The Twenty-Eighth Manchester Phonology Meeting

ABSTRACTS BOOKLET

Wednesday 26th - Friday 28th May 2021

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

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

This booklet contains the abstracts for all the papers presented at the **twenty-eighth Manchester Phonology Meeting**, held in cyberspace, in May 2021.

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

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

The **final programme**, available on the 28mfm website, gives the details of when presentations are scheduled.

The 28mfm website is available here:

http://www.lel.ed.ac.uk/mfm/28mfm.html

Talks

Glottal Stop Variation in Standard Arabic: OT-based Optionality Analysis

Mohammed Al-Ariqy (The University of Utah: u1271554@utah.edu)

This paper analyzes optional [ʔ] deletion in Standard Arabic. This deletion is typically accompanied by lengthening or gliding of an adjacent vowel, and deletion can be blocked when this lengthening/gliding is not possible, and also when deletion would create homophony. This paper assesses the ability of various OT-based theories of optionality to account for [ʔ] deletion, arguing that the rank-ordered model of EVAL (ROE; Coetzee 2006) provides a better account than alternatives such as partially ordered grammars (PO; Anttila 1997, 2007) and serial variation (SV; Kimper 2011).

The constraint **HavePlace** (HP) triggers deletion because [ʔ] lacks place features. When a coda [ʔ] is deleted, the preceding vowel is lengthened to satisfy **Max-μ** ([muʔna] ~ [mu:na] 'subsistence'). If this vowel is already long, it gives rise to a geminate glide instead ([xɑtˁi:ʔah]~[xɑtˁijjah] 'sin'). However, [ʔ] deletion is blocked by the **OCP** ([sajjiʔah]~*[sajjijah] 'bad deed'). When an onset [ʔ] is deleted, **ONSET** compels insertion of a glide whose features match those of the preceding vowel ([miʔah] ~ [mijah] 'a hundred', [miʔar]~[mijar] 'revenge'). When no such glide is available (i.e. when the preceding vowel is low), **ONSET** blocks deletion ([saʔala]~*[saɑ̯ala] 'asked'). When in word-final position, [ʔ] deletes, and its preceding long vowel shortens ([masaaʔ]~[masa] 'evening', [suwajʔil]~[suwajjil] 'inquirer') unless a homophony avoidance (Crosswhite, 1999) constraint blocks deletion ([samaaʔ] ~*[sama] 'sky'; cf. [sama] 'rise (past)'), ([mawʔɪl]~*[mawwɪl] 'resort'; cf. [mawwɪl] 'fund (v)') where the deletion of [ʔ] is blocked because **AvoidHomophony** outranks HP**.** In a word with multiple [ʔ], they delete independently of each other ([luʔluʔah]~[lu:luwah]~[lu:luʔah]~ [luʔluwah] 'pearl'). [ʔ] in onset position can also delete with no compensation if **ONSET** is satisfied by onset reassignment or metathesis ([ʔalʔaħmar]~[ʔalaħmar]~ [ʔalħamar] 'the red'). While other situations present additional complications, these are the core facts. ROE assumes a cut-off line somewhere in the constraint ranking. Constraints above the cut-off line eliminate candidates as normal, but any candidate that survives to the cut-off line is a possible output. Max-ʔ and HP are then below the cut-off to yield variants presented above. This model seems to be able to capture all these possible outputs including those of 'pearl'. See (1).

(1) ROE /luʔluʔah/	ONS	Max-μ	Max-ʔ	HP
a. ☞ luʔ.lu.ʔah				***
b. ☞ lu:.lu.wah			**	*
c. ☞ lu:.lu.ʔah			*	**
d. ☞ luʔ.lu.wah			*	**

(2) PO / luʔluʔah/	Max-ʔ	HP	IDENT-length
a. ☞ luʔ.lu.ʔah		***(!)	
b. ☞ lu:.lu.wah	**(!)	*	**
c. (☜) lu:.lu.ʔah	*(!)	**(!)	*
d. (☜)luʔ.lu.wah	*(!)	**(!)	*

Alternative theories fail to fully capture the variation in the data. In PO, the ranking can vary across tableaux, potentially giving multiple outputs for one input. This model fails to capture all variants of /luʔluʔah/ as seen in (2) above. Under either of PO's rankings, the winner will have to maximally satisfy the higher of the two relevant constraints, but the outputs it does not produce only partially satisfy those constraints--they neither delete all the glottal stops nor fully preserve them, and that problem remains no matter how many rankings you allow for PO. It captures variation in the data only where two variants are attested (3&4).

(3) PO /miʔar/	*Homophony	Max-ʔ	HP
a. ☞ mi.ʔar			*(!)
b. ☞ mi.jar		*(!)	
c. mi.har	*!		*

(4) PO / muʔnah/	Max-μ	HP	Max-ʔ
a. ☞ muʔ.nah		**	
b. ☞ mu:.nah		*	*
c. mu.nah	*!	*	*

Serial Variation, which uses PO in a serial derivation, also fails to capture variation in /luʔluʔah/ as it produces even more unattested forms such as *[luʔluah] and *[luluwah] due to GEN's restriction of producing outputs different from the input by only a single change.

To conclude, this paper supports the ROE model of optionality and shows some shortcomings for the PO and Serial Variation models of optionality.

When Phases become necessary: Adjectival and Nominal forms of verbs in Neo-Štokavian

Boban Arsenijević & Marko Simonović (University of Graz)

In Neo-Štokavian (NŠ), High tone systematically avoids lengthened vowels (i.e. long vowels derived by mora affixation). In the table below, this is illustrated by contexts where lengthened theme vowels get avoided.

NŠ verb stems end in a theme vowel (TV). The two most frequent TVs are *i* (e.g., in *molį̲-ti* 'pray') and *a* (e.g. in *usisaavą̲-ti* 'hoover'*)*. Both *i* and *a* are underlyingly short. In verbs with a floating H affiliated with the TV, the infinitive (and in all the other forms in black) shows the preferred alignment for the H: right-alignment with the stem. When a moraic affix lengthens the TV, the H retracts to avoid the lengthened vowel (in all the forms in blue).

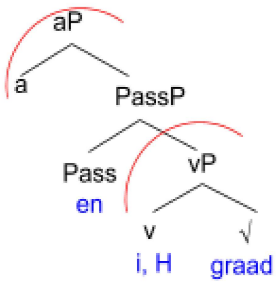
While the described generalisations hold for strictly verbal forms, it is contradicted by the forms of the (adjectival) Passive Participle and the Deverbal Noun (in red).

	moliti 'pray'		graaditi 'speak'		usisaavati 'hoover'	
	Singular	Plural	Singular	Plural	Singular	Plural
Infinitive	molí-ti		graadí-ti		usisavá-ti	
2Present	mólii-ʃ	mólii-te	gráadii-ʃ	gráadii-te	usisáavaa-ʃ	usisáavaa-te
3Present	mólii	mólee	gráadii	gráadee	usisáavaa	usisaavá-juu
2Imperative	molí	molí-te	graadí	graadí-te	usisáavaa-j	usisáavaa-jte
Past Ptcp	molí-o	molí-li	graadí-o	graadí-li	usisaavá-o	usisaavá-li
Passive Ptcp	móʌ-en	móʌ-en-i	gráadʒ-en	gráadʒ-en-i	usisáava-an	usisáava-an-i
Gerund	moʌéeɲ-e	moʌéeɲ-a	graadʒéeɲ-e	graadʒéeɲ-a	usisaaváaɲ-e	usisaaváaɲ-a

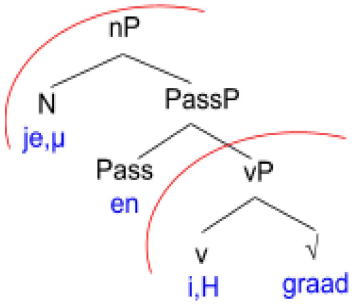
Table 1. Extended paradigm of verbs in TV-classes a and i with a floating H

We argue that while verbal forms can be analysed as pure concatenation of morphological elements (i.e. spelled-out in the same phase), the Passive Participle form and the Deverbal Noun crucially involve more complex structure. Both forms contain a verbal projection, which triggers the first round of spellout (graadí in (1) and (2)). When the TV gets delinked from the vocalic tier, its H gets relinked inside the sponsoring domain (= the structure built by the moment Spellout is triggered). We consider various implementations of the account with respect to the timing of the spellout of heads, co-phonologies etc.

(1) Structure for gráadʒen 'build-PassPctp'



(2) Structure for graadʒéeɲe 'building'



Intonation and string-identical utterances in English and Arabic

Mohammad Bani Younes
Al al-Bayt University, Jordan
myounes@aabu.edu.jo

Sam Hellmuth
University of York, UK
sam.hellmuth@york.ac.uk

Alternative questions (altqs) and disjunctive yes-no questions (dynqs) in English and Arabic are string-identical (Pruitt & Roelofsen, 2013; author, 2020). For example, *do you have a mobile or an iPad?* can be interpreted either as an altq or a dynq in English. These two readings are disambiguated by prosodic features such as accent distribution and the shape of the final intonation contour; with final falling intonation [\] the question is perceived by listeners as an altq, but with rising intonation [/], it is considered a dynq (Pruitt & Roelofsen). One reason why altqs and dynqs may need to be disambiguated by prosody in English is that there is only one disjunctive element (DE) (*or*), that can be used in both types of questions. Colloquial Arabic has two DEs that are equivalent to English *or*: *willa* and *ʔaw*. Hence a question arises: *does Arabic behave similarly to English in using only prosody in the disambiguation, or is there a role of DE choice, as well or instead?*

A production study was run with 18 Jordanian speakers to elicit examples of altqs and dynqs. Thus, this production study helps establish the independent variables to be included in the perception study. It revealed that altqs and dynqs have different intonational patterns: altqs (fall) and dynqs (rise). It also showed that both *willa* and *ʔaw* appeared in both types of question, so intonation and choice of DE could serve as independent variables in a perception study to test the relative contribution of each of these cues to the disambiguation of altqs and dynqs.

Following the production study, a comprehensive replication of Pruitt and Roelofsen's perception study was run with 244 participants (74 Jordanian (JA), 52 Egyptian (EA), 70 Kuwaiti (KA), and 48 Syrian (SA) Arabic). The perception study uses 24 lexically-distinct target sentences and 36 filler sentences. Each target was recorded in four conditions for presentation in a Latin Square design: *ʔaw*+rise, *ʔaw*+fall, *willa*+rise, *willa*+fall. Four copies of the experiment were created in Qualtrics and were sent to participants. Participants were provided with two written paraphrases of each trial they listened to: one was intended as an altq paraphrase, and one was meant to be a dynq paraphrase. Results from mixed-effects logistic regression (glmer(resp_numeric ~ intonation * disjunctive_element * dialect + gender + age + Education + device + (0+intonation|listener) + (1 | stimulus), data = cross_dialect, family = binomial, control = glmerControl(optimizer = "bobyqa"))) suggest that intonation is more important than DE choice in disambiguating altqs and dynqs in all four dialects. The results show variation between dialects in that the effect of DE choice was stronger in EA than in all other dialects, and there was no main effect of DE choice in SA.

Thus, although Arabic (as shown in the results of the four dialects) behaved similarly to English in employing intonation in the disambiguation, intonation was not the only cue Arabic uses. Despite this similarity in employing intonation, Arabic is still different from English as some of its dialects had main effects of DE choice while others did not. Hence, the results both support and contradict Dayal's (2016) generalisation that altqs and dynqs are solely disambiguated by prosody: DE choice matters in three dialects (JA, EA, and KA). This result supports Meertens' (2019) suggestion of a typology in which languages use prosody-only, disjunction-only, or a combination of both to resolve the ambiguity of altqs and dynqs. In the presentation, more details about how similar and different to each other these dialects are, in terms of the weight of each disambiguating cues, will be provided. The presentation will also show, in detail, how the results match or contradict Dayal's and Meertens claims.

Perception and phonology in loanword adaptation: /sC-/ onsets in Luso-American Portuguese

Justin Bland (The Ohio State University)

Research on loanwords typically attributes loanword adaptation to one of three sources: perception (e.g. Peperkamp & Dupoux 2003), phonology (e.g. Paradis & LaCharité 1997), or a combination of perception and phonology (e.g. Steriade 2001, Silverman 1992, Boersma & Hamann 2009) (see also Davidson 2007 for an overview). In this study I examine the adaptation of English loanwords with /sC-/ onsets in an immigrant variety of European Portuguese (EP) spoken in the US, which I term Luso-American Portuguese (LAP). I argue that /sC-/ adaptation in this variety can best be explained as an interaction between phonological constraints on syllable formation in EP and the perception of cues from vowel intrusion in American English.

In languages that do not permit /sC-/ onsets, loanwords with such onsets can be adapted by inserting a vowel. The vowel can be inserted before the cluster (e.g. Eng. *stop* > Spanish [es.ˈtop]), which is termed prothesis, or after the cluster (e.g. Eng. *stop* > Japanese [sɯ.top.pɯ]), which is termed anaptyxis (Fleischhacker 2005). Standard EP uses prothesis to adapt all /sC-/ onsets (e.g. *ski* [ɨʃ.ˈki] ‘ski’, *eslavo* [ɨʒ.ˈla.vu] ‘Slav’) and anaptyxis to adapt other illicit complex onsets (e.g. *pneu* [pɨ.ˈnew] ‘tire’). Drawing on Collischonn & Wetzels (2016) and Keller (2010), I explain this in terms of EP phonological constraints on syllable structure. Specifically, Keller argues that an avoidance of medial insertion results in an overall preference for prothesis. At the same time, Collischonn & Wetzels note that EP permits very few codas, most notably /s/, so EP will use anaptyxis if prothesis would result in an illicit coda, as in *pneu* *[ɨp.ˈnew]. Thus, EP phonology explains a pattern of prothesis for all /sC-/ onsets and anaptyxis for other illicit onsets.

However, LAP appears to follow a slightly different pattern. To examine this variety, I compiled a small corpus of English loanwords with /sC-/ onsets from previous phonetic transcriptions of mid-20th-century LAP (Borges 1960, Pap 1949, Dias 1989). In this corpus, /s/ + stop onsets are adapted via prothesis as in standard EP (e.g. Eng. *steamer* > LAP [ɨʃ.ˈti.mɐ]), but /s/ + sonorant onsets are adapted via anaptyxis (e.g. Eng. *snow* > LAP [sɨ.ˈnɔ]).

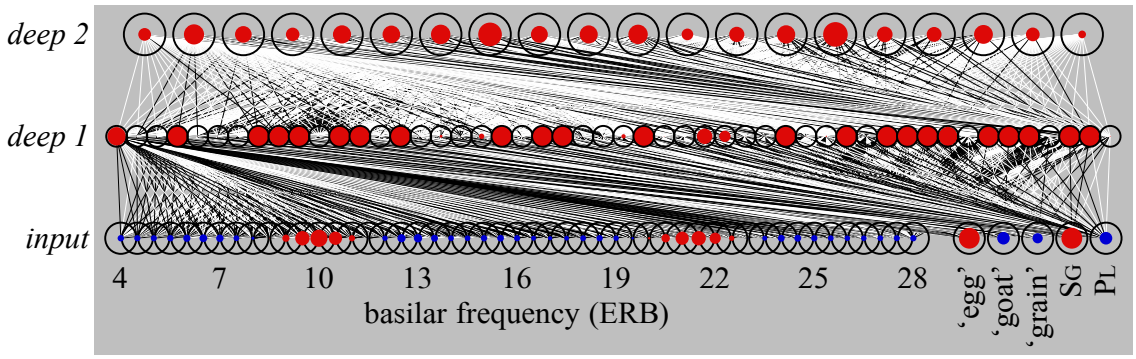
A possible explanation lies in perception, specifically the perception of what Hall (2003, 2006) calls *vowel intrusion* as epenthesis. According to Hall, when the consonants in some complex onsets are produced with minimal gestural overlap, a vowel-like element can arise between the consonants, resulting in a phonetic, non-segmental intrusive vowel. Moreover, Hall finds that sonorants are a common trigger for vowel intrusion. Since /sC-/ onsets are illicit in EP, speakers may be particularly attentive to any vowel cues for epenthesis, and if variable vowel intrusion is present in an English word like *snow*, it may be perceived as epenthesis [sɨ.ˈnɔ], resulting in anaptyxis in /s/ + sonorant onsets. Indeed, Fleischhacker (2005) and Broselow (2015) find evidence for such intrusion in English (cf. *puh-lease* for ‘please’), and Broselow (2015) proposes a similar explanation for loanword adaptation in other languages. On the other hand, since stops tend to block vowel intrusion (Hall 2003), intrusion should not be present in a English /s/ + stop onsets, as in *steamer*. For such words, LAP would have to rely its own phonology, which would specify prothesis [ɨʃ.ˈti.mɐ] in such a context.

Thus, loanword adaptation of /sC-/ onsets in LAP can best be explained as an interaction between perception and phonology: /s/ + sonorant onsets are adapted with anaptyxis because of the perception of vowel intrusion as epenthesis, while /s/ + stop onsets are adapted with prothesis because of EP phonological constraints on syllable structure. This process offers further evidence that loanword adaptation involves both phonology and perception.

