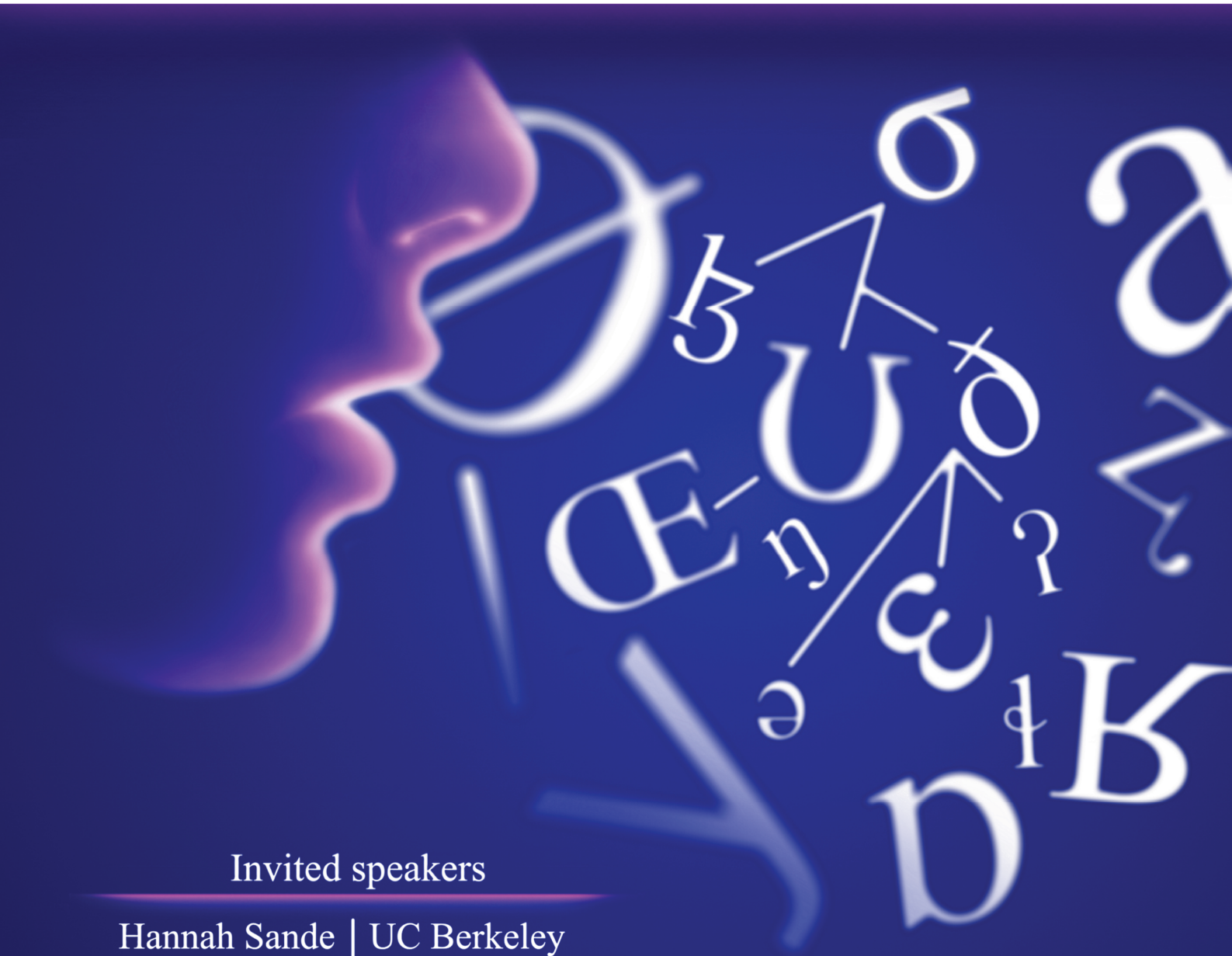
Université de Tours | January 25th – 27th 2023

OCP20 – The 20th Old World Conference on Phonology



Invited speakers

Hannah Sande	UC Berkeley
Noam Faust	Université Paris 8
Sabine Arndt-Lappe	Universität Trier

Laboratoire Ligérien de Linguistique

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Structures Formelles du Langage

Old World Conference of Phonology – OCP 20

Université de Tours (France) January 25th-27th, 2023

Program

Wednesday January 25th, 2023

	Speaker(s)	Title
9:30	**Welcome/Opening remarks**	
10:00	**Invited talk: Hannah Sande (Berkeley)**	***Discontinuous harmony is movement after local phonology***
11:00	**Coffee break**	
11:30	**Posters**	
	Kappa Ioanna & Katerina Ilioupoulou (Crete)	*Child speech vs aphasic speech: heterogeneously motivated homogeneous Consonant Harmony patterns*
	Wang Yuxuan (Harvard)	*Experimentally comparing the learnability of transparent and opaque rule interactions*
	Jesús Jiménez (Valencia) & Maria-Rosa Lloret (Barcelona)	*Explaining deviations from sonority preferences in the distribution of rhotics in Catalan*
	Nikolay Hakimov (Bamberg)	*Preliterate children's intuitions shed light on the variable syllable structure in Russian*
	Stephanie Kaucke & Marcel Schlechtweg (Oldenburg)	*Learning a non-native vowel contrast with vowel harmony in clear speech and in noise*
13:00	**Lunch break**	
15:00	Madeleine Gilbert (Sorbonne Nouvelle)	*The role of perceptual factors in laryngeal metathesis*
15:30	Julian Bradfield (Edinburgh) & Shanti Ulfsbjorninn (Memorial U.)	*Mirage of Gradience in !Xóõ Vowel Raising*
16:00	**Coffee break**	
16:45	Alireza Jaferian (Tours & SFL Paris 8)	*Consonant-clusters and the Word-initial position in Farsi*
17:15	Armel Jolin (Leipzig)	*A non-polar, concatenative account of Kipsigis across-the-board tonal polarity*
17:45	Guillaume Enguehard (Orléans)	*The erosion of the end of the word*
18:15	**End of day 1**	

Thursday January 26th, 2023

	Speaker(s)	Title
9:00	Birgit Alber (Bozen) & Eirini Apostolopoulou (Bozen)	*Language change as minimal change of property values.*
9:30	Geoffrey Schwartz & Ewelina Wojtkowiak (Poznań)	*Cross-language prosodic differences in onset clusters – acoustic evidence from Polish-English bilinguals*
10:00	Quentin Dabouis (Clermont Ferrand)	*Opaque yet still complex: Proper names in English*
10:30	**Coffee break**	
11:15	Claudia Parfene (Leipzig) & Shanti Ulfsbjorninn (Memorial U.)	*On the Shape of Roots in Romanian: Deriving the Nominal Inflectional Classes*
11:45	Maude Bouvier (UQAM)	*Double allomorphy in Korean nominative pronouns? Additional evidence from demonstrative and interrogative proforms for a floating segment analysis and derivation by phase.*
12:15	**Lunch break**	
14:00	**Invited talk: Sabine Arndt-Lappe (Trier)**	**Have a little FAITH? Stress alternations, variability, and meaning**
15:00	Posters	
	Karolina Broś (Warsaw) & Peter Krause (Santa Cruz)	*Stop lenition in Canary Islands Spanish – a motion capture study*
	Liu Haiyang (Lisbon)	*Violable cyclic construction of syntactic of post-syntactic linearization at PF & cyclicity of postlexical phonology*
	Veronica Miatto (Stony Brook)	*Word-final schwas in Italian are non-syllabic vocoids*
	Markus Pöchtrager (Vienna)	*Yoruba vowels and the representation of openness*
16:00	**Coffee break**	
16:30	Benjamin Storme (Leiden)	*The best of both worlds: variation and global evaluation in constraint-based grammars.*
17:00	Razieh Shojaei (Leipzig)	*A Gradient Harmonic Grammar account of Choguita Raramuri stress-accent*
17:30	Sabrina Bendjaballah (LLING CNRS) & David Le Gac (Rouen)	*On Somali geminates: Phonetics, Phonology and Diatopic variation.*
18:00	Clément Michard (Bern)	*Selection of the epenthetic 'l' in French with travlo words*
18:30	**End of day 2**	

Friday January 27th, 2023

		Title
9:00	Sören Tebay (Leipzig)	*Parallel interaction between infixation and root domain constraints*
9:30	N. Lampitelli (Paris Nanterre), A. Briglia, E. Bronner-Huard & Ch. Dos Santos (Tours)	*Compensatory lengthening in French language acquisition: Evidence from a nonword repetition task.*
10:00	Andrew Nevins (UCL) & Damulakis Gean (UFRJ)	*Acoustic for nouns, orthography for verbs: differential loanword adaptation and defectivity.*
10:30	**Coffee break**	
11:15	Chris Golston & Christian Paulsen (Fresno)	*Ancient Greek Accentual Classes*
11:45	**Invited talk 3: Noam Faust (Paris 8)**	***Metrical weight as incorporation in Strict CV metrics***
12:45	**Farewell/Closing remarks**	
13:15	**End of day 3/End of OCP20**	

Venue:

The conference will take place at the following address: 3, rue des Tanneurs 37000 Tours (the building is known as “Les Tanneurs”, you cannot miss it).

Oral talks will be in Room 70 (ground floor): follow the signs from the building’s main entrance.

Posters and coffee breaks will be in the library (5th floor, take the lift): follow the signs from Room 70 and/or ask the organizers.

Welcome desk will be right in front of Room 70.

Organizing Committee:

Véronique Abasq, Guillaume Enguehard, Jean-Michel Fournier, Nicola Lampitelli, Mohamed Lahrouchi, Marjolaine Martin, Stéfany Thierry

Institutional partners:

INVITED TALKS

Discontinuous harmony is movement after local phonology
Hannah Sande

This talk introduces the phenomenon of *discontinuous harmony*, where the target and trigger of harmony are separated by intervening non-harmonizing words. Discontinuous harmony presents a challenge for existing phonological models of harmony, which predict that harmony should be local, at least within a given tier. I show that discontinuous harmony is present in at least three West African languages, focusing on a case study from predicate focus constructions in Guébie (Kru). The Guébie data suggests an analysis where phonology applies to a subset of syntactic structure prior to focus movement, requiring interleaving between phonology and syntax.

Word order in Guébie varies between SVO and SAuxOV (1,2). When an auxiliary is present, the verb surfaces clause-finally, and for particle verbs, the **particle** surfaces as a prefix on the verb, undergoing root-controlled ATR harmony (1). The data presented here was collected in collaboration with the Guébie community between 2013 and 2020.

(1) **SAuxOV order**

a. e^{4} ji^{3} ɟaci$^{23.1}$ **joku**-ni$^{2.3.4}$
I FUT Djatchi PART-visit

b. ɟaci$^{23.1}$ ji^{3} ɔnɛ$^{3.3}$ gbɔgɔ$^{2.2}$ **jɔkʊ**-ŋ^{w}ɔsa$^{2.3.3.1}$
Djatchi FUT 3SG.POSS leg PART-scrape
'Jachi will scrape his leg'

When there is no auxiliary and the verb surfaces after the subject (SVO), the particle surfaces clause-finally with its default vowel quality (-ATR vowels in the examples in (2)).

(2) **SVO order**

a. e^{4} ni^{4} ɟaci$^{23.1}$ **jɔkʊ**$^{2.3}$
I visit.PFV Djatchi PART
'I visited Djatchi.'

b. ɟaci$^{23.1}$ ŋ^{w}ɔsa$^{3.1}$ ɔnɛ$^{3.3}$ gbɔgɔ$^{2.2}$ **jɔkʊ**$^{2.3}$
Djatchi scrape.PFV 3SG.POSS leg PART
'Jachi scraped his leg'

In contrastive predicate focus constructions, non-particle verbs double; one copy of the verb surfaces on the left edge, and another in the lower position: VSAuxOV or VSVO. For particle verbs in predicate focus constructions, the particle surfaces clause-initially: PartSAuxOV or PartSVO (3). In PartSVO particle-fronting constructions (3a) the particle surfaces with its default vowel quality. In PartSAuxOV particle-fronting constructions (3b), though, the particle harmonizes with the lower verb.

(3) **Particle fronting in predicate focus constructions**

a. **jɔkʊ**$^{2.3}$ ɔ^{3} ni=ɔ$^{4.2}$
PART 3SG.NOM see.PFV=3SG.ACC
'It's seeing him that he did.'

b. **joku**$^{2.3}$ ɔ^{3} k=ɔ^{32} ni^{4}
PART 3SG.NOM PROSP=3SG.ACC see
'It's seeing him that he's about to do.'

A purely phonological or purely syntactic account cannot derive the Guébie facts. I analyze discontinuous harmony in a phase-based spell-out approach to the syntax/phonology interface, where head movement of the verb out of the Voice phase (2) applies before the Voice domain is spelled out, but focus movement (3) applies after the Voice domain is phonologized. I show that cyclic phonologization of syntactic domains better accounts for the facts than a model where all of syntax applies before all of phonology.

Metrical weight as incorporation in Strict CV metrics

Noam Faust (Université Paris 8)

Metrical incorporation is the creation of prominence in one metrically significant position (MSP) through the grouping of its metrical projection and that of an adjacent MSP. This talk showcases the advantages of this tool, as implemented in the grid-based approach of Strict CV metrics (Ulfsbjorninn 2016, Faust & Ulfsbjorninn 2018). Two case studies are presented, and this approach is compared to a more "classic" moraic approach.

The first case comes from Mojeño Trinitario (Rose 2019), which exhibits metrically-driven syncope. In traditional moraic approach, syncope is analyzed as the result of a vowel's position under the weak branch of the foot, that is, under the branch with the diacritic "w". In contrast, using incorporation, one can tie together the prominence of one vowel, the incorporating vowel, and the syncope of the other, the incorporated vowel. With respect to the data, I show that an Incorporation-based analysis rids one of the need to assume all kinds of special machinery, like extrametricality, unparsedness, moraic onsets and violations of syllable integrity.

In Mojeño, Incorporation is motivated by the need to create prominence and avoid lapse. Another motivation is more specific to Strict CV: the elimination of projecting empty nuclei, a marked configuration. This is the logic of incorporation in the second case study, which focuses on Palestinian and Cairene Arabic and the use of incorporation in the designation of syllables with long vowels as heavy. In Palestinian Arabic, there is a process whereby the first of two adjacent long vowels is shortened /beːt-eːn/ 'house-dual' => [beˈteːn] (Abu-Salim 1986). I show that (1) this shortening can be understood as the blocking of incorporation with the goal of avoiding metrical clash, and (2) this analysis extends easily to final shortening, which is independently analyzed as lack of incorporation. Such a unified analysis, I claim, cannot be achieved within a moraic approach to long vowels.

Have a little FAITH? Stress alternations, variability, and meaning

Sabine Arndt-Lappe, Trier University

In the literature on morphological complexity, it is well-established that there is a correlation between three gradient properties of complex words: their formal transparency, their semantic transparency, and their (relative) frequencies (e.g. Hay & Baayen 2002). Formal approaches to the phonology-morphology interface have so far tended to deal with formal transparency in terms of a system of faithfulness constraints, and to often relegate a large part of the other aspects to the alleged divide between the online computation of phonological rules and lexical storage or between phonological and other modules of grammar, often assuming that the latter is of little concern to phonological theory. The present paper will use variable stress assignment in English complex words to argue that all three factors involved in the correlation are relevant for phonological theory, and are in fact key to an appropriate theory of faithfulness. It is intended as a contribution to a growing body of work pointing in this direction (esp. Collie 2008, Bermúdez-Otero 2012, Dabouis 2020, Breiss 2021, Stanton & Steriade 2021).

Three empirical case studies of stress variability in speech data will be presented, all of which provide statistically robust evidence that stress position is a reflex of how speakers segment morphologically complex words in processing (cf. Hay 2001; Hay 2003; Bermúdez-Otero 2012, 2018). Case study 1 (joint work with Tammy Ganster and Sonia Ben Hedia) deals with primary stress variability in complex words suffixed with -able and -ory (e.g. *ánalyseable* vs. *analýseable*, *célebratory* vs. *celebrátory*). Stress patterns are found to correlate with the frequencies of embedded verbs (the 'bases'). When comparing -able and -ory derivatives, we see that stress patterns also systematically reflect differences in how these two morphological categories are embedded in the paradigmatic structure of the mental lexicon. Unlike -able adjectives, -ory adjectives are systematically related not only to embedded verbs, but also to nouns ending in -ion, a morphological category with highly consistent stress (compare *introdúct-ion* < *introductory*; *celebrát-ion* < *celebratory*). This paradigmatic constellation is reflected in stress patterns in -ory derivatives, which are correlated with both lexical frequencies of embedded verbs and those of related nouns.

Case studies 2 and 3 deal with effects of prefixation on variability in stress position. English prefixes are known to be 'stress-repellent' (Fudge 1984), which means that prefixed words tend to have the same stress as their bases. In a study of secondary stress assignment in nouns ending in -ity and -ion (case study 2, joint work with Quentin Dabouis), we will see that the 'stress resistance' of prefixes is modulated by how speakers segment the embedded prefixes. For example, in words like *irrationality* and *reanimation* speakers have two options for segmentation (e.g.: *irrational* + *-ity* or *ir-* + *rationality*; *reanimate* + *-ion* or as *re-* + *animation*). We find that probabilities of stress patterns (secondary stress in: *ìrrationálity* or *irràtionálity*; *rèanimátion* or *reànimátion*) are correlated with frequencies of embedded nouns (e.g. *rationality*, *animation*) and adjectives (e.g. *irrational*) or verbs (e.g. *reanimate*), as well as with the semantic transparency of the construction. Case study 3 (joint work with Aaron Seiler) provides complementary evidence from a study of primary stress position in prefixed and simplex English pseudo verbs. In line with the findings of case study 2, stressability of the prefix in the test verbs is modulated by the degree to which the prefix is a semantically transparent prefix in English.

In conclusion, all studies presented show that semantic transparency and frequency relations within paradigmatic structure have an important say in explaining stress position in English. Cases of stress variability provide an important source of evidence here, as they apparently arise when different morphological segmentability options are available. An adequate theory of faithfulness, hence, must not only parametrise constraints according to different (groups of) morphological categories, but must also allow for word-based effects that are grounded in frequency of usage and semantic transparency.

ACCEPTED PAPERS:

POSTERS
&
TALKS

(In alphabetical order)

Language change as minimal change of property values

Birgit Alber[1] & Eirini Apostolopoulou[1]
[1]Free University of Bozen/Bolzano

Bias-driven assume that language change is not (or, at least, not exclusively) driven by imperfect learning or covert reanalysis of structures, but by learners' biases to override evidence to which they have been exposed (Garrett & Johnson 2013; Garrett 2015; see Kiparsky 2015 for an overview). We follow these approaches and propose that one bias determining the direction of language change is to keep change minimal, in grammatical terms. Working in the framework of OT-based property theory (Alber & Prince 2015 etc.), we define minimal grammatical change as one change of a property value inside a typological system, i.e. a single resetting of the defining ranking conditions of a typology (Alber 2015; Alber & Meneguzzo 2016; DelBusso 2018; Apostolopoulou 2022).

We illustrate minimal grammatical change in these terms via two case studies where prosodic structure plays a decisive role: (1) the variation of metrical parameters of word stress in the world's languages; (2) long-distance metathesis in Romance. Change in prosodic structure is rarely explored in historical linguistics (for an exception see Lahiri 2015), however, it shows most clearly that phonological change does not necessarily imply a minimal change of surface features, but can involve significant change in surface structure via the minimal resetting of grammatical parameters. It is thus best suited to demonstrate that at least some language change is equivalent to a change in grammar.

From descriptions in the literature (mostly Hayes 1995 and van der Hulst et al. 2010) we built a database of the stress patterns in ~80 languages, tagging them by language family and basic metrical parameters of word-stress, such as foot-type (trochaic of iambic), foot-position (right- or left-aligned) and density of parsing (many feet or only one; (non)-exhaustive parsing). We explore variation of these parameters inside the same language family, under the assumption that variation in the typological data can be interpreted as an instance of language change. This is then compared to minimal grammatical change as defined in terms of property values in a formal model of word-stress, the typological model nGX (Alber & Prince 2017, in prep.). nGX is defined by 4 properties determining, in their interaction, the basic patterns of word-stress:

(1) Properties defining the typological system of nGX

Typological Property - values	**example contrast**	**Ranking conditions**
Ft-type - trochaic/iambic	-Xu- vs. -uX-	Trochee < > Iamb
Ft-Position - left/right	-Xu-o- vs. -o-Xu	AFL < >AFR
Multiplicity - many stresses/one stress	-Xu-Xu- vs. -Xu-o-o-	Parse < > F.sub, A.dom
Unarity - (non) exhaustive parsing	-Xu-X- vs. -Xu-o-	Parse < > F.dom, A.dom

Notation: X = stressed syllable, head of a foot; u = unstressed syllable, parsed into foot; o = unstressed syllable, not parsed into foot; F.sub/dom = the subordinate/dominant Ft-type constraint (TROCHEE or IAMB) in a grammar, A.dom = the dominant alignment constraint (AFL or AFR) in a grammar.

Comparison with the data of the database shows that variation inside one language family (a) can be described as a change in property values following the model of nGX and (b) is indeed minimal in the sense that it almost always involves the change of a single property value. Crucially, though, change is not necessarily minimal in terms of surface features, thus confirming our assumption that a change of grammatical parameters is at stake. A striking example is the Pano language family, where foot-type is mostly iambic, but trochaic rhythm emerges in some languages and, inside some iambic Pano languages, in certain structures (Ellias-Ulloa 2006; Gonzales 2016; Gonzales & Couto, subm.). The above change involves the change of a single property value (from Iamb > Trochee to Trochee > Iamb), but is massively

disruptive on the surface, replacing even-stressed strings (uX-uX) with odd-stressed ones (Xu-Xu), i.e. changing the stress/unstress of every single syllable.

Our second case study concerns the phenomenon of long-distance metathesis of liquids, as attested in the diachrony of certain Romance varieties, e.g. Sardinian, Italo-Romance, Gascon, as well as Italiot Greek (Rohlfs 1950, 1966). Different patterns are observed with respect to (a) the source context of the metathesizing liquid (non-initial complex onset, non-final coda) and (b) distance limitations distinguishing between unbounded metathesis all the way to the first onset of the prosodic word and locally restricted metathesis to a closer docking site. Even though perceptual biases, e.g. the preference of complex structures in prominent positions such as the initial onset, seem to underly the process (e.g. Blevins & Garrett 2004; Coffman 2013 and references therein), the attested typological variation is best captured by a typological model involving 4 properties:

(2) Properties defining the typological system of long-distance metathesis

Typological Property - values	**example contrast**	**Ranking conditions**
MetFromCL - yes/no	/CL_2/ → [CL_1] vs. [CL_2]	CL=initial < > Linear(ity)
MetFromLC - yes/no	/LC_α/ → [$C_\beta L \ldots C_\alpha$] vs. [$LC_\alpha$]	*LC < > Linear
Distance - local/distal	/CL_3/ → [CL_2] vs. [CL_1]	Locality < > M.sub
SurvivingMarked - LC/$CL_{2,3}$	[LC] vs. [$CL_{2,3}$]	CL=initial < > *LC

Notation: L = liquid (subject to metathesis); CL = complex onset (CL_1 = initial CL; CL_2, CL_3 = non-initial CL, in the 2nd and 3rd syllable, respectively); LC = L in non-final coda; M.sub = the subordinate m.constraint (CL=initial or *LC) in a grammar.

The diachrony of long-distance metathesis furthermore shows that each step in the diachronic path involves exactly one change in property values. The gradual evolution of Sardinian varieties (Lai 2013) lends itself to explication. A first metathetic stage, where liquids from all medial complex onsets moved to the first syllable, emerged via the resetting of property MetFromCL from *no* to *yes* (i.e. from Linear > CL=initial to CL=initial > Linear). At a later stage of some Sardinian varieties, liquids in codas were also affected by distal metathesis, which resulted from the switch from Linear > *LC to *LC > Linear.

Also in this case, change is minimal in grammatical terms (i.e. is yielded from the resetting of a single property value), but not easily interpretable as minimal change of surface structure. If metathesis were guided by minimal disruption at the surface, we would expect a stepwise movement of the liquid to the left (or even to the right). Instead, we observe a resetting of grammatical parameters corresponding to minimal changes in terms of property values.

Our case studies show that language change is – at least in some cases – best explained as a (minimal) resetting of grammatical parameters, where grammatical minimality has been defined as a single change of property values inside a typological system. It has furthermore been shown that in phonology language change as a change of grammar is most clearly visible when prosodic structures (feet, sub-syllabic structure such as onsets and codas, prosodic words) are involved, since a change in the parameters defining their distribution often results in change which cannot be interpreted as a minimal change of surface patterns.

Selected references: Alber, B. & A. Prince. In prep. The structure of OT typologies. Chapter 1. Ms., UniBZ / Rutgers University. ROA-1381. • Alber, B. & A. Prince. 2017. The Book of nGX. ROA-1312. • Apostolopoulou, E. 2022. Typological variation in language contact: A phonological analysis of Italiot Greek. PhD thesis, UniVR & UiT. • Kiparsky, P. 2015. New perspectives in historical linguistics. In C. Bowern & B. Evans (eds.) *The Routledge handbook of historical linguistics*, 64–102. Routledge. • Lahiri, A. 2015. Change in Word Prosody: Stress and Quantity. In P. Honeybone & J. Salmons (eds) *The Oxford Handbook of Historical Phonology*, 219–244. Oxford: Oxford University Press.

On Somali geminates: phonetics, phonology and diatopic variation

Sabrina Bendjaballah (CNRS & Nantes Université), David Le Gac (Normandie Université)

1. Background and aims. There is a consensus on the fact that Standard Somali voiceless stops [t, k][1] are "never doubled to form a geminate": they always surface as short stops (Saeed 1999:9, cf. also Armstrong 1934, Farnetani 1981, Orwin 1994, Barillot 2002). Barillot (2002), Barillot & Ségéral (2005), Ségéral & Scheer (2001) argue that intervocalic [t, k] are 'virtual geminates', i.e. "object[s] [that] never betray [their] geminate identity by a phonetic clue related to length, but by other properties that can be read off the phonetic environment" (p. 312.) In the framework of autosegmental phonology, virtual geminates are virtual in the sense that their double association to the skeleton does not correspond to a long realization at the phonetic level. By contrast, Standard Somali voiced stops [b, d, g] are reputed to have geminate counterparts: [bb, dd, gg] (Saeed 1999:16). This results in an asymmetry in the way phonological length is taken to be realized in phonetics: with a length contrast for voiced stops, and with no length contrast for voiceless stops. However, most studies of Somali consonant acoustic properties rely on auditory approaches, or are based on data collected in uncontrolled environments (Armstrong 1934, Farnetani 1981, Barillot 2002, Edmonson et al. 2003), and a great variability in the realization of singleton and geminate voiced stops has been reported. Our aim is to decide whether an asymmetry obtains in the phonological system of Standard Somali. In addition, we extend our analysis to Djibouti Somali, with a view of providing first insights into Somali diatopic variation, which is still understudied at the present stage. Our results are thus expected to provide new information on the typology of geminates accross Somali varieties.

2. The phonetic and phonological definition of Somali singleton and geminate voiced stops. In order to offer a solid empirical basis, we investigate the acoustic characteristics of Somali singleton and geminate /b, d, g/ on the basis of a production experiment of a controlled corpus with 4 Standard Somali native speakers constituting a homogeneous group, and 1 Djibouti Somali speaker (EXPERIMENT 1). Singleton consonants are attested in all contexts, while geminate consonants are attested in intervocalic position, only. In order to specify the primary cue of the length contrast, we examine the acoustic properties of intervocalic singleton and geminate /b, d, g/ in morphologically simplex nouns. The surrounding vowels of the test consonant were kept constant: iC$_i$a(ː) (singletons) and iC$_i$C$_i$a(ː) (geminates). The corpus consists of 30 sentences, in which the serial position of the test segment within the carrier sentence was also kept constant. Each sentence was produced at least 3 times by each speaker, yielding a total of 497 items. We examine 3 temporal parameters (closure duration, release duration, duration of the vowel preceding the test stop) and 4 non-temporal parameters (presence/absence of release, devoicing of the test stop, stop closure amplitude, stop release amplitude). These parameters correspond to the acoustic correlates that most frequently oppose singleton and geminate consonants in the world's languages (Ridouane 2007).