Phonological features emerge substance-freely from the phonetics and the morphology

Paul Boersma, U. of Amsterdam, paul.boersma@uva.nl; Kateřina Chládková, Charles U., chladkova@praha.psu.cas.cz; Titia Benders, Macquarie U., titia.benders@mq.edu.au

Restricted Boltzmann machines (Smolensky 1986) have become stable enough for handling multi-level ("deep") representations (Hinton & Salakhutdinov 2009), which is what we need in linguistics. We employ deep Boltzmann machines to simulate the emergence of phonological features, using **sound–meaning pairs** as inputs. Our simulated toy language has five utterances aptly written as *a*, *e*, *i*, *o* and *u*. The **sound part** of the input represents each of these utterances as two peaks of activity on the basilar membrane: the utterance *a* has peaks whose centres lie around 13 and 19 ERB (i.e. [a]), and for *e*, *i*, *o* and *u* the peaks lie at {10, 22} ([ɐ]), {7, 25} ([i]), {10, 16} ([o]) and {7, 13} ([u]), respectively (all in ERBs). The **meaning part** of the utterances is typically composed of a lexical item with grammatical number (for count nouns): *a* 'grain', *e* 'egg-SG', *i* 'egg-PL', *o* 'goat-SG' and *u* 'goat-PL', i.e., a phonologist would generalize over this by saying that the number morpheme is implemented as vowel height. The network below shows how the input represents both sound and meaning for a typical instance of *e*.



This network has been trained with 3,000 sound–meaning pairs, for each pair updating the biases of the nodes and the weights of the connections between the nodes in four steps: activity spreading from the input throughout the network, a Hebbian learning step, random phantasizing (dreaming), and an anti-Hebbian (un-)learning step. This network exhibits the usual desirable properties: (1) it has become a **good listener** of the language, i.e. when given a sound on the left part of the input, activity spreading will cause the network to put the appropriate meaning on the right (this is what the figure shows), (2) it has become a **good speaker**, i.e. when given a meaning, activity spreading will cause the network to activate the appropriate sound, and (3) it exhibits the perceptual magnet effect during acquisition and generally shows **categorical behaviour**, i.e. it has a finite number of possible stable activity patterns on the deeper levels.

Most relevant is the observation that **features have emerged**. In terms of nodes in a distributed network, phonological features are similarities in activity at the deeper levels (which are the levels that influence the behaviour of the organism). At the level "deep 1" in the figure, the utterances *e* and *o* (either their sound or their meanings) come to show a high cosine similarity, i.e. feature sharing, of 69% (averaged over 100 virtual learners), due to the fact that there is support both in sound (a 10 ERB peak) and in meaning (the 'SG' morpheme); an equally high similarity (67%) emerges between *i* and *u*, by the same cause (7 ERB and 'PL'). Feature sharing is less for utterances that share sound only, namely *a* and *u* (62%, due to the 13 ERB peak) or for utterances that share meaning only, namely *e* and *i* (48%, sharing 'egg') or *o* and *u* (48%, sharing 'goat'). The remaining 5 similarities are around 40% ("no" feature sharing).

We conclude that phonological features can emerge both from sound and from meaning (though most strongly if sound similarities and meaning similarities are correlated), at a deep level that in itself is **substance-free**, i.e. a level written neither in a phonetic nor in a semantic alphabet, although the interfaces *link* it to both the phonetics and the semantics.

Downstep in Santiago Laxopa Zapotec and the prosodic typology of VSO languages

Mykel L. Brinkerhoff (mlbrinke@ucsc.edu), John Duff, & Maya Wax Cavallaro (UC Santa Cruz)

Background: Modern MATCH-theoretic approaches to prosodic structure derive cross-linguistic variation in prosody from two sources: (i) variation in syntactic structure and (ii) variation in the ranking of a set of universal markedness constraints on syntax-prosody mappings. In this study, we hold (i) constant in order to examine (ii) more closely. We show with novel fieldwork data that Santiago Laxopa Zapotec (SLZ) fills a problematic gap in the prosody of VSO languages.

VSO languages differ in the prosodic phrasing of transitive sentences with full DP arguments (1). In Irish (Celtic: Elfner 2012; Bennett, Elfner, & McCloskey 2016), (1a) is observed for complex subjects and (1b) possible for single-word subjects. Otomi (Oto-Manguean: Palancar 2004) shows (1b), and Ch'ol (Mayan: Clemens & Coon 2018, Clemens 2019) shows (1c).

(1) a. V [SO] b. [VS] O c. [V] [S] [O]

A language with only (1a) would be generated if MATCH outranks certain markedness constraints. According to Kalivoda (2018), no such language has been attested: a challenge to MATCH theory. We show here that SLZ fills this gap.

Language & Methodology: SLZ is an endangered Oto-Manguean (Northern Zapotec) language spoken in Santiago Laxopa, Ixtlán, Oaxaca, Mexico. It features VSO structure and lexical tone. Data presented here comes from weekly virtual elicitation with one native speaker consultant during the COVID-19 pandemic.

Phenomenon: In languages with downstep, particular tone values trigger lowering for subsequent tones within a prosodic domain (Connell 2011). Patterns of downstep can thus be used as a diagnostic for prosodic structure (e.g. Xitsonga: Selkirk 2009, 2011). We observe in SLZ that a H-tone causes downstep of all subsequent H-tones only within certain domains, which we take to be non-maximal phonological phrases (φ_{nonmax}) (Ito & Mester 2012). The right edge of these φ_{nonmax} are associated with pitch resets.

Prosodic structure: Using downstep as our diagnostic for the placement of φ_{nonmax}, we propose that transitive sentences in SLZ with full DPs are phrased as in (2a)—e.g. *Bgò békù'nh* ↓*békù'nh*, 'The dog fed the dog.' An alternative phrasing (2b) is only possible with dependent pronominal subjects—e.g. *Bkàtch=é' békù'nh*, 'She (an elder) hid the dog.'

(2) a. $[_{\iota}\ [_{\varphi\text{max}}\ V_{\omega}\ [_{\varphi}\ S_{\omega}\ {}^{\downarrow}O_{\omega}\ ]_{\varphi}\ ]_{\varphi\text{max}}\ ]_{\iota}$ b. $[_{\iota}\ [_{\varphi\text{max}}\ (V_{\omega}\ S_{\text{CL}})_{\omega}\ [_{\varphi}\ O_{\omega}\ ]_{\varphi}\ ]_{\varphi\text{max}}\ ]_{\iota}$

H-tones in a subject trigger downstep in an object, regardless of the amount of phonological material intervening, suggesting the arguments are phrased together. A lack of downstep between H-tones in the verb and the subject shows the verb lies outside this φ. Weak subjects (clitics), however, must adjoin to the verb (2b): subject clitics with H-tone fail to trigger downstep in objects. Finally, crucial evidence for recursion comes from the fact that downstep is not observed for H-tones within the verb; we conclude the verb adjoins without its own φ.

Analysis: As noted by Clemens & Coon (2018), existing syntactic accounts of VSO structure are not distinct for purposes of syntax-prosody mapping, all yielding the simplified schema in (3).

(3) $[_{\text{CP}}\ [_{\text{TP}}\ V\ [_{\text{XP}}\ S_{\text{DP}}\ O_{\text{DP}}\ ]_{\text{XP}}\ ]_{\text{TP}}\ ]_{\text{CP}}$

To capture the typology of VSO prosodies, we assume the existence of the constraints MATCH(XP,φ), STRONGSTART(XP), EQUALSISTERS, and BINARITY, as defined in Bennett et al. (2016). SLZ phrasing is predicted when MATCH dominates ES and BIN, with the behavior of clitic subjects derived from undominated STRONGSTART. Other rankings of these four constraints produce the attested patterns of Irish, Otomi, and Ch'ol. SLZ thus validates the typology predicted by MATCH theory, defending its validity as a theory of the syntax-prosody interface.

Variation as a measure of under-specification and category: The case of palatalization and emphasis

Małgorzata Cavar, Steven Lulich & Abdullah Alfaifi (Indiana University)
mcavar@indiana.edu, slulich@indiana.edu, abdalfai@iu.edu

In the past, variation in phonological data that was not determined by phonological context was considered to be anomalous in generative grammar. Early attempts to address variation in the grammar referred to optional rules, multiple grammars of an individual speaker, or the stratification of the lexicon (Ito and Mester 1995, Anttila 2006). Classical generative approaches looked at language as a phenomenon internal to the speaker, and consequently inter-speaker variation was of no concern. On the other hand, Labovian approaches investigating sociolinguistic variation include inter-speaker variation. The newer stochastic and probabilistic Optimality Theoretic approaches, such as e.g. Boersma (1998), Boersma and Hayes (2001), Hayes (2008), Pater (2016), or usage-based models (Bybee 2001), can be informed by corpus data and include variation and frequency as a factor in forming individual grammars. Thus, the concept of variation has gained some grounds in comparison to early generative approaches. However, research on phonological variation has thus far followed a "forward" trajectory, from positing an underlying category to observing and explaining the surface variation within this category. We take the opposite "inverse" direction: by examining the surface variation we attempt to discern the underlying representation. In particular, looking at the distribution of surface realizations in a certain phonological dimension, e.g. voicing, we will observe a clustering of values within established categories and a dispersion of values between categories. I.e., we expect a minimum of in-category variation and greater variation as we include data from outside of the category, or if the system of categories and contrasts is not stable.

In this presentation we analyze the data from a 3D ultrasound study of Russian, Polish and Arabic and focus on the variation in the realization of palatalized and emphatic consonants and their non-palatalized and non-emphatic counterparts. Emphatics are variously described as velarized, uvularized, pharyngealized or even glottalized. We hypothesize that an interpretation in terms of tongue root retraction might address most – if not all – of these realizations. (Secondary) palatalization is traditionally interpreted in terms of tongue body raising and fronting towards the palate, but recent works point to the systematic role of tongue root advancement in the articulation of palatalization. If these interpretations are correct, palatalization and emphasis might be considered two poles of the same dimension of contrast, with languages such as Arabic utilizing primarily [-ATR] and languages such as Russian or Polish utilizing primarily [+ATR]. We investigate variation of the surface realizations in a number of ways. We demonstrate that in palatalization the variation in the position of the tongue root is systematically smaller than the variation in the position of the tongue dorsum, which supports the hypothesis that it is the position of the tongue root that is the primary correlate of palatalization. We hypothesize that the same pattern of variation exists in emphasis. Further, we compare the variation of tongue root position in the [+ATR] and the [-ATR] category within individual languages. In Polish and Russian, the variation in tongue root position is larger within the non-palatalized consonants as opposed to palatalized. We hypothesize that in Arabic the opposite holds, i.e. the variation in tongue root position within emphatic consonants is lower than in non-emphatic consonants. These effects might support the idea that only one pole of the contrast in Russian, Polish or Arabic is specified, while the other is an under-specified opposition to the specified category. The prediction is that the underspecified pole of the dimension might develop some systematic sociolinguistic effects.

A'INGAE SYNTAX CONDITIONS THE REPRESENTATION OF GLOTTALIZATION

MAKSYMILIAN DĄBKOWSKI, UC BERKELEY dabkowski@berkeley.edu

In this paper, I address the complex facts of glottalization in A'ingae (or Cofán, an Amazonian isolate, ISO 639-3: con). I argue that A'ingae glottalization has two syntactically-conditioned representations: Within the aspectual projection (*asp*P), glottalization is a laryngeal feature of the metrical foot. Outside of *asp*P, it is a regular glottal stop. Thus, I show that the phonemic status of glottalization varies with word-internal syntax. All data were collected by the author.

LARYNGEAL FEATURE WITHIN *asp*P. Within *asp*P, glottalization is a laryngeal feature of the trochaic foot and surfaces in the nucleus of one of the foot's syllables. In trisyllabic roots, glottalization is realized in the second syllable (1), showing that by default glottalization surfaces in the second syllable of the foot (σ́σʔ). In bisyllabic roots, glottalization is realized in the first syllable (2), showing a ban on word-final glottalization *ʔ]$_{\omega}$, which gives rise to (σ́ʔσ)]$_{\omega}$.

(1) [$_{asp\text{P}}$ (*ák^{h}eʔ)pa*] forget

(2) [$_{asp\text{P}}$ (*kóʔfe*)] play

*Asp*P undergoes phonological evaluation before the rest of the phonological word. In consequence, the position of glottalization in inflected bisyllabic verbs depends on the structural position of the suffix. *Asp*P-internal suffixes are evaluated with the root, so glottalization surfaces at the right-edge of the foot (3). *Asp*P-external suffixes attach after the prohibition on word-final glottalization is enforced within *asp*P, resulting in foot-medial glottalization (4).

(3) [$_{asp\text{P}}$ (*kɨ́iʔ*) *-ɲa*] drink -CAUS

(4) [$_{asp\text{P}}$ (*kɨ́ʔi*)] *-^{m}bi* drink -NEG

Further evidence for glottalization as a laryngeal feature of the metrical foot comes from culminativity, preglottalized suffixes, and dominance effects. First, glottalization is culminative (i. e. there can be only one glottalized syllable) within *asp*P. Culminativity is definitional of metrical structure but typologically rare for a regular segment. Second, preglottalized *asp*P-internal suffixes, such as *-ʔhe* 'IPFV,' assign stress to the penultimate syllable of their morphological base (5). This shows that glottalization requires a metrical foot to host it. Third, *asp*P-internal dominant suffixes (i. e. suffixes which delete the stress of their base, Kiparsky et al., 1977), such as *-je* 'PASS,' in A'ingae also delete glottalization. This shows that glottalization is treated as a prosodic feature, not a segment (6, cf. 1). Penultimate stress in (6) is the default.

(5) [$_{asp\text{P}}$ *o(tíʃi -ʔ)he*] wash -IPFV

(6) [$_{asp\text{P}}$ *ak^{h}e(pá -je)*] forget -PASS

GLOTTAL STOP OUTSIDE *asp*P. Outside of *asp*P, glottalization is a segmental glottal stop. First, it can be outside of the head foot, it can be in the onset position (e. g. in *-ʔa* 'ASS'), and it is not culminative, i. e. there can be more than one glottalization per word (7). Second, in the absence of lexically specified stress and *asp*P-internal glottalization, stress is assigned by default to the last syllable of *asp*P (modulo non-finality, see 6). This holds regardless of whether the suffix outside of *asp*P is preglottalized (8) or not (9), showing that glottalization is not metrical and plays no role in stress assignment outside of *aspP*.

(7) [$_{asp\text{P}}$ (*ák^{h}eʔ)pa*] *-ʔa* forget -ASS

(8) [$_{asp\text{P}}$ *oti(ʃí*] *-ʔfa)* wash -PL

(9) [$_{asp\text{P}}$ *oti(ʃí*] *-^{m}bi)* wash -NEG

(10) [$_{asp\text{P}}$ *ak^{h}eʔ(pá*] *-ha)ma* forget -PROH

Third, *asp*P-external dominant suffixes, such as *-hama* 'PROH,' delete stress, but do not delete glottalization. This shows that glottalization is treated by *asp*P-external suffixes not as a prosodic feature, but rather as a regular segment (10, cf. 1 and 6).

THEORETICAL IMPORT. The data support a view of the phonological grammar where

(i) different levels of syntactic structure can have different phonological grammars,
(ii) phonological evaluation takes place at syntactic boundaries (e. g. *asp*P in 3, 4), and
(iii) particular morphemes can trigger idiosyncratic operations (e. g. stress deletion in 6, 10).

In the full paper, I show that the data are best captured in Cophonologies by Phase (Sande et al., 2020), a framework of the phonology-syntax interface which fulfills the three desiderata (i-iii).

Phonology-driven morphological epenthesis in Barguzin Buryat case marking

Colin Davis / University of Southern California / colind@usc.edu

1 Introduction. I use fieldwork data to analyze a morpho-phonological process in the Barguzin dialect of Buryat (Mongolic). I argue that this language performs epenthesis of a special morpheme to satisfy a phonological requirement of certain case affixes. Precedent for phonologically driven morpheme epenthesis comes from the analysis of Basque and Italian in Arregi & Nevins (2012). These Buryat patterns provide further evidence that morphological insertion is sensitive to phonology (McCarthy & Prince 1998, Wolf 2008, a.o.), and has consequences for the analysis of Barguzin Buryat, whose case paradigm remains incompletely understood.

2 Data. In Barguzin Buryat, nominative case is null, while the various oblique cases are straightforward suffixes which involve no morpho-phonological alternation. Genitive (GEN) and accusative (ACC) cases are more complex, however. When affixing to a bi-moraic vocalic segment (long vowel or diphthong), these elements respectively have the forms *-n* and *-jɔ*:

(1) a. **noxoi-n** xool ʉntɔi
dog-GEN food expensive

b. bi **taxʲaa-jɔ** xaraab
I chicken-ACC see

When affixing to any other segment, such as a consonant or short vowel, the element *-AI/ii-* is recruited to intervene between that segment and the GEN or ACC suffix, as (2) shows for consonants. With a short vowel a predictable hiatus-avoidance process applies in such contexts, deleting the short vowel (as Staroverov & Zelensky To appear describe, facts omitted due to space limits).