2.1. Standard Somali. Word-internal /b, d, g/ are characterized by a short duration, the absence of a burst release, the absence of frication noise, and a high level of energy: they are realized as 'open approximants' [β̞], [ð̞], [ɣ̞] (Martínez-Celdrán & Regueira 2008). Word-internal /bb, dd, gg/ are always realized as stops with a clear release burst. They show no devoicing, no shortening of the preceding vowel. It is striking to observe that their closure duration (72.7-88.7 ms) corresponds to that attested for singleton — and not geminate — stops cross-linguistically: lexical geminates are not realized as geminate stops, but as singleton stops. 'Virtual gemination' in Standard Somali does not target voiceless stops, only, but voiced stops, too: for the stop series, phonological length is never realized as phonetic length. Some authors (a.o. Armstrong 1934, Farnetani 1981, Saeed 1999:8) reported that intervocalic singleton voiced stops may be lenited to fricatives. However this claim was never investigated experimentally: it is not clear to which extent and under which conditions lenition obtain. We establish that singletons are always realized as approximants (not fricatives): they show a higher degree of lenition than what has been reported in earlier studies. We conclude that in today Standard Somali, the manner contrast '(short) open approximant' vs 'short stop' is the primary cue distinguishing singletons vs geminates. Somali instanciates a path of lenition that is largely attested cross-linguistically in intervocalic position: stop > fricative > approximant. In a classical Element Theory framework, this process is easily captured in terms of the loss of |ʔ| (stop > fricative) and further of |H| (fricative > approximant), cf. Backley (2011:128). We thus propose the following structures for Standard Somali voiced stops: geminates have a resonance element (|I|, |A| or |U|), noise |H| and occlusion |ʔ|, while singletons only have a resonance element.

2.2. Djibouti Somali. For each parameter examined, no significant difference between singleton

[1] [p] is not part of the Somali consonant inventory.

and geminate voiced stops was observed: for all temporal parameters, all segments are short, and for all non temporal parameters, all segments are realized as open approximants. In other words, both /b, d, g/ and /bb, dd, gg/ were realized as [β̞], [ð̞], [ɣ̞]. Contrarily to what was observed in Standard Somali, the underlying length contrast 'singleton' vs 'geminate' is not phonetically realized in Djibouti Somali: both geminates and singletons only have a resonance element. This raises the question of whether this contrast is neutralized at the phonological level, too, i.e. does Djibouti Somali have underlying geminate voiced stops at all?

3. Djibouti Somali: preservation of the underlying length contrast. In order to answer this question, we have a clear testing ground: Somali allows neither CCC, nor final CC clusters. As established by Barillot (2002) and Barillot & Ségéral (2005), $C_1V_iC_2V_iC_3$ verb- and noun-stems are better analyzed as /$C_1V_iC_2øC_3$/. They exhibit a propagation of the stem-vowel to the position between C_2 and C_3 in order to repare an ill-formed CCC or CC# cluster, i.e. if the stem is in isolation, e.g. /gudøb/ → gud**u**b 'cross!', * gudb, or if the stem is followed by a C-initial suffix, e.g. /gudøb + taa/ → gud**u**btaa, *gudbtaa 'she crosses'. By contrast, there is no V-propagation if the stem is followed by a V-initial suffix, e.g. /gudøb + aa/ → gudbaa 'he crosses'. Now consider a Djibouti Somali pair like ki[β̞]ir 'be arrogant' vs di[β̞]ir 'eat too much'. If a vowel-initial suffix is added to these forms, we observe kibraa (<ki[β̞]ir) vs di[β̞]**i**raa (<di[β̞]ir). This means that ki[β̞]ir and di[β̞]ir have different underlying representations: /kibir/ vs /dibbir/. In di[β̞]**i**raa, a vowel must surface between [β̞] and [r], because it would otherwise contain an ill-formed bbr-cluster. This result was corroborated by an elicitation of 129 $C_1V_iC_2V_iC_3$ verb forms with C_2 = /b(b), d(d), g(g)/ by the same Djibouti Somali native speaker (EXPERIMENT 2). We conclude that, despite the fact that there seems to be an absolute neutralization between singleton and geminate voiced stops at the phonetic level, Djibouti Somali does have a phonological length contrast between singletons and geminates.

4. Djibouti Somali: outlook. The results of EXPERIMENT 1 unambiguously show that the phonetic neutralization singleton vs geminate obtains for all places of articulation. By contrast, we found a less clear-cut pattern for /d(d), g(g)/ in EXPERIMENT 2: we report a contrast approximant (/d, g/) vs short voiced stop (/dd, gg/). We thus need to account for the contrast between EXPERIMENT 1 and EXPERIMENT 2 w.r.t. the realization of coronals and velars. As a starting point, note that, at the surface level, the test consonants were uniformly in intervocalic context in both experiments. However the underlying structures of the items were different: /Ci**C(C)**a(**:**)C/ nouns in EXPERIMENT 1 vs /CV_i**C(C)**øC/ verbs in EXPERIMENT 2. It has been observed that in various languages the phonology treats nouns differently from verbs (see e.g. references in Cable 2004). We could ascribe the observed discrepancy to this factor. An alternative hypothesis however can be considered: in EXPERIMENT 1, /C/ and /CC/ were underlyingly in intervocalic position, while they were followed by an empty nucleus in EXPERIMENT 2. The difference in the phonetic realization of the contrast singleton vs geminate could be attributed to a positional contrast of the test consonant in the underlying structure: there is absolute neutralization only in underlying intervocalic position. If the test segment is not in underlying intervocalic position, as is the case in EXPERIMENT 2, then, lenition less consistently applies. A reproduction of EXPERIMENT 1 with /$CV_iC(C)$øC/ nouns will make it possible to decide between these 2 options.

5. Conclusion. Our study argues for an extension of the analysis of Standard Somali geminate stops as 'virtual geminates': Standard Somali voiced and voiceless stops do not realize phonological length as phonetic length. In addition, we offer a first contribution to the documentation of the still understudied diatopic variation in Somali. We argue that in Djibouti Somali the underlying length contrast 'singleton' vs 'geminate' is absolutely neutralized at the phonetic level. However, the contrast is preserved at the phonological level: the underlying identity of the segment (singleton vs geminate) can be retrieved from the absence vs presence of a vowel to break up an ill-formed CCC cluster.

Selected References. Armstrong, L. 1934. The phonetic structure of Somali. *Mitteilungen des Seminars für orientalische Sprachen zu Berlin* 37(3), 116–161 | Backley, P. 2011. An Introduction to Element Theory. Edinburgh Univ. Press | Barillot, X. 2002. *Morphophonologie gabaritique et information consonantique latente en somali et dans les langues est-couchitiques.* thèse de doctorat, Univ. Paris 7. | Cable, S. 2004. *Phonological Noun-Verb Dissimilarities in Optimal Paradigms.* ms. | Edmondson, J. A., J. H. Esling & J. G. Harris. 2003. *Supraglottal cavity shape, linguistic register, and other phonetic features of Somali.* ms. | Farnetani, E. 1981. Dai tratti ai parametri: introduzione all'analisi strumentale della lingua somala. *Studi Somali* 11, 27–108. | Martínez-Celdrán, E. & X. L. Regueira. 2008. Spirant approximants in Galician. *JIPA* 38, 51–68. | Orwin, M. 1994. Aspects of Somali phonology. Ph.D. dissertation, SOAS. | Ridouane, R. 2007. Gemination in Tashlhiyt Berber: An acoustic and articulatory study. *JIPA* 37(2), 119–142. | Saeed, J.I. 1999. *Somali.* Benjamins. | Ségéral, P. & T. Scheer. 2001. Abstractness in phonology: the case of virtual geminates. *Constraints and Preferences*, 311-337, Mouton de Gruyter

Double allomorphy in Korean nominative pronouns? Additional evidence from demonstrative and interrogative proforms for a floating segment analysis and derivation by phase.

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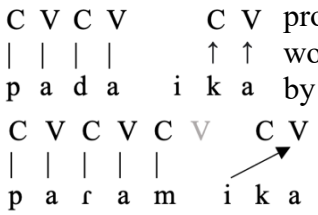
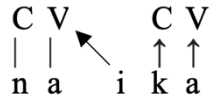
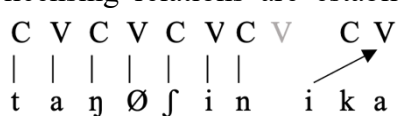
The problem I will solve. In Korean, some words are subject to variation in the environment of the nominative particle. For instance, the 1SG pronoun is *na* in isolation or when followed by any other particle of the language and *nɛ* only when *-ka* 'NOM' is suffixed to it (Yeon and Brown, 2019). This particle is said to have two allomorphs (Cho, 2016): *-i* surfaces after a consonant and *-ka* appears after vowels. A possible alternative would be to posit a single underlier (*-ika*) with floating segments along the lines of Scheer (2016). I will show that the second alternative is better since it accounts for the variation affecting some bases. In fact, we will see that morphosyntactic and phonological factors are conspiring to hide the regular derivation of so-called allomorphs.

Analysis. Following the allomorph hypothesis, *pada* 'sea' selects *-ka* to give *padaka* because the base ends in a vowel while *param* 'wind' selects *-i* since it ends in a consonant, yielding *parami*. However, the alternation in the form of bases like *na* can only be described in terms of allomorphy under this analysis: *nɛ* appears in the environment of the nominative particle, and *na* surfaces elsewhere. On the other hand, positing a single underlying form (*-ika*) with floating segments can thoroughly explain the distribution of *-i* and *-ka* under the strict CV framework (Scheer, 2004) as well as predict the form of the 1SG pronoun without appealing to allomorphy. I argue that the lexical entry of the particle comprises three segments but only two syllabic positions (CV). I propose that the association of melody proceeds from left to right. After a word ending in a vowel, *k* links first to preserve a CV sequence. It is followed by *a* to yield *padaka*. After a word ending in a consonant, *i* can only link to the V position in its own lexical entry, because Final Empty Nuclei (FEN) like the one at the end of *param* are not accessible in Korean. But how does this explanation account for the alternation in the form of pronouns like *na*? Using Element Theory to represent melodies' internal structure (Backley, 2011), I show that adjacent vowels can coalesce when the combination of their elements is possible in the language. The vowel *a* is represented by the element |A|. Adding *i* |I| to it yields *ɛ* |AI|, another vowel of the phoneme inventory (Lee, 1996). Only *a* and *ɔ* (|A|) show this fusion with |I| in Korean. An example of the latter would be the 1SG honorific pronoun *tʃɔ* becoming *tʃɛ* before *-ka*. **New problem.** The question arises as to why the same vowels don't undergo coalescence in lexical nouns like *pada* 'sea'. A theory of cyclic derivation (Chomsky, 2001) paired with Distributed Morphology allows for a differentiation of hiatus resolution across phase boundaries and within the same phase. For example, Ojibwe resorts to two different strategies to avoid VV sequences depending on the morphosyntactic environment defined by phases (Newell and Piggott, 2014), a pattern found cross-linguistically (Newell, 2017). Functional categories like pronouns don't contain a lexical head. They don't have enough structure to be sent to the phonology without *-ika*. Assuming that nP and DP are phases, the computation of pronouns proceeds in 1 phase [na√ ika]$_{DP}$ while lexical nouns are computed in 2 phases because of their (unpronounced) lexical head [[pada√ Ø]$_{nP}$ ika]$_{DP}$, following Newell and Scheer (2021). When one cycle is computed, like the nP phase containing *pada*, coalescence cannot happen because the governing and licensing relations of these segments are already established. But the melodies and syllabic structure pertaining to the first phase are still visible to the second, so the consonant *k* links first to the C in its lexical entry followed by *a* to keep a CV sequence in cases of suffixation. Since pronouns and *-ika* are in the same phase, coalescence can take place before governing and licensing relations are established. Pronouns ending in a consonant, like *taŋʃin* '2SG', must therefore be proposed to come with a lexicalized inaccessible FEN forcing *i* to associate to the last V position, blocking the association of *k* and *a*. The resulting nominative form is *taŋʃini*.

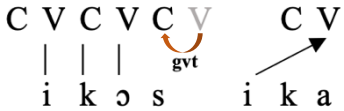






Extended analysis. I now examine the implications of the previous analysis for pronouns exhibiting different patterns. Some demonstrative and interrogative proforms ending with *s* can have many surface forms when they bear the nominative case particle. The demonstrative *ikɔs* 'this thing', often pronounced *ikɔ* especially in informal or fast speech, can yield either *ikɔʃi* or *ikɛ* in presence of *-ika*.

The first alternant (*ikɔʃi*) is not problematic since it follows the same pattern as any other pronouns ending in a consonant like *taŋʃini* with the additional palatalization of the fricative before *i*. The second one (*ikɛ*), however, requires a more thorough analysis to explain the absence of *s* and *-ka*. I have already shown that *ɔ* and *i* can coalesce into *ɛ*. Consequently, the fricative that was separating them must be floating to impact the association of *-ika*'s melodies while at the same time allowing coalescence. These alternants can be explained if the demonstrative has distinct lexical entries reflecting both isolated forms (*ikɔs* and *ikɔ*), one with an already linked *s* and another with a floating *s*. In cases where *s* is floating, the FEN governs the previous C position leaving the fricative unlinked. It has been shown that melodic material and syllabic positions are computed in independent modules of the phonology (Scheer, 2022). Unsurprisingly the segments of the suffix to be associated are sensitive to the floating consonant of the base even if it does not link. Therefore, *i* links to the last V before erasure of the extra syllabic positions separating it from *ɔ* (Gussmann and Kaye, 1993). The newly adjacent vowels then coalesce since they are part of the same cycle [ikɔs√ ika]$_{DP}$. The interrogative *mwɔs* 'what' follows exactly the same pattern yielding either *mwɔʃi* or *mwɛ*, except that it has a third alternative form (*mwɔka*) which won't be discussed in great length since further research would be needed. The existence of this extra alternant doesn't invalidate the present proposition. **Discussion.** A floating segment analysis combined with element fusion of adjacent vowels within a phase has more explanatory power than positing allomorphic alternations for both the nominative particle and many pronominal bases. I demonstrated above that all surface forms can be derived in a predictable manner, because hiatus resolution has been shown to operate differently within a phase and across phases in a wide variety of languages belonging to different typological families. The absence of coalescence in lexical nouns follows from phase-by-phase interpretation at PF. My analysis explains why only pronouns vary before *-ika*, while preserving their original form in isolation and when they combine with other particles. Additional evidence from demonstrative and interrogative pronouns brings forth that derivations can also be influenced by floating segments in the base. The absence of *-ka* in the demonstrative *ikɛ* and interrogative *mwɛ* forms has been proposed to stem from the presence of a floating *s* that is still visible in the module computing melodic material.



References. Backley, P. 2011. *An Introduction to Element Theory*. **Cho, S. 2016.** "The ɨ Deletion Rule and Phonologically Conditioned Allomorphy in Korean Case Markers", *University of Pennsylvania Working Papers in Linguistics*. **Chomsky, N. 2001.** "Derivation by phase". In *Ken Hale: A life in Language*. **Gussmann, E. & J. Kaye. 1993.** Polish notes from a Dubrovnik Café: I. The yers. SOAS Working papers in linguistics and phonetics. **Lee, D-Y. 1996.** "Vowel harmony in Korean: A-head alignment", In Proceedings of the 3rd government phonology workshop. **Newell, H. 2017.** *Typological Tendencies in Phonological Conspiracies*. Crecchio Workshop. **Newell, H. and G. Piggott. 2014.** "Interactions at the syntax-phonology interface: Evidence from Ojibwe". *Lingua*. **Newell, H. and T. Scheer. 2021.** *Function Words: Implications for the Syntax-Phonology Interface.* Old World Conference in Phonology. **Scheer, T. 2004.** *A lateral theory of phonology: what is CVCV, and why should it be?* **Scheer**, T. 2016. "Melody-free syntax and phonologically conditioned allomorphy", *Morphology*. **Scheer, T. 2022.** "3 x Phonology", *Canadian Journal of Linguistics*. **Yeon, J. and L. Brown. 2019.** *Korean: A Comprehensive Grammar*. **Yu Cho, Y.-M. 2016.** *Korean Phonetics and Phonology*. Oxford Research Encyclopedia of Linguistics.

Mirage of Gradience in !Xóõ Vowel Raising

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The language !Xóõ has complex assimilations: the degree of raising of a root's first vowel depends on following vowel and on preceding click and intervening consonants. Traill (1985) describes two levels of raising: [ɑ] to [ɜ] to [i]. Lionnet (2018) argues that the process is inherently gradient, showing 'subphonemic teamwork' or 'gang effects'. Contrariwise, our element-theoretic analysis shows that there is neither *phonological* gradience, nor any gang effect/teamwork. The mirage of gradience is produced by spreading conditions applying to two different features |I| and |A|. This happens C-to-C, V-to-V, with potential blocking. There is also a Plateau effect: C-to-C, where C2 assimilates to C1, affecting V1 between it.

Data (*per* Traill 1985/94): !Xóõ roots are C1V1(C2)V2, where C1 may be a complex click-obstruent cluster, V1 is /ɑ/ or /o/ further specified for breathiness, pharyngealization and glottalization, C2 is /m,r,n,b/, and V2 is /a,e,i,o,u/ with possible nasalization. A non-pharyngeal V1 /ɑ/ fronts/raises to [ɜ] when C1 contains /ǀ, ǂ, t/ (but not /!, ǁ, Θ/) and V2 is /i/, or even to [i] if C2 is absent and (*per* Traill 1985) C1 does not contain an uvular obstruent. Lionnet's careful examination of Traill (1994) revises this description, saying that i-blockers are just /χ, q^{χ}'/ not /q, q^{h}, q'/ - however, we find that audio data from West !Xóõ (Naumann 2016) casts some doubt on this. A similar (but interestingly different) position obtains in G|ui (Nakagawa 2010).

Back Vowel Constraint (BVC): This constraint (widespread in Khoisan) prohibits *underlying* V1 = /i/ after back C1, where [+back] also includes all clicks. We interpret [+back] as |**U**|**.** We adopt Bradfield's (2018) suggestion that the raising clicks (ǀ, ǂ) and dentals (but not alveolars) contain palatal |**I**|, an unusual aspect of !Xóõ (but which is transparently supported by allomorphy). The BVC says 'If C1 contains |U|, V1 cannot underlyingly contain |I|'.

Place features in !Xóõ: We use headed and unheaded elements for places: Labial **U**; Velar **U**; Uvular **U, A**; Glottal Ø; Palatal **I**; Dental **I**; Dental and Palatal Click **I, U**; Alveolar and Lateral Click **A, U**; Bilabial click **U**; Dental nasal **A, I**. We represent the cluster consonants (which are all word initial) thus:

/ts/	/ts$^{\chi}$/	/ǂ/	/ǂ$^{\chi}$/
|	|	|	|
I	I U, A	I, U	I, U U, A

The basic five vowels (i,e,a,o,u) are represented standardly (**I, A.I, A, A.U, U**), with the elements **L, H, ʔ, A** for nasal, breathy, creaky, pharyngeal (and combinations thereof). A key fact, revealed by Lionnet (2018)'s careful handling of the data, seems to indicate that [ɜ] is sometimes an allophone/phonetic realization of an empty V-slot and alternates with [ɨ]. However, in other forms and contexts, [ɜ] is an allophone of a V-slot containing |A,I| and it alternates with [ɛ, æ, e] and even [i].

Assimilation: the behaviour of V1 /ɑ/ is summarized in the following table (Lionnet 2018).

	OV_1V_2			$OV_1C_mV_2$								
	_i	_e	_a	_Ji	_Je	_Ja	_Li	_Le	_La	_Bi	_Be	_Ba
ʔ_	i	e	a	–	–	–	–	–	–	–	–	a
$C_{[+]}$_	i	e	a	–	–	ɜ~i	ɜ~i	ɜ?	a	ɜ	ɜ?	a
$C_{[-]}$_	ɜ~e	ɜ~ɛ	a	–	a	a	a	a	a	a	a	a

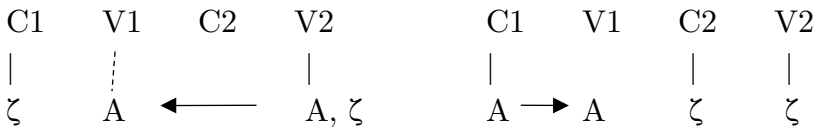
Proposal: We will show that the mirage of gradience in !Xóõ come from three sources:

(1) Incorrectly assuming that all phonetic instance of [ɜ] are underlain by the same phonological features. Rather, [ɜ] is sometimes |Ø| (~ [ɨ]). Otherwise |A,I| [~ ɛ, æ, e, i].

(2) Spreading conditions applying to two different features: |I| & |A|. Applying C-to-C, V-to-V, with blocking in some cases.

(3) A Plateau effect (C-to-C), where C2 assimilates to C1, affecting the interpolated V1.

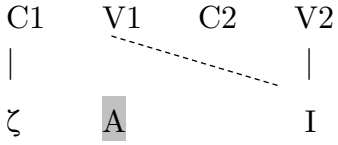
We hypothesize that |A| in V1 is a floating element, linking if it is final, or licensed by |A| (cf. Metaphony). In the representations, ζ stands for any content.



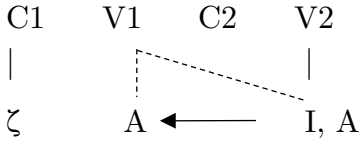
Spreading conditions: If (4a) occurs and V1 contains only |I| [i], the |A| under V1 will not link (giving an a-i alternation). But, if (see 4b), V2 contains both |I| and |A| [e], then the |A| under V1 will link *and* the |I| will spread into V1 producing [e]. This difference in raising is not a product of [i] being a stronger *phonological* raising trigger than [e].

(4) If V2 has |I|, |I| spreads to V1.

a. UR/ǂÀi/ [ǂìi] 'steenbok'



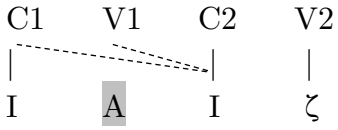
b. UR /ǂÂẽ/ [ǂêẽ] 'jaw'



If C2 is filled it will block spreading of |I| from V2 to V1. If this happens and there's no source of |A| to license |A|, the result will be the empty V-slot variant of [ɜ ~ ɨ]: [ǂɜ́bi] 'young steenbok'.

Plateau effect: There is an assimilatory effect between C2 and C1, if they both share |I|, then |I| will spread also into V1 which is sandwiched between them.

(5) If C1 has |I| and C2 has |I|, |I| will spread through adjacent V1



References: Bradfield, J. (2018). Clicks, elements and concurrency. *Toronto Working Papers in Linguistics*, *40*(1). **Lionnet, F.** (2018). Phonological teamwork in Kalahari Basin languages. *Africana Linguistica* 54: 75-97. **Nakagawa, H.** 2010. Phonotactics of Disyllabic Lexical Morphemes in G|ui. *Working Papers in Corpus-Based Linguistics and Language Education* 5:23–31. **Naumann, C.** (2016). The phoneme inventory of Taa (West !Xóõ dialect). In R. Vossen and W. Haacke (Eds.), E*ssays in memory of Anthony Traill.* Rüdiger Köppe Verlag. **Traill, A.** (1985). *Phonetic and Phonological Studies of !Xóõ Bushman*. Hamburg: Buske. **Traill, A.** (1994). *A !Xóõ Dictionary*. Köln: Köppe.

Stop lenition in Canary Islands Spanish – a motion capture study

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Stop lenition is a well-known phenomenon across the varieties of Spanish spoken around the world. In Canary Islands Spanish, it concerns both voiced /b d g/ and voiceless /p t k/ and usually takes the form of approximantisation or deletion of the former sound group, and voicing or approximantisation of the latter in post-vocalic position. While many Spanish dialects also approximantise /b d g/ in post-consonantal positions, this usually differs depending on the consonant, with the general observation being that /b d g/ are realised as stops after a nasal or a pause, and /d/ also after /l/. In the Canary Islands the situation is not that clear given the overlap with different lenition processes, such as other consonant weakening and elision. An important observation about the behaviour of /b d g/ in this dialect, however, is that their weakening is (partially) blocked by preceding sound deletion (Broś et al. 2021). From previous studies on this and other varieties of Spanish, we also know that stress is a key factor in obstruent lenition.

UR	Example	Majority realisation	Other realisations
/p/	*la paciencia* 'the pacience'	[la.**b̥**a.ˈsjen.sja]	[la.pa.ˈsjen.sja] [la.ba.ˈsjen.sja] [la.βa.ˈsjen.sja]
	Las Palmas	[la.ˈ**p**almah]	[la.ˈb̥almah], [la.ˈbalmah]
/b/	*la barrera* 'the wall'	[la.**β̞**a.ˈre.ɾa]	[la.βa.ˈre.ɾa], [la:.ˈre.ɾa]
	las vacas 'the cows'	[la.ˈ**b**a.kah]	[la.ˈβa.kah]

Against this background, the present study explores the question of weakening in larger utterances, in which phrase-level prosody may play a role. It also looks at the effects of preceding consonant and its optional deletion on the actual realization of voiced and voiceless stops. New methodology is used to disentangle articulation from acoustics and see how the two interplay. While most studies on lenition in Spanish rely on acoustic measurements, especially the intensity of the target segment compared to the flanking vowels, there have been few articulatory explorations (e.g. Parrell 2011). In this study, we use video recordings and extract information concerning lip movements to measure relative consonant aperture as a proxy of degree of lenition (the more open the lips, the more lenited the sound) using a procedure elaborated by Krause et al. (2020). Thus, we made video recordings of 16 native speakers from the Canary Islands using an internet camera. Due to the nature of the study (lip movement exploration), we tested labials /p b/ and their surface realisations, which could be [p b̥ b β β̞]. The participants were sitting in front of a computer screen and reading out a total of 376 sentences containing 560 target words. These included underlyingly intervocalic contexts (VCV) and possible deletion contexts in which /p b/ were preceded by /s/ (V(s)CV). In this case, native speakers either retain the /s/ as [h] or delete it altogether, which makes /p b/ intervocalic. Apart from this, we looked at word stress, with the obstruent occurring as an onset of a stressed or an unstressed syllable, and at main sentence stress (i.e. focus). The expectation is that stops are most likely to weaken in unstressed syllables (US), followed by stressed (S) and the least likely when stressed and in focus (SF). Examples are given below.

1. *La barrera estaba mal colocada y el portero no veía.* 'The wall was made badly and the goalkeeper couldn't see'. US /b/ **2.** *La banda de música empezó el concierto con la bamba.* 'The music band started the concert playing *La bamba'*. S /b/, SF /b/ **3.** *Las Vacas* Locas es una banda de música de Tenerife. 'The Mad Cows is a music band from Tenerife'. DEL, S /b/

In data analysis, we looked at underlying sound categories and did not determine which surface realisation was made given gradient effects. Instead, we used continuous acoustic and articulatory variables to measure the degree of weakening. To prepare data for analysis, sequences of V(s)CV and VCV were annotated in Praat. Then, intensity measurements were extracted to calculate intensity difference (V1-C and V2-C). A custom Python script used the temporal markings from the TextGrid to split each participant's video into segments containing VCV / V(s)CV sequences and process them with the OpenFace 2.0 face-tracking utility (Baltrušaitis et al., 2018). Vertical lip

aperture was calculated as the Euclidean distance between the upper and the lower lip. We also looked at total lip area and the vertical lip aperture trajectory, normalized to 11 time steps via linear interpolation. We then fit linear mixed effects models with 1) lip aperture and 2) intensity difference as dependent variables.

The results of the study show that articulatory data are compatible with the acoustics in that more lenition is present in underlyingly intervocalic positions compared to the deletion contexts. Also, there is no difference in lip/consonant aperture depending on whether the preceding /s/ was retained in some form or completely elided (see. Fig. 1), which means that derived [VCV] sequences behave exactly like [VsCV] sequences, i.e. as if deletion never took place. This has important phonological implications as it confirms the blocking effect of deletion. It also shows unequivocally that there is no obstruent weakening after /s/ in this variety of Spanish. Thus, we have an opacity effect in which the consonant seems not to be deleted completely (e.g. left unpronounced). Our data therefore support containment-based approaches to solving phonological problems. Furthermore, differences in lip aperture are significant only in /b/, suggesting different lenition patterns for voiced vs. voiceless stops.

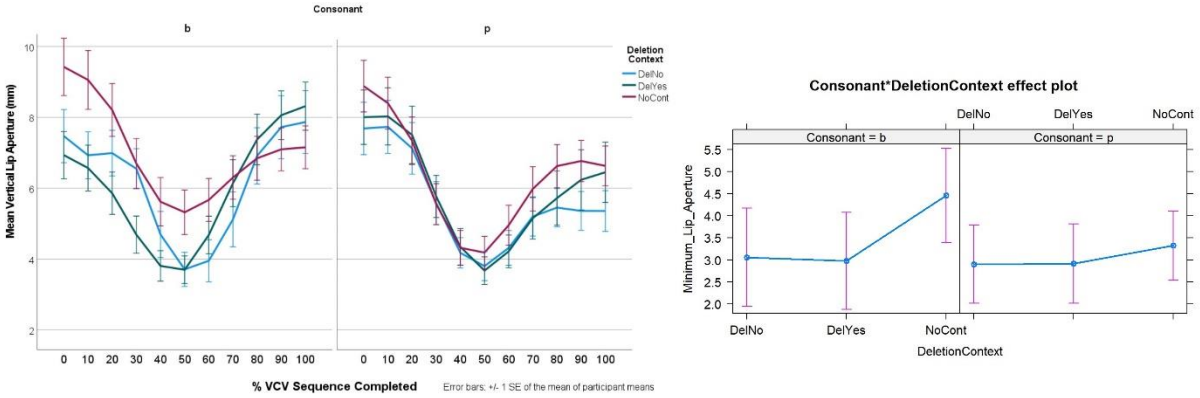

Fig. 1. Left: Trajectories of lip aperture. Red lines mark underlying VCV which promotes lenition; the blue and green lines show VsCV with retained and deleted /s/, respectively. Right: The effect of context on lip aperture. NoCont = underlying /VCV/, DelNo = /VsCV/ -> [VhCV], DelYes = /VsCV/ -> [VCV].

As for the results concerning stress and focus, both lip movements and acoustic data show that less weakening is present in SF contexts. However, there is not much difference in lip measurements between S and US, which suggests that lip movements more visibly mark higher levels of prosodic information (see Fig. 2). Overall the study provides a novel way of exploring the phonetics and phonology of consonant weakening that requires less financial resources and equipment than alternatives such as EMA.

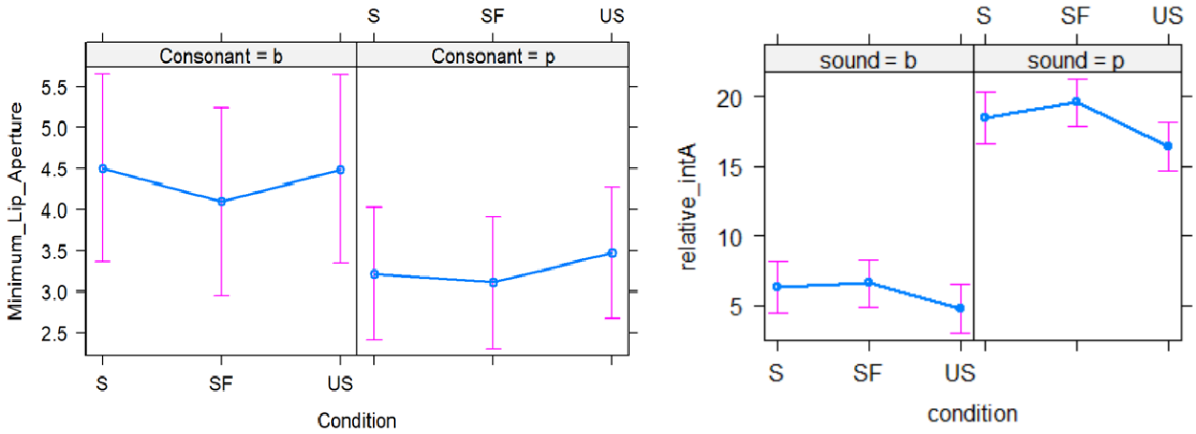

Fig. 2. Effect plots from the models using articulatory data (left) and acoustic data (intensity difference, right), showing similar effects, i.e. less lenition in stress + focus compared to the other conditions.

Opaque yet still complex: Proper names in English

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Virtually all theories of phonology recognise the influence of morphological structure on phonological representations, but they often deal with what we could call "prototypical morphemes", i.e. units which have both form and meaning, but disregard the interaction of more opaque morphological structures with phonology. There is now considerable evidence that opaque prefixed words in English (e.g. *adverb, contain, submit*) should be treated as complex units by the phonology, as they have a behaviour that is distinct from simplex words for stress placement in verbs (Chomsky & Halle 1968; Dabouis & Fournier to appear), for vowel reduction (Dabouis & Fournier 2019; Guierre 1979), and they often contain consonant clusters that are illegal in monomorphemes (Guierre 1990; Hammond 1999). There is also a vast body of evidence from psycholinguistics showing that speakers treat such units as complex, in lexical decision tasks (Forster & Azuma 2000; Pastizzo & Feldman 2004), reading studies (Ktori *et al.* 2018; Rastle & Coltheart 2000) and ERP (McKinnon *et al.* 2003).

Köhnlein (2015) reports similar results for another type of opaque unit: place names in Dutch (e.g. *Amsterdam, huisdeur, Wageningen*). These may have extrafenestral or final stress and phonotactics which are not regular for simplex words, and so he analyses these words as suffixed words or compound words, which makes these properties predictable. This paper seeks to establish if similar properties can be found in English place and family names such as *Attenborough, Canterbury, Lincolnshire* or *Westminster*. I show that, although they vary in opacity as their constituents may or may not be attested and, if attested, may or may not have undergone reductions, these words show stress and phonotactic properties which make them distinct from simplex words, and closer to compounds or words with a neutral suffix. Using dictionary data (Wells 2008) and searching for all relevant units, we find that:

- All 28 quadrisyllabic words with a final disyllabic unit have preantepenultimate primary stress (e.g. *Cánterbury, Hígginbottom, Dérwentwater* cp. *Ánybody, wátermelon*);
- Over 93% of the 353 words with a closed penult have antepenultimate stress (e.g. *Íronbridge, Óxenden, Éddington* cp. *cómmonwealth, páperwork, cónstantly, devélopment*);
- They contain consonant clusters which are exclusively attested in such words or complex words (e.g. /mzb/ is found in *Amesbury, Bloomsbury, gemsbok, Grimsby, Malmesbury, Ormesby, Ormsby, Ramsbotham, Ramsbottom, Samlesbury, Williamsburg*);
- In some words, we find medial /i/, which can be analysed as a sign that these words contain a morphological boundary (e.g. *Hunniford, Darbyshire, Stalybridge* cp. *anything, copycat, partygoer*);
- Some words may contain nasals at the end of the first constituent which are not homorganic with the following consonant (e.g. *Ratte*[n]*bury, Ede*[n]*bridge, Abi*[ŋ]*don*).

Following Köhnlein (2015) and based on the literature on opaque prefixed words in English, I will propose that the recurrence of the constituents involved in these words across dozens of proper names leads learners to postulate a corresponding formative. Such formatives are semantically underspecified and may not occur as independent words. Although some of them are homophones or homographs with existing words, I assume them to be different units. I assume that these words were all initially interpreted as compounds, and some still are, but that

some have undergone various processes of reduction which now make them likely to be interpreted as suffixes rather than as compounding elements. Thus, words containing second elements which are phonologically comparable to words will be analysed as in (1a) and those whose second elements contain no full vowel will be analysed as in (1b).

(1) a. Morphology: $[[X]_{stem}[Y]_{stem}]_{word}$
Semantics: Settlement/Person
Phonology: $(X)_{\omega}(Y)_{\omega}$

b. Morphology: $[[X]_{stem}[Y]_{suffix}]_{word}$
Semantics: Settlement/Person
Phonology: $(X)_{\omega}Y$

The results that are reported along with the analysis proposed in this paper provide additional evidence that phonological theories should integrate the possibility of refering to opaque morphological constituents.

References

CHOMSKY, N. & HALLE, M. (1968). *The Sound Pattern of English*. New York: Harper & Row.

DABOUIS, Q. & FOURNIER, J.-M. (to appear). The stress patterns of English verbs: Syllable weight or morphology? In N. Ballier, J.-M. Fournier, A. Przewozny, & E. Yamada (Eds.), *English Word Stress: Theories, Data and Variation*. Edinburgh: Edinburgh University Press.

DABOUIS, Q. & FOURNIER, J.-M. (2019). On the role of morphology, syllable structure, frequency and spelling in English vowel reduction. Poster Presented at the 27th MFM Conference at the University of Manchester (23-25 June).

FORSTER, K. I. & AZUMA, T. (2000). Masked priming for prefixed words with bound stems: Does submit prime permit? *Language and Cognitive Processes*, *15*(4–5), 539–561.

GUIERRE, L. (1979). *Essai sur l'accentuation en anglais contemporain : Eléments pour une synthèse*. Ph.D. dissertation. Université Paris-VII.

GUIERRE, L. (1990). Mots composés anglais et agrégats consonantiques. In *5ème Colloque d'Avril sur l'anglais oral* (pp. 59–72). Villetaneuse: Université de Paris-Nord, CELDA, diffusion APLV.

HAMMOND, M. (1999). *The Phonology of English: A Prosodic Optimality-Theoretic Approach*. (J. Durand, Ed.). Oxford: Oxford University Press.

KÖHNLEIN, B. (2015). The morphological structure of complex place names: the case of Dutch. *Journal of Comparative Germanic Linguistics*, *3*(18), 183–212.

KTORI, M. MOUSIKOU, P. & RASTLE, K. (2018). Cues to Stress Assignment in Reading Aloud. *Journal of Experimental Psychology*, *147*(1), 36–61.

MCKINNON, R. ALLEN, M. & OSTERHOUT, L. (2003). Morphological decomposition involving non-productive morphemes: ERP evidence. *NeuroReport*, *14*(6), 883–886.

PASTIZZO, M. J. & FELDMAN, L. B. (2004). Morphological processing: A comparison between free and bound stem facilitation. *Brain and Language*, *90*(1–3), 31–39.

RASTLE, K. & COLTHEART, M. (2000). Lexical and Nonlexical Print-to-Sound Translation of Disyllabic Words and Nonwords. *Journal of Memory and Language*, *42*, 342–364.

WELLS, J. C. (2008). *Longman Pronunciation Dictionary* (3rd ed). London: Longman.

The erosion of the end of the word

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The masculine and feminine forms of the Old Norse indefinite article show a conrtast between short and long final consonants that has been lost in Norwegian. In the eastern varieties (bokmål), the long final consonant has been shortened and it merges with the corresponding short final consonant (1a). In the western varieties (nynorsk), the shortening of the long final consonant is associated with a loss of the short final consonant (1b).

(1)	OLD NORSE	BOKMÅL	NYNORSK	
a.	einn	en	ein	'an (M)'
b.	ein	en	ei	'an (F)'

The second case is an example of chain shift which illustrates the fact that the word end segments are not affected by lenition individually, but rather in bundles. Here, the change in (2a) implies the change in (2b).

(2) a. nn > n

b. n > Ø

This type of chain shift can affect very distinct segments, as is the case in Jutlandic (Ejsing 2005). In this West Danish variety, there is a tendency to drop final /r/ (3a), final schwas (3b) and to shorten final consonants (3c).

(3)	ETYMOLOGICAL ORTHOGRAPHY	IPA	
a.	<drikker>	dreˀkə	'drink(s)'
b.	<drikke>	dreˀk	'to drink'
c.	<drakk>	drak	'drank'

It is easy to see that these three changes are parallel. From a functionalist point of view, the change in (4a) leads to a morphological confusion which triggers the change in (4b), which leads to a new morphological confusion which motivates the change in (4c).

(4) a. kkər > kkə

b. kkə > kk

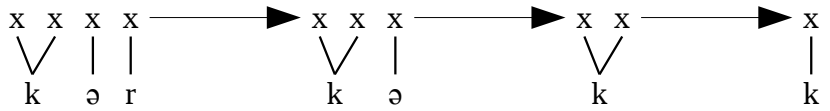
c. kk > k

In view of the consistency of these changes, there seems little justification for proposing three separate rules. Rather, it would seem that there is a single rule which affects any segment of the end of the word (5).

(5) x → Ø /_#

The autosegmental model is an efficient way to account for this bundle of changes. Assuming that 'x' in (5) represents a position, then the above rule suffices to derive all changes in (4) simultaneously.

(6)



Other changes may affect not the presence or length of a segment, but its quality. This is particularly the case with final devoicing, which can occur along with other changes at the end of a word. In French, for example, we find a loss of the final schwa (7a), a final devoicing in liaison context (7b) and a loss of final consonants outside liaison context (7c).

(7)	ETYMOLOGICAL ORTHOGRAPHY	IPA	
a.	<grande amie>	gʁɑ̃d	'great female friend'
b.	<grand ami>	gʁɑ̃t	'great mal friend'
d.	<grand camarade>	gʁɑ̃	'great comrade'

These three changes also form a chain. Still from the functionalist point of view, the change in (8a) triggers the change in (8b), which triggers the change in (8c).

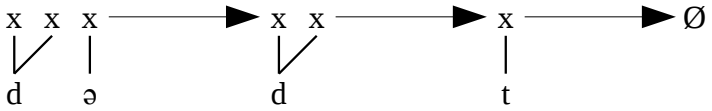
(8) a. də > d

b. d > t

c. t > Ø

It is known that some surface qualitative contrasts may be due to underlying quantitative contrasts (Ségéral & Scheer 2001). In this light, the rule in (5) derives the French final devoicing in the same way as it derives the Jutlandic final consonant shortening.

(9)



The idea that French final devoicing depends on the presence or absence of a position is confirmed by the fact that both voiced~voiceless and C~Ø alternations serve to form the feminine of adjectives in: i. fɔʁ~fɔʁt ('strong' M~F), ii. vif~viv ('sharp' M~F).

In sum, I show that the erosion at the end of the word does not affect the melodic content of the segments so much as their positions. Based on Anderson & Durand (2012) and Carvalho (2002), I will show in a fuller presentation that this erosion is only expected at the word boundary and that the virtual length of the voiced consonant with respect to its voiceless counterpart is not actually identical to that of a geminate consonant. Rather, it is a dependence of voiced consonants on the presence of a syllabic position on their right.

Anderson, J., & **Durand**, J. (Eds.). (2012). Explorations in Dependency Phonology (Vol. 26). Walter de Gruyter. **Carvalho** (Brandão de), J. 2002. De la syllabation en termes de contours CV. HDR dissertation [ms]. **Ejsing**, J. 2005. Sallingmålet: lydlære, grammatik, faste udtryk. Aarhus: Peter Skautrup Centret. **Ségéral**, P., & **Scheer**. T. 2001. Abstractness in phonology: the case of virtual geminates. in Constraints and Preferences.

The role of perceptual factors in laryngeal metathesis

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Introduction: Metathesis has been argued to be perceptually driven and facilitated (Grammont 1933; Steriade 2001; Hume 2004). More specifically, laryngeal metathesis [hC] → [Ch] has been said to optimize [h] perception around stops (Cho 2012; Yoon 2012), since [h] may be easier to perceive on a stop release (the burst increases salience) than before a stop (Bladon 1986; Kingston 1990; Silverman 2003). Cross-linguistically, many laryngeal metatheses seem to support this claim, since they move [h] from before to after a stop (Cho 2012; Yoon 2012). Laryngeal metathesis has also been argued to be facilitated by spread-out phonetic cues: Blevins & Garrett (2004) propose that cues realized across a long domain allow listeners to perceive them in a non-historical location. Perceptual explanations for metathesis are common, but largely untested.

Sevillian Spanish provides a test case, because it is undergoing a change from h-stop to stop-h in /sC/ sequences (/pasta/: [pa**ht**a] → [pa**th**a]) (Torreira 2006; Ruch & Peters 2016). The change is often explained in articulatory terms (Parrell 2012), but others have suggested that perceptual factors may be at play (Ruch & Harrington 2014). In a cross-linguistic ABX discrimination task, I test how listeners perceive [h] in HC and CH sequences. These patterns could provide evidence that HC sequences are perceptually difficult, which support the argument that metathesis to CH improves perceptibility of [h]. I find no perceptual benefit to CH over HC sequences. Instead, perceptual patterns are driven by native language experience (Dupoux et al. 1999; Mielke 2003).

Experiment: The nonce words for the ABX task were trisyllabic, had penultimate stress, and had medial consonants /ptk bdg mnl sf/. The nonce words were recorded by a native Turkish speaker, and were manipulated so that paired words had similar pitch contours, vowels, and [h] duration. There were three types of words: NoH (VCV), HC (VhCV) and CH (VChV). Trials paired these words to test how listeners perceive the linear order of [h] (HC/CH trials), and the presence vs. absence of [h] before or after a consonant (HC/C, CH/C trials). Each comparison was presented in four orders (ABA, ABB, BAB, BAA), and listeners were asked to choose which of the first two words was the same as the last. There were 132 test trials and 72 control trials.

Type	Presentation	Example
HC/CH	HC-CH-HC	lana**ht**a - lana**th**a - lana**ht**a
HC/C	HC-NoH-HC	lana**ht**a - lana**t**a - lana**ht**a
CH/C	CH-NoH-CH	lana**th**a - lana**t**a - lana**th**a

Participants were native speakers of Arabic, French, English, and Spanish (Mexican, Argentinian, Sevillian) (~20 each). These languages differ in the presence and phonological status of HC and CH sequences. Similar results across groups would indicate a general perceptual difficulty; different results would indicate that language-specific perception plays a larger role in [h] perception.

	HC seqs?	CH seqs?
Arabic	/h/	No
English	No	Asp. Stops
French	No	No
Sp–Mex	No	No
Sp–Arg	[h] ← /sC/	No
Sp–Sev	[h] ← /sC/	[Ch] ←/sC/

Hypotheses: The experiment tests two hypotheses, focusing on perception around voiceless stops.

Perceptual facilitation and optimization: Steriade (2001: 14) argues that productive metathesis improves perceptibility and results in a sequence perceptually similar to the original. Under this account, listeners should have more difficulty hearing [h] in HC sequences than in CH sequences, since [h] may be less salient before a stop (Bladon 1986; Kingston 1990). The location of [h] should also be most confusable around voiceless stops, since metathesis occurs mostly around these consonants cross-linguistically. This behavior would support the role of perceptual factors in facilitating and motivating metathesis.

Language-specific perception: A different possibility is that listeners' perception of [h] depends on native language experience. On this account, listeners should have higher accuracy perceiving the sequences that exist in their language. Accuracy may also depend on whether [h] is mapped to a native phonological category or to a non-contrastive allophone. This result would support an account in which perception of [h] is modulated by listeners' mappings between non-native sounds and native phonological categories (Best & Tyler 2007), not a general CH > HC preference.

Results: Figure 1 shows accuracy around voiceless stops. Accuracy was analyzed with linear mixed-effects models, and *emmeans* was used to examine pairwise comparisons. Across listener groups, [h] is either easier to perceive *before* stops (HC/C) than *after* stops (CH/C), or accuracy is similar. Accuracy also depends on native language. French and all Spanish-speaking listeners pattern together, with higher accuracy on HC/C than on CH/C. For Arabic-speaking and English-speaking listeners, accuracy on CH/C and HC/C is similar. Furthermore, accuracy on linear order (HC/CH) differs by consonantal environment: it is similar around voiceless and voiced stops, and lower around fricatives (not shown).

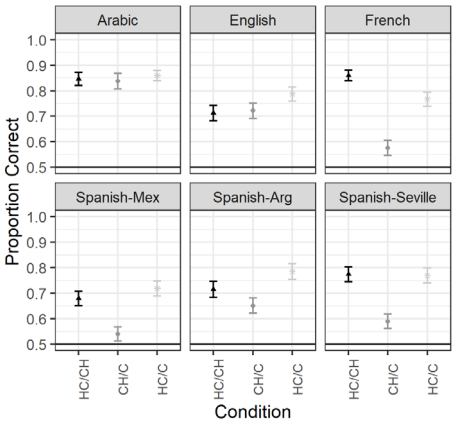

Figure 1 Accuracy around voiceless stops

Discussion: The results provide no evidence that laryngeal metathesis is perceptually facilitated or optimizing. The one result that holds across groups contradicts this prediction: [h] is either easier to perceive before a stop than after it, or accuracy is similar. For no group is [h] easier to perceive after a stop than before it. This is surprising given the many perceptual proposals for laryngeal metathesis, but is consistent with Clayton (2010) who found that preaspiration (HC) was not more perceptually difficult than postaspiration (HC). I also found no evidence that linear order is difficult to perceive around voiceless stops, which Steriade (2001) argues facilitates metathesis.

Instead, listeners' perception depends on native phonological categories, and how the stimuli were mapped to them. English-speaking listeners likely mapped CH stimuli as aspirated stops, leading to higher discrimination accuracy than French and Spanish-speaking listeners, who lack aspirated stops. Arabic-speaking listeners had high accuracy in all comparisons, likely mapping [h] to native phonemic /h/, which has a relatively free distribution in Arabic.

Two results were unexpected. First, Sevillian listeners behaved similarly to other Spanish-speakers. The dialects share the /sC/ representation, but have quite different surface forms (Sev: [Ch], Mex: [sC], Arg: [hC]). Sevillians' experience with surface [Ch] sequences did not improve their accuracy on CH sequences. This may be due to the lack of context: [Ch] forms appeared in nonce words, with no possibility that [Ch] derived from /sC/. Second, French listeners had high accuracy, even though French lacks both [h] and aspirated stops. If these listeners could not map [h] to a native category, it may have been uncategorizable and thus distinct from categorizable sounds, leading to high discrimination accuracy (Best & Tyler 2007). On the other hand, they may have mapped [h] to French /r/, leading to good discrimination in certain contexts.

In sum, the results provide no evidence that general tendencies of perceptual optimization promote metathesis from [hC] → [Ch], in Sevillian or in other languages. Instead, perception of [h] is largely language-specific. These results suggest that laryngeal metathesis is not solely perceptually motivated, and that other phenomena involving similar sequences (e.g., pre- and postaspiration) may not be either.

Ancient Greek Accentual Classes

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A building consensus on Ancient Greek recessive accentuation treats it as a pitch accent drawn to the main stress (HL*, Sauzet 1989, Golston 1990, Kiparsky 2003, Blumenfeld 2004; see Gunkel 2014 for review) or to the right edge of the word (Itô & Mester 2017). Lacking in the literature is careful discussion of Greek's many *non-recessive* accentual patterns. Focusing on the surface tonal phonology, we propose that Greek had two additional accentual classes, falling H*L and rising L*H.

The tonal classes can best be seen by comparing where the H tone falls in relation to the first μ of the main stress foot: *before* that μ (HL*), *on* that μ (H*L), or *after* that μ (L*H):

	HL*	H*L	L*H
nouns	dɔɔ́ˈròù	osˈtóù	nèˈɔ̀ɔ́s
	gift–GEN	*bone*–GEN	*temple*–GEN
verbs	luúˈɔ̀ɔ̀	poiˈɔ́ɔ̀	
	loose–1SG	*make*–1SG	
adjectives	eudaíˈmɔ̀ɔ̀n	kʰruuˈsóùs	ˈhɛ̀ɛ̀dús
	happy–MASC.NOM	golden–MASC.NOM	*sweet*–MASC.NOM

In HL* 'recessive' accentuation, the H falls before the first μ of the main stress (ánˈtʰrɔ̀ɔ̀pos *person*), or on that μ if no tone-bearing unit precedes it (ˈóìkòs *house*). In H*L accentuation, H falls on the first μ of the syllable with primary stress. In so-called contract forms, Probert (2003) derives the late accentuation from abstract vowels (tiimá– *honor*, poié– *make*, dɛɛló– *show*) whose deletion results in accent shift; this is difficult synchronically due to many uncontracted words like nèòós 'temple' and thèós 'god', and to the fact that the H*L pattern is found in indicative and subjunctive (below) while the imperfect is mostly HL* but generally has the same vowel quality as the present:

	HL*	H*L	HL*/H*L	H*L
1SG	luú–ˈɔ̀ɔ̀	poi–ˈɔ́ɔ̀	epoí–ˈòùn	poi–ˈɔ́ɔ̀
2SG	luú–ˈèìs	poi–ˈéìs	epoí–ˈèìs	poi–ˈɛ́ɛ̀s
3SG	luú–ˈèìs	poi–ˈéì	epoí–ˈèì	poi–ˈɛ́ɛ̀
2DU	luú–ˈètòn	poi–ˈéìtòn	epoi–ˈéìtòn	poi–ˈɛ́ɛ̀tòn
3DU	luú–ˈètòn	poi–ˈéìtòn	epoi–eíˈtɛ̀ɛ̀n	poi–ˈɛ́ɛ̀tòn
1PL	luú–ˈòmèn	poi–ˈóùmen	epoi–ˈóùmèn	poi–ˈɔ́ɔ̀men
2PL	luú–ˈètè	poi–ˈéìte	epoi–ˈéìtè	poi–ˈɛ́ɛ̀te
3PL	luú–ˈòùsi	poi–ˈóùsi	epoí–ˈòùn	poi–ˈɔ́ɔ̀si
	loose–INDIC	*make*–INDIC	*make*–IMPERF	*make*–SUBJ

Our analysis provides a surface true account of 'contract' forms as tonally H*L, with quality and quantity differences due to floating [LOW, FRONG, BACK] features and moras on roots:

		[μ LOW]	[μ FRONT]	[μ BACK]
2DU	luú–ˈètòn	tiim–ˈáàton	poi–ˈéìton	dɛɛl–ˈóùton
2PL	luú–ˈètè	tiim–ˈáàte	poi–ˈéìte	dɛɛl–ˈóùte
	'loose–INDIC'	'honor–INDIC'	'make–INDIC'	'show–INDIC'

Our proposed cases of consistent L*H are textually less sound but occur in the so-called Attic declension (e.g. nèˈòós 'temple'), (for words like làgòó 'hare–GEN', which appear in some texts as H*L lagóò, see Probert 2003 and references therein); but L*H is independently required by many nouns (ˈpòús 'foot', ˈhòdós 'way') and adjectives (alɛɛˈtʰɛ̀ɛ́s 'true', aˈgàthós 'noble') (see Probert 2003 and references therein). Besides Attic declension, finally accented first and second declension and monosyllabic third declension, of the type of pòús 'foot' have consistent alternation of L*H and H*L:

	L*H	L*H/H*L	L*H/H*L	L*H/H*L
NOM.SG	neˈɔ̀ɔ́–s	tiiˈmɛ̀ɛ́	ˈhòdó–s	ˈpòú–s
VOC.SG	neˈɔ̀ɔ́–s	tiiˈmɛ̀ɛ́	ˈhòdé	ˈpòú–s
ACC.SG	neˈɔ̀ɔ́–n	tiiˈmɛ̀ɛ́–n	ˈhòdó–n	ˈpód–à
GEN.SG	neˈɔ̀ɔ́	tiiˈmɛ́ɛ̀–s	hoˈdóù	ˈpòd–ós
DAT.SG	nèˈɔ̀ɔ́ʲ	tiiˈmɛ́ɛ̀ʲ	hoˈdɔ́ɔ̀ʲ	ˈpòd–í
N/A/V.DU	neˈɔ̀ɔ́	tiiˈmàá	hoˈdɔ̀ɔ́	ˈpód–è
GEN/DAT.DU	neˈɔ̀ɔ́ʲ–n	tiiˈmáì–n	hoˈdóì–n	ˈpòd–óìn
N/V.PL	neˈɔ̀ɔ́–ʲ	ˈtììmá–j	ˈhòdó–j	ˈpód–ès
ACC.PL	neˈɔ̀ɔ́–s	tiiˈmàá–s	hoˈdòú–s	ˈpód–às
GEN.PL	neˈɔ̀ɔ́–n	tiiˈmɔ́ɔ̀–n	hoˈdɔ́ɔ̀–n	ˈpod–ɔ́ɔ̀n
DAT.PL	neˈɔ̀ɔ́ʲ–s	tiiˈmáì–s	hoˈdóì–s	ˈpò–sí
	temple	*honor*	*way*	*foot*

By drawing falling (H*L, HL*) and rising (L*H) tunes to the main stress, our *-based analysis accounts for the fact that all accents fall within a three-syllable window at the end of a word. It does so without postulating an accentual window consisting of a three-syllable foot (Kager 2003), which runs into conceptual and empirical problems with respect to ostensible recursion (Golston 2021).