(2) a. **dugar**-*(ai/ii)-**n** miisgɔi bʉdʉʉn
Dugar-??-GEN cat fat

b. bi **dugar**-*(ai/ii)-**jɔ** xaranaab
I Dugar-??-ACC saw

Barguzin Buryat has productive purely phonological epenthesis, which inserts the harmonizing vowel /A/ to break up /CC/ clusters at morpheme boundaries (Staroverov & Zelensky, ex. 24), as (3) shows. Importantly, this phonologically driven /A/ epenthesis is clearly distinct from the *-AI/ii-* epenthesis sometimes required by GEN and ACC cases. Thus these are distinct processes.

(3) a. xɑtɑr-dag-bdi → xɑtɑr-a-dag-a-bdi
dance-HAB-1PL

b. nʲʉʉr-mnʲi → nʲʉʉr-a-mnʲi
face-1SG.POSS

3 Analysis. The facts indicate that GEN and ACC morphology in Barguzin Buryat have a characteristic phonological requirement, which I descirbe with the following constraint in (4):

(4) *μμ*-GEN/ACC:
*Assign a * when GEN or ACC marking is not left-adjacent to a bi-moraic vocalic segment.*

The partial table in (5) describes the distribution of the morpheme epentheis that (4) motivates. While usual epenthesis of /A/ would save some (though not all) potential violations of *μμ*-GEN/ACC, the ranking of Dep(/A/) over *μμ*-GEN/ACC prevents this. The ranking of *μμ*-GEN/ACC over Dep(Ai/ii) allows the morpheme *-Ai/ii-* (which has no other function in Barguzin Buryat) to be recruited as an epenthetic item that satisfies *μμ*-GEN/ACC, if this constraint would otherwise be violated:

(5)

dugar+n/jɔ	*C+C	Dep(/A/)	*μμ*-GEN/ACC	Dep(Ai/ii)
a. dugar+n/jɔ	*	✓	*	✓
b. dugar+a+n/jɔ	✓	*	*	✓
→ c. dugar-**ai/ii**-n/jɔ	✓	✓	✓	*

4 Implications. Building from discussion in Baker (2015), I argue that the requirement in (4) is unique to GEN and ACC case because in Barguzin Buryat they are in the natural class of *dependent cases* (in the case ontology of Marantz (1999), a.o.). I show that these cases also pattern together for suppletion processes, as expected if they are fundamentally members of the same category. I extend the above analysis to further puzzles about GEN and ACC in Barguzin Buryat, which display much morpho-phonological complexity that is absent from standard Burayt.

The ‘st’ problem in Faifi Arabic

Stuart Davis & Abdullah Alfaifi, Indiana University (davis@indiana.edu; abdalfai@iu.edu)

The different patterning of s-clusters that occur word-initially from other word-initial consonant clusters has long drawn the attention of phonologists, especially those focused on the various Indo-European language s where either all s-clusters or a subset of s-clusters pattern differently from other word-initial clusters. One can go back to Selkirk (1982) who posits a single-segment analysis of English s-plus-obstruent clusters given that their word initial phonotactics resemble those of single obstruent segments as well as to a series of works by Davis (1984, 1990, 1991, 1992) where it is shown that English [st] patterns differently from [sp] and [sk] with respect to stress patterns and cross-vowel phonotactics. For example, trisyllabic nouns where [st] occurs between the nuclei of the last two syllables can have antepenultimate stress as in words like *mínister*, *pédestal*, and *Pálestine*, but if [sk] or [sp] are in the same position then penultimate stress is typical as in words like *hibíscus*, *Unésco*, *Aláska*, and *Gilléspie*. Also, while [sp] and [sk] are subject to a cross-vowel constraint that disallows the same consonant from flanking both sides of a vowel when there is an initial cluster (so that hypothetical words like [spip] and [skak] are dispreferred) no such constraint holds on [st] given the occurrence of words like *state*, *stat*, and *stout*. More recent work on the phonology of s-clusters focused on Indo-European languages can be found in Goad (2011), Zukoff (2017), and Kim (2021) among others. An issue that emerges from these works is the syllabification of s-clusters as true onsets or not, and whether they can be considered as single complex segments. The recent work by Scheer and Ségéral (2020) makes the strong case for “elastic” sC: that is, the [s] in an sC sequence will normally syllabify as heterosyllabic (with [s] in the coda) after a short vowel, but the [s] can syllabify as a non-coda in other situations (e.g. word-initially or after a long vowel). With this as background, we present a particularly interesting case of the patterning of [st] in a subvariety of Faifi Arabic, a historically isolated dialect of Arabic spoken in the mountainous area of Saudi Arabia’s Jizan Province along the border of Yemen. While the dialect has unusual phonological features (such as the realization of the pharyngealized /dˤ/ (Daad) as [f], as detailed in Davis and Alfaifi 2019), its most unusual feature according to Behnstedt and Alfaifi (2011) is the realization of the Arabic pharyngealized /sˤ/ as nonpharyngealized [st], which is claimed by them to pattern as a single complex segment, a reverse affricate that is cognate with the Hebrew affricate /tˢ/. One matter that is not discussed by Behnstedt and Alfaifi (2011) or in any of the small subsequent literature on Faifi Arabic is phonological argumentation for such a position. In this talk, we argue based on phonological patterning that the Faifi [st] reflex of standard Arabic /sˤ/ basically patterns as a bisegmental sequence (not as a single complex segment). Nonetheless, we show that the [st] sequence demonstrates some “elasticity” along the lines of Scheer and Ségéral. There are three arguments for [st] being a sequence and not a complex segment. First, in word-initial position, as in the word [stawm-in] ‘fasting’, when the prefixal definite article /m-/ is affixed, epenthesis is triggered resulting in [ʔim-stawm] ‘the fasting’ where epenthesis prevents a word-initial trisyllabic cluster (*[m-stawm]). On the other hand, a true affricate, as in [m-d͡ʒazara] ‘the carrot’, patterns as a single segment since no epenthesis occurs word-initially (note that the sub-variety permits initial biconsonantal clusters). Second, [st] syllabifies as heterosyllabic when it is intervocalic as in [ʕas.ta] ‘a stick’. Third, while all consonantal phonemes undergo gemination including affricates ([zad͡ʒd͡ʒara] ‘he scolded’), [st] never geminates even when required by the morphology (as in causative verb forms) as seen by the Faifi causative [was.ta.la] ‘he delivered’ (cognate with Classical Arabic [wasˤsˤala]). This suggests that [st] cannot geminate because it is already two segments. We conclude by showing how this distribution of [st] reflects elasticity as in Scheer and Ségéral, including a discussion of its uncertain syllabification after a long vowel.

Cyclic overriding of irregular stress in Armenian

Hossep Dolatian[1] + **Öner Özçelik**[2]
1: Stony Brook; hossep.dolatian@alumni.stonybrook.edu); 2: Indiana University; oozcelik@indiana.edu

Keywords: Armenian, stress, irregular stress, underlying foot, cophonology, prestressing, cyclicity

Introduction: In Western Armenian, morphologically-assigned irregular stress is overridden by regular stress in inflection. This requires both cyclic cophonologies and underlying feet.

Regular stress: Stress is on the rightmost full vowel, thanks to ALIGN-R (AL) which requires stress on the rightmost grid-mark in the PWord Gordon (2002). Schwas are unstressed and trigger penultimate stress. Thus *ə́ outranks ALIGN-R.

(1)

kórd͡z	'work'	párt͡sər	'high'
kahaná	'priest'	méɣər	'honey'

/agra/	*ə	AL	/meɣər/	*ə	AL
a. ☞ agrá			a. meɣár	*!	
b. ágra		*!	b. ☞ méɣər		*

Suffixation triggers stress shift. ALIGN-R outranks IDENT-STR (ID). Schwas and clitics do not take stress. PWord-external Clitics are unstressed to satisfy ALIGN-R. Roots with schwas behave the same.

(2)

a.	kórd͡z-é	'work-ABL'	b.	meɣər-óv	'honey-INST'
	kórd͡z-əs	'work-ABL-1POSS'		méɣər-əs	'honey-1POSS'
	kórd͡z=e	'work-1POSS=is'		méɣər=e	'honey-is'

[kórd͡z] -/e/	*ə	AL	ID	[kórd͡z]/-əs/	*ə	AL	ID	[kórd͡z]/=e/	*ə	AL	ID
a. kórd͡z-e		*!		a. ☞ kórd͡z-əs		*		a. ☞ kórd͡z=e			
b. ☞ kord͡z-é			*	b. kord͡z-ə́s	*!		*	b. kord͡z=é		*!	*

Irregular stress: The ordinal suffix *-erort* is irregularly prestressing (Vaux, 1998). It can be added to non-existent bases (like the root in 'third'). We argue that prestressing is due to two factors. The suffix has a preceding underlying iambic foot /()-erort/ (cf. underlying trochees in Turkish: Özçelik, 2017). And, these suffixes select a cophonology where ALIGN-R is outranked by IDENT-STR. Stress is preserved, even if from a prestressor's underlying foot.

(3)

hínk	'six'
hínk-erort	'sixth'
jerék	'three'
jér-rort	'third'

[hínk]/()-erort/	*ə	IDENT-STR	ALIGN-R
a. ☞ (hínk)-erort			**
b. hink-erórt		*!	

Both factors are needed because irregular stress is removed once these words take nominal inflection or clitics. If a full-vowel suffix is added, stress shifts to the new suffix. If a schwa-suffix or clitic is added, stress shifts to the prestressing suffix. These facts require that any additional morphology undergoes the regular cophonology of ALIGN-R>>IDENT-STR (not shown). Using just one of the two factors does not capture all the data.

(4)

hínk-erort	'fifth'
hink-erort-óv	'fifth-INS'
hink-erórt-əs	'fifth-1POSS'
hink-erórt=e	'fifth-is'
hink-erórt-əs=e	'fifth-1POSS-is'

[(hínk)-erort]/-əs=e/	*ə	AL	ID
a. (hínk)-erort-əs=e		**!*	
b. vet͡s-erort-ə́s=e	*!		
c. ☞ hink-erórt-əs=e		*	*

Vowel epenthesis in Maaloula Aramaic

Ghattas Eid & Ingo Plag, Heinrich Heine University Düsseldorf
ghattas.eid@hhu.de, ingo.plag@uni-duesseldorf.de

One of the intricate topics in the phonology of the Semitic languages is their syllabification and epenthesis processes. Much attention has been given to this topic in the different Arabic dialects (e.g. Selkirk 1981; Itô 1989; Broselow 1992, 2017; Watson 2002, 2007; Kiparsky 2003). This topic, however, has received significantly less attention in the neighboring Aramaic dialects although they present similarly intricate problems. This paper analyzes the phenomenon of vowel epenthesis in Maaloula Aramaic. It revisits Arnold's (1990: 40) algorithm, according to which epenthesis takes place as follows: (a) Count the consonants in a consonant cluster from right to left. (b) Insert an epenthetic schwa after every second consonant (e.g. *nošḵṯa* → *nošəḵṯa* 'kiss'). (c) In the case of two word-final consonants, the word boundary is counted as a consonant (e.g. *ṯarč*# → *ṯarəč*# 'two (FEM)').

Although this algorithm predicts accurately where the epenthetic vowel is expected to occur, it leaves a number of questions unanswered. First, what is in common between the two environments CCC and CC# where epenthesis occurs? Second, what determines the place of epenthesis? In other words, why is CəCC possible but *CCəC is not? Third, how can this rule be explained from a perspective which takes the syllable structure into account? Fourth, why are the epenthetic vowel and the resulting syllable invisible to stress? Fifth, why does Maaloula Aramaic seem to tolerate certain word-initial and word-medial CCC clusters where epenthesis is surprisingly ruled out (e.g. *ščḥunna* 'they found her' but not **šəčḥunna; frīsčxun* 'your (MASC PL) right' but not **frīsəčxun*)?

To answer these questions, this paper proposes a syllable-based analysis inspired by the above-cited studies on Arabic. Following Kiparsky (2003), we put forward a stratal OT account that uses universal constraints such as *COMPLEX, MAX-C, DEP-V, and LICENSE-μ. We propose that Maaloula Aramaic allows only three types of syllable: CV, CVC, and CVV. Syllabification and stress assignment take place at the lexical level. The remaining consonants are not part of syllables and thus are called 'stray consonants'. In the following examples, fish brackets are used to indicate stray consonants: /xṯōb-a/ 'book' → [⟨x⟩.ˈṯō.ba]; /nošḵ-T-a/ 'kiss' → [ˈnoš.⟨ḵ⟩.ṯa]; /ṯarč/ 'two (FEM)' → [ˈṯar.⟨č⟩].

At the postlexical level, an epenthetic vowel is inserted between a coda consonant and a following stray consonant (C′). This triggers a resyllabification process in which the coda of the previous syllable becomes the onset of a new syllable whose nucleus is the epenthetic vowel and whose coda is the stray consonant (e.g. /nošḵ-T-a/ 'kiss' → [ˈnoš.⟨ḵ⟩.ṯa] lexically → [ˈno.šəḵ.ṯa] postlexically). These postlexically formed syllables (e.g. [šəḵ]$_{\sigma}$) are not visible to stress because stress rules are lexical.

If a morphosyntactic process concatenates two stray consonants (C′C′), an epenthetic vowel is usually inserted between them (e.g. /ṯarč ḏrōʕ/ 'two cubits' → [ˈṯar.⟨č⟩#⟨ḏ⟩.ˈrō.⟨ʕ⟩] lexically → [ˈṯar.čəḏ.ˈrō.⟨ʕ⟩] postlexically). This epenthesis is blocked, however, when C′C′ are followed by an onset consonant within the boundaries of the same word (e.g. /frīs-T-xun/ 'your (MASC PL) right'→ [⟨f⟩.ˈrī.**⟨s⟩⟨č⟩.x**un] lexically and postlexically (*[⟨f⟩.ˈrī.səč.xun])). This explains the unexpected tolerance of certain CCC clusters where epenthesis is not possible (i.e. the fifth remaining question above).

The syllable-based account proposed in this paper successfully addresses the empirical and theoretical problems of the only available account to date. The Aramaic facts have repercussions for the typology of epenthesis in varieties of Semitic, which needs to be enriched in order to cover the full range of variability.

Defining and operationalizing 'borrowability' in phonology

Elad Eisen[1], Dmitry Nikolaev[2], Eitan Grossman[1], Steven Moran[3]
elad.eisen@mail.huji.ac.il, dnikolaev@fastmail.com, eitan.grossman@mail.huji.ac.il, steven.moran@unine.ch
[1]The Hebrew University of Jerusalem, [2]Stockholm University, [3]University of Neuchâtel

Borrowability is a central notion in language contact research, and reflects the idea that some types of linguistic items (e.g., word classes, sounds, syntactic constructions) are more easily borrowed than others. Since the earliest stages of modern language contact research (Haugen 1950, Weinreich 1953) generalizations about borrowability have been formulated as 'borrowing hierarchies' or 'borrowing scales' (Muysken 1999, Matras 2009), e.g. NOUNS > VERBS, which predicts that nouns are more 'borrowable' than verbs. However, such hierarchies can have multiple interpretations (Haspelmath 2009). For example, the above hierarchy can be understood quantitatively, i.e., languages borrow more nouns than adjectives, or implicationally, i.e., if a language has a borrowed adjective it must also have a borrowed noun.

Crucially, the notion of borrowability has never been properly defined. A typical assumption is that "a category is 'more likely' to be borrowed, relative to other categories, if it is borrowed more frequently in cross-linguistic comparison" (Matras 2009: 154). In the domain of phonology, for example, it is observed that consonants are borrowed more frequently than vowels, but it has been suggested that this is merely a result of consonant inventories typically being larger than vowel inventories (Matras 2007: 37).

In this talk, we show that the empirical frequency of borrowing is, to a large extent, an artifact of the probability of a contact situation that permits borrowing to occur. We propose a definition of borrowability that takes this bias into account: Borrowability is the probability of a given item/category to be borrowed, *given a contact situation that permits borrowing*.

This definition can be illustrated by examining the process of phonological segment borrowing. When a language is said to borrow a phonological segment from another language, it is assumed to have lacked this segment beforehand, while the donor language is assumed to have had it. In other words, a contact situation that permits the borrowing of a phonological segment is one in which a language that has a certain segment is in contact with a language lacking it.

Putting it in mathematical terms, if a segment's typological frequency is f_S, the probability of a language to have it is f_S, and the probability of a language to lack it is $1 - f_S$. The probability of a contact situation that permits borrowing to occur is then the product of both probabilities, $f_S \cdot (1 - f_S)$.

If we express the borrowability of a segment S as b_S, the probability of a segment to be borrowed can be expressed as: $P = b_S \cdot f_S - b_S \cdot {f_S}^2$. This formula results in a series of quadratic functions of f_S. From the general form of these functions we predict that the most frequently borrowed segments will be segments that occur in around 50% of the world's languages, since *they are the most probable to occur in an appropriate contact situation to begin with.* Data from SegBo, a new typological database of borrowed segments (Eisen 2019, Grossman et al. 2020) confirm this prediction.

The data are used to assess the borrowability scores of various segments, showing for example that the most borrowable segments are generally affricates and fricatives, in particular /f/. We also calculate the average borrowability scores of several phonological classes, and show that consonants are more borrowable than vowels, even when taking into account the differences in their typological distributions. We also show that fricatives are more borrowable than affricates, which are more borrowable than stops.

This study provides the first explicit operationalization of the notion of 'borrowability' in phonology as distinct from the empirical frequency of borrowing. This allows us, for the first time, to quantitatively assess the borrowability of various phonological segments and classes and to make predictions about what will likely be borrowed in language contact situations.