Our analysis receives surprising comparative support from Siouan languages with similar (Winnebago) or identical (Hidatsa) accentual classes. L*H with left-aligned iambs has been proposed for Winnebago (Golston 2021, based on Miner 1989, 1993), where the pattern is (waˈšò)šé *brave* with H on the μ following the main stress, the mirror image of Greek recessive accent. Hidatsa has the exact same three tonal classes we postulate here for Greek—HL*, H*L, L*H (Metzler 2021, Rivera 2017). Hidatsa uses these with left-aligned moraic iambs (Driscoll 2019, Metzler 2022), however, rather than with the right-aligned moraic trochees found in Greek.

References

Blumenfeld 2004 Tone-to-stress and stress-to-tone: Ancient Greek accent revisited. BLS 30.
Driscoll 2019 *Metrical, photactic, phonetic evidence against asymmetric iambs*. MA CSUF.
Golston 1990 Floating high (and L*) tones in Ancient Greek (1990). *APC* Vol. 3., 66-82.
Golston 2021 No stress system requires recursive feet. *Catalan Journal of Linguistics*, 1-27.
Gunkel. 2014 Accentuation. *Encyclopedia of Ancient Greek Language and Linguistics*.
Itô/Mester 2017 Ancient Greek pitch-accent: anti-lapse and tonal antepenultimacy.Tanaka ed.
Kager 2012 Stress in windows: language typology and factorial typology. *Lingua*.
Kiparsky 2003 Accent, syllable structure, and morphology in Ancient Greek. 15th ISTAL.
Metzler 2021 *Iambic Intensity in Hidatsa*. MA CSUF.
Metzler 2022. Pitch-accent in Hidatsa. Proceedings *WECOL*.
Miner 1989 Winnebago accent: the rest of the data. *Anthropological Linguistics.*
Miner 1993 On some theoretical implications of Winnebago phonology. *Kansas WPL 18.*
Rivera 2017 *Metrical prominence in Hidatsa*. MA CSUF.
Probert 2003 *New Short Guide to the Accentuation of Ancient Greek.*
Sauzet 1989 L'accent du grec ancien et les relations entre structure metrique et representation autosegmentale. *Langages* 95.

Preliterate children's intuitions shed light on the variable syllable structure in Russian

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The present study investigates alternative syllabifications involving intervocalic two-consonant clusters in Russian. Syllabification of Russian words containing intervocalic consonants has been a matter of controversy in phonological literature. Existing approaches have suggested alternative syllabications and have attributed them to different weights which they attached to factors such as sonority sequencing (Avanesov & Sidorov 1945, Bondarko 1977, 1998, Kasatkin 2001, Ščerba 1983, Vinogradov et al. 1953, Wade 1994), stress placement (Vinogradov et al. 1953, Ščerba 1983), and consonant cluster probability (Kempgen 2003). However, all these studies are based on solely theoretical assumptions and the scholars' own intuitions. Côté and Kharlamov (2011) is one of the few studies that analyzes production data. The authors report a general preference for the CVC.CVC pattern for all clusters in Russian, which is against the predictions articulated in the literature earlier. Crucially, no study has so far addressed the possible role of literacy on Russian syllabification, or has compared syllabifications in adults and preliterate children.

The aim of the study is thus to determine patterns of syllabification of Russian items containing intervocalic two-consonant clusters in Russian-speaking adults and preliterate children. The intervocalic clusters in the test items (42 words) differed from each other in terms of sonority sequencing, frequency and stress position. The influence of these factors as well as the effect of literacy was evaluated by comparing the segmental behavior of 5-year-old preliterate children and adults by using a pause insertion task, following Goslin & Floccia (2007) and Côté & Kharlamov (2011).

The results indicate that adults produce the CVC.CVC pattern most of the time, regardless of the cluster frequency, stress position and sonority sequencing, which is in line with the finding by Côté & Kharlamov (2011). Preliterate children follow this pattern only for sonorant-obstruent clusters, as in *tol'.ko* 'only' and *džyn.sy* 'jeans'. In the other cases, the general pattern is CV.CCVC, as in *ka.ždyj* 'every' and *ra.zrez* 'cut'. The finding that preliterate children differentiate between sonorant-obstruent clusters and all the other clusters is in line with the results reported for adult speakers of Polish by Booij & Rubach (1990) and indicate an influence of literacy education on adult Russian speakers. I argue that the theoretical controversy dominating the literature on Russian syllabification may be defused should preliterate children's intuitions be taken seriously.

References

Avanesov, Ruben I. & Vladimir N. Sidorov. 1945. *Očerk grammatiki russkogo literaturnogo jazyka.* Moscow.

Bondarko, Lija V. 1977. *Zvukovoj stroj sovremennogo russkogo jazyka*. Moscow: Prosveščenie.

Bondarko, Lija V. 1998. *Fonetika sovremennogo russkogo jazyka*. St.-Petersburg.

Booij, Geert & Jerzy Rubach. 1990. Syllable structure assignment in Polish. *Phonology* 7(1), 121-158.

Côté, Marie-Hélène & Viktor Kharlamov. 2011. The impact of experimental tasks on syllabification judgements: A case study of Russian. In Cairns, Charles E. & Eric Raimy (eds.), *Handbook of the syllable*, 271-269. Leiden: Brill.

Goslin, Jeremy & Caroline Floccia. 2007. Comparing French syllabification in preliterate children and adults. *Applied Psycholinguistics* 28, 341-367.
Kasatkin, Leonid L. (ed.) 2001. *Russkij jazyk*. Moscow: Academia.
Kempgen, Sebastian. 2003. Phonologische Silbentrennung im Russischen. In Kempgen, Sebastian, Ulrich Schweier & Tilman Berger (eds.), *Rusistika – Slavistika – Linguistika. Festschrift für Werner Lehfeldt zum 60. Geburtstag*, 195-211. München: Sagner.
Ščerba, Lev V. 1983. *Teorija russkogo pis'ma.* Leningrad.
Vinogradov, Viktor V., Evgenija S. Istrina & Stepan G. Barkhudarov (eds.) 1953. *Grammatika russkogo jazyka. Vol. 1. Fonetika i morfologija.* Moscow: Academy of Science of the USSR.
Wade, Terence. 1994. *A comprehensive Russian grammar.* Oxford: Blackwell.

Consonant Clusters and the Word-initial Position in Farsi (Alireza Jaferian[1])

The syllable structure of Colloquial Iranian Persian, natively known as Farsi has been thoroughly described in the literature (e.g. Mahootian 1997). Issues of syllable representation, however, have not been properly addressed (cf. Bijankhan 2018: 115 for an example). This work is part of a first approach to syllabic representation of Farsi within the Strict CV model (Lowenstamm 1996, Scheer 2004). Our focus is on consonant clusters and word-initial restrictions, supporting the systematic licensing of an initial CV site (Lowenstamm 1999).

Farsi has three syllable types: CV, CVC and CVCC: bu "smell (n.)", pir "old", dozd "thief".

Word-initial vowels, as well as initial consonant clusters are prohibited: /abr/ → [ʔabr] "cloud", "train" > [teran] (French loan).

Word-internally, many heterosyllabic clusters of two consonants violate the Syllable Contact Law. All sonority slopes are attested: ab.jɑt "verses", tak.rim "honor". Also word-internally, clusters of up to three consonants are attested. In most such cases, there is a morpheme boundary. An illustrative example is the word ka**fʃd**uzak "beetle", consisting of three morphemes: ka**fʃ-d**uz-ak, "shoe", "sew", "diminutive suffix".

In word-final CC clusters, a large number of logically possible combinations are attested, including clusters violating the Sonority Sequencing Principle. Gaps are due to lexical accidents, diachronic change and OCP-type constraints.

In summary, the three syllabic restrictions of Farsi are: *#V, *CCC (word-finally and word-internally without morpheme boundary), and *#CC(C).

CVCV account

***#V**: Following Guerssel 2014 on Classical Arabic, we propose that the required initial Onset parameter in ON in Farsi. Another way of explaining this is that, in Farsi, following Faust et al. 2018 on Italian, Onsets need to be governed to be empty.

***CCC# & *CCC without morpheme boundary:** A triconsonantal cluster involves two consecutive empty Nuclei, the rightmost of which cannot be governed, because the following Nucleus is non-final and empty. Exceptions are all loans: septɑmbr < septembre (French).

***#CC**: The fact that in Farsi, consonant clusters are prohibited only in initial position can be explained by means of the initial CV hypothesis, first proposed by Lowenstamm (1999) within the Strict CV model, then adapted and developed by Lahrouchi (2001, 2003, 2018) and Scheer (2009, 2014). The theory replaces word-edge diacritics by syllabic space in the form of CV units.

In Farsi, it is argued that each word has an initial CV site, which is always licensed[2]. Thus, the first Nucleus of the word cannot be empty. When empty in the lexical form, it is filled by an epenthetic vowel, namely **e** or a copy of the first lexical vowel. In cases of initial sC clusters, the epenthetic vowel precedes the first segment: stop > [ʔestop].

Branching onsets do not exist in Farsi. This can be explained by the fact that the language is not sensible to the sonority hierarchy, i.e. neither SCL nor SSP apply.

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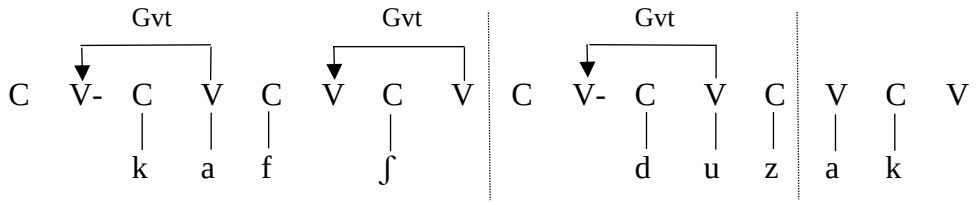
[2] Cf. debate on parametrization of the initial CV, i.e. the initial CV is universally present, but not always licensed (Lowenstamm 1999, Lahrouchi 2001, 2003) vs the initial CV is either present or absent (Scheer 2014).

Further evidence for the existence or the systematic licensing of the initial CV in Farsi includes the following:
- Initial Nuclei cannot alternate with zero, while non-initial Nuclei can, e.g. in verb paradigms, in unprefixed vs prefixed forms : ʃ**e**nɑxtam vs miʃ**ø**nɑxtam “I knew” vs “I used to know”.
- Initial consonants are not intervocalic, i.e. are strong (cf. Scheer 2014: 321 sq.). Intervocalic consonants undergo lenition, while initial consonants never do: /ɑɢɑ/ → [ɑɣɑ] “mister”.

In Strict CV terms, these can be accounted for by positing that the governing force emanating from the initial vowel is absorbed by the initial CV that requires licensing. This has two consequences: (1) The initial Nucleus cannot remain empty, (2) the initial Onset is ungoverned. Another argument is that verb prefixes have the shape of a CV unit: mi- “progressive aspect”, na- “negation”, be- “subjunctive”.

CVCC-CV: More problematic are numerous words with internal CCC clusters including morpheme boundary. Given that there are no branching constituents in Farsi, their presence assumes two successive empty Nuclei: ka**fʃ-d**uz-ak “beetle”, ha**rf-g**uʃ-kon “one who listens (to advice)”. The triconsonantal clusters can be explained assuming that each lexical morpheme includes an (always licensed) initial CV site (working hypothesis). Evidence supporting the hypothesis includes the same facts as mentioned above, namely: no morpheme-initial clusters and no V/ø alternations on the morpheme-initial Nucleus. Furthermore, verb morphemes can receive CV-shaped prefixes word-internally: harf-guʃ-kon vs harf-guʃ-**na**-kon “one who listens” vs “one who does not listen (to advice)”. A CVCV representation follows.



References

Bijankhan, Mahmood 2018. Phonology. *The Oxford Handbook of Persian Linguistics.* OUP.
Guerssel, Mohand 2014. On the licensing of glides. *The Form of Structure, the Structure of Form*: 85-101. John Benjamins.
Lahrouchi, Mohamed 2001. *Aspects morpho-phonologiques de la dérivation verbale en berbère (parler chleuh d'Agadir*). Thèse de doctorat. Université Paris VII.
– 2003. Manifestations gabaritiques dans la morphologie verbale du berbère (parler chleuh d'Agadir). *Recherches linguistiques de Vincennes*, (32), 61-82.
– 2018. The left edge of the word in Berber derivational morphology. *Glossa* 3 (1), 1-25.
Faust, Noam ; Nicola Lampitelli & Shanti Ulfsbjorninn 2018. Articles of Italian unite! Italian definite articles without allomorphy. *Canadian Journal of Linguistics, 63(3):* 1–27.
Lowenstamm, Jean 1996. CV as the only syllabe type. *Current trends in Phonology. Models and Methods*. 419-441. Salford, Manchester: ESRI.
– 1999. The beginning of the word. *Phonologica*: 153-166.
Mahootian, Shahrzad 1997. *Persian*. Routledge.
Scheer, Tobias 2004. *A Lateral Theory of Phonology. Volume 1: What is CVCV and Why Should It Be?* Mouton de Gruyter.
– 2009. External sandhi: What the initial CV is initial of. *Linguistic Studies and Essays*, 43-82.
– 2014. The Initial CV: Herald of a non-diacritic interface theory. *The Form of Structure, the Structure of Form:* 315-330. John Benjamins.

Explaining deviations from sonority preferences in the distribution of rhotics in Catalan

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Catalan contrasts two rhotics, but only in intervocalic position: the alveolar tap (*pa*[ɾ]*a* 'stop.IMP') and the alveolar trill (*pa*[r]*a* 'grapevine'). The contrast is neutralized in all other positions. The trill systematically appears as the first element of an onset root-initially ([r]*oca* 'rock', *pre*[r]*omà* 'pre-Roman') and after a consonant (*hon*[r]*a* 'honor'). The tap usually appears as the second element of a complex onset (*t*[ɾ]*enta* 'thirty') and word-finally before a vowel-initial word (*co*[ɾ] *obert* 'open heart'). The main locus of variation between both realizations is the coda position, whether word-internally (*po*[ɾ]*ta*, *po*[r]*ta* 'door') or word-finally (*co*[ɾ], *co*[r] 'heart'). It is essentially determined by dialectal differences but also due to prosodic and contextual factors (Recasens & Espinosa 2007; Recasens 2014: 215–238).

In this talk, we focus on the study of two types of contexts. The first are the contexts that are the most common locus of variation between a tap and a trill realization, to which less attention has been paid in the phonological literature. The second are the contexts that exhibit less common changes such as lambdacism (or lateralization) and rhotacism derived from other consonants, which have been the focus of renewed interest recently (Pons-Moll 2008, 2011; Cabrera-Callís 2014). In the analysis we present, we depart from previous claims according to which the overall distribution of rhotics depends on sonority-related segmental preferences for syllabification (Bonet & Mascaró 1997; Pons-Moll 2008, 2011). As a novelty, we show that any deviation from these tendencies derives from uniformity effects or contextually-marked and prominence-driven constraints taking precedence over sonority conditions.

The study is based on the distribution of rhotics in three Catalan dialects: Algherese (spoken in the city of Alghero in Sardinia), Central Catalan (spoken in the northern and eastern areas of Catalonia), and Valencian. Central Catalan and Valencian display patterns of rhotic distribution that only differ in the outcomes of the coda position, while Algherese deviates from the regular Catalan pattern in onsets as well. Table 1 summarizes the distribution of rhotics in non-contrastive positions according to the context in which they occur (in the contextual column, rhotics are represented orthographically; 'approx' stands for approximant, and ˈV indicates a stressed vowel and V̆ an unstressed one whenever that distinction is relevant).

TABLE 1: Contextual realizations of rhotics in non-contrastive positions.

Context	**Valencian**	**Central Catalan**	**Algherese**	**Example**
a. #rV	trill	trill	trill	*roca* 'rock'
b. C.r	trill	trill	trill	*honra* 'honor'
c. ˈVr#	tap	trill	trill	*cor* 'heart'
d. Vr.#$C_{[non\text{-}approx]}$	tap	trill	trill	*cor ple* 'full heart'
e. Vr.$C_{[non\text{-}approx]}$	tap	trill	[l] or trill	*porta* 'door'
f. VrC#	tap	trill	[l] or trill	*arc* 'arch'
g. V̆r#	tap	tap	trill	*Sàsser* 'Sassari'
h. Vr.#$C_{[approx]}$	tap	tap	—	*cor de bou* 'ox heart'
i. Vr.$C_{[approx]}$	tap	tap	—	*herba* 'grass'
j. V.r#V	tap	tap	trill	*cor obert* 'open heart'
k. .CrV	tap	Tap	tap (or trill)	*trenta* 'thirty'

According to the predictions made by the Split Margin approach to syllable organization (Baertsch 2002), we expect that the tap, being more sonorous than the trill (Bonet & Mascaró 1997; Pons-Moll 2008, 2011; Parker 2011), appears in margin 2 (M2), that is, in the second position of an onset (*braç*) and in the first position of a coda (*cor*, *arc*, *cor ple*). Additionally, although consonants that appear intervocalically occupy the first position of an onset (a margin 1, M1), the cross-linguistic preference for more sonorous segments to appear in that position

as well (Uffmann 2007) upholds the presence of the tap in intervocalic M1 (*para*, *cor ample*) (Pons-Moll 2011). Instead, the trill should be reserved for the remaining M1, that is, the initial position of a non-intervocalic onset (*roca*, *honra*). This is the pattern found in Valencian Catalan, except for the intervocalic contrasting environment (*parra*), for which some kind of underlying specification is needed in all dialects. In our view, the divergences from this pattern shown by Central Catalan and Algherese stem from requirements not related to the sonority of rhotics and their consequences for syllabification.

Central Catalan limits the contexts in which the tap can show up through the activation of contextual and prominence constraints above the constraint that disfavors trills in M2. To begin with, the selection of trills in word-final stressed syllables, as in *co*[r], can be interpreted as the conjoined action of constraints searching for the alignment of segmental prominence (trills more salient than taps) and positional prominence (final syllable more salient than medial and stressed more salient than unstressed). On the other hand, a marked cluster constraint against the co-occurrence of a tap and a non-approximant consonant promotes the presence of trills in some codas, as in *a*[rk]. Algherese presents further intricacies. Unlike other dialects, it does not show /b, d, g/ lenition; hence, the contextual constraint against taps preceding non-approximant consonants targets all rhotics in preconsonantal codas, even in *co*[r] *de bou*. Moreover, the positional constraint promoting more constricted segments word-finally seems to be not prosodically limited in Algherese, since all rhotics in that position are realized as trills (*co*[r], *Sàsse*[r]). What singles out Algherese is the maximization of the contexts in which trills may occur. This result is obtained through the activation of constraints pursuing either the uniformity of the realizations of words, with word-final trills maintained when resyllabified before a vowel (*co*[r] *obert*), or the segmental consistency of non-contrasting rhotics, selecting trills even in the second position of an onset (*t*[r]*enta*). Finally, the same constraints suggested for the distribution of rhotics can account for the outcomes of liquid neutralization in Algherese, with the selection of the most sonorous segment available in each position: [ɾ] in M2 generally, but the lateral [l] in preconsonantal codas.

In sum, Catalan dialects provide rich evidence for the variability of rhotics, which is a classic cross-linguistic trait of this class of segments. Nevertheless, the variation that is found is far from random. There is an inclusive relationship between the contexts in which the tap can appear, in the order Algherese ⊂ Central Catalan ⊂ Valencian. As shown, this inclusive relationship indicates that the intervention of additional constraints progressively narrows the contexts in which one realization, e.g., the tap, can occur. As a logical consequence, this enlarges the contexts with the alternative outcome, e.g., the trill.

References

● Baertsch, K. (2002). *An optimality theoretic approach to syllable structure: The split margin hierarchy*. Indiana U dissertation. ● Bonet, E. & Mascaró, J. (1997). On the representation of contrasting rhotics. In F. Martínez Gil & A. Morales Front (eds.), *Issues in the phonology and morphology of the major Iberian languages*, 103–126. Washington: Georgetown U Press. ● Cabrera-Callís, M. (2014). Morphologically conditioned intervocalic rhotacism in Algherese Catalan. An account with lexically indexed constraints. In M.-H. Côté & E. Mathieu (eds.), *Variation within and across Romance Languages: Selected papers from the 41st LSRL, Ottawa, 5–7 May 2011*, 63–76. Amsterdam/Philadelphia: John Benjamins. ● Parker, S. G. (2011). Sonority. In M. van Oostendorp, C. J. Ewen, E. Hume & K. Rice (eds.), *The Blackwell companion to phonology*, 1160–184. Oxford: Blackwell. ● Pons-Moll, C. (2008). Regarding the sonority of liquids. Some evidence from Romance. 38th Linguistic Symposium on Romance Languages, U of Illinois, April 2008. ● Pons-Moll, C. (2011). It is all downhill from here: a typological study of the role of syllable contact in Romance languages. *Probus*, 23, 105–173. ● Recasens, D. (2014). *Fonètica i fonologia experimentals del català: Vocals i consonants*. Barcelona: Institut d'Estudis Catalans. ● Recasens, D. & Espinosa, A. (2007). Phonetic typology and positional allophones for alveolar rhotics in Catalan. *Phonetica*, 63, 1–28. ● Uffmann, C. (2007). Intrusive [r] and optimal epenthetic consonants. *Language Sciences*, 29, 451–476.

A non-polar, concatenative account of Kipsigis across-the-board tonal polarity

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Introduction. Kipsigis (Glottocode: kips1239, ISO-639-3: sgc) is a Kalenjin language of the Southern Nilotic branch of the Nilo-Saharan family which distinguishes two morphological cases, termed *nominative* (NOM) and *absolute* (ABS), exclusively by tonal means, as exemplified in (1).

(1) *Kipsigis nouns* (Kouneli and Nie 2021: e118)

ABS		NOM		Gloss
a. sʊ̀gàrʊ́ːk	L.L.H	sʊ̀gárʊ̀ːk	L.H.L	'sugar'
b. mágásɛ́ːt	H.H.H	màgásɛ̀ːt	L.H.L	'skin'
c. sòlóptʃáːt	L.H.H	sòlóptʃàːt	L.H.L	'cockroach'
d. ŋétùndá	H.L.H	ŋètúndà	L.H.L	'lion'
e. kôːkwàːtìnkwêːk	HL.L.L.HL	kòːkwáːtínkwèːk	L.H.H.L	'village.PL'

Nominal modifiers, i.e. adjectives, demonstratives and pronominal possessives also employ tonal alternations to mark case, albeit in a slightly different manner: every nominative tone is the polar opposite of its absolute counterpart, as illustrated in (2).

(2) *A sample of Kipsigis nominal modifiers* (Kouneli and Nie 2021: e131, e133)

ABS		NOM		Gloss
a. lítìt	H.L	lìtít	L.H	'straight.SG'
b. ɲígàn	H.L	ɲìgán	L.H	'brave.SG'
c. -(n)ì/-(n)ì	L	-(n)í/-(n)í	H	PROX.SG
d. -(n)áːn	H	-(n)àːn	L	MED.SG
e. -ŋùːŋ	L	-ŋúːŋ	H	'your(SG).SG'
f. -ŋwàːŋ	L	-ŋwáːŋ	H	'your(PL).SG'

Kouneli and Nie (2021) argue that these data represent the first attested case of across-the-board, paradigmatic tonal polarity. Moreover, they suggest that a dedicated polarity mechanism may provide a better account of the pattern, thereby challenging work for which morphophonological polarity effects are epiphenomenal (e.g. Trommer and Zimmermann 2014) and exponence is strictly piece-based and concatenative (e.g. Wolf 2007; Bye and Svenonius 2012). In this talk I reply to Kouneli and Nie's (2021) claim, providing a reanalysis of the data that obviates reference to polarity and only employs discrete exponents.

Crucial datapoints and generalizations. The analysis I propose relies on the fact that Kipsigis modifiers possess a third tonal shape, the predicative (PRED), which surfaces when modifiers are used predicatively. The complete sample paradigm is presented below in (3).

(3) *A sample of Kipsigis nominal modifiers, complete paradigm* (Kouneli and Nie 2021: e131, e133)

PRED		ABS		NOM		Gloss
a. lítít	H.H	lítìt	H.L	lìtít	L.H	'straight.SG'
b. ɲígân	H.HL	ɲígàn	H.L	ɲìgán	L.H	'brave.SG'
c. -(n)ì/-(n)ì	L	-(n)ì/-(n)ì	L	-(n)í/-(n)í	H	PROX.SG
d. -(n)áːn	H	-(n)áːn	H	-(n)àːn	L	MED.SG
e. -ŋûːŋ	HL	-ŋùːŋ	L	-ŋúːŋ	H	'your(SG).SG'
f. -ŋwâːŋ	HL	-ŋwàːŋ	L	-ŋwáːŋ	H	'your(PL).SG'

The PRED tonal shape has received little attention in previous work (e.g. Kouneli and Nie 2021; Trommer 2022), despite the fact that it is highly regular: ① light syllables (CV, CVC) typically surface High-toned (3a,b), whereas heavy syllables (CVː, (final) CVN) usually bear a falling HL contour (3b,e,f). This is crucially important for the ABS shape, as ② PRED tones faithfully surface in the absolute, except in the final syllable, which is (almost) invariably overwritten to L (3a,b,c,e,f). As for the NOM shape, it systematically results in the ③ overwriting of all pre-existing tonal specifications by an LH melody, which matches the nominative melody L_0H found in other nominal forms in the language (Creider 1982, a. o.).

Analysis. I account for the previously noted generalizations by proposing that all three tonal shapes involve a tonal affix (①, ②, ③): in the PRED, a floating H prefix; in the ABS, a floating L suffix; and in the NOM, a floating LH melody. Exceptions to the PRED generalization ① (e.g., (3c) and (3d)) follow straightforwardly if an underlying contrast exists between *toneless* (i.e. ①-abiding) and *tonally specified*

(i.e. exceptional, like (3c) and (3d)) TBUs, with the PRED exponent unable to alter pre-existing tonal specifications. The different behavior of the PRED exponent on the one hand and the ABS and NOM exponents on the other hand with respect to targeted TBU (PRED: mora; ABS, NOM: syllable) and 'overwriting power' (PRED: absence; ABS, NOM: presence) suggests that different phonological demands are at play for both groups of exponents, an observation I formalize using strata (Kiparsky 2000 *et. seq.*).