Metrically-conditioned syncope in Modern Hebrew simple and compound nominals

Noam Faust (noam.faust@univ-paris8.fr) & Francesc Torres-Tamarit (francescjosep.torres@cnrs.fr)
Université Paris 8, CNRS SFL

In Modern Hebrew (MH), many pretonic /a/s in unsuffixed nouns (and adjectives) obligatorily syncopate when, upon suffixation, they become antepretonic (1a). This syncope is also possible – though not obligatory – in the *un*suffixed form, when it is the first N in a N+N compound (rightmost data column). At the same time, many other pretonic /a/s don't syncopate in any configuration (1b). Optional syncope in compounds is also found in examples which never display syncope outside conpounds (1c).

(1)	UNSUFF.	SUFF. PL		_+N COMPOUND	
a.	pakíd	pkid-ím	'clerk'	pakìd~pkìd más	'tax clerk'
b.	pakáχ	pakaχ-ím	'supervisor'	pakàχ más, *pkàχ más	'tax suervisor'
c.	mosád	mosad-ót	'institution'	mosadòt~mosdòt χinúχ	'educational institution'

We provide an analysis of the facts in Gradient Harmonic Grammar (GHG, Smolensky, Goldrick & Mathis 2014), whose main tenet is that underlying segments can differ in strength.

$pa_1(ki'dim) \rightarrow (pki'dim)$

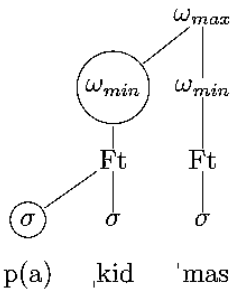
	$pa_1(ki'dim)$	MAX^2	*a_{unftd}^{1}	DEP^1	*H*
a. ☞	(pki'dim)	−1			−2
b.	$pa_2(ki'dim)$		−2	−1	−3

$pa_2(ka'χim) \rightarrow pa_2(ka'χim)$

	$pa_2(ka'χim)$	MAX^2	*a_{unftd}^{1}	DEP^1	*H*
a. ☞	$pa_2(ka'χim)$		−2		−2
b.	(pki'χim)	−2			−4

We assume that all segments in candidates must have the strength of 2; but the alternating /a/ is deficient in that it has the underlying strength of 1; and the non-alternating /a/ is lexicalized with the strength of 2. Assuming right-aligned, non-iterative, quantity-insensitive iambs for MH (Graf & Ussishkin 2003), a pretonic vowel is footed *(pa**k**íd)*, whereas an antepretonic one is unfooted *pa(kidím)*. We propose that maintaining any /a/ in an unfooted position is disprefered (hence the constraint *a_{unftd}). In the first tableau, a candidate with an underlyingly weak /a/ in an antepretonic position leads to violations of both *a_{unftd} and DEP (constraint weights appear in superscript). While the syncopated candidate violates MAX, it is only to a degree of 1. It is therefore better to syncopate than to strengthen the underlyingly weak /a/ given the constraint weights above. In contrast, as in the second tableau, if the vowel is already strong underlyingly, then syncope is more costly, and maintaining the vowel incurs no violation of DEP: the vowel therefore does not syncopate.

We then ask why, given that in *(pakíd)* the foot-internal position of /a/ protects it from syncope, the same /a/ *can* be syncopated in the compound. To answer this question, we provide evidence that the first N of the compound is prosodically weaker in MH (as pointed out by the different stresses in [pakìd más] above). If so, syncope here is triggered in a doubly weak position: in the weak branch of the foot of a weak minimal word (see diagram to the right). In other words, unstressed *footed* [a]s are licensed in MH, *except when they occupy a highly weak metrical position*.



To formalize the facts, we assume that there is a family of constraints *[V]WEAK-IN-FOOT, (McCarthy 2008) each specified for different levels of the prosodic hierarchy. We show that in MH, the constraint specified for [a] and a non-head ω_{min} penalizes a form without syncope [pakìd más], and militates in favor of [pkìd más]. At the same time, an output-output relation with the basic [pakíd] militates against syncope. The result in terms of harmony scores is a tie, leading to the variation in (1a,c) above. In contrast, for an input like [pakàχ más], syncope of the first /a/ is again too much of a violation of MAX, and so it never arises.

Our analysis illustrates how GHG can be used in accounting for both lexical exceptions and variation without recourse to allomorphy (as in Bat El's 2008 of the same facts). In addition, it provides an explanation for a hitherto unattested type of weakness effect that is in fact predicted by the prosodic hierarchy and recursivity at the prosodic word level.

On the UR construction of (non-)alternating unstressed [ə]s and [u]s in Catalan. Some evidence from primary school children handwriting

Gisela Fuertes (INS Can Margarit) & Clàudia Pons-Moll (Universitat de Barcelona)

1. Empirical & theoretical debate. In Eastern Catalan, surface unstressed [ə]s can alternate with a stressed [á], [ɛ́] or [é] (*c*[ə]*seta* 'house dim.'~ *c*[á]*sa* 'house'; *p*[ə]*lut* 'hairy'~ *p*[ɛ́]*l* 'hair'; *d*[ə]*nteta* 'tooth dim.'~ *d*[é]*nt* 'tooth'), and unstressed [u]s can alternate with a stressed [ú], [ɔ́] or [ó] (*ll*[u]*cet* 'hake dim.'~ *ll*[u]*ç* 'hake'; *b*[u]*leta* 'ball dim.'~ *b*[ɔ́]*la* 'ball'; *p*[u]*meta* 'apple dim.'~ *p*[ó]*ma* 'apple'). This has traditionally been taken as evidence for an UR of these occurrences with /a/, /ɛ/, /e/, /u/, /ɔ/, and /o/, respectively. In some cases, though, unstressed [ə]s and [u]s do not have the chance to alternate with a vowel in stressed position, because the stem in which they appear is always unstressed (*m*[ə]*rtell* 'hammer'; *m*[u]*ssol* 'owl'), so the UR remains uncertain: unstressed [ə]s may either correspond to an underlying /a/, /ɛ/, /e/ or /ə/, and unstressed [u]s may either correspond to an underlying /ɔ/, /o/ or /u/. Between the 70s and the 80s, the UR of non-alternating [u]s and especially [ə]s was object of an endless debate among scholars working on Catalan phonology (for a review, see Bonet & Lloret 1998: 38-39), which proved to be unproductive in many respects (see Mascaró 1991). OT has developed various theories and hypothesis about the nature of URs and their process of acquisition, construction, storage, and access when no dynamic morphophonemic alternations are (still) available to the speaker-learner or to the analyst: among others, Richness of the Base (Prince & Smolensky 1993: 209), Lexicon Optimization (Prince & Smolensky 1993: 209-210; Smolensky 1996) or the Free-Ride in Morphophonemic Learning (McCarthy 2005), the latter being challenged in non-univocal [X] → /Y/ mappings, like those of Catalan exposed above (Pons-Moll 2016). **2. Goals.** In order to through some light on this empirical and theoretical debate, in this paper we present the results of an experimental survey (Fuertes 2020) analyzing the handwriting of 1st grade primary school children, who are in a very premature stage of their reading abilities, and thus with little exposure to conventional spelling and an unstable knowledge of it (e.g. Varnhagen *et al*. 1997). **3. Survey's methodology and main results.** A group of 28 primary school children aged between 6 and 7 attending the same school and class and with (Eastern) Catalan as L1 were asked to answer a test, in which they had to write-down the words corresponding to 21 images projected to them in a big screen using PowerPoint. 10 of these words included orthographic *a* and *e* corresponding to unstressed [ə]s alternating with either [á] (Fig. 1*a*), [ɛ́] (Fig. 1*b*) or [é] (Fig. 1*c*) and orthographic *u* and *o* corresponding to unstressed [u]s alternating with either /o/ (Fig. 1*d*) and /ɔ/ (Fig. 1*e*). The other 11 words included orthographic *a* and *e* corresponding to non-alternating (at least transparently for the kids) unstressed [ə]s (Fig1. *f*-*g*), and *o* and *u* corresponding to non-alternating (at least transparently for the kids) unstressed [u]s (Fig1. *h*-*i*). Note that [ə] is either represented by the graphemes *a* or *e*; [u], either with *o* or *u*, and that most cases of alternation are reflected in the spelling. As can be observed in Fig. 1 (in which blue stands for the ratio of responses with spellings with *a* or *u*, and yellow, for the ratio of responses with spellings with *e* or *o*), no significative differences were found among alternating and non-alternating [ə]s and [u]s: [ə] and [u] were predominantly associated with an ortographic *a* and *u*, repectively, no matter whether they alternate or not, and in cases were this association is not so clear (cf. Fig1.*e* and Fig1.*h*), the results for alternating and non-alternating unstressed vowels are practically the same. Our claim is that these results support the **Lexicon Optimization Hypothesis**, according to which there is a first satge in language acquisition in which, from all possible input candidates (Richness of the Base), the learner selects the one that matches the adult output representation as the optimal input (Smolensky 1996), a reasoning that probably can be extrapolated to the UR of non-alternating unstressed [ə]s and [u]s in the adult phonology of Eastern Catalan.

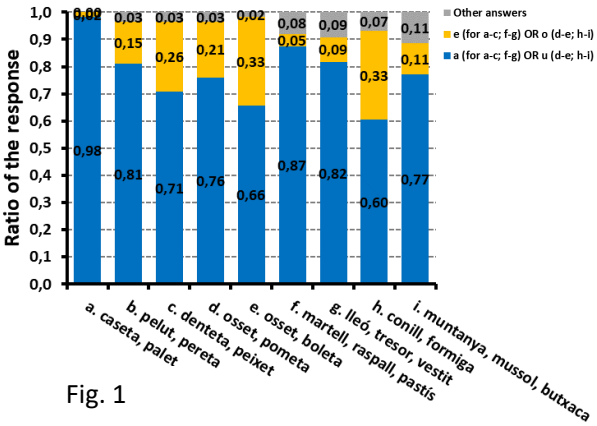


Fig. 1

The role of individual linguistic experience in the stressing of complex words

Tammy Ganster, Trier University, ganster@uni-trier.de

Although *-able* has long been assumed to be a stress preserving suffix (e.g. Guierre 1979, 1985, 1994), this was first rebutted by anecdotal evidence and, more recently, by empirical evidence of variable stress shift in *-able* derivatives (Kiparsky 2005, Trevian 2007, Bauer, Lieber & Plag 2013). What is still not fully understood is what conditions this stress shift.

Trevian (2007) and Bauer, Lieber & Plag (2013) give a structural explanation: they posit that a heavy presuffixal syllable causes categorical or variable stress shift (Trevian 2007: 440; Bauer, Lieber & Plag 2013: 186). Kiparsky (2005) accepts stress shift only in stem-level *-able* derivatives (*ádmire* > *ádmirable* ~ *admírable*) but not in word-level *-able* derivatives (*parody* > **parodíable*). However, there are major issues with these approaches: Bauer, Lieber & Plag's (2013) and Trevian's (2007) approaches fail to explain why the stress shift is variable. Furthermore, Kiparsky's approach cannot account for observations such as *distríbute* > *distribútable*, that do show stress shift in word-level derivatives.

The dual-route models developed by Hay (2001, 2003) and Bermúdez-Otero (2012) offer a way to explore stress variability from a processing-based perspective. Both models assume speakers have two options to process complex words: retrieving words whole from storage or computing them online from their components. Bermúdez-Otero's model predicts that stem-level forms, such as some *-able* derivatives, are obligatorily stored and that the properties of stored forms can include stress (2012: 18). The relationship of the base verb frequency to the derivative frequency decides whether the whole-word route or the computation route is used. It follows that stem-level derivatives that are more frequent than their bases are stress shifting, while stem-level derivatives that are less frequent than their bases preserve the base stress. Word-level derivatives are assumed to be strictly stress preserving in Bermúdez-Otero's model (2012: 18, 42).

The present paper investigates the production of stress in 1023 observations of 46 different types of *-able* derivatives elicited from 93 British English native speakers during a reading study. The bases of all derivatives in the study are at least trisyllabic. All presented derivatives are less frequent or as frequent as their bases. The data were analyzed using random forests and conditional inference trees. The models include structural, processing-based and socio-linguistic variables. Both structural (e.g. base stress pattern) and processing-based factors (e.g. derivative frequency) emerge as significant in the analysis. However, the effects are not as predicted by Hay and Bermúdez-Otero's models.

The stress shift mainly occurs in derivatives with bases that carry stress on the antepenultimate syllable. For these derivatives, speakers can be classified into two groups: those who shift stress to the presuffixal syllable in frequent derivatives and those who preserve base stress despite a high derivative frequency. I interpret the evidence as indicating that individual speakers' impressions of a derivative's frequency are not congruent with the lexical frequency attested for that derivative in a corpus. This explanation is substantiated by the fact that, when asked to rate the frequency of the tested derivatives, participants agree in their ratings on only about 24% of the testwords. In addition, none of the socio-linguistic factors tested in the model (e.g. regional variety or age) attained significance. This further points to a speaker's individual mental lexicon playing a more crucial role than sociological features.

The present paper thus demonstrates that stress variability in *-able* derivatives is not only motivated by structural factors, but also strongly depends on speaker-specific processing-related factors. I argue that models of morpho-phonological variation such as Bermúdez-Otero's and Hay's need to take the individual speaker's linguistic experience into account in order to make accurate predictions. Furthermore, a model that can account for stress shift in word-level *-able* derivatives is still lacking.

Postaspiration and stress in Sevillian Spanish

Madeline Gilbert, New York University

Introduction: Sevillian Spanish is undergoing a change from preaspiration to postaspiration in /s ptk/ sequences (/tʃispa/ →[tʃihpa]→[ˈtʃip^{h}a]) (Ruch & Peters 2016; Torreira 2006). Some argue that postaspirated stops are becoming phonemic (Gylfadottir 2015; O'Neill 2009), but others treat them as clusters (Torreira 2012; Parrell 2012). I test this representation using a stress judgment task. Spanish stress is penultimate (default), antepenultimate or final, but antepenultimate stress is essentially nonexistent when the penult is heavy (*CV.CV́.CVC.CV) (Fuchs 2018). Do Sevillian listeners treat syllables preceding postaspiration as heavy or light? A cluster analysis of postaspiration predicts that the preceding syllable is heavy /ˈCVS.CV/ → [ˈCV.C^{h}V] (HL); a postaspiration analysis predicts that it is light /ˈCV.C^{h}V/ → [ˈCV.C^{h}V] (LL). In the perception task, Sevillians treat postaspiration as contributing weight to the preceding syllable. I analyze this as an opaque interaction between debuccalization/metathesis and stress assignment.

Experiment: 26 Sevillian listeners completed a forced-choice stress judgment task. There were 5 test conditions with 9 words each (Table 1). Nonce words were recorded by a male Sevillian speaker, had antepenultimate stress, and consisted of light syllables (other than the penults of interest). The words were presented auditorily in pairs, and comparisons differed only in penultimate coda type ([giˈnakapo]-[giˈnakaspo]). Results were modeled in logistic regressions.

Table 1: Nonce word set example

a. NoCoda	[giˈnakapo]	**d. CodaH**	[giˈnakahpo]
b. Coda	[giˈnakampo]	**e. PostAsp**	[giˈnakap^{h}o]
c. CodaS	[giˈnakaspo]		

I focus on two sets of comparisons for words with antepenultimate stress (Table 1). (1) In comparison to words with light penults, do listeners disprefer words with postaspiration as much as they disprefer words with other surface-heavy penults? (NoCoda comparisons: (a)-(b), (a)-(c), (a)-(d), (a)-(e)). (2) In comparison to words with postaspiration, do they disprefer words with light penults? Do they distinguish PostAspiration codas from other types of codas (PostAspiration comparisons: (e)-(a), (e)-(b), (e)-(c), (e)-(d))?

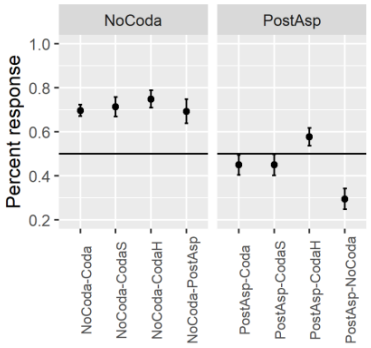


Figure 1 Proportion response of base form (vs. comparison form)

Results: NoCoda comparisons: listeners prefer NoCoda > Coda, CodaS, CodaH, PostAspiration (Figure 1, left). Forms with codas—including postaspiration—are equally dispreferred. PostAspiration comparisons: PostAspiration is worse than NoCoda, and forms with other codas are similar to PostAspiration (Figure 1, right). PostAspiration is treated the same as forms with surface-heavy penults: it contributes weight to a preceding syllable.

Analysis: Stress must be evaluated on the UR, where /s/ is still a coda of the penult, rather than on the surface where the penult is light. If stress were evaluated after debuccalization and postaspiration, antepenultimate stress would be better in words with surface-light penults than in words with surface-heavy penults, regardless of UR ([giˈnakap^{h}o] > [giˈnakaspo]).