(4) PRED *shape, stratum I; toned base*

Input=a.	LONGH(μ)$_{2COL}$	$\mu \longrightarrow \tau$	$*\mu \longrightarrow$ [-CONT]	MAX-AL	$\tau \longrightarrow \mu$	COLTOCOL	*H.H#	DEP-AL	DEP-μ	DEP-L
☞ a. H L L / μ μ / t a l a					*					
b. H L L / μ μ / t a l a				*!*			*	**		
c. H L L / μ μ / t a l a				*!				*		

(5) ABS *shape, stratum II*

Input=a.	$*\sigma_2$	$\tau_\omega \longrightarrow \sigma_\omega$	MAX-AL	*FALL
a. H H L / σ σ / l i t i t		*!		
☞ b. H H L / σ σ / l i t i t			*	
c. H H L / σ σ / l i t i t	*!			*

(6) NOM *shape, stratum II*

Input=a.	CTG-C	$\sigma \longrightarrow \tau$	HEAVYPEN $\longrightarrow$ H	$*\ldots\tau_\omega$	$*\tau_{\omega\ldots}$	MAX-AL	DEP-AL
a. L H H H / σ σ / l i t i t	*!						
b. L H H H / σ σ / l i t i t		*!*				**	
☞ c. L H H H / σ σ / l i t i t						**	**
d. L H H H / σ σ / l i t i t				*!		**	**
e. L H H H / σ σ / l i t i t					*!	**	**

In the first stratum, which introduces the PRED exponent, MAX-ASSOCIATIONLINE (MAX-AL) is undominated, driving faithfulness to underlying specifications (4), whereas it is low-ranked in the second stratum that introduces the ABS and NOM exponents, allowing for tonal overwriting to become a viable repair strategy in the case of derived contour formation (5) or phonetic non-contiguity of elements (6). This has the additional advantage of explaining the fact that PRED tones also appear in the absolute (②): the stratum which introduces the PRED exponent feeds the stratum which introduces the case exponents, i.e. the absolute and the nominative are built upon the predicative. Finally, the difference in the amount of overwriting between the ABS and the NOM follows from the interaction between the shape of their respective exponent and a high-ranked CONTIGUITY constraint (Trommer 2022), which demands the contiguous realization of tautomorphemic tones (③): while this trivially achieved by the monotonal ABS exponent, which then triggers minimal overwriting, the bitonality of the NOM exponent, combined with edge-in association (Yip 1988), enforces the non-realization of all intervening tones, thereby deriving complete overwriting.

Discussion. Under the analysis advocated for here, the polarity effect found in the nominative is contingent upon the shape and the linearization of the relevant exponents, i.e. it is purely accidental. While the pattern satisfies DiCanio *et. al.*'s (2020) empirical criteria for morphophonological polarity, it can be handled without any reference to polarity. This shows that even a stricter definition of the empirical phenomenon still does not warrant theoretical enhancements such as polarity-specific mechanisms, a position which supports De Lacy's (2020) reply to DiCanio *et. al.* (2020). Moreover, the analysis demonstrates that across-the-board tonal polarity can be accounted for in a purely concatenative, item-and-arrangement way, *contra* Kouneli and Nie's (2021) claim.

Selected references. Creider, C. (1982). *Kalenjin nominal tonology* – Kouneli, M. and Nie, Y. (2021). Across-the-board tonal polarity in Kipsigis – Trommer, J. (2022). The concatenative structure of tonal overwriting.

Child speech vs aphasic speech: heterogeneously motivated homogeneous Consonant Harmony patterns

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Consonant Harmony (CH), i.e. long-distance partial or full assimilation between non-adjacent consonantal segments (e.g. Hansson, 2010; i.a.), is a process not typologically common in adult systems. CH is widely attested in the early stages of (a)typical phonological development in many languages, Standard Modern Greek (SMG) among them (Kappa *et al.*, 2022, i.a.), and it has been viewed as a *repair mechanism*, facilitating and promoting acquisition of structures while the acquisition of phonemic contrasts is yet to be completed (e.g. Vihman, 1978, i.a.). CH is also employed in aphasia, as a *compensatory mechanism* (Kohn *et al.*, 1995).

Aim of this paper is to verify Jakobson's (1941) claim that aphasia is the mirror image of acquisition, and that phoneme acquisition and loss are both subject to the notion of *Markedness.* Therefore, this study will explore and subsequently compare the CH patterns attested in SMG, both in typical child speech and in aphasic adult speech, a topic not yet addressed in the Greek phonological literature. For the purposes of the study, we rely

(i) on a corpus of longitudinal developmental data from the spontaneous speech of 4 (male) children (ages:2-2;06.15 years;months.days) who acquire SMG as first language,

(ii) on the Goutsos *et al.* (2011) corpus on *TalkBank*, from where we have drawn data from 10 Greek-speaking Persons with Aphasia (PwA) with phonemic paraphasias.

In both (i) and (ii) the CH applies within the domain of the phonological word (PWd).

i) Typically developing children. CH directionality mainly leftwards (trigger of CH in italics)

Target	Child's Output	#Child (age)	Gloss	CH
1)ˈ**fe***t***a**	ˈ**te***t***a**	#2(2;01.11)	'slice'	CORONAL≻LABIAL
2) ˈ**pa***n***o**	ˈ**ta***n***o**	#2 (2;01.24), #1(2;04.16)	'on/above'	CORONAL≻LABIAL
3) sfuˈ**ga***ɾ***i**	fuˈ**da***l***i**	#2(2;01.11), #6(2;03.19)	'sponge'	CORONAL≻DORSAL
4) **x**aɾˈ*t***i**	**s**aˈ*t***i**	#2(2;01.11), #4 (2;05.18)	'paper'	CORONAL≻DORSAL
5)ˈ**ci***t***a**	ˈ**ti***t***a**	#1(2;04;16), #2(2;01.24), #6(2;03.19)	'look!'	CORONAL≻DORSAL
6) **k**aˈ*p***elo**	**p**aˈ*p***elo**	#2(2;01.11), #1(2;05.01),), #6(2;03.19)	'hat'	LABIAL≻ DORSAL

Table 1. Percentages of CH in the speech of typically developing children. CH fades with age

Child #No /Age	Tokens with CH	CORONAL CH (tokens)		LABIAL CH (tokens)		DORSAL CH (tokens)	
#2/ 2;00.24-2;03.24	296	87,5%	(259/296)	11,50%	(34/296)	1%	(3/296)
#6/ 2;03.19- 2;05	82	93,90%	(77/82)	3,66%	(3/82)	2,44%	(2/82)
#1/ 2;04.16-2;07.01	32	75%	(24/32)	15,60%	(5/32)	9,40%	(3/32)
#4/ 2;05.18-2;08.15	18	66, 8%	(12/18)	16,6 %	(3/18)	16,6%	(3/18)

ii) PwA: 26 instances of CH, mainly a CORONAL one (63,16%) (DORSAL CH 26,32%) within the PWd, in 162 paraphasias, i.e. in16% of the total paraphasias of 10 PwA, indicating that this is a rare compensation strategy among Greek-speaking PwA. (trigger of CH in italics)

Target	Output	Gloss	PwA	CH
7) **m**a.*n*a	ˈ**n**a.*n*a	'mom'	PAR-A11	CORONAL≻LABIAL
8) **v**oʲˈθiso	**ð**oʲˈ*θ*iso	'to help.1SG.FUT.'	PAR-A38	CORONAL≻LABIAL
9) e.ɟe.fa.*l*i.ˈ**k**o	e.ɟe.fa.*l̠*i.ˈ**t**o	'stroke'	PAR-A33	CORONAL≻DORSAL
10) ˈpiso	ˈ**ðis**o	'back'	PAR-A13	CORONAL≻LABIAL
11) ˈ*c*i.**p**os	ˈ*c*i.**k**os	'garden'	PAR-A13	DORSAL≻LABIAL

In both children's developmental data (1-6) and data of Persons With Aphasia (7-11) we have attested the following common CH patterns:

I. For both children and Persons With Aphasia, CH may occur leftwards between two onsets in successive syllables that may have similar feature(s) in the target structure, namely the same MANNER OF ARTICULATION (MoA) within the domain of phonological word. The consonant segments that are mainly targeted by CH are LABIAL and DORSAL ones, that agree to the most unmarked PLACE OF ARTICULATION) (PoA), namely to the ***unmarked*** CORONAL PoA (Paradis & Prunet, 1991) of a strictly following syllable, e.g. ˈ**ci***t*a→ˈ**t***it*a (5), **m**a.*n*a→ˈ**n**a.na (7), **v**oʲˈθiso→**ð**oʲˈθiso (8), following the *harmonic PoA hierarchy* (Prince & Smolensky, 2004), i.e. CORONAL≻DORSAL (5) and CORONAL≻LABIAL (7), (8) (≻: more harmonic or less marked), while MoA and laryngeal features are realized faithfully.

II. CH may occur between two onsets in successive syllables that may have dissimilar feature(s) in the target structure, i.e. different MoA and PoA e.g. ˈ**p**a*n*o→ˈ**t**a*n*o (2), sfuˈ**g**a*r*i→fuˈ**d**a*l*i (3), **x**arˈti→**s**aˈti (4), e.ɟe.fa.*l*i.ˈ**k**o→e.ɟe.fa.l̠i.ˈ**t**o (9). In this case different patterns emerge:

a) PoA agreement to the most unmarked PoA (like above in (I)) for both children and PwA: CORONAL≻LABIAL in (2) and CORONAL≻DORSAL, in (3), (4), (9), while MoA and laryngeal features are realized faithfully.

b) both PoA **and** MoA agreement to the consonant with the more unmarked primary PoA, according to each grammar e.g. CORONAL≻LABIAL: ˈ**fe***t*a→ˈ**t**eta (1),ˈ**p**iso→ˈ**ð**i**s**o (10).

The data show that in the children's developmental data LABIAL≻DORSAL (6), while in the aphasic speech DORSAL≻LABIAL (11).

Our results indicate that CH in Greek language development and language loss seems to be guided by *agreement* to an **unmarked primary PoA feature,** i.e the **CORONAL** one. We illustrate the grammars active in cases (i) and (ii), couching our analysis in Span Theory (McCarthy, 2004), and Agreement By Correspondence theory (ABC; Rose & Walker, 2004).

We claim that, while CH in language acquisition and loss is driven by unmarkedness, as claimed in the literature, it is the result of different requirements in the relevant grammars. CH in (Greek) developmental data is viewed not as product of phonologized speech error(s), but as a neutralization process which minimizes the contrasts, mainly in primary PoA features within the PWd, due to the children's immature phonological system in general (Fikkert & Levelt, 2008) which is being reorganized in the course of phonological development, and the faithful PoA licensing for each segment within a PWd occurs in later developmental stages, i.e. at a later age. CH in Greek aphasic data is a compensatory mechanism that seems to result from a phonological access deficit, not from an immature system or system reorganization (like in developing grammars): the PwA has access to the segmental quantity of the target word but a restricted access to some distinctive features (PoA or MoA) that cannot be retrieved for some phonemes within a lexical item. In order for these phonemes to be licensed and realized, they agree to an *unmarked for PoA* adjacent consonant on the segmental (consonantal) tier.

Selected References

Fikkert, P. & Levelt, C. (2008). How does Place fall into place? The lexicon and emergent constraints in children's developing grammars. In P. Avery, B. E. Dresher & K. Rice (eds.) *Contrast in phonology: Theory, perception, acquisition*. Berlin & New York: Mouton de Gruyter. 231–268 ●Goutsos, D., Potagas, C., Kasselimis, D., Varkanitsa, M., & Evdokimidis, I. (2011). The Corpus of Greek Aphasic Speech: Design and compilation. In M.L. Carrió Pastor, M.A. Candel Mora (eds.) *Actas del III Congreso Internacional de Lingüística de Corpus.* 77-86. ●Hansson, G. Ó. (2010). *Consonant harmony: long-distance interaction in phonology*. University of California Press. ●Jakobson, R. (1941). *Kindersprache, Aphasie und allgemeine Lautgesetze*. Uppsala. ●Kohn, S. E., Melvold, J., & Smith, K. L. (1995). Consonant Harmony as a Compensatory Mechanism in Fluent Aphasic Speech. *Cortex*, *31*(4), 747–756. ●McCarthy, John J. (2004). *Headed spans and autosegmental spreading*. https://scholarworks.umass.edu/linguist_faculty_pubs/42 ●Paradis C.& Prunet J.-F. (1991). *Phonetics and Phonology. The Special Status of Coronals. Internal and External Evidence,* New York: Academic Press. ●Prince, A. & Smolensky, P. (2004). *Optimality theory: constraint interaction in generative grammar*. Oxford: Blackwell ●Rose, S. & Walker, R. (2004). A typology of consonant agreement as correspondence. *Language*, 80(3), 475-531. ●Vihman, M. M. (1978). Consonant harmony: Its scope and function in child language. In J. Greenberg (Ed.), *Universals of Human Language*. Stanford University Press. 403–442.

Learning a non-native vowel contrast with vowel harmony in clear speech and in noise

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Previous studies on vowel harmony have shown that it has several benefits in both perception and production. For instance, it reduces difficulties in speech planning (Berg 2003), helps identifying the following vowels after the first (Suomi 1983), and aids in word segmentation (Suomi, McQueen & Cutler 1997). Thus, vowel harmony is a phonetically motivated process, while its logical counterpart, vowel disharmony, lacks a phonetic motivation and has not been attested in the world's languages.

In the recent years, a number of studies have examined the learnability of vowel harmony and disharmony patterns in light of a substantive bias. This bias assumes that phonetically motivated patterns which facilitate speech production or perception are acquired more easily than patterns that do not (Wilson 2006). Several studies have revealed that vowel harmony is indeed learned more easily than vowel disharmony (e.g. Martin & White 2021, Martin & Peperkamp 2020).

However, these studies only examined the learnability of the pattern itself, but not if a bias for vowel harmony could be exploited to acquire a new vowel contrast. This is the aim of the present study. We examine whether native English speakers can use vowel harmony to their advantage in order to establish new phoneme categories for the German vowels /y/ and /ø/. English speakers have been reported to confuse these vowels with the back rounded vowels /u/ and /o/, respectively (e.g. Strange, Bohn, Nishi & Trent 2005, Levy & Strange 2008), so we use a palatal (dis)harmony to implicitly teach the difference between these vowels. When the speech signal is masked by noise, however, English speakers tend to confuse the front rounded vowels with the front unrounded vowels /i/ and /e/ instead (Kaucke & Schlechtweg, in prep.). Thus, in an additional noise condition, we also teach participants a rounding harmony. Half of the participants are taught and tested with a palatal (dis)harmony in clear speech, while the other half is taught and tested with a rounding (dis)harmony in speech-shaped noise at two signal-to-noise ratios (8dB and 0dB).

There are two parts to our study: 1.) In an AX Discrimination Task, participants have to discriminate German CVC pseudowords differing in backness (e.g. /puːm/ vs. /pyːm/); and 2.) in an Artificial Language Learning Paradigm, participants are trained with a (dis)harmony pattern by listening to either plural or diminutive forms. Both the clear condition and the noise condition consist of four subgroups: harmony training with plurals containing /y/, harmony

training with diminutives containing /ø/, disharmony training with plurals containing /y/, and disharmony training with diminutives containing /ø/. Depending on the vowel properties of the stem, the suffixes will alternate (e.g. harmonic plurals in the clear condition: *veki-ky* and *mudo-ku*). Thus, participants can use the familiar vowels of the stem to draw conclusions about the identity of the suffix vowel and learn to differentiate these critical vowels. After the training phase, all participants are then tested on new plural *and* diminutive forms in order to examine if they are able to generalise the newly learned (dis)harmonic pattern to another non-native vowel contrast. So in this test phase, participants hear a harmonic and a disharmonic version of a word (e.g. *roto-ky* versus *roto-ku*) and have to choose the correct version based on their (dis)harmonic training.

Data collection is about to start. We expect participants to be able to use a vowel harmony both in clear speech and in noise to improve their discriminative abilities compared to their results on the AX Discrimination Task. Further, we expect participants that have been trained on harmonic forms to perform better than those participants that have been trained on disharmonic forms, and to be better at generalising the harmonic pattern to an untrained non-native vowel contrast.

References:

Berg, T. (2003). Die Analyse von Versprechern. In T. Hermann & J. Grabowski (eds.), *Sprachproduktion*, 247-264. Göttingen: Hofgrefe.

Kaucke, S. & Schlechtweg, M. (in prep.). Perception of non-native vowel contrasts in clear speech and in noise.

Levy, E.S. & Strange, W. (2008). Perception of French vowels by American English adults with and without French experience. *Journal of Phonetics 36*, 141-157.

Martin, A. & Peperkamp, S. (2020). Phonetically natural rules benefit from a learning bias: a re-examination of vowel harmony and disharmony. *Phonology 37*, 65-90.

Martin, A. & White, J. (2021). Vowel harmony and disharmony are not equivalent in learning. *Linguistic Inquiry 52*, 227-239.

Strange, W., Bohn, O.-S., Nishi, K. & Trent, S.A. (2005). Contextual variation in the acoustic and perceptual similarity of North German and American English vowels. *Journal of the Acoustical Society of America 118*, 1751-1762.

Suomi, K. (1983). Palatal vowel harmony: a perceptually motivated phenomenon?. *Nordic Journal of Linguistics 6,* 1-35.

Suomi, K., McQueen, J. & Cutler, A. (1997). Vowel harmony and speech segmentation in Finnish. *Journal of Memory and Language 36*, 422-444.

Wilson, C. (2006). Learning phonology with substantive bias: an experimental and computational study of velar palatalization. *Cognitive Science 30*, 945-982.

Compensatory lengthening in French language acquisition:
Evidence from a nonword repetition task

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The issue. This paper investigates compensatory lengthening (CL) occurrences in the production of 59 French children, aged 4 and half years old on average during the first session and 6 and half years old on average during the second session. They have been tested through a nonword repetition task known as LITMUS-QU-NWR-FRENCH (LQNF, dos Santos & Ferré 2016, dos Santos et al. 2020). CL consists of replacing the loss of a segment through lengthening of another segment (Gess 2011). One of the most common cases of CL involves the loss of a coda (C in 1) followed by lengthening of the preceding vowel:

(1) (C)VC.CV → (C)V:.CV [C stands for consonant and V for vowel.]

Analyses of CL (Hayes 1989, Ingria 1980 a.o.) have generally postulated a requirement imposing the parsing of the mora originally associated with the lost coda: thus, lengthening the vowel preceding the dropped consonant has the immediate effect of realizing that underlying mora. This approach assumes that i. languages displaying CL must be moraic, and ii. morae cannot remain unparsed (in synchronic terms). It is generally claimed that mora is irrelevant in French (Dell 1995 a.o., but see Féry 2003); consequently, we should expect CL not to be occurring in this language. Rather, our data supports the hypothesis that words realize an underlying sequence of strict alternation of Cs and Vs (Lowenstamm 1996, Scheer 2004). We argue that CL results from a CV unit in the template associated with each nonword.

Children and data. The 59 children have been recruited in 2018-2019 in Tours (France), for none of them parents reported any kind of pathology (including speech pathologies). Each child was tested twice: first, in *moyenne section* (MS, roughly equivalent to Preschool in the US) then later in *cours préparatoire* (CP, roughly equivalent to 1st grade) (Plasse 2021, Bellakhal 2021). LQNF consists of some items fitting this specific template (CV.)CV(C).CV where codas are limited to /l/ or /s/ (see dos Santos & Ferré 2016). Overall, seven such items with internal coda (IC) exist in the corpus: [kupalfi], [kufalpi], [fikuspa], [pafuski], [kuspa], [filpa], [pilfu], and seven without IC: [kifapu], [pufaki], [piklafu], [kuflapi], [fupli], [paklu], [plifu]. Each session was first recorded, then transcribed with Phon (Hedlund & Rose 2022); later we segmented vowels and consonants manually using Praat (Boersma & Weening, 2022) available directly through Phon.

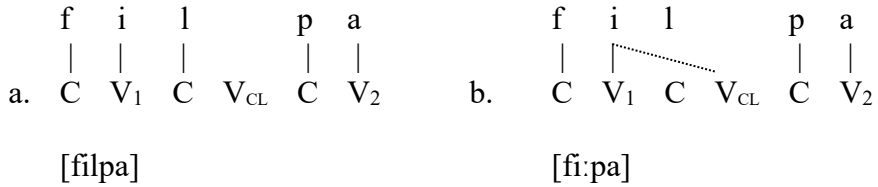
Methodology. The production of the target items with IC was grouped into two categories, those whose IC was produced, and those whose IC was not produced by the children. For each of these productions, vowel length was obtained. The table below presents the data analyzed to date, i.e. the average vowel length for each item according to the presence or absence of IC in production in MS and CP. Whatever the item, the average vowel length is systematically longer if the item is produced without internal coda. For comparison purposes, the vowel length of the seven target-items without IC is given.

NW (target)			Vowel length in s. (σ)	
			Produced with IC	Produced without IC
with IC	MS	n=391	n=336 | 0.116 (.052)	n=55 | 0.162 (.058)
	CP	n=398	n=391 | 0.093 (.028)	n=7 | 0.164 (.053)
without IC	MS	n=403	NA	n=403 | 0.138 (.057)
	CP	n=405	NA	n=405 | 0.109 (.032)

Results. As our data do not follow normal distribution, we used a non-parametric statistical test. The duration of the vowel in MS is statistically longer when the target NW with IC is produced without IC ($U(391) = 14093.000$; $p < .001$). The same statistical difference is found in CP ($U(398) = 2495.000$; $p < .001$). Our data shows therefore that the vowel is clearly lengthened when the IC of a target NW with an IC is not produced in MS or in CP.

Discussion. Differing from Almeida (2008) who assumes that Portuguese/French bilingual children employ CL as a repair strategy to realize an underlying mora, then discharge it from their representation when the acquisition process is over, we hypothesize that children compute first the prosodic template of (non)words, namely (CV.)CV_1(.CV_{CL}).CV_2, then they realize each CV unit. The CV_{CL} refers to the site of realization codas /l/ and /s/. In case the child does not produce codas yet, the repair strategy consists of spreading the vowel associated to CV_1 onto CV_{CL}. In other words, CL emerges from the underlying sequence of prosodic positions, and this is orthogonal to the purported moraicity of French. In (2a), we show the representation of target form [filpa] and the form [fi:pa] produced by VAL1, one of the children in MS (2b). The duration of the lengthened vowel is 0.184 s.

(2) a. Target Production (VAL1)



In conclusion, robust statistical evidence militates in favor of vowel lengthening as a repair strategy when codas are omitted. Strict CV naturally accounts for CL with no need to assume morae in a non-moraic language like French.

References. Almeida, L. 2008. Compensatory Lengthening in Bilingual Acquisition of Languages Insensitive to Syllable Weight. A. Gavarró & M. J. Freitas (eds) Proceeding of GALA 2007. Newcastle: Cambridge Scholars, 30-40. **Bellakhal, S. 2021.** Prédire les performances en orthographe dès la maternelle, pertinence de l'épreuve LITMUS-NWR-QU-FR. MA Thesis, U. Tours. **Boersma, P. & D. Weening. 2022.** Praat: doing phonetics by computer version 6.2.06 [Computer Software]. Retrieved from https://www.praat.org. **Dell, F. 1995.** Consonant Clusters and Phonological Syllables in French. *Lingua* 95. 5-26. **Féry, C. 2003.** Markedness, Faithfulness, Vowel Quality and Syllable Structure in *French. Journal of French Studies* 13. 247-280. **Gess, R. 2011.** Compensatory Lengthening. M. van Oostendorp et al. *Wiley-Blackwell Companion to Phonology*. Oxford: Blackwell, 1513-1536. **Hayes, B. 1989.** Compensatory Lengthening in Moraic phonology. *Linguistic Inquiry* 20, 235-306. **Hedlund, G. & Y. Rose. 2022.** Phon 3.4.2 [Computer Software]. Retrieved from https://phon.ca. **Ingria, R. 1980.** Compensatory Lengthening as a metrical phenomenon. *Linguistic Inquiry* 11, 465-495. **Lowenstamm, J. 1996.** CV as the Only Syllable Type. *Current Trends in Phonology Models and Methods*, ed. by J. Durand & B. Laks, ESRI, Salford. 419-442. **Plasse, C. 2021.** *Liens entre représentations phonologiques en maternelle et apprentissage de la lecture : une étude longitudinale*. MA Thesis, U. Tours. **dos Santos, C. & S. Ferré 2016.** A Nonword Repetition Task to Access Bilingual Children's Phonology. *Language Acquisition*, 1-14. **dos Santos, C., Frau, S., Labrevoit, S., & Zebib, R. 2020.** L'épreuve de répétition de non-mots LITMUS-NWR-FR évalue-t-elle la phonologie ? *SHS Web of Conferences* (Vol. 78, p. 10005). EDP Sciences. **Scheer, T. 2004.** *A Lateral Theory of Phonology. Vol 1: What is CVCV, and Why Should it Be?* Berlin: Mouton.

Violable cyclic construction of post-syntactic linearization at PF & cyclicity of postlexical phonology

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This abstract proposes a violable cyclic construction of post-syntactic linearization at PF, which is an extension from the direct spell-out model at the syntax and phonology interface in Pak (2008), within the framework of Distributed Morphology (Halle & Marantz 1993, Harley and Noyer 1999 among others). This PF linearization model develops the direct syntax inference approach at the syntax and phonology interface, which can be beneficial to accommodate problematic data of cyclic postlexical (phrasal) phonology, e.g., cyclic tonal sandhi such as Mandarin T3 tonal sandhi (Shih 1986; Chen 2008), and potentially deal with more variable sandhi phenomena with perplexing data in the future.

In Distributed Morphology, simple words are derived from the Root undergoing head movement to its categorical head, i.e., n° v°, a°etc., In Embick (2007; 2010), Morphological words (M-words) are defined as (potentially complex) heads not dominated by further head-projections (Chomsky 2001 H^{o}_{max}). In the direct spell-out model of PF linearization in Pak (2008) shown graphically in (1), phonological rules apply directly in the domains derived from post-syntactic linearization at different stages at PF, such as **a** or **b** domains below. In (1), suppose a sequence of M-words of (M1 M2 M3 M4). At early stage, c-command conditioned early linearied strings are specified as (M1 M2) and (M2 M3 M4), with red brackets indicating the c-command linearized string and blue brackets indicating non c-command linearized string. At late stage, the early linearized strings from the early stage construct a longer chain, the domain **c**.

We would like to introduce a violabe cyclicity at the late stage in model (1). The linearization structure at late stage is not shown as a flat linearized chain like (M1-M2-M3-M4) in (1), instead, a cyclic chain, e.g, (M1 (M2) M3 M4), needs to be formed, which is illustrated in (2). The (M1 M2) and (M2 M3 M4) construct multiple cycles of domain. In default model **d** the linearization chain is constructed from the most embedded inner cycle to outer cycle (right to left). In violated model **e**, the linearization chain is constructed from outer to inner cycle (left to right).

(1) Linearization model in Pak (2008)

M1 M2 M3 M4

EARLY STAGE **a**. (M1 M2)
b. (M2 M3 M4)

LATE STAGE **c**. M1–M2–M3–M4

(2) Modified version of linearization model in Pak (2008)

M1 M2 M3 M4

EARLY STAGE **a**. (M1 M2)
b. (M2 M3 M4)

LATE STAGE (M1 (M2) M3 M4)

d. default (M2 M3 M4) —first cycle
(M1 M2) —second cycle

e. Violated (M1 M2) —first cycle
(M2 M3 M4) —second cycle

The motivation to modify the original structure is the cyclicity feature with bleeding effects equipped by some phonological phenomena. We use the data of extremely perplexing and abundant variations of the Mandarin T3 tonal sandhi rule to illustrate the capability of the modified model in (2). In Mandarin Chinese, there are four basic lexical tones: T1 high-level, T2 high-rising, T3 low-dipping and T4 high-falling tones. T3 (low-dipping) is changed to sandhi form T2 (high-rising) if followed by another T3: T3 → T2 / ___T3. In a domain involving consecutive sandhi behaviors, e.g., in a domain bearing base tone of (T3 T3' T3''), according to the sandhi rule T3: T3 → T2 / ___T3, the sandhi of T3' bleeds the sandhi of T3. The bleeding effect naturally raises the issue of cyclicity, which means sandhi rule applies in repeated times, and at the same time, the different forms of cyclicity derive different surface results (with bleeding effects or not). That is to say, if sandhi rule applies from the inner

(most embedded) cycle (T3' T3'') to outer cycle (T3 T3' T3''), the surface tone is (T3 T2 T3), whereas the counter-order from outer to inner cycle derives surface tone of (T2 T2 T3).