UR:	/ka.pi.ta.lis.ta/	LLLHL
Stress:	[ka.pi.ta.ˈlis.ta]	LLLH́L
Debucc:	[ka.pi.ta.ˈlih.ta]	LLLH́L
PostAsp:	[ka.pi.ta.ˈli.t^{h}a]	LLLĹL

This study contributes to a larger body of work on opaque interactions between metrical and segmental structure, like stress-epenthesis interactions. Epenthetic material is sometimes—but not always—visible to stress (Elfner 2009). The interaction between stress and postaspiration (metathesis) in Sevillian Spanish raises further questions about how stress and metathesis interact typologically.

Cayuvava without stress

Chris Golston, California State University Fresno

Only one language reportedly has regular ternary stress, Cayuvava, (once) spoken in Bolivia:

> Among ternary stress languages, Cayuvava... takes a special position in the sense that its ternarity is pure: all stresses are spaced exactly three syllables apart.... Disyllabic words are stressed on the penult. In longer words, stress falls on the antepenult and on every third syllable preceding it. (Elenbaas & Kager 1999:278)

Other 'ternary stress' languages mix binary and ternary stress in long words (Martinez-Parício & Kager 2015), making Cayuvava the best case for ternary feet (Halle & Vergnaud 1987) or for regularly skipping syllables between feet ('weak local parsing': Hammond 1990).

A stress-based analysis of the data is actually very problematic given Key's narrow transcriptions. These contain many words with (i) no strong stress, [jokore] 'eye', (ii) multiple strong stresses, [ˈpɛčaiˈpɛ] 'where', and (iii) stress on the penult [pɔˈrejieˈñečɔ] 'he really grew worse again' or ultima [aβiˈro] 'come'. Worse yet, Key's 'weak stress' (ĭ, ă, etc.) introduces (iv) rampant stress clash [bĭsĭˈriăă] 'it is straight', with 'stress' on five adjacent syllables. Overlooked facts like these led Key himself to claim that (v) strong stress is 'phonemic' and (vi) weak stress is phonemic too. Cayuvava is *not* a poster-child for ternary stress.

I argue that Cayuvava probably had no 'word stress' in the sense familiar from English or Latin, but a rich and *phrasal* pitch accent, making it more like Basque (Elordiata 2015) or Japanese (Itô & Mester 2014), in which words come either accented or unaccented. Evidence comes from Key's 'examples of stress patterns' (1961:149), narrow transcriptions that have been ignored in the literature for sixty years. Based on these, I argue for four tonal classes in Cayuvava. Key tells us that strong stress is realized as H tone and weak stress as L, and I interpret his unmarked tone as M, giving Cayuvava three surface tones—H (á), M (a) , L (à)—in four surface patterns (LHL, MHL, MHM, LHM). Words with no accented morphemes (Ø) surface as toneless. H tone is always short (μ), while M and L are long (μμ) when possible:

Ø	[jokore]	'eye'	[kayuβaβa]	'Cayuvava'
MHM	[kidabúkuɛ]	'the wind'	[arisúpuru]	'already is strong'
MHL	[uhíài]	'I go'	[pawáwàhà]	'want'
LHM	[yàkɛ̀háama]	'one who listens'	[yàhùhámiño]	'small peto bee'
LHL	[ráwàwà]	'star'	[bìsìríàà]	'it is straight'

The crucial ingredients of the analysis are attested in other languages. Accentless words are found in Japanese and Basque; MHL is found as a surface pitch accent in Chimila alongside HML (Malone 2006); H tone must be μ in Kinyarwanda (Myers 2003) and L must be μμ in Ancient Greek (Golston 2016).

All of Key's data can be modeled with these tonal classes and they do not overgenerate in any way. Each has H sandwiched between L or M and so form a coherent set, and all can simply be aligned to the end of the phrase without reference to stress. Key himself offers no analysis of 'weak stress', treating it as phonemic, and the following half century of generative research avoids it entirely, carefully modeling 'strong stress' while systematically ignoring 'weak stress'.

Hybrid analyses with stress *and* tone are of course possible. Antepenultimate stress would attract the H tone in each tonal class, with L and M tones spreading to adjacent syllables: MHM [ki.da.ˈbú.ku.ɛ] 'the wind', MHL [u.ˈhí.à.ì] 'I go'. Alternatively, penultimate stress would attact the final L or M tone, with the H docking on the pretonic syllable, as Sauzet argues for Ancient Greek (1988): MHM [ki.da.bú.ˈku.ɛ] 'the-wind', MHL* [u.ˈhí.ˈà.ì] 'I go'. Crucially, stress alone cannot model the suprasegmental differences in [kayuβaβa, arisúpuru, pawáwàhà, yàhùhámiño, bìsìríàà]; a tonal analysis, meanwhile, doesn't require stress at all, though it does not preclude it.

Final Vowels in Drehu: Epenthesis vs. Apocope

Mark Hale (mark.hale@concordia.ca) & Madelyn Kissock (madelyn.kissock@concordia.ca)
Concordia University, Montréal

The Drehu language (Loyalty Islands) allows only open syllables word-internally, regularly epenthesizing a V to break up C-clusters in loanwords. This V is usually a 'copy V' (Tryon 1967), but when not, it defaults to [e]. However, with *s*-clusters the default epenthetic V is [i] (data below). Word-finally, the language shows, descriptively, 'fleeting' Vs, which surface when the next word in the relevant prosodic domain is C-initial, but otherwise do not.

There are two analyses of these Vs in the Drehu literature. The epenthesis ('Ep') analysis assumes that final coda Cs are permitted (though internal codas are not), but that there is a general [e]-epenthesis phenomenon that breaks up C-clusters across the word-boundary (Tryon 1967, Lenormand 1999). The deletion ('Del') analysis posits final 'fleeting' Vs in the lexical entry (indicated with parentheses in the dictionaries of Sam 1995 & Lecari *et al.* 2001), with a rule which deletes these Vs before V-initial words and *in pausa*. Typical examples include (there is a wealth of indigenous lexeme data of this type as well):

Source	Tryon/Lenormand	Sam/Lecari	Source	Tryon/Lenormand	Sam/Lecari
bag	**bæek**	**bæek(e)**	*soap*	**so:p**	**so:p(e)**
belt	**beleʈ**	**beleʈ(e)**	*spoon*	**sipun**	**sipun(e)**
grease	**gilis**	**gilis(i)**	*time*	**ʈaem**	**ʈaem(e)**
jam	**ʤæm**	**ʤæm(e)**	*watch*	**watʃ**	**watʃ(i)**

The typological status of Drehu syllable structure depends on which analysis one adopts, but which is correct? Epenthesis must be in play, at least historically, given the loanword data. If Ep is correct, the process is synchronically active. If Del is correct, it need not be. The most complicated, and least desirable, theory is that both final V-deletion and final V-insertion are required (under distinct conditions). We argue in this paper that this least desirable analysis is the correct one, as is, alas, sometimes the case.

The first thing to note is that the final 'fleeting' Vs are not invariably [e]. Sam's dictionary lists lexical items ending with **-(i)** and **-(u)** as well (but none of the other vowels of Drehu, whose vowel inventory is /i, u, e, o, æ, ə/ (note that the epenthetic V is *not* [ə]). There is one clear phonological conditioning effect: after palatals (/ʧ/, /ʤ/, and /ɲ/) — see 'watch' in the table above — and (laminal) /s/ and /z/ ('grease') we find [i] (cp. internal epenthesis after /s/). It is well-known that epenthetic vowels can be affected by general phonological processes, so this is not a problem. However, not all cases of final **-(i)** are after palatals, and, moreover, there is no obvious conditioning at all for final **-(u)**. Note the near-minimal pairs: **kem(e)** 'father', **xem(i)** 'respond', **gem(u)** 'louse'. Since the quality of these 'fleeting' Vs must be specified (at least for /i/ and /u/), this favors the Del Analysis. Reduplication facts also favor that analysis. In a form such as **n̥emun̥em(u)** 'drizzle' or **mitimit(i)** 'kinda dark' (beside **mit(i)** 'dark'), the reduplicative base seems to contain the final 'fleeting' V, protected from 'fleeting' by its non-finality.

But for final **-(e)** (including its realization as [i] after palatals) there seem to be good reasons to believe that epenthesis is what is going on. First, if one runs a 'wug'-test with new loans, they all show this vowel, but of course it is not present in the source. While the need to insert a vowel could be made to follow under an 'open syllables only' theory of Drehu phonotactics, whence the consistent quality? And a more general challenge faces the Del Analysis. Drehu has final vowels which *are not* 'fleeting'. While this is expected for the vowels /o/, /æ/ and /ə/, which are never 'fleeting', there are also words which end in non-fleeting /e/. One of these is **hatʃe** 'heavy'. Note that this /e/ is unaffected by the palatality of the /ʧ/. That is, lexical /e/ appears not to be raised by adjacent palatals (cp. word-internal **ʧelæ** 'here'). The presence of words ending **-ʧe** contrasts strikingly with the absence of dictionary entries with the form **-ʧ(e)**. This can be explained if final epenthetic V is less specified (with respect to height), and thus more subject to phonological modification, than lexical /e/.

Verbal tone interactions of Iquito: a constraint-based analysis

Wanqing He, Cornell University & University of California, Berkeley; k_psyche@berkeley.edu

This study aims to use a constraint-based analysis to explain different strategies of resolving tone overlapping in the verbal domain of Iquito, an indigenous Zaparoan language. Built on Beier and Michael's (2019) data, the classic, parallel Optimality Theory (P-OT; Prince & Smolensky, 1993/2004) is employed to account for the patterns of tone deletion, truncation, and mobile tone dislocation in three verbal domains (proclitic, stem, post-stem).

First, I argue that the resolution of overlapping between lexical tones and between lexical and metrical tones in verbs is sensitive to the boundary of the stem domain. Stem-external tones are heavily penalized if they cross the boundary and attach to any mora in the stem domain. Second, I present that Iquito verbal tones have a general faithfulness to the right edge. MAX-R is posited to assign a violation for every lexical tone melody to the right of the target morpheme in the input that is deleted in the output. Third, there is a strong tendency for an underlying HL lexical tone to surface as an HLL melody. L-doubling is posited to assign a violation for every L tone in the input that does not branch out and surface as an LL sequence in the output. As in tableau 1, there is no relative ranking between MAX-R and L-doubling.

Further, I demonstrate that the deletion of multiple stem tones involves the lookahead effects, an instance of irreducible parallelism (Adler & Zymet, 2017; McCarthy, 2013) that challenges Harmonic Serialism (HS; McCarthy, 2010 and others). Here, tone deletion is able to see the result of applying multiple deletions and attachments from a given derivational step. As in *nuaparaahuúnìkuráànà*, there are three tones melodies overlapped as shown below and only the rightmost one survives, as in illustration 1, but not in 2. When the lexical tone assignment starts from the right edge to first preserve the rightmost tone of /-ˈnìi/, the lexical tone of /-ˈhùu/ could be deleted immediately and the lexical tone of /apárà/ to its left would surface without difficulty. However, the rightmost lexical tone of /-ˈnìi/ foresees all the clashes between any two tones to its right, and all the overlapped tone melodies within that domain are deleted.

Illustration 1:

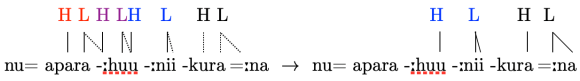


Illustration 2:

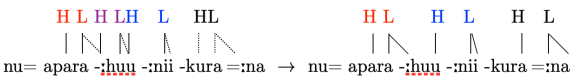


Tableau 1. *nuaparaahuúnìkuráànà*

/nu=apárà-ˈhùu-ˈnìi-kura^{HL}=ːna/	L-doubling	MAX-R
☞ a. nu(a.pa){(raa)(huú)}{(nìi.ku)(ráà.nà)}		
b. nu(a.pa){(raá)(hùú)}{(nìi.ku)(ráà.nà)}	*!	
c. nu(a.pá){(ràá)(hùú)}{(nìi.ku)(ráà.nà)}	*!*	
d. nu(a.pá){(ràà)(huú)}{(nìi.ku)(ráà.nà)}		*!

Here, tone deletion *looks ahead* into the result of applying multiple deletions to the input in a single derivational step. Since the deletions must be simultaneous but not iterative, it posits a challenge to Harmonic Serialism (McCarthy, 2000 and others) where each derivational step only allows one minimal change.

Overall, my talk will present rich interactions of the Iquito verbal tones that are well accounted for by several constraints in P-OT, but difficult in HS. I will also consider the typological implications of bringing in the lookahead effect in Iquito tonology to the theoretical debate between OT and HS. Future studies will bring in other frameworks to investigate the right-to-left tone assignment, especially to evaluate some other potential factors (e.g. the lexical frequency for a tone to surface) that may contribute to deletion as a resolution of tone overlapping.

Frequency effects in foreign language acquisition: The emergence of French liaison

Elisabeth Heiszenberger[1], Elissa Pustka[1]
(elisabeth.heiszenberger@univie.ac.at, elissa.pustka@univie.ac.at)
[1]University of Vienna

French *liaison* is a phonological process in which a final consonant, mute in isolation or before a consonant (e.g. *des chats* [de.ʃa] 'cats'), is realized when the following word begins with a vowel (e.g. *des amis* [de.za.mi] 'friends'). Having inspired various theoretical frameworks for phonology, from (post-) generative models (Encrevé, 1988; Schane, 1967) to usage-based approaches (Bybee, 2002; 2005), more recently, studies on liaison are oriented towards a psycholinguistic perspective to test these linguistic generalizations (Wauquier, 2009; Chevrot et al., 2009).

Two main theoretical frameworks have emerged to account for existing language acquisition data: a phonological model based on autosegmental theory (Wauquier, 2009) and a constructionist model developed within usage-based approaches (Chevrot et al. 2009). According to Wauquier (2009), children acquiring L1 French generate an abstract generalization of prosodic slots, whereas Chevrot et al. (2009) argue in favour of a lexical surface-based generalization (e.g. *des* + zX). This emerges not only from the frequency of the same global sequences (*token*), but also from the frequency of each construction itself (*type*) in the linguistic environment and in children's production. The aim of the current study is to re-examine the constructionist model in the light of foreign language acquisition data.

For this purpose, we examine the behaviour of categorical liaison after determiners, clitic pronouns, monosyllabic prepositions and monosyllabic adverbs in spontaneous speech of 145 high-school students (ages 12-18; 0 to B1; L1 German). To analyse the association of usage in learners' production and the realization rates of liaison, we examine the impact of the left and the right word on the behaviour of liaison by using a Chi Squared Test.

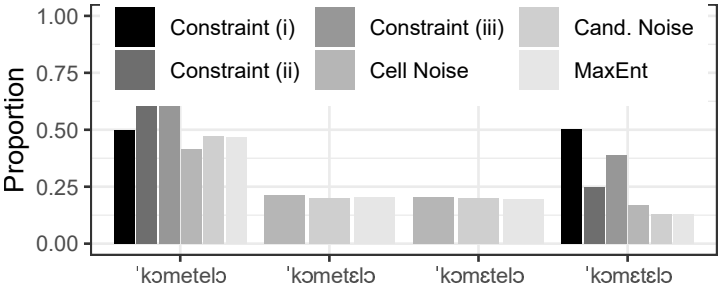
The results show that the realization rates of liaison are significantly associated with the left and the right word ($\chi 2$, $p < 0.01$). Realized liaisons are predominantly associated with the left words *aux*, *mes*, *les*, *on*, *des*, *nous* and the right words *États-Unis*, *avons*, *amis*, *est*, *allemand*, *yeux*, *aimons, Autriche* (realization rates ≥ 90%). This hierarchy in the realization rates of liaison does not necessarily parallel that of frequency of word occurrence, because *aux* 'in', *États-Unis* 'USA' or *yeux* 'eyes', for instance, are by far the least frequent of the words under scrutiny (less than 50 occurrences). However, the hierarchy in the realization rates is strongly correlated with that of frequency of word co-occurrence. These are all words that occur in more than 80% of the cases in a categorical liaison context, e.g. *aux États-Unis* 'in the USA', *les*/*des yeux* '(the) eyes', *nous avons* 'we have', with the exception of the plural determiners *les* and *des*. Although both of these words occur in less than 20% of the cases before a vowel-initial word, the learners realize liaison very frequently after these words (>90%). This might be explained by the fact that they are both of extremely high absolute frequency (more than 1000 occurrences) and that they represent a very specific grammatical construction. The findings consequently indicate, that despite different acquisition trajectories, similar as in L1 children, in spontaneous speech of French the productivity of liaison being highly determined by the frequency of co-occurrence: the higher the frequency of the construction, the more likely it is to realize liaison.

Serial versus Parallel Noisy HG Accounts of Eastern Andalusian Harmony

Aaron Kaplan
University of Utah
a.kaplan@utah.edu

Noisy Harmonic Grammar (NHG) is a family of probabilistic implementations of Harmonic Grammar. Hayes (2017) and Kaplan (2019) investigate properties of the members of this family in parallel frameworks, and this paper adds to that work by exploring serial implementations of Kaplan's NHG analysis of harmony in Eastern Andalusian (EA; Jiménez & Lloret 2007). The interest of this is twofold. First, it improves upon Kaplan's analysis, which uses a positive constraint and therefore requires serialism to avoid the "infinite goodness" problem (Kimper 2011). Second, by retaining Kaplan's empirical and analytical bases, stronger conclusions about serial versus parallel NHG can be drawn. The results show that parallel and serial NHG are very similar: the same version of NHG that provides the best parallel account of EA also provides the best serial analysis. The inferior versions fail in serial NHG for the same reason they fail in parallel NHG.