To incorporate the complex cyclicity feature with bleeding effects of certain phonological rules, the phonological rules application can be accommodated as below:

Phrasal Phonological rules application in domains of post-syntactic linearization at PF:

Early rules*: Early rules follow either right-to-left or left-to-right direction to apply in early linearized strings, which are the* ***a)*** *and* ***b)*** *domains in (2) above.*

Late rules: i*. Many late phonological rules follow the default model of "right to left" cyclic order (linearization cyclicity) between early linearized strings, which is the default* ***d*** *domain in (2).* ***ii.*** *Some phonological rules with bleeding effects can violate the linearization cyclicity in* ***i****. Under deliberate or careful reading, these phonological rules apply from left to right between cycles of early linearized strings, which is the violated* ***e*** *domain in (2) above.*

Below is the perplexing data of variations in long sequences of words in Mandarin T3 sandhi. The logical possibilities of "[$_{CP}$wo[$_{VP}$xiang[$_{CP}$PRO[$_{VP}$mai[$_{NP}$gudong]]]]]*([$_{CP}$I[$_{VP}$want[$_{CP}$PRO[$_{VP}$buy [$_{NP}$antiques]]]]])*" is in (3) and the derived results in current model is in (4).

(3) logical possibilities of "[$_{CP}$wo[$_{VP}$xiang [$_{CP}$PRO [$_{VP}$mai [$_{NP}$gudong]]]]] (3→T3; 2→T2)

[$_{CP}$wo[$_{VP}$xiang [$_{CP}$PRO [$_{VP}$mai [$_{NP}$gudong]]]]]([$_{CP}$I[$_{VP}$want [$_{CP}$ PRO [$_{VP}$buy [$_{NP}$*antiques*]]]]])

```
3   3          3   3   3 base tone
2   3          2   2   3 surface tone
2   2          3   2   3
2   2          2   2   3
3   2          3   2   3
3   2          2   2   3
```

(4) Derived sandhi results in current modified model

[$_{CP}$wo[$_{VP}$xiang [$_{CP}$PRO [$_{VP}$mai [$_{NP}$gudong]]]]]([$_{CP}$I[$_{VP}$want [$_{CP}$ PRO [$_{VP}$buy [$_{NP}$stocks]]]]])

```
3   3          3   3   3   base tone
(   p   (m n)      M c (p c) m n)   early linearized strings
Default model- linearization cyclicity forms "right to left" cycles between early linearized strings
                   (  2   3 )       first cycle
      (  2         3     2 )        second cycle
(  3     2  )                       third cycle
  3    2          3     2   3       surface tone
Violated model 1- linearization cyclicity breaks down between the first and second cycles
      (  2         2     3 )        second cycle
                   (  2   3 )       first cycle
(  3     2  )                       third cycle
  3    2          2     2   3       surface tone
```

[$_{CP}$wo[$_{VP}$xiang [$_{CP}$PRO [$_{VP}$mai [$_{NP}$gudong]]]]]([$_{CP}$I[$_{VP}$want [$_{CP}$ PRO [$_{VP}$buy [$_{NP}$stocks]]]]])

```
(   p   (m n)      M c (p c) m n)   early linearized strings
Violated model 2- linearization cyclicity breaks down between the second and third cycles
                   (  2   3 )       first cycle
(  2     3  )                       third cycle
      (  2         3     2 )        second cycle
  2    2          3     2   3       surface tone

Violated model 3A- linearization cyclicity breaks down between the first and second, second and third cycles
(  2     3  )                       third cycle
      (  2         2     3 )        second cycle
                   (  2   3 )       first cycle
  2    2          2     2   3       surface tone

Violated model 3B- linearization cyclicity breaks down between the first and second, second and third cycles
(  2     3  )                       third cycle
      (  3         2     3 )        second cycle
                   (  2   3 )       first cycle
  2    3          2     2   3       surface tone
```

In default model, cyclicity of linearization follows the "right to left" between early linearized strings. In the violated models, cyclicity of linearization breaks down between 1° and 2° cycle, OR 2° and 3° cycle, OR 1°, 2° and 3° cycle, producing the violated forms of 1, 2, 3A and 3B in (4). In violated model 3B, T3 from 3° cycle optionally remain unchanged (T2s from early cycles are not possible to undergo any change though), which is similar to cyclic Phonological Impenetrability Effects. Different from classical PIC effects related to syntactic cyclic phases, here Phonological Impenetrability Effects are potentially determined by the cyclic cycles of post-syntactic linearization chains at PF. But this condition is banned in the "must-go" sandhi situation, e.g., short cycles with only (T3 T3) → (T2 T3).

Note that this data can not be accounted for in the prosodic analysis in Shih (1986), which shares the same sandhi results (fewer than logical possibilities in (3)) from similar prosodic foot construction of the classical data [$_{S}$[$_{NP}$lao-li][$_{VP}$mai[$_{NP}$hao-jiu]]]*([$_{S}$[$_{NP}$lao-li][$_{VP}$buy[$_{NP}$ good wine]]]),* but different in underlying morphosyntactic structures proved in the current model.

key words: syntax and phonology interface; Distributed Morphology; direct spell-out model; syntactic linearization; PF

Selected references

Chen, Matthew Y. (2009). Tone sandhi-Patterns across Chinese Dialects. *Cambridge University Press.*

Halle, M., & Marantz, A. (1993). Distributed morphology and the pieces of inflection. In K. Hale, & S. J. Keyser (Eds.), *The view from building 20* (pp. 111-176). The MIT Press.

Pak, Marjorie. (2008). The postsyntactic derivation and its phonological reflexes. *University of Pennsylvania PhD dissertation.*

Shih, Chilin (1986). THE PROSODIC DOMAIN OF TONE SANDHI IN CHINESE (PHRASAL PHONOLOGY, TONAL TYPOLOGY, MANDARIN, SYNTAX-PHONOLOGY INTERFACE), *PhD dissertation, UCSD*
Chomsky, N. (2001). Derivation by Phase. *In M. Kenstowicz (Ed.), Ken Hale: A Life in Language (pp. 1-52). Cambridge, MA: MIT.*
Harley, H. & Noyer, R. (1999). Distributed Morphology. *Glot International, 4, 3-9.*
Embick, David (2010), Localism versus Globalism in Morphology and Phonology (2010) MIT Press, Cambridge, MA. MIT Press
Embick, David (2007), Linearization and Local Dislocation: Derivational mechanics and interactions, University of Pennsylvania.

Word-final schwas in Italian are non-syllabic vocoids

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In Italian, word-final consonants are sometimes produced with a schwa-like vocoid after the release, so a word like *jet* might be pronounced as [dʒɛtə] with or without lengthening of the final consonant. Italian consonant-final words are mainly loanwords or acronyms, and these vocalic elements have long been treated as epenthetic vowels that repair a phonological constraint that prohibits word-final codas (Bafile 2002 for Tuscan Italian, Passino 2008, Broniś 2016 for Roman Italian). The implications of this interpretation are that the phonetic material is perceived and produced as a phonological vowel, and that it constitutes the nucleus of a syllable. Although using different frameworks, these authors agree that *jet* in Italian is constituted by two syllables /dʒɛt.tə/, with the lengthened consonant serving as a geminated consonant.

However, there are many reasons to rethink this analysis. Grice et al. (2018) proposed that for Barese Italian word-final schwas are non-syllabic vowels that appear under certain phonological and prosodic pressures, with characteristics similar to Hall's (2006, 2011) intrusive vowels. Similarly, Repetti (2012) proposed that these are vowel-like segments that are part of the release of the preceding consonant. These proposals imply that Italian is tolerant of word-final consonant, as it does not need to insert a phonological vowel to repair a violated structure. The present paper will provide a number of reasons based on research on Veneto Italian that suggest that word-final schwas in Italian are not epenthetic vowels but are instead akin to intrusive vowels, albeit of a different nature.

First, the occurrence rate of word-final schwas in Italian is susceptible to experience with English, which does not insert vocalic elements in word-final position. Miatto et al. (2019) found that with increasing experience in spoken L2 English, Veneto Italian speakers tend to produce fewer vocoids after word-final consonants in Italian. This suggests that word-final schwas are likely to be a phonetic phenomenon rather than a phonological repair, because the speakers' exposure to L2 English was too limited to have caused a change in their L1 phonology.

Second, following Hall's (2006, 2011) criteria for the diagnosis of epenthetic (i.e., phonological) vowels versus intrusive vowels (formant transitions between consonants), the characteristics of word-final schwas in Italian are much closer to intrusive vowels than canonical epenthetic vowels. Word-final vocoids in Italian are not always present, they acoustically resemble schwa, and they are highly variable in their duration. Moreover, they do not participate in phonological processes such as stress assignment (Repetti 2012) or syllabicity (Miatto 2020). In particular, Miatto's (2020) study on the perception of word-final schwas shows that Veneto speakers are not aware that they insert a vocoid, and they do not perceive it.

Third, Miatto's (2022) findings on factors that condition the presence of vocoids after word-final voiceless plosives can best be explained by referring to their perceptibility. In their study, vocoids were more likely to appear after labials and coronals than dorsals. Since most Italian consonants are followed by a vowel, it was argued that formant transitions are extremely important cues for the perceptibility of plosives. Word-final labials and coronals, which have weaker bursts than dorsals (Dorman et al. 1977), would be less perceptible without releases that incorporated formant transitions, than dorsals would be. Other possible arguments for the findings differentiating labial/coronal vs dorsal place of articulation include phonemic frequency and markedness, but neither makes the right predictions.

Fourth, Miatto's (2022) study also shows that with increased repetitions of the same plosive-final nonce word, the presence of vocoids significantly decreases. Repetition is generally shown to have a negative effect on clarity and intelligibility of phonetic production (Fowler & Housum 1987),

which would indicate that word-final schwas appear to aid the perceptibility of the final consonant and appear less frequently if the words are produced less carefully in later repetitions. While this result does not directly support the argument that Italian word-final schwas are non-syllabic vocoids, it gives insights on why word-final schwas might appear at all.

Finally, as stated in Miatto (2022), duration measurements were not consistent with a phonological analysis in which the word-final schwa is syllabic and the nucleus of a new syllable. They found that the stressed vowels in nonce words such as *fap* were short, and therefore obligatorily in a closed syllable due to their duration. Moreover, word-final consonants in nonce words were significantly shorter than control geminated consonants, which indicates that the consonants might not be geminated but only slightly lengthened, contrary to what was reported in previous literature.

The studies above seem to indicate that word-final schwas in Italian are intrusive vowels and that they are not syllabic. This is, in fact, the only option we are left with, if we follow the classical dichotomy proposed by Hall (2006, 2011). However, while word-final schwas in Italian look and behave like intrusive vowels, their nature is fundamentally different: intrusive vowels are the result of articulatory retiming between two consonants, and, by this definition, vocoids in Italian cannot be considered intrusive vowels because they are word-final. Another reason to consider Italian word-final schwas as different from intrusive vowels is that the former, unlike intrusive vowels, seem to serve a perceptibility function: they help carry the prosodical contour (Grice et al 2018), and they help make the word-final consonant more perceptible by providing formant transitions. For these reasons, the terms word-final 'vocoid' or 'vocalic element' seem to be more appropriate. In fact, Hall (2021) has recently proposed that the distinction between intrusive and epenthetic vowels might not be so clear cut.

In sum, the example of Italian vocoids inform us on the need to rethink how vowels are defined, both generally and language-specifically, especially in the realm of phonetic (non-syllabic) vowels to which both vocoids and intrusive vowels belong.

References

Miatto, V., Hamann, S. & Boersma, P. 2019. Self-reported L2 input predicts phonetic variation in the adaptation of English final consonants into Italian. *ICPhS 2019*. ● Miatto, V. 2020. Perception of word-final inserted vowels and syllabicity in Italian. *ExLing 2020*. ● Miatto, V. 2022. Between intrusivity and epenthesis: A case of Italian word-final inserted vowels (Submitted). ● Bafile, L. (2002). Il trattamento delle consonanti finali nel Fiorentino: Aspetti fonetici. *Atti delle XXIII Giornate G.F.S*. ● Broniś, O. 2016. Italian vowel paragoge in loanword adaptation. *Italian Journal of Linguistics* 28. 25-68. ● Dorman, M.F., Studdert-Kennedy, M. & Raphael, L.J. 1977. Stop-consonant recognition: Release bursts and formant transitions as functionally equivalent, context-dependent cues. *Perception & Psychophysics* 22. 109-122. ● Fowler, C.A. & Housum, J. 1987. Talkers' signaling of 'new' and 'old' words in speech and listeners' perception and use of the distinction. *Journal of Memory and Language* 26. 489-504. ● Grice, M., Savino, M. & Roettger, T.B. 2018. Word final schwa is driven by intonation-The case of Bari Italian. *JASA* 143. 2474. ● Hall, N. 2006. Cross-linguistic patterns of vowel intrusion. *Phonology* 23. 387-429. ● Hall, N. 2011. Vowel epenthesis. In: van Oostendorp, M., Ewen, C., Hume E. & Rice, K. (eds.) *The Blackwell Companion to Phonology*, 1576–1596. Oxford: Blackwell. ● Hall, N. 2021. How many ways can an inserted vowel be weak? Beyond the epenthesis / intrusion dichotomy. *Epenthesis and Beyond*, Stony Brook University. ●Passino, D. 2008. *Aspects of consonantal lengthening in*

Italian. Padua: UniPress. ●Repetti, L. 2012. Consonant-final loanwords and epenthetic vowels in Italian. *Catalan Journal of Linguistics* 11, 167-188.

Between phonological attraction and salience in French slang :
selection of the epenthetic /l/ with *travlo* words (Clément Michard[1])

Among the many constructed words of colloquial and slang French, still are a few impervious ones. Culprits : epenthetic consonants (EC) placed between what appears to be a truncated base and a suffix. In this presentation, we explore the possibility that these rebelious coumpounded words result from different processes leading to a similar ending, emphasising attraction between segments and salience of the result as main factors. Given the words in list 1, we can see different suffixes attached on different base endings :

(1)	a.	tabatière	b.	congolais	c.	morutier	d.	lionceau
	e.	fromton	f.	valoche	g.	travlo	h.	soldo

Dister (1997) shows how French likes to truncate words in search of an -o rime, or after a maximum of two lexical syllables. Suffixes tend to be monosyllabic, with -o ending staying *à la mode* for more than five centuries. Pagliano (2003) proposes that verb-pronouns's EC is managed by syntax, ordering /t/ for 3sg and /z/ for the rest probably based on a *mécoupure*[2] (***fait-il*** /**fɛt**il/, lave-t-il /lav̥til/). However, she denies the possibility for labials to be epenthetic, which does not seem right (**cale**çon → **cal**bute), and does not explain suffixal allomorphy (**-ard** for *con→ conn**ard***, *miche→mich**ard*** ; **-lard** for *papier→ pape**lard***, *vicieux→ vice**lard***).

French cryptolects such as *argot* work with catachresis (*flotte* = 'fleet' (vern.)/'water/rain' (arg.)), clipping and adding slang-fashionned suffixes (*ciné* 'cinema' > *cinoche*), or regorganising the phonetics/spelling of words to create crypto-lexemes (largonji : *en douce* 'secretly' > *en loucedé*) in order to blurr full understanding of a sentence by non *argot* speakers. In list 1, words (e) to (h) are *argot :*

(2)	a.	*fromton* /frɔm̥tõ/	*fromage* 'cheese'
	b.	*valoche* /valɔʃ/	*valise* 'suitcase'
	c.	*soldo* /sɔldo/	motorbike popular in the early 1900's called *Solex*
	d.	*travlo* /travlo/	denigratory word for transverstite people (*travesti*)

Cut after one syllable then suffixed with a slang ending, some like *fromton* and *valoche* seem to belong to larger paradigms (*mecton, bricheton, rejeton, biffeton* ; *cinoche, cantoche, pétoche, téloche*), while others like *travlo* and *soldo* seem to only have in common an -o suffix with a varying unpredictable onset.

We decided to call these words "*travlo"* words, as they look a transvestite version of their base with different shapes each quite unique. Here is part of the list we compiled so far :

(3)	a.	travlo	b.	pecno	c.	soldo	d.	dirlo
	e.	clodo	f.	champlard	g.	camerluche	h.	pistoche
	i.	valtoche	j.	calebute	k.	chin'toc	l.	vicelard
	m.	queutard	n.	louveteau	o.	lionceau	p.	congolais

They all have in common an epenthetic consonant between the (truncated) base and the suffix, most of them coronal stops or fricatives.

Dirlo[5] < *directeur* (headmaster)

Sainéan (1920) quotes Bruant (1905) with a *dirlingue*, with a meaning of *sou* 'dime'. In the same dictionnary, Bruant mentions seven other words ending in -*lingue* (*flingue*,

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2 Apothéloz (2002) calls *mécoupure* (mis-cutting) *a* base-suffix boundary reinterpretation leading to new base or suffixe

morlingue, *burlingue*, *r'lingue*, *schlingue*/*chelingue*, *bourlingue* and *déglingue)*, with *burlingue* based on *bureau* 'desk'. There seems to be a pattern with [velar]-lingue except for *schlingue* (probably borrowed to German or made to appear so) and *flingue*. We suspect that *argot* speakers really liked catachresis, to the point where an existing word-form was needed to create a fashion item (cf. clodo with claudoche). The existing *dirlingue* 'dime' was necessary for the catachresis process to take place, putting emphasis on the *directeur*'s *dirlingue. -lingue* probably results from a *mécoupure* (many words in -ingue such as *sourdingue*) leading to a *re-mécoupure* dirl+ingue, suffixed with -o/-ote producing the catchy *dirlo*. **Dirlote* has disappeared, *dirlo* being used for both genders nowadays.

Congolais[3] < Congo (inhabitants of Congo)

Demonyms in French are very irregular. *Congolais* is amongst the most irregular, belonging to a paradigm of three. According to the official demonyms (names of inhabitants) list of 2008[3], Congo /kɔ̃go/ gives *congolais·e* / kɔ̃golɛ|z/ ; Togo /togo/ gives *togolais·e* /togolɛ|z/, Diégo(-Suarez) /djego/ (Madagascar) gives *diégolais·e* /djegolɛ|z/. It seems that ending -/go/ triggers an -/lɛ|z/ allomorphy of suffix *-ais/-aise* /ɛ|z/. However, the existing Ougadougou /ugadugu/ giving *ougalais·e* /ugalɛ|z/ entails to think that any /gV/ second syllable in a word will give a demonym in -/lɛ|z/, hence a possible "attraction law" between velar segments and epenthetic /l/ as shown in *dirlo*, added by a salience principle.

This salience in *argot* and colloquial French tends to force a truncated-suffixed words with a (σ-)CVC-CV(C) structure, allowing for a protrusion between C2 and C3, C2 belonging to the base, C3 to the suffix or epenthetic for the purpose of salience. Salience would then dictate a rupture of harmony between these segments, where C2's syllable is linited and C3's fortited.

(4) a. /r/, /v/, /p/, /gV/ attract /l/ salience : [labial/velar] + /l/
b. /l/ attracts /d/, /b/, /t/ salience : /l/ + [labial/coronal]

Américain indeed gives *amerlo*, *amerloque*, *amerluche*, *balance* 'snitch' gives *baltringue*, Hugo fans gives *hugolien*.

REFERENCES

[1] Apothéloz, D. (2002). La construction du lexique français: principes de morphologie dérivationnelle. Editions Ophrys.

[2] Bruant, A. (1905). L'argot au XXe siècle : Dictionnaire français-argot. *Paris, Flammarion*.

[3] Commission générale de terminologie et de néologie (2009). Recommandation concernant les noms d'États, d'habitants, de capitales, de sièges diplomatiques ou consulaires.

[4] Dister, A. (1997). Aspects phonétiques et morphologiques de l'apocope en français contemporain. *INSTITUTION Laval Univ., Quebec (Quebec). International Center for Research on Language Planning.*, 53.

[5] Esnault, G. (1965). Dictionnaire des argots. *Paris, Larousse*.

[6] Pagliano, C. (2003). L'épenthèse consonantique en français: ce que la syntaxe, la sémantique et la morphologie peuvent faire à la phonologie: parles-en de ta numérotation? impossible: thèse.. (Doctoral dissertation, Nice).

[7] Sainéan, L. (1920). Le langage parisien au 19e siècle: Facteurs sociaux, contingents linguistiques, faits sémantiques, influences littéraires. *E. De Boccard.*

[8] Französiches Etymologisches Wörterbuch : https://lecteur-few.atilf.fr/index.php/

[9] BOB, base de donnée de l'argot : https://www.languefrancaise.net/Bob/Introduction

ACOUSTICS FOR NOUNS, ORTHOGRAPHY FOR VERBS:
DIFFERENTIAL LOANWORD ADAPTATION AND DEFECTIVITY

ANDREW NEVINS AND GEAN DAMULAKIS

Jurgec (2014) demonstrates the Oprah Effect, whereby loanwords show a non-native segmental adaptation (e.g. English retroflex [ɹ̠] being used in Dutch) until they undergo morphological derivation, at which point they revert to a native adaptation (e.g. the Standard Dutch rhotic). A general idea in the literature is that morphologically integrated loanwords are more likely to be nativized than bare roots (Bloomfield 1933:447;Mascaró 1976; Kiparsky 1993, Simonović 2009: footnote 30).

What some morphologically derived loanwords in Brazilian Portuguese (BP) show is that the Oprah Effect can involve *orthographic* accommodation to native patterns, leaving aside other possibilities based on acoustic similarity. For example, the English loanword *bug* [bʌg] is adapted as a close acoustic match [bɐg] when borrowed as a noun into BP, but when it enters into verbal derivation, it becomes *b*[u]*gar* 'to bug out', where the only explanation for this [u] is knowledge of the orthography. Something in the morphological derivation prevents the non-native adaptation with [ɐ], but instead of retreating to another possible nearby vocalic adaptation, speakers retreat to orthography as a source. One line of explanation holds that while [ɐ] is a non-native vowel of BP within stressed syllables, nouns can "get away with" phonology that verbs cannot (on category-specific noun and verb phonology; see work such as Smith 2001, McCarthy 2005, and Bobaljik 2008). This cannot be the full story, however, as the same vowel adaptation difference occurs between the loaned noun *surf* with English [ɝ], adapted with [ɐ] in the noun *surf* versus [u] in the noun *surfista* 'surfer' (with [u]), unless one appeals to an intermediate base-form of the verb in between the noun and the agentive form.

Instead of appealing to a difference such as "nouns allow non-native phonemes, while verbs do not" (i.e. "BP has *[ˈɐ], except in nouns") based on BP loaned adaptations of English [ʌ/ɝ], consider further the data that arises with English [æ]. Here, loaned versions of the noun *do not contain* a non-native phoneme, but instead adapt to the existing BP vowel [ɛ], as in *lag* (adapted as l[ɛ]g). There is no way one can say that "BP has *[æ], except in nouns", because in nouns it's *also* banned. Crucially, however, the adaptation in nouns and verbs is still different: in verbs it's adapted as [a]: *l*[a]ˈ*gar* 'to lag'. At this point, therefore, we might arrive at the following generalization:

(1) With non-native vocalic adaptations from English such as [ˈɐ, æ],
   a. Nouns adapt the closest acoustic match from within BP:
      b[ʌ]g, l[æ]g → BP [ɐ, ɛ]
   b. Verbs and agentive nouns (e.g. anything with further derivational morphology) adapts an orthographic match:
      <bug, lag> → BP [u],[a]

The story could end here (as it did for Damulakis & Nevins 2022), and indeed, the fact that orthographic mapping (e.g. Dabouis & Fournier 2022) plays a differential role in nouns and verbs can be made sense of. However, further investigation with rating studies of a broader set of forms reveals that the adaptation of *stressed* [æ] in verbs is essentially ineffable (accepted only 38% in an acceptability judgement):

(2) a. *laˈgar* ‘lag-inf.’, *laˈguei* ‘lag-1sg.past’, *laˈgando* ‘lag-ger.’
c. ??*eu ˈlago* ‘lag-1sg.pres’*, ??ele ˈlaga* ‘lag-3sg.pres’
d. *dar um lag* ‘give a lag’ (light verb construction)

This impossibility of rhizotonic verbal adaptations of English [æ], even with the orthographically based [a], recalls defective verbs in Portuguese and Spanish, such as

(3) a. *coloˈrir, coloˈrei, coloˈrindo, floˈrir, floˈrei, floˈrindo* ‘to color/to flower’
b. **eu coˈloro, *ele coˈlore, *eu ˈfloro, *ele ˈflore*
c. *cor* ‘color*’ flor* ‘flower’

The explanation for (3b) is that these verbs lack a rhizotonic verbal allomorph. By ushering in (2b) to the same family of analysis, we are in fact claiming that there is a new class of defective verbs within Portuguese. In fact, diachronically, many defective verbs (including *colorir*) were loanwords (reborrowed from learned Latin). The proposal in this paper is that stressed loan verbs with [æ] are ineffable because they cannot satisfy two equally ranked constraints; one acoustic and one based on orthographic mapping. Taking inspiration from Hamann & Colombo 2017 and Dabouis & Fournier 2022, we argue that the following two constraints are active in the grammar of BP loans of this type:

(4) MATCH-MIDHIGH-F2(ˈσ): match the acoustic value of mid-high-f2 vowels in stressed syllables (perceptual constraint)
<u>Satisfied by adapation of [læg] as nominal [lɛg]</u>
(5) MAP_{BP}<a>:[a]: Under a BP-based orthographic mapping (imposed by derivational morphology and the Head-of-the-Word as a BP affix), map loans with orthographic <a> onto the vowel [a].
<u>Satisfied by adaptation of nonrhizotonic verbs such as [lagˈar]</u>

However, in stressed verbs, either the option [ˈlaga] violates (4), or [ˈlɛga] violates (5). (See Postma 2022 for a proposal of the relevance of stress in BP loaned verbs, although not applied to these cases). We argue that ineffability/defectivity (and the repair route of a light-verb construction) results from cases where either option will violate a crucially ranked constraint, and in which learners do not yet have sufficient evidence (these loans being relatively recent and few in number) for one or the other to be inherently preferred over the other.

In summary, our research adds to the growing research suggesting that orthographic mapping (see Vendelin & Peperkamp 2006), acoustic matching, *and* morphological derivation (Jurgec 2014) all interact in loanword adaptation, particularly in stressed verbs, and in this case, culminating in a novel observation, namely the emergence of a new class of defective verbs in Brazilian Portuguese (no longer limited to the third conjugation; *pace* Maiden & O’Neil 2014).

Selected References:

Dabouis, Quentin & Fournier, Pierre (to appear) “English PhonologiES?”. In *Discours métalinguistiques*, eds. V. Arigne & C. Migette (ed.), Bern : Peter Lang.
Damulakis, Gean & Andrew Nevins. 2022. An Orthographic Twist to the Oprah Effect. *Radical*
Hamann, S. & I. Colombo. 2017. A formal account of the interaction of orthography and perception: English intervocalic consonants borrowed into Italian. *NLLT.*
Jurgec, Peter (2014). Morphology affects loanword phonology. *NELS* 43:1. 191–202.
Postma, Gertjan. (2022). Reaction to the paper by Damulakis & Nevins. *Radical*

On the Shape of Roots in Romanian: Deriving the Nominal Inflectional Classes

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Aim – We propose a decompositional, diacritic-free analysis of nominal inflectional classes where the alternations emerge directly from the phonological shape of roots as they interact with the exponents of the inflectional system. Thematic vowels (ThV), their alternations, and even the non-alternations are derived without class features and only very minimal allomorphy.