In EA, a final lax vowel triggers [ATR] harmony in the stressed syllable. Any intervening vowels optionally harmonize ([ˈkɔ̲metelɔ̲] ∼ [ˈkɔ̲mɛ̲tɛ̲lɔ̲] 'eat them (for you)!'), though if one does, they all do (*[ˈkɔ̲mɛ̲telɔ̲]). Likewise for pretonic vowels: [moneˈðɛ̲ɾɔ̲] ∼ [mɔ̲nɛ̲ˈðɛ̲ɾɔ̲] 'purses'; *[mɔ̲neˈðɛ̲ɾɔ̲]. In OT analyses (e.g. Jiménez & Lloret 2007), positional licensing drives harmony on the stressed syllable; variable rankings (Anttila 1997) between other constraints produce optional harmony on unstressed syllables. Kaplan adapts this analysis for NHG.



Serial implementations of Kaplan's analysis were built, testing four subfamilies of NHG: constraint noise (weights are perturbed by noise), cell noise (weights are perturbed differently in each cell in a tableau), candidate noise (harmony scores are perturbed), and MaxEnt (Goldwater & Johnson 2003). Three versions of constraint noise were tested: (i) weights are perturbed once and for all at the outset of a derivation, (ii) weights are perturbed anew on each step, and (iii) like (ii) but each step inherits the perturbed weights from the previous step and adds more noise. As shown in the representative graph above, constraint noise (all versions) produced just the attested surface forms. The other versions of NHG overgenerated, mainly by producing candidates with partial post-tonic/pretonic harmony (e.g. *[ˈkɔ̲mɛ̲telɔ̲], *[mɔ̲neˈðɛ̲ɾɔ̲]). These candidates are collectively harmonically bounded by attested forms with full or no harmony on those vowels, and they therefore necessarily outperform one licit candidate. Because noise affects each candidate independently of the others in non-constraint noise, these illicit candidates are unavoidably more likely to win than one attested candidate. But constraint noise cannot produce harmonically bounded outputs (Hayes 2017) and therefore correctly generates just the harmonic bounders. These results mirror Kaplan's parallel NHG findings: constraint noise is also the only implementation that succeeds in parallel, and the other implementations overgenerate in exactly the way just described.

These results indicate that constraint noise is superior to other forms of NHG, and the particular way constraint noise is implemented might be inconsequential. Furthermore, at least in cases like the one shown here, NHG behaves comparably in serialism and parallelism, demonstrating a robustness that is independent of choices like serialism versus parallelism. For this reason, tools designed for the former (e.g. OTSoft (Hayes et al. 2013)) also give clues about the behavior of the latter.

Jonah Katz West Virginia University

Campidanese Sardinian lenition as prosodically-conditioned duration differences

Campidanese Sardinian displays a complex system of obstruent lenition that has received much attention in theoretical phonology, motivating formal devices such as constraints on systemic contrast (Tessier 2004); local conjunction of markedness and faithfulness (Łubowicz 2002); perceptual 'warping' of faithfulness scales (Storme 2018), and *MAP constraints with ranking biases (Hayes & White 2015). All of these proposals are based on Bolognesi's (1998) description of Campidanese, illustrated in (1). A voiced and voiceless series of stops (referred to as /D/ and /T/, respectively) contrast in post-pausal or utterance-initial position. The /T/ series lenite to voiced continuants following a vowel within a phrase; the /D/ series do not lenite. This pattern is phonologically problematic because /T/ undergoes a relatively radical change ([voi] and [cont]), while /D/ fails to undergo a less radical change (just [cont]).

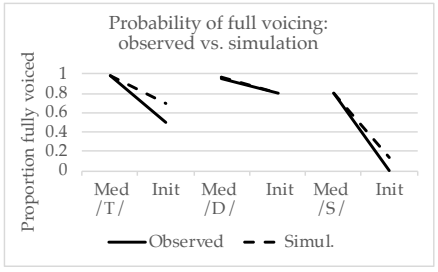
(1) Campidanese lenition as described by Bolognesi (1998); illustrated with labials

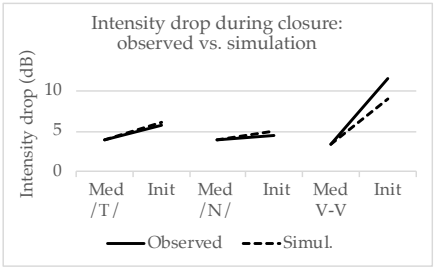
Noun (isolation/post-pausal)	Determiner + Noun	Gloss
[pota]	[sːaβota]	'(the) door'
[bota]	[sːabota]	'(the) time/occasion'

This talk argues, based on phonetic fieldwork, that none of the phonological devices mentioned above are necessary or sufficient for describing Campidanese consonant lenition. Instead, I propose a model that derives manner-related lenition and fortition from prosodically-conditioned changes in duration, without changing phonological features at all. This phonetic approach captures core facts about the consonant system revealed by Katz & Pitzanti (2019), which are missing from Bolognesi's (1998) description: (1) the /T/ series is extremely short, similar in duration to the apical tap; (2) the /D/ series *does* sometimes lenite medially (cf. Virdis 1978, Blasco Ferrer 1984, Cossu 2013); (3) rates of manner-related lenition and associated changes in intensity are gradient and mostly predictable from prosodically-conditioned differences in duration; (4) manner and intensity differences between *different* UR consonant series are *not* predictable from duration alone; and (5) duration- and intensity-based lenition and fortition affect *all* consonants, even extending to vowel-vowel transitions in hiatus.

Model parameters are derived from field recordings of 15 speakers. Each UR consonant series has a default duration, which increases adjacent to a prosodic boundary. The duration adjustment is (logarithmically) uniform across different sounds, so all consonants participate in the lenition/forition system. However, the extent to which shortening increases intensity, undershoots consonant closure, encourages voicing, or blocks devoicing varies by consonant UR. Shown in (2) are selected predictions and observed values for one qualitative feature (presence of voicing throughout a consonant) and one continuous feature (intensity drop during closure) in post-pausal ('Init') vs. phrase-medial ('Med') positions.

(2)





The account accurately predicts that consonants uniformly undergo duration-related lenition and fortition, but there is a more dramatic effect on intensity and manner for some sounds than for others. It is the short duration of the /T/ series (not necessarily specified in URs as [-voi] or [-cont]) that results in more extensive lenition than the /D/ series, for instance.

Nasal shielding and the non-phonological status of voicing in Amuzgo

Yuni Kim[1], Bert Botma[2], Florian Breit[3], Faith Chiu[1], Natalia Hernández[4], Nancy Kula[1] & Kuniya Nasukawa[5]

[1]University of Essex, [2]Leiden University, [3]University College London, [4]Independent Scholar, [5]Tohoku Gakuin University

Amuzgo, an Oto-Manguean language of southern Mexico, has two sets of distinctions whose phonological description and status have been murky. According to Smith-Stark & Tapia García (1984), the phonemic contrast between oral and nasalized vowels is restricted by context, as only nasalized vowels appear to be possible after nasal onsets. Meanwhile, contrastive voicing in obstruents is said to be limited to postnasal contexts, giving rise to a distinction generally rendered in the literature (e.g. Stewart & Stewart 2000) as ND versus NT, where N represents a nasal stop and D/T represent voiced and voiceless plosives, respectively.

(1) a. nda^{H} 'water' b. nta^{HL} 'wedding'
c. ndu^{L} 'firewood', pl. d. nt^{j}u^{H} 'sugar cane leaf'

We argue that the two puzzles are connected: oral and nasal vowels are underlyingly contrastive after all onset types. Whereas NT are underlyingly clusters, ND are derived post-stopped nasals which provide a surface transition between a nasal stop and oral vowel: /NV/ → [N^{D}V]. This 'nasal shielding' is a well-known phenomenon at least since Herbert (1986). Recent discussions of this phenomenon include Durvasula (2009), Stanton (2017) and Nevins & Wetzels (2018), who show that nasal shielding is by and large limited to languages with contrastive vowel nasalisation. This means that we do not consider the voiced oral stops to be underlying segments in Amuzgo.

The correct identification of shielded nasals versus NT clusters reveals unexpected distributions that yield some more general consequences for the typology and analysis of shielding effects. First, we show that while shielding is robust after voiced nasals, it is only variably present after voiceless nasals: while older speakers of Amuzgo have consistent shielding in this context, at least some younger speakers shield after voiced nasals only. Second, we consider both phonetic and phonological evidence which shows that shielded nasals are also found before oral vowels with non-modal voice, i.e. breathy and creaky, considered to be instances of NT in previous sources. In fact, NT appears to be systematically absent before non-modal vowels as well as diphthongs. Amuzgo has only falling diphthongs, with high /i/ and /u/ as possible first elements. Both creaky voice and rising diphthongs may disfavour maintenance of NT as distinct from ND, as their acoustic cues (low F0 and F1 in the initial part of the nucleus) mimic acoustic cues to voicing.

Since voicing is not contrastive in Amuzgo, and the interacting factors are so disparate, traditional feature-based analyses of the interaction are unable to capture the generalizations. We develop an analysis in Element Theory. The key insight of our analysis is that nasal shielding is the result of a prosodic restriction on the distribution of the |L| element. |L| can be specified no more than once in an onset–nucleus sequence. If it is specified in the (head) nucleus, |L| can license a preceding nasal onset, i.e. [NṼ]. If, on the other hand, |L| is specified in the (dependent) onset, it cannot be phonetically exponed as part of the vocalic transition. In this case, the phonetic effect is a shielded consonant, i.e. [N^{D}V]. We argue that similar distributional restrictions apply to the laryngeal elements |H| and |ʔ|, resulting in shielding effects involving aspirated nasals as well as creaky and breathy vowels.

Predicting the assibilated outputs of stop palatalisation: diachronic evidence and BiPhon-NN

Joachim Kokkelmans Free University of Bozen-Bolzano jkokkelmans@unibz.it

With 'assibilating stop palatalisation' (ASP), we refer to a stop in a sequence (e.g. /ti/, /pj/, /kt/) becoming a sibilant affricate through a(n alveo-)palatal intermediary step (Recasens 2011).

A persistent **problem** in the literature on ASP, especially in Romance or Slavic, are the unexplained language-specific place of articulation (PoA) divergences between its outputs /(t)͡ʃ/ and /(t)͡s/ (e.g. Latin [ke]LUM > Italian [t͡ʃ]*elo* but French [s]*iel* 'sky'; Calabrese 1993, Baker 2004: 51, Kortlandt 1982, 1994). Early literature on e.g. Romance ASPs simply attributes the anterior-posterior variation to a dialectal East-West division despite ample counterevidence (Elcock 1960: 54). Recasens (2011, 2020) posits instead that ASP always yields a palatal stop [c] that variably becomes anterior [t͡s] (tendentially voiceless/coronal stops and before /j/) or posterior [t͡ʃ] (tendentially voiced/dorsal stops and before vowels). His explanation rests on the phonetic nature of the input sequence rather than the relative diachrony of the ASPs.

We **hypothesise** instead, observing that diachronically older ASPs are more likely to have yielded anterior outputs (e.g. PIE */ǵ/ > /z/ *before* */ge/ > /ʒ/ in Slavic; Latin /ke/ > /s/ *before* /ka/ > /ʃ/ in French), that the outputs of ASP depend on the diachrony of the changes involved and that they are better predicted by the sibilant inventory structure at the time of occurrence:

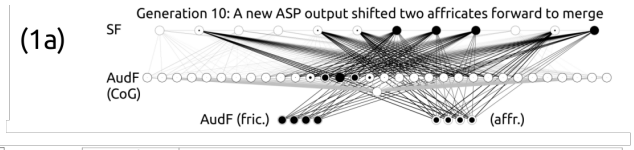
(1) Hypothesis: ASP output depends on number of PoAs in the sibilant fricative inventory
   a. In an inventory with 1 sibilant fricative PoA, the ASP output [c] pushes any older sibilant affricate forward to anterior /t͡s/ and takes its place as a sibilant affricate.
   b. In an inventory with a /s - ʃ/ contrast, the ASP output [c] becomes /t͡ʃ/ directly.

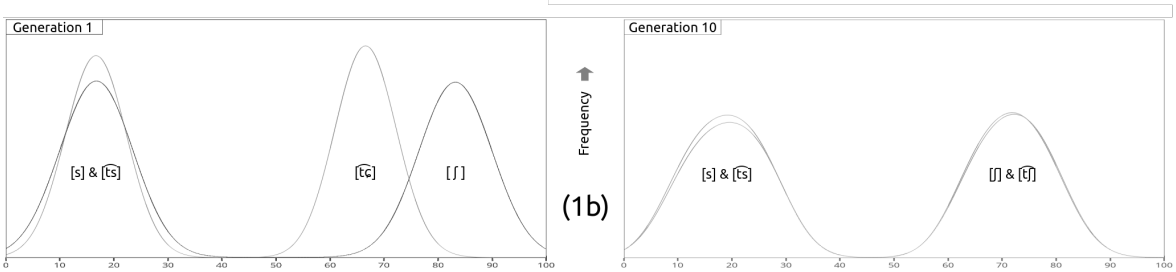
This explains why the latest ASPs when Early Romance varieties still had 1 sibilant fricative PoA pushed earlier ASP outputs to /t͡s/, yet ASP in modern varieties with a /s - ʃ/ contrast yields /t͡ʃ/. We explain the different behaviour of ASP in (1a) and (1b) as the result of fricative-affricate symmetry and a universal preference for precisely 2 sibilant PoAs (Kokkelmans 2021).

A **data** sample containing 129 ASPs that targeted 21 different input sequences in 23 Romance varieties (15 at stage *a* and 8 at stage *b*) is used to test the three hypotheses above, besides a 'randomness hypothesis' stating that ASP outputs are unpredictably anterior/posterior.

It **results** that our hypothesis correctly predicts 95.6% of it (only Québec French [t͡s] left unexplained), that of Recasens (2011) 60.3%, East-West 49.5% and randomness 53.9% $\simeq P\frac{1}{2}$.

Our hypothesis not only fits the data, but can also be **modelled** in bidirectional neural networks (BiPhon-NN), a framework in which Boersma et al. (2020) already successfully simulated the behaviour of phonemic categories on the sibilant PoA continuum. Adding a layer of fricative vs. affricate AudF nodes to account for fricative-affricate interactions in BiPhon-NN simulations in Praat (Boersma & Weenink 2019), the predicted behaviours of ASP outputs (in particular, cases (1a) and (1b)) emerge.





On the phonological status and behaviour of schwa in Welsh

László Kristó
Institute of English and American Studies
Eszterházy Károly University, Eger, Hungary

The goal of the presentation is to examine the role of schwa in the phonological system of Welsh. Specifically, we will investigate the behaviour of schwa within the vowel system on the one hand as well as its relationship to word stress.

Schwa in Welsh has several important, sometimes apparently unexpected, phonological characteristics in these respects. First of all, it is the only vowel of the language which is consistently short, whereas all other vowels are either short or long (length depends on several factors such as stress, final vs. non-final position in the word, and the type of consonant or consonant cluster following the vowel in question); see Hannahs (2013) and Bednarska-Adamowicz (2016) for details. The fact that schwa is never long would not be particularly surprising, cross-linguistically speaking. The peculiarity of Welsh schwa is that it can be stressed or unstressed, but remains short in stressed syllables even in positions where other vowels are long. For example, in South Welsh (see Bednarska-Adamowicz (2016:§3.1.)) stressed vowels are long before an intervocalic lenis fricative, cf. *afon* /ˈaːvɔn/ 'river', but schwa remains short, e.g. *tyfu* /ˈtəvi/ 'to grow'. In North Welsh, stressed vowels cannot be long except in ults (so, *afon* = /ˈavɔn/). Since stress falls regularly on the penult in polysyllables, North Welsh only has long vowels in stressed monosyllables, which leads us to another important feature of schwa in Welsh: except for clitics, it never occurs in ults. Consequently, schwa is never long in North Welsh because it does not occur in the only position where long vowels are found. Note, however, that this still does not explain the Southern situation. All in all, the stressability of schwa leads Hannahs (2013, passim) to conclude that Welsh schwa cannot be regarded as a weak or default vowel. In fact, schwa replaces certain high vowels when the syllable receives stress due to stress shift, e.g. *mynydd* /ˈmənɪ̲ð/ 'mountain' vs. *mynyddoedd* /məˈnə̲ðɔɪð/ 'mountains'. Recall that Welsh has regular penultimate stress.

In this presentation, based on Hannahs (2013) as well as Williams (1989), we will present arguments that the contradictory (or even, apparently chaotic) behaviour of Welsh schwa – i.e. that it is stressable but seems to be "inherently" short, and that it fails to occur in ults - is connected to the fact that, although polysyllables have regular penultimate stress, it is ults that behave in many ways like stressed syllables. Stressed ults, for one thing, may host long vowels in all varieties of Welsh (in monosyllables, of course), but there is a South-North split in this respect in penults. Furthermore, it will be pointed out that penults exhibit vowel alternations (vis-à-vis ults) which are strongly reminiscent of vowel reduction processes – including the /ɪ/~/ə/ alternation mentioned above. We will argue that Welsh words are underlyingly stressed on the ult, but the ultimate stress shifts to the penult. In fact, this is what happened historically, and our proposal is that the present-day situation is a relic of the earlier stage in several ways. Admittedly, this is only half the truth: in terms of consonant phonotactics, for example, penults do behave like stressed syllables, and we will briefly illustrate this by giving examples concerning the distribution of /h/ as well as post-tonic gemination. It will be proposed that the Janus-faced behaviour of schwa is connected to the similarly Janus-faced situation concerning stress and related phenomena, looking at the South-North split in the light of the abovesaid. Finally, some derivational problems will be considered.

Anton Kukhto & Alexander Piperski

Russian echo-reduplication revisited

This talk proposes an OT analysis of echo-reduplication in Russian. Russian exhibits a pattern of morphological fixed segment reduplication (Alderete et. al. 1999) with the prefix *xuj-* with roughly derisive/derogatory meaning, e.g. *startápy-xujápy* 'startups-RED', *sélfi-xuélfi* 'selfie-RED' (Dreizin & Priestly 1982, Plähn 1987, Belikov 1990, Voinov 2012, Podobryaev 2012, Delikanova 2017). The fact that *xuj* 'penis' is a word used outside of reduplication also makes this type of formation similar to blending (Bat-El 2006).

Belikov (1990) describes the basics of *xuj*-reduplication, based on introspection: if the base ends in an open stressed syllable, *xue-* is added to the last syllable of the base (*oslý-xueslý* 'donkeys-RED'); otherwise, the pretonic part of the base is replaced with *xuj-* in the reduplicant (*úlica-xujúlica* 'street-RED', *avtóbus-xujóbus* 'bus-RED', *tumán-xuján* 'fog-RED').

The data in this study come from the Araneum Russicum Maximum corpus (Benko 2014). The corpus search yields 397 types and 439 tokens of *xuj*-reduplication (434 nouns, two verbs, one adverb, one pronoun, and one *wh*-word); see also Delikanova (2017) for data from the General Web Corpus of the Russian Language (GIKRJa).

The rules above are confirmed with some exceptions, mostly of the type where the onset of the stressed syllable is retained in the reduplicant, e.g. *profkóma-xujkóma* instead of the expected *profkóma-xujóma*, which in this case might be due to the fact that *profkom* is a compound itself (*profsojuznyj komitet* 'trade union committee'). However, words with ultimate stress show substantial variation. While half of them confirm to Belikov's rules, in some the reduplicant follows the *xuj*$VC_1^nVC_0^1$ pattern, e.g. *m*[a]*ntáž-xujantáž* 'assembling-RED' instead of *m*[a]*ntáž-xujáž*. In yet another group, the pattern is *xuj*$C_1^nVC_0^1$, e.g. *lar'kí-xujkí* 'booth-RED', *xujkí* coinciding with an existing diminutive of *xuj*. The data also show that reduplication of words with final stress is avoided, which is manifested in them being underrepresented in the corpus compared to words with final stress in general.

The analysis is couched in Correspondence Theory (McCarty & Prince 1995). The patterns presented above result from the interaction of FAITH$_{\text{STEM}}$, FAITH$_{\text{AFFIX}}$, and FAITH$_{\text{BR}}$ constraints (Zimmermann & Trommer 2011) as well as the constraint ensuring specifically faithfulness to base stress (cf. FAITHHEAD in Bat-El & Cohen 2012) and a constraint on the length of the part of the base that survives in the reduplicant (cf. Bat-El 1996): it should not be too short for the base to be recoverable. The insight in Podobryaev (2012) that echo-reduplication ensures rhyming appears to not be sufficient to account for the facts, see examples like *m*[a]*ntáž-xujantáž* cited above, where the alternative candidate *m*[a]*ntáž-xujáž* establishes *rime suffisante* but the remnant of the base in the reduplicant (*-áž*) is nevertheless to short to be recoverable and *xujantáž* surfaces instead.

Finally, the talk addresses the issue of backcopying. Nevins (2005) argues that CT analyses of reduplication are inherently flawed for a number of reasons, one of them being that they allow backcopying, e.g. **shmapple-shmapple*. Zimmermann and Trommer (2011; they also provide other counter-arguments to Nevins) show that backcopying does exist based on examples from Siroi and Seereer-Siin, which involve reduplication in derivational morphology. This talk discusses syntactic properties of echo-reduplication in Russian and shows that reduplication of this type involves correspondence between a reduplicant and a base that is no longer accessible at the point where the shape of the reduplicant is computed having been spelled out before, which precludes backcopying.

CATALEXIS REVISITED

EMILY LINDSAY-SMITH (emily.lindsay-smith@ling-phil.ox.ac.uk) ~ University of Oxford
and ADITI LAHIRI (aditi.lahiri@ling-phil.ox.ac.uk) ~ University of Oxford

CVXC syllables at word edges are well known to create complications for metrical structure. Catalexis, a familiar mechanism in medieval poetry, was incorporated in phonology as a mechanism to repair degenerate feet, with segmentally empty material available for prosodic operations (Kiparsky 1991). It can account for stress shift in Toba Batak and Tongan (Kager1995a), marked stress patterns in Dutch (Nouveau1994) and subminimal clitics in Catalan (Torres-Tammarit and Pons-Moll 2019). In this paper, we demonstrate that catalexis can also be used to repair degenerate syllables. Unlike extrametricality, it can be found on the left or the right edge, and as such can account for the shape of word final CVXC and the distribution of initial and final consonant clusters across modern Arabic varieties.

Based on the evidence from stress in modern Arabic varieties (16 for the present analysis), all final CVXC are stressed in cases of syllable extrametricality (cf. Lebanese [ˈnaz:al], *he brought down*, vs [nazˈzalt], *I brought down*, (Haddad1984)), and final CVC: is stressed even in cases of consonant extrametricality (cf. Cairene [ˈʔamal], *hope*, vs [ˈʔamal:], *more boring* (Davis and Ragheb 2014:4)). This data informs choice of CVXC representation for Arabic. It rules out the recursive syllable structure of McCarthy (1979) and McCarthy and Prince (1990b), as syllable extrametricality should affect both the N1 syllable as well as the N0 syllable. Similarly it discounts the branching nodes of Halle and Vergnaud (1979) and the adjunction to mora of Broselow et al. (1995; 1997) and Watson (2002;2007) as in these analyses the final C is still internal to the syllable. Kiparksy's (2003) adjunction to word is insufficient as the stressing of final CVC: with consonant extrametricality demonstrates. The solution is that we need this final C to be non-peripheral, and to do so must make recourse to catalexis.

The proposal is that any material which does not conform to a bimoraic syllable template or is not tolerated medially is incorporated into the word as part of a syllable with a catalectic mora. Crucially, this proposal does not solely account for the stressing of final CVXC but can also account for the relationship between epenthetic position and word-edge clusters. We propose that the extrasyllabic consonant can be assigned to either the onset or coda of the syllable containing a catalectic mora. Epenthesis is then not a matter of resyllabification but of associating segmental material to this catalectic mora. Modern Arabic varieties thus differ in the extent to which they permit word internal catalectic mora. In word medial syllables, catalectic mora cannot surface as they are non-peripheral, so these are always filled with segmental material through epenthesis. In word edge syllables, it depends on whether the catalectic mora is word internal or word peripheral. In (1) and (2), we see the position of the catalectic mora in relation to an edge consonant. In Onset varieties, the catalectic mora is at the edge of the word, so is permitted to not contain overt segmental material; however in Coda varieties, it is word-internal, so if a variety does not permit this it is filled with an epenthetic vowel as overt segmental material.

(1) Initial Clusters
a. Onset Variety : Cairene
*k[μ]la:b → kila:b, *dogs*
b. Coda Variety: Iraqi
[μ]ɡla:b, *dogs*

(2) Final Clusters
a. Onset Variety: Cairene
katabt[μ], *I wrote*
b. Coda Variety: Iraqi
*katab[μ]t → katabit, *I wrote*

Like all repair strategies, our proposal is that catalexis is not always 'on' for Arabic dialects; rather it occurs when needed to repair degenerate feet and syllables.

Words without Vowels, Reduplication, and Syllable Structure in Bella Coola (Nuxalk)

Gloria Mellesmoen – University of British Columbia – gloria.mellesmoen@ubc.ca

Bella Coola (Nuxalk) is best known to phonologists for having "vowelless" words that present challenges for theories of syllabification (e.g. Bagemihl 1991). This paper an analysis of syllable structure and reduplication in Bella Coola that is informed by a combination of published materials (e.g. Nater 1984, 1990) and available audio recordings (from the First Voices website).

True Vowel-Free Words: It is impossible to discuss "vowelless" words in Bella Coola without defining the set of "vowelless" words. Previous literature has collapsed three sets of vowel-free words: words without an orthographic vowel (1), roots without an orthographic vowel that surface with vowels in full words (2), and words that are truly vowel free (3).

(1)	a. *plhtkn*	/płtkən/	'bark of cherry tree'	b. *plhtkn̓knlhp*	/płtkənkənɬp/	'bitter cherry tree'
(2)	a. *lhqw'-*	/ɬqʷ'-/	root meaning 'sob'	b. *lhiclhiqw'*	/ɬixɬiqʷ'/	'to be sobbing'
(3)	a. *t'xt*	/t'χt/	'stone'	b. *tlh*	/tɬ/	'strong'

The number of forms that are "vowelless" is much smaller than the literature suggests, because the /ə/ is omitted before a sonorant (where it is predictable) in Nater's (1984, 1990) orthography in words like *plhtkn* in (1a). I treat the pre-sonorant /ə/ as present in the phonology at the point of syllabification and I exclude partial words that are not attested without additional affixes, such as**lhqw'-* in (2a). Setting these two types of "vowelless" words aside, there is a smaller set of words which are obstruent-only and can surface without additional suffixes, such as *t'xt* in (3a).

Syllable Structure: Bagemihl (1991) considers four possible analyses of the word *t'xt* 'stone' – three having no syllabification (the no syllable hypothesis, the simple syllable hypothesis, and the complex syllable hypothesis) as in (4a), and one having three syllables (one per obstruent) as in (4b) (obstruent syllabicity hypothesis). I argue for a fifth solution (the "good enough" nucleus hypothesis), where the fricative is nuclear, with the stops parsed as onset and coda, as in (4c). The structure in (4c) is permitted only when nothing else is available to fill the nucleus, which suggests that DEP is ranked low enough that it is better to use a "good enough" nucleus than epenthesize something that is more sonorant. The sonority hierarchy is obeyed in (4c) if fricatives are considered more sonorant than stops.

(4) a. No Syllable, Simple Syllable, and Complex Syllable Hypotheses

b. Obstruent Syllabicity Hypothesis 

c. "Good Enough" Nucleus Hypothesis 

The "good enough" nucleus hypothesis has cross-linguistic precedence (see Bagemihl's 1991 discussion of Dell & Elmedlaoui 1985), and syllable-dependant alternations between obstruent and sonorant segments are attested in other Salish languages (see Blake's 1992/2000 discussion of /g/ in Comox-Sliammon as [g] when parsed as an onset, but [w] or [xʷ] when in a coda or [u] or [o] when serving as a nucleus). Recordings suggest that obstruents in "good enough" nucleus positions may be similar to fricative vowels, found in varieties of Chinese (Faytak 2018).

Reduplication: An asymmetry Bagemihl (1991) observes between the number of obstruent-only lexical items and the (small) number of corresponding reduplicated forms reflects the ordering of Bella Coola reduplication and the "good enough" syllabification. In a Generalized Nonlinear Affixation approach (e.g. Bermúdez-Otero 2012), with reduplication involving affixation of prosodic units, reduplication must occur prior to building "good enough" syllables. This accounts for why reduplication in (1b) occurs so far from the left edge of the word (aligning instead with the first available mora), and why vowel epenthesis is seen with reduplication in (2b) when there is nothing available to copy. The high ranking of DEP and a motivation to copy something sonorant in reduplication leads to the forms discussed by Saunders and Davis (1972), where an infixed *-n-* (absent from the root) is copied instead of epenthesizing a vowel. (Compare *k'ts-* 'to chop' with *k'nk'ntsats* 'I chop again and again, but not now'.)

Modelling the exceptionality/opacity dilemma in acquiring Bedouin Arabic

Aleksei Nazarov, Utrecht University

Bedouin Arabic has a complex opaque interaction (Al-Mozainy 1981, McCarthy 2007) involving three processes shown in (1abc). (1de) shows the opaque interactions.

(1) a. epenthesis: Ø→$V_{[+high]}$ / C_$C_{[+son]}$; /libn/ → [li**bin**] ‘clay’
b. raising: a → i / _CV; /katab/→[k**i**tab] ‘wrote’;/samiʕ/→[s**i**miʕ] ‘heard’
c. deletion: $V_{[+high]}$ → Ø / _CV; /kitib/ → [**kt**ib] ‘was written’
d. (1a) counterfeeds (1bc): /gabl/ → [g**a**bil](*→ [g(i)bil]) ‘before’
e. (1b) counterfeeds (1c): /katab/ → [k**i**tab](*→ [ktab])

On the surface this pattern looks rather like a case of exceptionality (certain vowels raise, others do not; certain vowels delete, others do not), and a learner should consider this hypothesis alongside the regular, opaque analysis. To make this ambiguity explicit, I use segmentally local constraint indexation (Round 2017), which allows for an interpretation in terms of exceptionless rules (grammatical analysis) and one in terms of exceptionality (lexical analysis). Other analyses (e.g., McCarthy 2007, Jarosz 2014) do not make this ambiguity as explicit. The **lexical** analysis of the Bedouin Arabic pattern is that certain vowels in certain morphemes have an index to undergo raising and/or deletion, but there are no further constraints on these indices. For instance, if the vowel /a/ in /$ka_{[+L]}$tab/ has the index [+L], it raises but does not delete. However, other /a/s might have other indices and delete or fail to raise. The **grammatical** analysis is that each of the indices that a raising or deleting vowel is associated with also comes with certain other requirements: e.g., *[+hi,+L] unless raising applies. Below, /a/ in /$ga_{[+L,+V]}$bl/ has the index [+L]. Never followed by a [+V] vowel (epenthetic vowels must be [-V]), this /a/ does not raise (no violations of *$a_{[+L]}CV_{[+V]}$); this means that the [+L] vowel must be realized as [a] (*$[+hi]_{[+L]}$): every non-deleting (=[+L]) vowel is [-high] except when it can raise (/_CV).

/$ga_{[+L,+V]}$bl/	*$CC_{[+son]}$#	Dep	*$V_{[-V]}$	*$V_{[-L]}CV_{[+V]}$	MAX(V)	*$a_{[+L]}CV_{[+V]}$	*$[-hi]_{[-L]}$	*$[+hi]_{[+L]}$	IDENT(hi)
$ga_{[+L,+V]}$bl	*!								
☞$ga_{[+L,+V]}bi_{[-V]}$l		*	*						
$gi_{[+L,+V]}bi_{[-V]}$l		*	*					*!	*

To simulate the choice between these analyses, I use a slightly modified version of Round’s (2017) learner for segmentally local constraints, which starts with universal constraints and finds which constraints and input segments should have which indices with a bias towards more general indexed constraints, but without any further biases against the lexical analysis. Starting with a slightly modified version of the constraints in the tableau above (indexation removed), a learner with just the dataset in (1) failed to learn a grammatical analysis: on all 10 runs, it simply marked vowels as raising regardless of environment (*[-hi], *Ident(hi)) and other vowels as non-deleting (MAX(V)). When the dataset was expanded to include raising/deletion alternations (using the [-at] suffix on verbs), the analysis is closer to grammatical: it marked certain vowels as raising/deleting before certain (non-epenthetic) vowels (*aCV); random vowels were still marked as non-deleting (MAX(V)) (with some variance among the 10 runs). Finally, when multiple URs were offered to the learner (Jarosz 2006; the underlying height of non-epenthetic vowels was varied), it still marked certain vowels as raising/deleting before certain (non-epenthetic) vowels (*aCV) and certain vowels as non-deleting (MAX(V)), but this time, the alternating vowels subject to raising are also marked as being [a] by default and the alternating vowels subject to deletion, as [i]. This is close to the grammatical analysis in the tableau above, and shows that a generalizable account may be chosen despite the additional complexity and despite no overt biases against the lexical analysis.

Tamil Pronouns: How Phonology Solves a Morphosyntactic Problem

Heather Newell, UQAM

Take-home message: To account for the Tamil pronominal paradigm we need to examine the phonology and the morphosyntactic structure of both the Tamil pronominal and verbal systems. Importantly, paying close attention to the phonology of Tamil solves a significant problem in the morpho-syntactic literature. (Data from Annamalai & Steever 1998; Schiffman 1999; Subrahmanyam 1967/1968). **An autosegmental analysis:** To account for the variations in the Tamil pronominal paradigm we need to note/propose two things. (A) Final sonorant consonants are floating (as in French liaison). They will only be pronounced as onsets to following vowels. E.g. *naal* 'day': [naalɯ] or [naa]. Final nasals will nasalize a preceding vowel if not pronounced as an onset. E.g. *maram* 'tree': [marõ]. (B) Tamil has a phonological reflex triggered by word minimality. If a word is mono-syllabic a CV/σ may be inserted (note that the epenthetic vowel 'saves' the final C in *naal* but not in longer words like *maram*). Floating segments and the insertion of a CV for sub-minimal words will be crucial below. **The data:** The pronominal base alternates in the 1st and 2nd person in Tamil (not the 3rd. See Harley & Ritter 2002 for the relevant morphosyntactic distinctions). Nominative bases are distinct from bases in all other Cases.