Background – In Romanian, the root exists in obligatory association with a thematic suffix, a portmanteau inflectional marker that consists of an alternating vowel. Most analyses of the Romanian inflectional system follow a non-decompositional approach based on nominal classes (*e.g.* Farkas 1990; Dobrovie-Sorin & Giurgea 2013). These are due to the very many morphological irregularities, that lead to positing arbitrary noun classes.

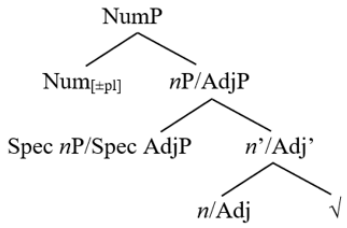
(1) Nominal classes in Romanian (adapted from Dobrovie-Sorin & Giurgea 2013)

	SG	PL	Alternation	Gender	Gloss
Ia	[elev]	[elev^{j}]	Ø > C^{j}	M	‘student’
Ib	[litru]	[litri]	u > i	M	‘liter’
IIa	[vas]	[vase]	Ø > e	N	‘vase’
IIb	[teatru]	[teatre]	u > e	N	‘theater’
III	[kasə]	[kase]	ə > e	F	‘house’
IVa	[skatiw]	[skatij]	w > j	M	‘siskin’
IVb	[st͡ea]	[stele]	a > le	F	‘star’
V	[medju]	[medij]	u > j	N	‘environment’
VIa	[ardej]	[ardej]	Ø > Ø	M	‘pepper’
VIb	[gunoj]	[gun͡oaje]	Ø > e	N	‘garbage’
VIIa	[karte]	[kərts^{j}]	e > C^{j}	F	‘book’
VIIb	[femeje]	[femej]	e > j	F	‘woman’
VIII	[perete]	[perets^{j}]	e > C^{j}	M	‘wall’
IXa	[direkt͡oare]	[direkt͡oare]	e > e	F	‘director’
IXb	[nume]	[nume]	e > e	N	‘name’
X	[vakə]	[vatʃ^{j}]	ə > C^{j}	F	‘cow’

Problem – Nominal classes do not inherently fit a minimalist and fully modular architecture of grammar. A major problem is that if syntax is restricted to category-neutral roots and category-defining heads (Borer 2005; Embick & Marantz 2008), roots should not bear featural content. Moreover, class features are entirely syntactically inert (Acquaviva 2009). Modularity precludes a syntactic thematic position whose identity is purely morphophonological and exists only to introduce a piece of phonological material in the spell out. At the same time, class features are not true phonological objects with instructions for the phonetic component either. Class features thus function only as diacritics ensuring the right pairings of root and ThV head.

Proposal – Following Lampitelli & Ulfsbjorninn (accepted), we propose a decompositional analysis of the alternations, otherwise known as a ‘syntax-all-the-way-down’ approach to word-formation (Halle & Marantz 1993). This will be couched in Element Theory (Harris & Lindsey 1995; Backley 2011) and the autosegmental framework of Strict CV (Lowenstamm 1996; Scheer 2004). It should also be noted that Romanian is a three-gendered language: masculine, feminine, neuter (M, F, N). However, the N behaves like the M in the SG and the F in the PL. The main generative analysis treats N nouns as lacking gender features and receiving default gender: M in SG, F in PL (Kramer 2015). Ergo, there are only two genders in the syntax (both syntactically visible), and the status of the three morphological genders is emergent. Class features are similarly syntactically inert, and their alternations emerge from the phonological shape of root and the exponents of gender and number.

(2) Nominal structure: root-derived items



(3) Exponents of phi-features

a. Exponents for number

SG ⇔ Ø

PL ⇔ |I|

b. Exponents for gender

M ⇔ |U|

F ⇔ C V
|
|A|

Following the typical phonological computations of Strict CV, the root-shapes in (4), in combination with the exponents in (3), generate all the class (non-)alternations. This approach greatly reduces the need for allomorphy, though it persists for final stressed roots that take *-le*.

(4) Root shapes and their effects in association with regular inflection (* marks stress)

	C V | seg			C V C V | | T R			* C V C V | seg			C V C V | seg <I>		
	SG	**PL**		**SG**	**PL**		**SG**	**PL**		**SG**	**PL**
M	-Ø	-Cʲ	**M**	-u	-i	**M**	-w	-j	**M**	—	—
	[elev]	[elevʲ]		[litru]	[litri]		[skatiw]	[skatij]			
	'student'			'liter'			'siskin'				
F	-ə	-e	**F**	-ə	-e	**F**	-a	-le	**F**	—	—
	[kasə]	[kase]		[pudrə]	[pudre]		[stẹa]	[stele]			
	'house'			'powder'			'star'				
N	-Ø	-e	**N**	-u	-e	**N**	-w	-je	**N**	-u	-j
	[vas]	[vase]		[teatru]	[teatre]		[muzew]	[muzeje]		[medju]	[medij]
	'vase'			'theater'			'museum'			'environment'	

	* C V C V | seg <I>			C V | seg <I>			C V | | seg A I		ROOT SUPPLETION (select floating <|I|> root in the plural)
	SG	**PL**		**SG**	**PL**		**SG**	**PL**	
M	-Ø	-Ø	**M**	—	—	**M**	-e	-Cʲ	
	[ardej]	[ardej]					[perete]	[peretsʲ]	
	'pepper'						'wall'		
F	—	—	**F**	-e	-Cʲ -Ø	**F**	-Ø	-Ø	
				[karte] [femeje]	[kərtsʲ] [femej]		[direktọare]	[direktọare]	
				'book' 'woman'			'director'		
N	-Ø	-e	**N**	—	—	**N**	-Ø	-Ø	
	[gunoj]	[gunọaje]					[nume]	[nume]	
	'garbage'						'name'		

References – Acquaviva, P. 2009. The structure of the Italian declension system. In F. Montermini, G. Boyé & J. Tseng (eds.), *Selected proceedings of the 6th Décembrettes: Morphology in Bordeaux*. Cascadilla Proceedings Project. 50–62. **Backley, P.** 2011. *An Introduction to Element Theory*. EUP. **Borer, H.** 2005. *Structuring Sense*. OUP. **Dobrovie-Sorin, C & I. Giurgea,** (eds.). 2013. *A reference grammar of Romanian. Vol. 1: The noun phrase*. John Benjamins. **Embick, D & A. Marantz.** 2008. Architecture and blocking. *LI* 39:1–53. **Farkas, D.** 1990. Two cases of underspecification in morphology. *LI* 22:27–62. **Halle, M. & A. Marantz.** 1993. Distributed morphology and the pieces of inflection. In K. Hale and S. J. Keyser (eds.), *The view from building 20*. MIT Press. 111–176. **Harris, J. & G. Lindsey.** 1995. The elements of phonological representation. In J. Durand and F. Katamba (eds.), *Frontiers of phonology*. Longman. 34–79. **Kramer, R.** 2015. *The morphosyntax of gender*. OUP. **Lampitelli, N & S. Ulfsbjorninn.** accepted. A classless analysis of Italian nouns and their theme-vowel alternations. *Isogloss*. **Lowenstamm, J.** 1996. CV as the only syllable type. In J. Durand and B. Laks (eds.), *Current trends in phonology*. University of Salford Publications. 419–441. **Scheer, T.** 2004. *A lateral theory of phonology. Vol. 1*. MdG.

Yoruba vowels and the representation of openness

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Claim. The system of Standard Yoruba vowels and their harmonic behaviour follows directly from the internal structure of nuclei assumed in Government Phonology 2.0. Aperture and [−ATR] share a common property: structure.

Background. In Government Phonology (GP; Kaye, Lowenstamm & Vergnaud 1990), privative elements (**A**, **I**, **U** etc.) capture vowel patterns. Declaring (any) one element in a set the 'head' expresses [+ATR] (Cobb 2003; van der Hulst 2018 for the opposite view). The offspring GP 2.0 (Pöchtrager 2006 & references below) reinterprets as structural certain phonological properties commonly taken as melodic. This includes the element **A** (aperture in vowels, coronality in consonants), which interacts with (constituent) structure by allowing for bigger structures than otherwise possible. Fudge (1969), Selkirk (1982), or Vaux & Wolfe (2009) assume special syllabic positions for coronals since the size limit of English monosyllables (VVC/VCC: *seek*, *late*/*sink*, *left*) can be exceeded (to VVCC) if both final consonants are coronal: *fiend* (**fiemp*/**fienk*), *count* (**coump*/ **counk*), *feast* (**feasp*/**feask*) etc. But special positions do not explain *why* coronals are special. Also, vowels show similar "excesses": Southern British English has long *a* in *draft*, *task*, *clasp* but only one coronal following; the vowel (**A**) makes up for a coronal. GP 2.0 reinterprets **A** as a structural configuration, with part of the structure "unused" and available to adjacent segments. (In *fiend* the long vowel borrows space from the coronals.) Coronality and aperture (both old **A**) *are* structure; objects that used to contain **A** are bigger (rather: contain more empty structure) than those without. This provides, amongst other things, a scalar representation of openness where several types of vowel reduction (and lenition in general) as well as stress-related phenomena fall out (Pöchtrager 2006, 2018, 2020, 2021 for detailed analyses).

Standard Yoruba (SY) has 7 oral vowels (Bamgboṣe 1967); the higher 4 [+ATR], the lower 3 [−ATR] (1). Mid-vowels are [−ATR] when followed by another [−ATR] vowel (mid or low). Thus *a* is a trigger (though not a target); the high vowels are neither, but block harmony (2). Ideally, these facts should follow from the theory.

(1)

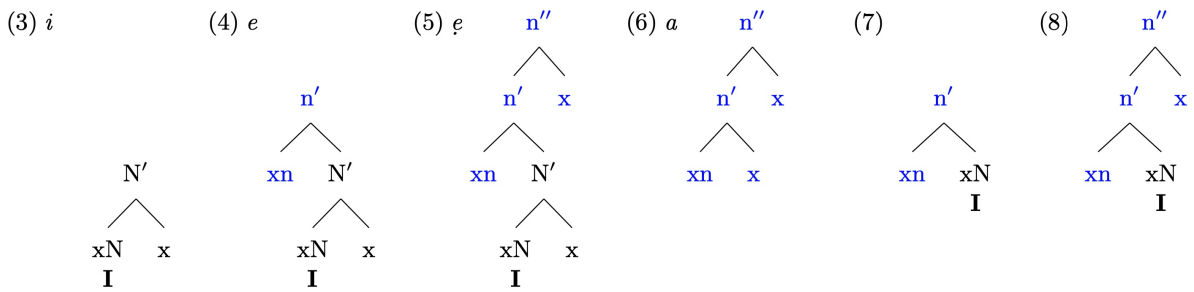
i	*u*	
e	*o*	[+ATR]
ẹ /ɛ/	*ọ* /ɔ/	[−ATR]
a		

(2)

ẹsẹ̀ 'foot'	**esẹ̀*
ọbẹ̀ 'soup'	**obẹ̀*
ẹ̀pà 'groundnut'	**epà*
Yorùbá 'Yoruba'	**Yọrùbá*

Proposal. [−ATR] vowels are more complex than their [+ATR] counterparts; [−ATR] means more structure, *as does aperture,* but the two differ in internal arrangement. (Schane 1990 makes a similar equation, but treats both as melodic, not structural, thus leaving the interaction of **A** with structure completely unexplained.)

Application. Nuclei have a bipartite structure (Pöchtrager 2018, 2020, 2021) of up to two heads (xn, xN), with xn on top of xN (if both are present). Each head projects maximally twice (xn–n'–n", xN–N'–N"). Aperture is expressed by the amount of (empty) structure. Any given language has a subset of possible structures; (3–6) give SY *i e ẹ a*. (The vowel *ẹ* is bigger, but does not contain more empty structure, than *a*.)



I assume that SY limits elements to xN, which also bars combinations of **I** and **U** (ie. front rounded vowels), given a limit of one element per position. [−ATR] is expressed by a specifier of xn (Specxn), which is crucial for harmony: If a vowel projects up to Specxn (the triggers *ẹ ọ a*), then the vowel to its left will do as well, if it contains xn to begin with. Thus, mid vowels must be [−ATR] *ẹ ọ*, low *a* already contains Specxn and meets the requirement vacuously, and high vowels do not contain xn and stay unaffected. Harmony, an agreement between Specs, falls out from the internal structure of the vowels.

Further issues. 1. For Archangeli & Pulleyblank (1989) non-mid vowels are underspecified for ATR (high: [+ATR], low: [−ATR]). [−ATR] is filled in in time to make /a/ a trigger, casting doubt on the usefulness/testability of underspecification (Dresher 2009: 125f). No underspecification is required (or possible) in our (privative) account.

2. Our analysis extends to more complex vowel systems and also explains why ATR contrasts are diachronically unstable in high vowels, and why [−ATR] *high* vowels typically merge with [+ATR] *mid* vowels (Stewart 1971). With openness a function of size and [−ATR] expressed by Specxn, high (front) vowels with an ATR contrast can be expressed as in (7–8). (7–8) are unusual in that two heads are sisters, as xN does not project. (In mid/low vowels in such systems xN *does* project for openness.) If those marked structures are reinterpreted (by learners) such that the lowest level of projection is actually a projection of xN, while keeping the amount of structure constant, (7) changes to (3), a high vowel identical to SY *i*. That same change also takes (8) to (4), identical to SY *e*. A former high vowel (with Specxn ie. [−ATR]) is reorganised such that [−ATR] is lost but openness gained.

3. Acoustic evidence (Lindau 1978: 552) supports the parallel treatment of [−ATR] and aperture (both structure), cf. also Schane (1990). Both have lower F_1 (vis-à-vis [+ATR]/ higher counterparts), with high [−ATR] vowels particularly close to mid [+ATR] vowels.

4. SY high vowels *block* as they lack xn; Finnish *i e* are (partially) *neutral* in (palatal) harmony for the same reason (lack of xn, Pöchtrager 2017). They differ in harmony being strictly local in SY (between adjacent vowels), but operating over larger strings in Finnish: *häkki-ä* 'cage PAR.', *lakki-a* 'cap PAR.' (*i* neutral) but *tikki-ä* 'stitch PAR.'; the entire base is requied to establish neutrality (neutrals alone behave as front).

References. Archangeli, D. & D. Pulleyblank. 1989. Yoruba Vowel Harmony. *Linguistic Inquiry* **20:2.** 173–217. ★ Bamgbọṣe, A. 1967. Vowel Harmony in Yoruba. *Journal of African Languages* **6.** 268–273. ★ Cobb, M. 2003. Government Phonology and the vowel harmonies of Natal Portuguese and Yoruba. S. Ploch (ed.) *Living on the Edge.* Berlin. 223–242. ★ Dresher, E. 2009. *The Contrastive Hierarchy in Phonology.* Cambridge. ★ Fudge, E. 1969. Syllables. *Journal of Linguistics* **5.** 253–286. ★ Kaye, J., J. Lowenstamm & J.-R. Vergnaud. 1990. Constituent structure and government in phonology. *Phonology Yearbook* **7.** 193–231. ★ Lindau, M. 1978. Vowel features. *Language* **54:3.** 541–563. ★ Pöchtrager, M. 2006. *The Structure of Length.* PhD Vienna. ★ Pöchtrager, M. 2017. Transparent vowels: small cogs in large machines. Talk mfm25. ★ Pöchtrager, M. 2018. Sawing off the branch you are sitting on. *Acta Linguistica Academica* **65:1.** 47–68. ★ Pöchtrager, M. 2020. Tense? (Re)lax! A new formalisation for a controversial contrast. *Acta Linguistica Academica* **67:1.** 53–71. ★ Pöchtrager, M. 2021. English vowel structure and stress in GP 2.0. S. Bendjaballah, A. Tifrit & L. Voeltzel (eds.) *Perspectives on Element Theory*. Berlin. 157–183. ★ Schane, S. 1990. Lowered height, laxness, and retracted tongue root: Different manifestations of phonological aperture. *Word* **41:1.** 1–16. ★ Stewart, J. 1971. Niger-Congo Kwa. T. Sebeok (ed.) *Current Trends in Linguistics VII*. The Hague. 179–212. ★ van der Hulst, Harry. 2018. *Asymmetries in Vowel Harmony.* Oxford. ★ Vaux, B. & A. Wolfe. 2009. The appendix. E. Raimy & C. Cairns (eds.) *Contemporary views on architecture and representations in phonology.* Cambridge MA. 101–143.

Cross-language prosodic differences in onset clusters – acoustic evidence from Polish-English bilinguals

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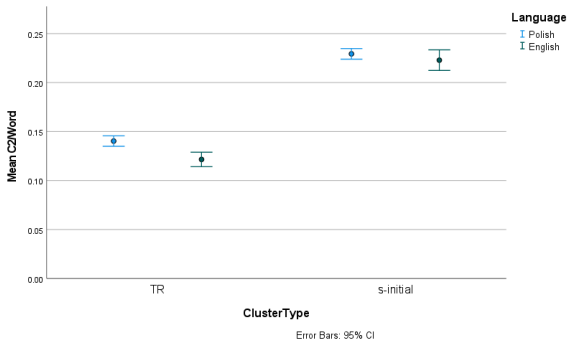
EMA (electromagnetic articulography) studies of consonant cluster production have focused on the question of whether initial consonant sequences constitute 'simplex' or 'complex' syllable onsets (e.g. Shaw et al. 2009). One heuristic adopted in this research is based on time lags between initial consonant(s) and an 'anchor' point in the vocalic nucleus. So-called c-center stability across CVC and CCVC words is taken as evidence for complex clusters (as in English), while right-edge-to-anchor stability presumably reflects simplex onsets (as in Tashlhiyt Berber). Durvasula et al. (2021) applied this heuristic using acoustic measures, opening the door to larger scale studies unconstrained by EMA-induced limitations on data collection.

The anchor heuristic, while describing coordination between onset and nucleus, unfortunately says nothing about the synchronicity of consonants in a cluster with each other. In principle, shorter lags between consonants should be associated with complex onsets, since tighter phonetic cohesion suggests the consonants in a cluster are joined into a single constituent. However, shorter lags do not always mean greater c-center stability. In Hermes et al.'s (2017) EMA study of Tashlhiyt Berber and Polish onset clusters, Polish showed greater center-to-anchor stability, suggesting complex onsets, yet longer target-to-target lags, indicating asynchronous cluster articulation. Schwartz et al. (2021) used EMA to look at CCV words in the speech of 5 Polish-English bilinguals in both of their languages, and found longer lags in Polish. This finding also correlated with the acoustic measure of C2 duration, opening the door to a larger-scale acoustic experiment based in C2 duration.

The present study presents acoustic data of cluster production in the speech of twelve L2 Polish-English bilinguals – L1 speakers of Polish who have been trained in English phonetics and whose English pronunciation can be described along a number of acoustic and perceptual dimensions as target-like – speaking in both of their languages. The goal was to probe the 'same' initial consonant clusters in the two languages for evidence of language-based differences in the structural organization of the clusters. Participants read pairs of 'similar' CCVC words in the two languages (e.g. PL *blok* /blɔk/ 'block' vs. Eng *block* /blɒk/; PL *styl* 'style' /stɨl/ vs. *still* /stɪl/), embedded in a carrier phrase. Separate recording sessions were carried out to avoid language mixing effects. A linear mixed effects regression analysis was run in SPSS, with a dependent variable of C2 duration, normalized by dividing by the duration of the entire word, and a Language*Cluster interaction term as predictor variable. We find longer C2 durations in Polish for stop-approximant (TR) clusters, but not for /s/-initial clusters, as shown in Figure 1.

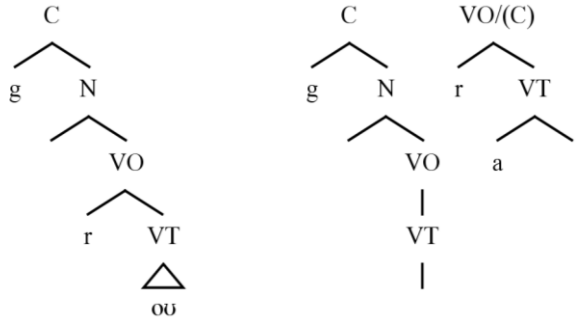
Figure 1 - *Normalized C2 duration (C2/Word) as a cluster type and language*



Our results are compatible with a postulate that TR onsets have different structural properties in the two languages, despite the fact that the clusters are the 'same' according to segmental transcription and sonority sequencing. The Onset Prominence framework (OP) posits different structural configurations for TR onsets (see Schwartz 2022). These configurations are shown in Figure 2. In Polish *gra* (Fig. 2, right), an *adjoined* cluster places C_1 into a separate constituent from C_2. In English *grow* (Fig. 2, left), a *absorbed* cluster is contained in a single iteration of the OP structural hierarchy. The structural differences are assumed to contribute to the observed differences in phonetic synchronicity between consonants in a cluster, in accordance with our study.

The structures in Figure 2 also reflect Polish-English differences in prosodic minimality. For the purposes of inflectional morphology, a minimal word in Polish contains may contain CCV (or (C)VC), but not CV. Thus, CCV-shaped Polish words may be inflected normally: *gra-grze* /gʐɛ/ – 'game (nom.-loc.)', but CV-shaped words may not. These facts suggest that in Polish, C_1 in initial clusters is not joined with C_2 into a single 'complex' onset constituent. Rather, C_1 is part of an independent constituent that contributes to the prosodic structure of the word. By contrast, in English, as well known, onsets play no role in defining prosodic words.

Figure 2 - *OP configurations for English (left) and Polish rising sonority onset clusters*



This presentation will also consider the representation of /s/-initial clusters, which as common sonority violators are often assumed not to be complex onsets (e.g. Goad 2012). While OP posits cross-language differences in their representation, /s/-initial clusters showed no significant results in our study. At the same time, /s/-initial clusters may be more susceptible than TR clusters to cross-language phonetic interference in bilinguals (Schwartz 2022b).

Durvasula, K., M. Qasen Ruthan, S. Heidenreich & Y.-H. Lin. 2021. Probing syllable structure through acoustic measurements: case studies on American English and Jazani Arabic. *Phonology* 38, 173-202.

Goad, H. 2012. sC clusters are (almost always) coda-initial. *The Linguistic Review* 29 (3), 335-373.

Hermes, A., Mücke, D & Auris, B. 2017. The variability of syllable patterns in Tashlhiyt Berber & Polish. *Journal of Phonetics* 64, 127-144.

Schwartz, G. 2022a. All TRs are not created equal – L1 and L2 perception of English cluster affrication. *Journal of Linguistics*. DOI:10.1017/S0022226722000275.

Schwartz, G. 2022b. Searching for common phonological space – /s/-stop clusters in L1 Polish and L2 English. *Second Langauge Research*. DOI:10.1177/02676583221122425

Schwartz, G., A. Hermes & R. Święcicki. 2021. The phonology of initial cluster coordination – a cross-langauge articulographic study. Talk at OCP 18.

Shaw, J. A., Gafos, A., Hoole, P., & Zeroual, C. 2009. Syllabification in Moroccan Arabic: Evidence from patterns of temporal stability in articulation. *Phonology* 26. 187–215.

A Gradient Harmonic Grammar account of Choguita Raramuri stress-accent

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Aim. I show that a Gradient Harmonic Grammar account (GHG, Legendre et al. 1990; Smolensky and Goldrick 2016) straightforwardly captures various properties of the complex stress-accent of Choguita Rarámuri (Uto-Aztecan), including: Ⓐ morphologically conditioned (non)local stress shifts, Ⓑ unstressable suffixes that are invisible to stress assignment but block stress shift, Ⓒ a three-syllable stress window and two default stress patterns in second and third syllable. The gradient analysis is a simpler alternative to previous accounts with two major advantages: 1 It accounts for all stress patterns of Choguita Rarámuri (henceforth CR) by using standard indendently motivated constraints without resort to co-phonologies and diacritic marking of morphemes (Caballero, 2011, 2008) or additional machinery employed in prior accounts, e.g. the Satellite parameter forming an Obligatory Stress Domain that is distinct from the stress assigning domain (Bogomolets, 2020) or a ternary constituent with a left-adjoined syllable (Caballero, 2011). 2 The current study has a greater empirical coverage by accounting for **(i)** the intriguing 'nonlocal' suffix-induced stress shifts that are neglected in Caballero (2008, 2011); Spahr (2016), and **(ii)** the tricky stress behaviour of trisyllabic roots that are mispredicted in Root Controlled Accent analyses, see Caballero (2011) for undergeneration problems of RCA analyses. **Stress-accent in CR.** CR is presented as a prosodically complex language with both stress-accent and a three-way lexical tonal contrast (H, L, HL) in Caballero (2008, 2011). Tone distribution is dependent on stress-accent (not otherwise) but they show independent alternations. The stress system is the focus of this study, for CR tone alternations see Caballero and Carroll (2015); Caballero (2018). Stress in CR is lexically contrastive (cf. minimal pairs such as *ˈsawa* 'smell' and *saˈwa* 'leaf'), culminative and obligatory within the posodic word (PW). The language has a three-syllable window with stress falling on one of the first three syllables of the PW (1+2). As shown in table (1), the stress patterns are determined by the stress properties of roots and suffixes. Stressed roots bear a fix lexical stress across all paradigms, whereas stressless roots receive stress depending on the words morphological makeup, especially the suffix types. Suffixes fall into two classes: **(i)** stress-neutral that do not show any effect on the word stress and never bear stress, hence termed and considered as unstressable (Unst) hereafter. Forms with unstressable suffixes and bare stems receive default stress on the second syllable of the 'root' or the only syllable of the root if it is monosyllabic, e.g. *ˈru-li* 'said'. **(ii)** Stress-shifting suffixes bear the surface stress when attached to mono- or disyllabic stressless roots but trigger a stress shift to the third syllable in trisyllabic roots. For its stress attracting effect towards/onto the suffix, this class is termed Attractive (Att) here.

(1) Morphologically conditioned stress patterns in CR (Caballero and Carroll, 2015, 463)

	Root	bare stem	Unstressable (Pst)	Attractive (Cond)
Unstressed	ru 'say'	ˈru	ˈru-li	ru-ˈsa
	tapi 'grab'	taˈpi	taˈpi-li	tapi-ˈsa
	ruruwa 'throw liquid'	ruˈruwa	ruˈruwa-li	ruruˈwa-sa
Stressed	ˈsu 'sew'	ˈsu	ˈsu-li	ˈsu-sa
	ˈputi 'blow'	ˈputi	ˈputi-li	ˈputi-sa
	seˈme 'play violin'	seˈme	seˈme-li	seˈme-sa
	ˈhumisi 'run away' (pl)	ˈhumisi	ˈhumisi-li	ˈhumisi-sa

Based on multiply affixed words such as (2c) where the attractive suffix that is not adjacent to the root fails to trigger third-syllable stress (cf. 2a), Caballero (2011) argues that word stress in CR is dependent on the the root and the 'immediately adjacent suffix' while outer suffixes are excluded from the stress domain. This local effect is derived by co-phonology of first layer of affixation taking precedence over the outer material in his account. As counter-evidence

to the locality assumption, Bogomolets (2020) provides example (2d) where the nonadjacent attractive -*ma* induces a third-syllable stress on the trisyllabic root. A floating prosodic feature is postulated for the attractive suffix in Bogomolets (2020) that has to align with the right edge of OSD if it is not occupied by an unstressable suffix that does not project a stressable unit (2c).

(2) Stress in multiply suffixed words (Caballero and Carroll 2015, Bogomolets 2020)

a.	suku-ˈnale-ki	b.	suˈku-ri-li	c.	suˈku-si-ma	d.	raʔiˈ͡ta-ri-ma
	scratch-DESID-PST		scratch-CAUS-PST		scratch-MOT-FUT.SG		speak-CAUS-FUT.SG

Analysis. All properties of CR stress-accent are straightforwardly captured under the assumption of Gradient Symbolic Representations (GSR) allowing for three classes of morphemes in the language with different degrees of underlying activity: Att_3>Root_1> $\text{Unst}_{0.5}$. In this analysis, roots have default activity and are underlyingly stressed or stressless, whereas suffixes are stressless but have different strengths. CR stress is determined by a competition between the following lexical and general phonological preferences: Ⓐ there is a high preference for preservation of underlying stress. Ⓑ Morphemes with different activities in their vowels show a competition in terms of bearing a stress and avoiding stress lapses. Ⓒ There is a general phonological preference for leftmost realisation of stress in the PW. Ⓐ is captured by a high faithfulness constraint, e.g. MAX STRESS ensuring that the underlying stress of roots is preserved and unaffected by attractive suffixes. The gradient preferences in Ⓑ are captured by markedness constraints in HG that are crucially scaled wrt. the morpheme activities. PARSE V ensures that vowels of stronger morphemes are footed by penalising unparsed vowels by their activity. Footing of attractive vowels (V_3) is hence most preferred. The constraint FULL (V) requires default activity for footed vowels: it excludes the weak unstressable suffixes ($\text{V}_{0.5}$) from the foot by penalising the weak footed vowels by their activity deficit with the default 1. The other crucially scalar constraint is *LAPSE φ that disfavours foot lapses by penalising lapse forming vowel pairs by their sum of activity. An extended version of *LAPSE φ, namely *EX(TENDED) LAPSE φ, is also required that penalises a sequence of two lapses. Ⓒ is captured by ALIGN L(EFT) φ that dictates left-alignment of the φ with the PW. Finally, the three-syllable window of CR is simply captured by a high-weighted *LAPSE L(EFT) φ that disallows two adjacent unfooted vowels word-initially. Under this constraint, not more than one syllable may intervene between the foot and the left edge of the PW, restricting the stress to the initial three syllables. The exact locus of stress is determined by the interaction of other constraints shown below. The conflict between Ⓑ and Ⓒ is the gist of the analysis reflected in the following constraint weighting relation:VVx *LAPSE φ≫ALIGN L φ vs. ALIGN L φ≫VVx *LAPSE φ. Presence of one attractive suffix (V) is enough to induce a stress-shift: V's violation of *LAPSE φ is high enough to overcome ALIGN L φ. The relation is reversed in forms with only weak unstressable suffixes due to their low *LAPSE φ violation. This is illustrated in (4) with the attractive suffix triggering a third-syllable stress while no shifting occurs in (3). The attractive suffix's interesting nonlocal stress-shift effect is driven in (5) by the cooperation of two versions of *LAPSE φ that overcome ALIGN L φ. However, as (6b) shows, the suffix is not strong enough to overcome FULL(σ) and shift the stress onto the weak suffix, capturing the unstressability of the suffix. For space reasons, some constraints are excluded that enforce general CR stress properties, e.g. stress obligatoriness, non-iterative footing, iambic feet.

		FULL(σ) 15	*LAPSEL φ 12	ALIGNL φ 3.25	PARSE σ 1.7	*LAPSE φ 1.6	
☞ 3a.	(σˈσ)σσσ				2	2.5	8.15
3b.	σ(σˈσ)σσ			1	2	1	8.25
3c.	σσ(σˈσ)σ	0.5	1	2	2.5	2	33.45
☞ 4a.	σ(σˈσ)σσ			1	4.5	3.5	16.5
4b.	σσ(σˈσ)σ		1	2	2.5	2	25.95
4c.	(σˈσ)σσσ				4.5	7.5	27.45

		FULL(σ) 15	*LAPSEL φ 12	ALIGNL φ 3.25	PARSE σ 1.7	*LAPSE φ 1.6	*EXLAPSE φ 0.3	
☞ 5a.	σ(σˈσ)σσ			1	4.5	3.5		16.5
5b.	(σˈσ)σσσ				4.5	5	5	17.15
5c.	σσσ(σˈσ)	0.5		3	3	4	4	29.95
☞ 6a.	(σˈσ)σσ				3.5	3.5		11.55
6b.	σ(σˈσ)σ	0.5		1	4			17.5
6c.	σσ(σˈσ)	0.5	1	2	2	2		32.6

The best of both worlds: variation and global evaluation in constraint-based grammars

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1. The problem. Systemic constraints have been proposed in phonology to account for dispersion effects (e.g. contrast enhancement; Flemming 2004) and in morphophonology to account for paradigmatic effects (e.g. homophony avoidance). For instance, Crosswhite (1999) analyzes the morphophonologically-conditioned blocking of vowel reduction in Trigrad Bulgarian as motivated by homophony avoidance. Technically, this is implemented by positing an anti-homophony constraint requiring distinct output forms for the singular and plural forms of a given lexeme. Systemic constraints such as anti-homophony constraints are not trivial because they require an important departure from the classical mode of evaluation proposed in the seminal work of Prince & Smolensky (1993): input-output mappings can no longer be evaluated individually, as shown in Table 1, but must be evaluated globally instead, as shown in Table 2. For instance, an anti-homophony constraint requires inputs a and b to be evaluated together. When input-output mappings are evaluated globally, the constraint-violation profile of a set of input-output mappings is obtained by summing the violation profiles of individual input-output mappings inside that set (Magri and Storme 2021), as shown in Table 2.

a	Constraint$_1$	Constraint$_2$
α_1	1	0
α_2	0	1
b	Constraint$_1$	Constraint$_2$
β_1	1	0
β_2	0	1

Table 1: Classical evaluation

a,	b	Constraint$_1$	Constraint$_2$
α_1,	β_1	2	0
α_1,	β_2	1	1
α_2,	β_1	1	1
α_2,	β_2	0	2

Table 2: Global evaluation

Unfortunately global evaluation is not directly compatible with current probabilistic models for constraint-based grammars (e.g. Stochastic Optimality Theory, Noisy Harmonic Grammar, MaxEnt), as these models assume the classical mode of evaluation shown in Table 1. In the absence of statistical framework for global evaluation, analyses of dispersion and paradigmatic effects using systemic constraints cannot currently be fit to realistic noisy data and cannot be compared quantitatively against alternative analyses that do not include these constraints. In other words, analyses using systemic constraints can currently only be used to model idealized linguistic data without any variation.

2. A solution: marginalization. This paper proposes a simple and mathematically motivated method to address this issue and get both variation and global evaluation in constraint-based grammars. This method exploits a theorem of probability theory stating that the joint distribution of any given number of random variables encodes the marginal distributions, i.e. the distributions of each of the individual random variable. In the context of constraint-based grammars, this means that the probability of individual input-output mappings can be reconstructed by marginalizing over all other input-output mappings, as shown in (1).

(1) Marginalization
Let a_1, ..., a_n be underlying forms, A_1, ..., A_n the corresponding sets of output candidates, and α_i a specific output candidate in A_i. Then,

$$P(\alpha_i) = \sum_{\alpha_1,...,\alpha_{i-1},\alpha_{i+1},...,\alpha_n} P((\alpha_1, ..., \alpha_i, ..., \alpha_n))$$

Marginalization is an extra component that can be added to the pipeline of probabilistic constraint-based grammars when global evaluation is required. By relating the probability of sets of mappings to the probability of individual input-output mappings, marginalization provides a method to draw inferences about the constraint weights/rankings of a grammar requiring global evaluation from the frequencies of individual input-output mappings. For instance, this method makes it possible to reconstruct the probability of individual mappings in Table 1 by summing the probabilities of all rows including those individual mappings in Table 2.

$$\begin{cases} P(\alpha_1) = P((\alpha_1,\beta_1)) + P((\alpha_1,\beta_2)) \\ P(\alpha_2) = P((\alpha_2,\beta_1)) + P((\alpha_2,\beta_2)) \\ P(\beta_1) = P((\alpha_1,\beta_1)) + P((\alpha_2,\beta_1)) \\ P(\beta_2) = P((\alpha_1,\beta_2)) + P((\alpha_2,\beta_2)) \end{cases}$$

3. Application: variable homophony avoidance in Persian. The method is illustrated with a concrete case study involving variable homophony avoidance in Spoken Persian (Ariyaee and Jurgec 2021). In Spoken Persian, vowel hiatuses are generally avoided at stem-suffix boundaries by deletion of the suffix vowel. For instance, /hut͡ʃɑ-emun/ is typically realized as [hut͡ʃɑmun] with deletion of the suffix vowel. However monosegmental suffixes do not follow this generalization: their suffix vowel is more resistant to deletion. For instance, /hut͡ʃɑ-e/ is typically realized as [hut͡ʃɑe] with a vowel hiatus. This pattern can be analyzed as motivated by homophony avoidance: the general tendency to delete suffix vowels is overriden in the specific case of monosegmental suffixes by the need to maintain suffixed forms distinct from the unsuffixed base. Indeed vowel deletion results in homophony with the base form (e.g. /hut͡ʃɑ/ [hut͡ʃɑ]) for monosegmental suffixes (e.g. /hut͡ʃɑ-e/ realized as [hut͡ʃɑ]) but not for polysegmental suffixes. Moreover, hiatus resolution in Spoken Persian is probabilistic, as shown in Table 3.

Inputs	Outputs	Frequency
/hut͡ʃɑ-emun/	[hut͡ʃɑmun]	0.61
	[hut͡ʃɑemun]	0.25
	[hut͡ʃɑʔemun]	0.14
/hut͡ʃɑ-e/	[hut͡ʃɑ]	0.14
	[hut͡ʃɑe]	0.55
	[hut͡ʃɑʔe]	0.31

Table 3: Variable hiatus resolution

To put it in a nutshell, the analysis of variable vowel-hiatus resolution in Spoken Persian as conditioned by homophony avoidance requires a model that can deal with both global evaluation (cf. the role of homophony avoidance) and variation (cf. Table 3). The constraint-based analysis with global evaluation is shown in Table 4. The MaxEnt framework (Hayes and Wilson 2008) was used to get from constraint violations to probabilities. Constraint weights of the grammar in Table 4 were inferred from the frequencies of individual input-output mappings in Table 3 using a Bayesian multinomial logistic regression implemented in Rjags (Plummer 2016) combined with the marginalization procedure described above. The model also estimates the probabilities of individual input-output pairs. Those estimated probabilities were found to perfectly match the frequencies observed in Table 2, indicating that the analysis combining variation and global evaluation is successful at accounting for the Persian data. The model was also compared to a model that does not include the anti-homophony constraint and therefore does not require global evaluation, using the Deviation Information Criterion (DIC; Gelman et al 2014). The model with *Homophony was found to better fit the data than the model without this constraint (DIC = -496.62, Sample Standard Error = 51.34), therefore providing a quantitative argument for systemic constraints.

4. Conclusion. This paper has proposed a new method to combine variation and global evaluation. This method is both theoretically and empirically motivated. Hopefully, this work will foster new studies of variable morphophonological patterns using systemic constraints.

			*Homophony	Dep	*Hiatus	Max
/hut͡ʃɑ/,	/hut͡ʃɑ-e/,	/hut͡ʃɑ-emun/	$w = 2.27$	$w = 2.47$	$w = 1.89$	$w = 1.00$
[hut͡ʃɑ],	[hut͡ʃɑe],	[hut͡ʃɑemun]			2	
[hut͡ʃɑ],	[hut͡ʃɑe],	[hut͡ʃɑʔemun]		1	1	
[hut͡ʃɑ],	[hut͡ʃɑe],	[hut͡ʃɑmun]			1	1
[hut͡ʃɑ],	[hut͡ʃɑʔe],	[hut͡ʃɑemun]		1	1	
[hut͡ʃɑ],	[hut͡ʃɑʔe],	[hut͡ʃɑʔemun]		2		
[hut͡ʃɑ],	[hut͡ʃɑʔe],	[hut͡ʃɑmun]		1		1
[hut͡ʃɑ],	[hut͡ʃɑ],	[hut͡ʃɑemun]	1		1	1
[hut͡ʃɑ],	[hut͡ʃɑ],	[hut͡ʃɑʔemun]	1	1		1
[hut͡ʃɑ],	[hut͡ʃɑ],	[hut͡ʃɑmun]	1			2

Table 4: Constraint-based analysis of variable homophony avoidance in Persian

Parallel interaction between infixation and root domain constraints

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Main Claim: The typology of the interaction between infixation and morpheme structure constraints provides an empirical argument for parallel Optimality Theory with constraint domains.

Interaction between Infixation and Root Domain Constraints: Apart from the more frequent patterns of prefixation and suffixation, where an affix attaches to the left or to the right of their base, some languages use infixation, where an affix attaches inside its base. If attached to a monomorphemic base, i.e. a root, this leads to derived discontinuity (Yu 2007). Phonological segments of the root that were adjacent in the input are not adjacent anymore in the output. This leads to an interesting interaction with Root Domain Constraints (RDC, Albright 2004), which are a subset of so called Morpheme Structure Constraints (Halle 1959). These are static constraints that only hold within the root domain. Two questions emerge: Can infixes be included in these root domains? And do RDCs extend to discontinuous roots created by infixation? A small scale study of 55 patterns from 32 languages with 32 interacting patterns reveals that the former question is answered of on a language-specific basis. In 20 patterns infixes are included in the domain of RDCs and in 12 patterns they are exempt from these constraints. The latter question on the other hand is uniformly answered positively. RDCs always extent to discontinuous roots, i.e. infixed roots are never exempt from RDCs.

(1) Typology of Infix-RDC-Interaction

	# of patterns	
	Yes	No
Infix included inside Root Domains	20	12
Discontinuous Root Domains	32	0

(2) Muna infix repair

a. *pimi
b. d⟨um⟩adi '⟨IRR⟩live'
c. m-oŋko 'IRR-kill'
d. *p⟨um⟩oŋko '⟨IRR⟩kill'

Muna (Austronesian, Indonesia) and Modern Hebrew (Afro-Asiatic, Israel) will serve here as two illustrative examples. In Muna, a root cannot include a labial obstruent followed by a labial nasal, i.e. 2a is not a possible root in Muna (van den Berg 1989). The irrealis infix ⟨um⟩ includes a bilabial nasal (cf 2b) and can thus create a structure inside a root domain that would conflict with the RDC, cf. 2d. Such a conflict is resolved by a repair mechanism in 2c, where nasal accretion applies. These data contrast with Hitpa'el forms in Hebrew, where under certain conditions a ⟨t⟩ exponent is infixed. cf. 3b. It is well known that in Hebrew, similar to other Semitic languages, a consonantal root cannot include a sequence of two identical consonants in non-final position, e.g. the impossible root in 3a. However, whenever ⟨t⟩ is infixed, it can systematically violate this RDC (cf. also McCarthy 1979). This means that in Hebrew, the infix is not part of the domain of the RDC. In both languages the RDC still holds inside the discontiguous root, i.e. between segments separated by the infix (e.g. 3d). **Predictions of a serial account:** The typological pattern is unexpected from a serial point of view. A RDC that ignores discontinuous roots can be easily modeled as a process that applies only after infixation. In this transparent bleeding relationship, the context for the RDC is destroyed by the infixation process. A fictional example could be Muna′, a language that differs only minimally from Muna proper. Like in Muna, non-infixed roots with a labial obstruent before a labial nasal do not occur (4a) and the infix has a labial nasal (4b). For expository purposes, the violation will be repaired by major place dissimilation (4c). In Muna′ discontiguous roots are allowed to violate the RDC, as shown in 4d.

(3) No repair in Hebrew

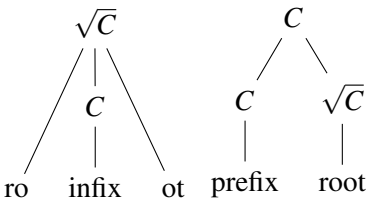
a. *tatav
b. hi-s⟨t⟩arek 'REFL$_i$-⟨REFL$_i$⟩comb'
c. hi-s⟨t⟩ater 'REFL$_i$-⟨ REFL$_i$⟩secret'
d. *hi-s⟨t⟩asek

(4) Discontiguous roots in Muna′

a. *pimi
b. *p⟨um⟩oŋko '⟨IRR⟩kill'
c. p⟨un⟩oŋko '⟨IRR⟩kill'
d. p⟨un⟩imi

A language such as Muna′ is not attested, cf. (1). A serial account cannot be easily restricted in order to exclude Muna′. The obvious candidate that restricts the ordering of processes is the Strong Domain Hypothesis (Kiparksy 1985), which restricts the application of phonological processes such that any phonological process that applies after a morphological process also applies before it. This restriction would correctly exclude the Muna′ pattern, because it would exclude a pattern where the RDC only applies after infixation. Unfortunately, the Strong Domain Hypothesis has been faced with clear counterexamples from prefixation and suffixation almost since its inception. The Strong Domain Hypothesis would thus need to be restricted to infixation only, a conceptually undesirable move. **OT approach:** Ordering cannot explain domain restrictions in a parallel framework of phonology. Therefore, in a parallel OT approach (Prince & Smolensky 1993/2004), some device has to be used to restrict constraint violations to certain domains. I will propose that this can be done by relativizing constraints to hierarchical domains, including a root domain $\sqrt{C}$. These domains can be thought of as prosodic, since they restrict the domain of constraint application in phonology. As shown in (5) this representational approach to RDCs allows infixes to be special because they need to become part of the root domain. In order to still distinguish between root material proper and the root+infix domain a distinction between direct domination (DD) and domination in general (D) is introduced. Only material that is directly dominated by the root constituent is part of the root domain proper, whereas the domain dominated by the root constituent also includes the infix. Domain relativization yields two versions of any RDC, one that includes infixes (C_D) and one that excludes them (C_{DD}). Following considerations on locality domains of OCP constraints by Suzuki (1998), I will assume that these constraints are in a fixed ranking $C_{DD} \gg C_D$. This in turn means that any RDCs that holds for the root+infix domain will also hold for the root proper. This excludes the pattern of Muna′ that is empirically unattested, cf. (6). Note that the effect of this fixed ranking is weaker than the Strong Domain Hypothesis, since suffixes and prefixes need not to be included inside the root domain, cf. (5), yet it provides a more general solution that is not restricted to infixation.

(5) Structural difference between in- and prefixes



(6) Factorial Typology

ranking	language
$C_{DD}, C_D \gg$ FAITH	Muna
$C_{DD} \gg$ FAITH $\gg C_D$	Hebrew
FAITH $\gg C_{DD}, C_{DD}$	No RDC
$C_D \gg$ FAITH $\gg C_{DD}$	Muna′

Alternative Approaches: All derivational approaches based on serial interactions between phonology and morphology, including rule based approaches, such as SPE (Chomsky & Halle 1968), as well as Stratal OT (Kiparsky 2015) and Harmonic Serialism (McCarthy 2000), predict a Muna′ pattern by simply ordering infixation before a repair mechanism to the RDC. Note that the late application of the RDC is independently required to derive the interaction Muna proper, where the infix is included inside the domain of the RDC.

Selected References: •Albright, Adam. 2004. The emergence of the marked: Root-domain markedness in Lakhota. LSA talk handout, Boston. •van den Berg, René. 1989. A grammar of the Muna language. Dodrecht: Foris. •Kiparsky, Paul. 1985. Some consequences of lexical phonology. *Phonology yearbook* 2(1). 85–138. In Silvya Blaho, Patrik Bye & Martin Krämer (eds.), *Freedom of analysis?*, 123–148. Berlin: Mouton de Gruyter. •Suzuki, Keiichiro. 1998. *A typological investigation of dissimilation*. Tucson, AZ: University of Arizona dissertation. •Yu, Alan. 2007. *A natural history of infixation*. Oxford: Oxford University Press.

Experimentally comparing the learnability of transparent and opaque rule interactions

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Background. Numerous artificial language learning studies flourished in the last two decades to test Kiparsky's (1973) claim that opaque interactions are harder to learn. However, none of them provided direct evidence of transparency preference and many had unneglectable methodological or statistical deficiencies: Ettlinger's experiment (2008) focused more on speakers' ability of abstracting UR from opaque surface generalisations than on the comparison between transparency and opacity, Kim (2012) had too small a sample size (*N*=12) and no inferential statistics, and Brooks et al. (2013) only compared a Feeding interaction with two rules that had no interacting potential rather than with opaque interactions. Prickett (2019) conducted research directly comparing different interaction types but by explicitly telling participants how rules should interact, which is not a close simulation of real phonological learning processes. Hence this project aims to directly compare Feeding and Counterfeeding and test whether opacity is less learnable without teaching the participants specific orderings but rather letting them choose the default order in ambiguous environments under a 'poverty-of-stimulus' paradigm. If transparency is preferred as Kiparsky claimed, significantly more participants should be more disposed to learning forms derived from Feeding than those derived from Counterfeeding.

Materials. The two interacting rules were Vowel Harmony (/e/→[i], /o/→[u] within a word) and Palatalisation (/t, d/→[tʃ, dʒ] / _i). Participants learned them by observing how the plural and diminutive suffixes worked in an artificial language. The two suffixes were *-i* and *-a* and their meanings were counterbalanced between subjects. Participants were presented a picture of an object and the corresponding word stem, followed by another picture consisting of either two or a smaller version of that object. Two option buttons then appeared, and participants were told to click on them, listen to the suffixed forms, and choose the one they deemed correct. Feedback was provided immediately after each choice. So, participants were expected to learn the phonological rules using the feedback, especially how the stem changed in the correct environment when *-i* was attached. All stimuli were in $C_1VC_2VC_3$ form and recorded by a female native English speaker at UCL.

Feeding		Counterfeeding	
UR	/petek-i/	UR	/petek-i/
Harmony	pitiki	Palatalisation	------
Palatalisation	pitʃiki	Harmony	pitiki
SF	[pitʃiki]	SF	[pitiki]

***Table 1**. Expected surface forms assuming Feeding vs. Counterfeeding rule orderings*

	Affixed form	Option1	Option2	'Correct' form
Critical	petek-i	pitʃiki (Feeding)	pitiki (Counterfeeding)	pitʃiki (Feeding)
Harmony	komop-i	kumupi	komopi	kumupi
PalC1C2	kutug-i	kutʃugi	kutugi	kutugi
PalC3	bimit-i	bimitʃi	bimiti	bimitʃi

***Table 2**. Examples of choices in the Test phase. In the bracket show the ordering that would create this option in Critical trials. The 'correct' forms for Critical trials were set to be those created by Feeding (i.e., what the transparency bias theory would predict).*

Procedures. The experiment had three phases: Training, Verification, and Test phase. Training phase had four blocks (two for learning Harmony and two for Palatalisation) each with 20 stimuli (10 suffixed with *-i* and 10 suffixed with *-a*). Verification phase was a 'shorter' version of Training with one block for each rule to test if participants grasped that rule. Only subjects with a 75%+ accuracy entered Test phase. Test phase had four blocks – one Critical and three Fillers (Harmony, PalC1C2 and PalC3)[1] – each with eight stimuli. Only *-i* was used in Test phase. Critical trials had the potential to create environment where the participants could apply either rule first (see Table 1). This experiment is interested in the order participants would choose by default and if the transparency preference is true, the Feeding option should become the default of significantly

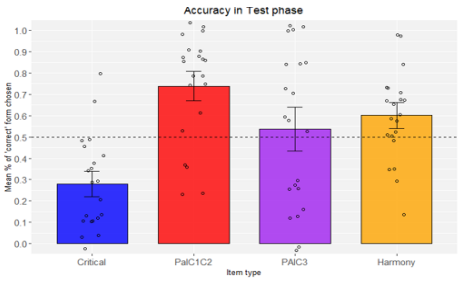

***Figure 1**. Mean % accuracy in Test phase by clock (in Critical block, accurate = Feeding option chosen)*

[1] PalC1C2: Filler trials for Palatalisation at C1 and C2 positions, to ensure participants do not randomly palatalise even when environments do not allow; PalC3: Filler trials for Palatalisation at C3 position, to ensure the participants know how to Palatalise

more participants. The three Filler blocks aimed to check the participants' understanding of each rule separately. Examples of Test phase are shown in Table 2. The order in which the blocks appeared in each phase was counterbalanced between participants. Thirty native American English speakers participated in this online study in 2020.

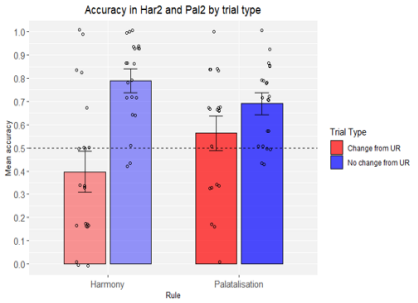

***Figure 2**. Mean % accuracy in Har2 and Pal2 blocks by trial type and change nature*

Results. Results were analysed with mixed-effects logistic regression models implemented in *R* using the *lme4* package. The relationship between Stimulus Block in Test phase and Accuracy was investigated. The percentage (28.0%, z=–4.509, p<0.001) of participants who chose the 'correct' (Feeding) option for Critical trials was significantly lower than chance, and the accuracy rates in PalC3 (53.6%, z=4.904, p<0.001) and Harmony Fillers (60.1%, z=6.037, p<0.001) were significantly different from that of Critical trials. In other words, participants successfully learned these two rules separately but refused to let them feed each other. So, it can be concluded that Feeding option is not necessarily preferred or the easier order to learn.

Discussion. Contrary to predictions, participants did *not* prefer Feeding to Counterfeeding in Critical trials. They also achieved higher accuracy when the correct option required no change from the UR in Training blocks Har2 and Pal2 (see Figure 2). Together, these could be interpreted as a faithfulness bias, which coincided with Kim (2012), Ettlinger (2008) and Brooks et al. (2013)'s findings. Faithfulness bias has been well documented but no direct account of how it could apply to rule ordering was provided. A potential explanation by the author concerns structural complexity: the more features are involved in a pattern, the harder it is to learn (Pater & Moreton, 2012). In this experiment, the grammar deriving Counterfeeding requires the learning of only vowel co-occurring restrictions (i.e., height), whereas deriving Feeding requires knowing the constraints on alveolar stops/affricates (i.e., only affricates before [i]) besides vowel height agreement. However, earlier experimental evidence for structural complexity only tested stable patterns but no dynamic derivations, which could be a direction for future research.

Participants' rejection to apply Palatalisation in Critical trials is also worth discussion. Since Palatalisation in this experiment required participants to generalise the rule from C3 (the original position at which they learned the rule) to C1/C2 positions (which they did not see in training), the author proposes that they could either have employed a more conservative learning strategy (e.g. Hayes, 2004), or believed C1/C2 positions had intrinsic differences from C3 positions. One piece of evidence for the latter comes from Finnish (see more in Baković, 2011) where Assibilation happens only when the environment description is met after the application of another phonological rule, or at morpheme concatenation boundaries. Here, since C3 was where the suffix was attached (i.e., a position theoretically more prone to changes), it is natural for participants to think that only C3 could undergo Palatalisation. This not only suggests a future research direction i.e., the effects of morpheme boundaries on opacity learning, but also potential revisions of the current Palatalisation training stimuli (i.e., more evidence that C1/C2 can also undergo changes should be added) or rule design (i.e., use rules with only local changes).

In short, this project provides laboratory evidence that transparent rule order is *not* necessarily easier to learn and calls for more research in confirming the faithfulness bias.

Selected References: Baković, E. (2011). Opacity and Ordering. In *The Handbook of Phonological Theory*. · Brooks, K. M., Pajak, B., & Baković, E. (2013). Learning biases for phonological interactions. · Ettlinger, M. (2008). *Input-driven Opacity* [PhD dissertation, UCB]. · Hayes, B. (2004). Phonological acquisition in optimality theory: The early stages. In *Fixing Priorities: Constraints in Phonological Acquisition*. · Kim, Y. J. (2012). Do learners prefer transparent rule ordering? An artificial language learning study. *CLS*. · Kiparsky, P. (1973). Abstractness, opacity, and global rules. In *Three dimensions in linguistic theory*. · Pater, J., & Moreton, E. (2012). *Structurally biased phonology: Complexity in learning and typology*.