(1) a. Nominative: (i) 1sg. [nã:ɳ-Ø] (ii) 1pl. [na:ŋ-ka‿-Ø]
b. Accusative: (i) 1sg. [en:-ai] (ii) 1pl. [eŋ-ka‿-ai] (and other Cases)

(2) a. Nominative: (i) 1sg. [ni:-Ø] (ii) 1pl. [ni:-ŋka‿-Ø]
b. Accusative: (i) 1sg. [un:-ai] (ii) 1pl. [uŋ-ka‿-ai] (and other Cases)

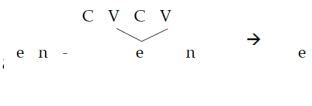
Allomorphy and Locality: The standard assumption is that morphemes need to be adjacent in the syntactic structure in order to condition allomorphy. E.g. *go* → *went* when local to *PAST* (*I went*), but not across an intervening negator (*I did not go*). Importantly, the Tamil evidence in (1) has been proposed to be the best evidence morphologists have for non-local allomorphy; allomorphy conditioned across an intervener, here the plural morpheme. The analysis of (1) in Smith et al. (2019) necessitates a serious complication of the theory of allomorphy to account for this non-local conditioning of the form of the base. This complication is proposed here to be an error. **Two parts to the solution:** The above pattern is argued here to not be allomorphy, but phonology. ***Morphosyntax:*** The root in (1ai) is proposed to be bi-morphemic. *V:n/V:* is the shape of 1st/2nd person agreement in the verbal system (*iru-kur-een* : be located-PRES-1sg 'I am located', *poo-v-ii-ngaɭ* go-fut-2sg.pl 'You will go'). Distinctions in vowel quality in the verbal and nominal systems are to be discussed in the talk. ***Phonology:*** The pronominal bases are 1sg *en* and 2sg *on*; the segments in these forms are floating. There is agreement morphology on the Nominative pronouns but not in the other cases. (3/4) demonstrates this difference:

(3) a. en 'D.1SG.OBLIQUE' [ʸẽ] 'my'
b. en-a:n 'D.1SG-AGR' [nã:] 'I'

(4) a. on 'D.2SG.OBLIQUE' [ʷõ] 'your'
b. on-i: 'D.2SG-AGR' [ni:] 'you'

The onglides in (3/4a) are part of the regular phonology of Tamil. The agreement suffixes come with linked CV structure. The oblique pronouns, lacking any underlying CV structure, are augmented with a CV due to minimality (to be discussed further in the talk). This gives us the following derivations of (3b/5a) and (3a/5b):

(5) a.



b.

Conclusion: The data in (1/2a) are more complex than presumed in the analysis of Smith et al. The phonological shape of the agreement morphemes determines the variation seen in the base (*en/n, on/n*). This complete morpho-phonological analysis relieves the problem that arises in the morpho-syntactic literature: there is no allomorphy here, and therefore no problem for locality. In sum, without an understanding of the phonology of the language, morpho-syntactic analyses may encounter serious problems.

Title: The articulatory targets for vowels in non-native speech production

Author: Madeleine Oakley, Georgetown University: mo643@georgetown.edu

Background: Because of their phonetic properties, vowels have typically been considered to have an acoustic target (Gay et al., 1981; Pierrehumbert, 2000; Stevens, 2010). However, by considering the articulatory gesture to be the basic phonological unit, theories such as Articulatory Phonology (Browman & Goldstein, 1992) or PAM (Best, 1994) successfully describe many phonological processes, but importantly focus on consonants rather than vowels. This study is designed to look at situations where articulatory and acoustic theories make different predictions about vowel targets. Specifically, this study compares how L1 English speakers produce L1 vowels compared to non-native Akan vowels using ultrasound and acoustic data. It is hypothesized that L1 English speakers will perceptually map Akan vowels to their English counterparts, even though they are articulatorily different (Tiede, 1996; Kirkham & Nance, 2017). Thus, if the vowels have an articulatory target, speakers will produce the non-native vowels with the same articulatory gestures as L1 vowels, and if they have an acoustic target, the non-native vowels will have the same acoustic values as L1 vowels. Importantly, it is not the case that transfer of acoustic values entails transfer of articulatory gestures, given previous evidence that there is a non-linear mapping between vowel articulation and acoustics (Perkell et al., 1993; Stevens, 2010; Whalen et al., 2018).

Methods:

6 L1 English speakers (E1-E6), who had no prior exposure to Akan, completed a production task. Participants repeated a wordlist in Akan containing 12 words with each target vowel /i, ɪ, e, ɛ, u, ʊ, o, ɔ/, and a wordlist in English containing 12 words with each target vowel /i, ɪ, e, ɛ, u, ʊ, o, ɔ /. Stimuli were recorded by a native speaker of Akan and a native speaker of North American English. Stimuli were presented auditorily in AAA (Articulate Instruments Ltd.) while participants wore a stabilization headset connected to an ultrasound probe, and a headset microphone. The acoustic values of each speaker's English and Akan vowels were compared using F1 and F2 at the midpoint of each vowel. For ultrasound tongue position, radial coordinates were extracted at the midpoint of the vowel, and each speakers' English and Akan vowels were compared.

Results:

For the acoustic results, Pillai scores from separate MANOVAs show that all speakers produce Akan and English /i/ and /ɪ/ with the same F1-F2 values, but speakers do *not* produce Akan and English /e, ɛ, u, ʊ, o, ɔ/ in the same F1-F2 values. Although the acoustic results show only transfer of the high front vowels, articulatory results (using within speaker SSANOVAs with Bayesian 95% confidence intervals) show that all speakers produce Akan and English /i, ɪ/ and /e/ with the same tongue position. Furthermore, half of speakers produce Akan and English back vowels with the same tongue position, which again is not found with the acoustic results.

Concluding remarks:

The results of this study show that the articulatory gesture is more predictive of non-native vowel production transfer than acoustic-phonetic categories. Speakers produce the Akan front vowels with the same articulatory gestures as their L1 English vowels, and about half of speakers produce Akan back vowels with the same articulatory gestures as English back vowel. I hypothesize that the variability across speakers in regards to the back vowels is caused by the notoriously fronted American English back vowels, which causes some speakers to not perceptually map Akan back vowels to English back vowels. However, the nature of category transfer (or lack thereof) depends greatly on vowel quality. Specifically, speakers reliably use *both* L1 acoustic-phonetic categories and articulatory gestures to produce Akan high front vowels, showing that the mapping between acoustics and articulation is uniquely stable for high front vowels. The high front vowels are unique in their transfer properties, suggesting they are perhaps an anchor point by which the rest of the vowel space is defined.

The effect of aspiration lengthening on speech segmentation: An artificial language learning study

Shu-chen Ou
National Sun Yat-sen University
sherryou@mail.nsysu.edu.tw

Zhe-chen Guo
The University of Texas at Austin
zcadamguo@utexas.edu

It is well-recognized that listeners across languages tend to perceive longer vowel duration as cueing word-finality in segmenting running speech (Saffran et al., 1996; Tyler & Cutler, 2009). Recently, they are shown to interpret longer consonants as cues to word beginnings (White et al., 2020). This study aims to extends this line of research by focusing on aspirated consonants. This subset of consonants warrants a focused investigation as aspiration could have different perceptual interpretations. If it is perceived as part of the consonant only, lengthening it should produce effects similar to that of consonant lengthening revealed by studies using a mixture of consonant types (e.g., White et al., 2020). That is, it would facilitate word segmentation in word-initial but not word-final position. Yet, listeners include the aspiration period in making metalinguistic judgments of the following vowel's duration (Gussenhoven & Zhou, 2013). This suggests that as with lengthening acoustic vowel duration, lengthening aspiration may produce the percept of a longer vowel and facilitate segmentation word-finally but not word-initially.

We explored the above possibilities with an artificial language (AL) learning experiment. Participants learned an AL by listening to continuous repetitions of its words, which were nonsense trisyllabic sequences with each syllable comprised of an aspirated stop and a vowel (e.g., / t^ha.t^he.k^ho/). The stimuli were presented under three conditions: no lengthening (NL), in which all segments were equally long; initial lengthening (IL), in which the aspiration period of the initial consonant of every AL word was lengthened by 1.5 times; final lengthening (FL), in which the same lengthening was applied to the consonant of the final syllable of every AL word. Participants then identified the AL words in a two-alternative forced-choice test. More accurate responses indicate better segmentation during the learning. Ninety native Taiwanese Southern Min listeners were randomly and equally assigned to the three conditions. A Bayesian mixed-effects logistic regression model fitted to their responses in the test revealed that word identification accuracy was higher for the IL condition (mean: 68%) than for the NL one (mean: 58%) (95% CI: [0.14, 0.82]; zero deemed not credible). Accuracy did not differ between the FL (mean: 56%) and NL conditions (95% CI: [-0.41, 0.24]; zero among the credible values).

The results suggest that lengthened aspiration improves segmentation only when it occurs word-initially, replicating the consonant lengthening effect from prior research. There is no evidence that including aspiration in explicit vowel duration estimation inclines listeners to analyze longer aspiration as extra vowel duration and use it as a finality cue. The empirical patterns from the current and previous studies align with an account of speech representations which assumes a rich representational structure, through which listeners exhibit task-specific perceptual behavior that is dependent on the goals of perception (e.g., finding word boundaries or making metalinguistic judgments about vowel properties).

References

Gussenhoven, C., & Zhou, W.-C. (2013). Revisiting pitch slope and height effects on perceived duration. *INTERSPEECH 2013: 14th Annual Conference of the International Speech Communication Association*, 1365–1369.

Saffran, J. R., Newport, E. L., & Aslin, R. N. (1996). Word segmentation: The role of distributional cues. *Journal of Memory and Language*, *35*(4), 606–621.

Tyler, M. D., & Cutler, A. (2009). Cross-language differences in cue use for speech segmentation. *The Journal of the Acoustical Society of America*, *126*(1), 367–376.

White, L., Benavides-Varela, S., & Mády, K. (2020). Are initial-consonant lengthening and final-vowel lengthening both universal word segmentation cues? *Journal of Phonetics*, *81*, 100982.

Danish is Estonian is English

Markus A. Pöchtrager (University of Vienna), markus.poechtrager@univie.ac.at

Basbøll (1988) takes Danish stød (a laryngealisation) to mark the second mora in odd-numbered syllables, counting from the right (1). The mora allows unification of /V:/ and tautosyllabic /V/+sonorant (2); but the restriction to odd-numbered syllables remains mysterious. I claim that the pattern is **(C1)** neither restricted to Danish or stød, **(C2)** nor does it require moras.

(1) a. *sen* [se:ʔn] 'late' (1st σ from right, stød) b. *sene* [se:nə] 'tendon' (2nd, no stød)
(2) a. *sen* [se:ʔn] 'late' (/V:/) b. *kant* [kænʔd] 'edge' (/V/+sonorant)

C1. The distribution of Danish (Da.) stød is virtually identical to that of Estonian (Ee.) overlength, which in turn parallels where English (En.) shows *lack* of pre-fortis clipping (Crystal & House 1988, Klatt 1976, Lehiste 1970, Lisker 1957, Luce & Charles-Luce 1985, Luce, Charles-Luce & McLennan 1999, Peterson & Lehiste 1960, Umeda 1975), henceforth also 'overlength' (Pöchtrager 2006, 2014 for arguments of its phonological relevance). Parallels P1–5 suggest that stød and overlength realise the same underlying phonological property.

(P1) Stress is a necessary condition for both stød and overlength
Da. *fon* [fo:ʔn] 'phone' Ee. *siid* [si::d] 'silk' En. *loon* [lu::n]
(P2) Monosyllabic words ending in a vowel are always overlong/take stød
Da. *bi* [bi:ʔ] 'bee' Ee. *tee* [de::] 'road' En. *bee* [bi::]
(P3) Bisyllabic forms do not have overlength/stød (cf. P5 for apparent exceptions)
Da. *vane* [væ:nə] 'habit' Ee. *sooni* [so:ni] 'cut! IMP.' En. *lunar* [lu:nə]
(P4) Nature of final consonant in monosyllabic words relevant for overlength/stød
Da. *lam* [lamʔ] 'lamb' Ee. *siid* [si::d] 'silk' En. *bead* [bi::d]
vs. *lap* [lab]/*[labʔ] 'rag' vs. *[si::d:] vs. *beat* [bi:t]/*[bi::t]
(P5) Morphological structure plays crucial role (English example by Abercrombie 1964)
Da. [[*mus*]*en*] 'the mouse' (stød) vs. [[*muse*]*n*] 'the muse' (no stød)
Ee. [[*moos*]*i*] 'jam PAR.SG.' (overlength) vs. [*moosi*] 'jam GEN.SG.' (no overlength)
En. *Take Grey* (overlength) *to London* vs. *Take Greater* (no overlength) *London*

C2. Pöchtrager (2006, 2014) analyses Ee./En. (over)length as follows: Like all lenis consonants, the *n* in En. *loon* has an empty position inside. (Representations skipped for reasons of space.) This position is claimed by the preceding long stressed vowel, yielding overlong [u::]. (Contrast *boot* [bu:t]: fortis *t* and long, not overlong [u:]. Fortis consonants provide no empty positions.) In *lunar* this position within the *n* is inaccessible to the preceding vowel, as *n* groups with the following vowel (*lu.nar*): [u:] is long, not overlong. This distinction between mono- and bisyllabic words parallels Ee. (P3) and also extends to (1): In Da. *sen* [se:ʔn] 'late' the empty position is not used for further lengthening of the (long) vowel (unlike Ee./En.). Instead, the empty position is realised as [ʔ] (stød) by the Empty Category Principle (Kaye 1990, Larsen 1994). In Da. *sene* [se:nə] 'tendon' the *n* is again out of reach (*se.ne*), preventing stød. The asymmetry in (1) falls out, while it had to be stipulated under a mora-account.

Further issues. 1. In final clusters with a lenis second member the sonorant lengthens in Ee./En. (*send* [sɛn:d]), while in Da. there is again default spell-out of the empty position as stød (*kant* [kænʔd], 2b). **2.** Morphology creates apparent violations of P3 (P5): Da. [[*muse*]*n*] 'the muse' has a bisyllabic base, thus no stød; [[*mus*]*en*] 'the mouse' a monosyllabic base, hence stød, cf. also Morén (2013). This extends to English cliticised *to*. **3.** P3 shows that the sonorant/obstruent distinction is crucial in Da. after short vowels. (After long vowels the fortis/lenis distinction becomes relevant, just like Ee./En.) For Pöchtrager (2014) sonorants contain more empty structure than obstruents, explaining stød after short vowels, cf. Pöchtrager (2010) for similar trade-offs in other languages. **4.** Words like *bid* (vs. *bit*) conform to the generalisation in P3 with the vowel again lengthened before lenis. This does not lead to *over*length, only to a lengthened short vowel (cf. Pöchtrager 2006, 2020); orthogonal to the analysis here. **5.** P4 is sufficient for lengthening in Ee./En., while a few words in Da. (*ven* [vɛn] 'friend') lack stød though all conditions are met. This has been (Grønnum & Basbøll 2001) and still is unresolved.

The representation of nas+stop+obs clusters in English: Stop insertion or stop deletion?

Krisztina Polgárdi, Hungarian Research Centre for Linguistics, polgardi.krisztina@nytud.hu

The occurrence of CCC-clusters where C_2C_3 do not form a possible branching onset is severely limited in English: either C_2 must be [s] (as in *substitute* [ˈsʌbstɪtjuːt]), or a homorganic nasal+stop cluster is followed by an obstruent. The medial stop of such nas+stop+obs clusters is present only optionally, indicated by italics or superscript in the transcriptions of (1) vs (2), following Wells 2008.

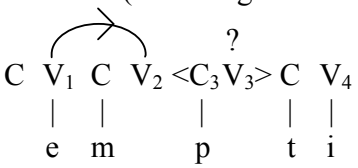
(1)	empty	[ˈem*p*ti]	(2)	concert	[ˈkɒnᵗsət]
	tincture	[ˈtɪŋ*k*tʃə]		infant	[ˈɪnᵗfənt]
	sphincter	[ˈsfɪŋ*k*tə]		month	[mʌnᵗθ]
	function	[ˈfʌŋ*k*ʃən]		hamster	[ˈhæmᵖstə]

The question then arises if the stop is deleted or inserted in this context? Szigetvári 2020 proposes to analyse both cases as insertion. However, I will show that important differences between the two types (listed below as (i)–(v)) remain unexplained under such an analysis. Therefore, I will argue that there is both deletion and insertion (as suggested by the transcriptions of Wells), and I will provide a Government Phonological analysis.

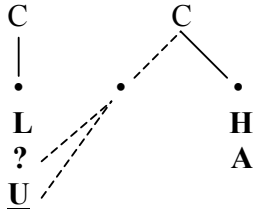
(i) Insertion only occurs before a fricative, as in (2), while deletion mostly occurs before a stop or an affricate, as in (1). (ii) When the last consonant in the cluster is a fricative, the alternation only occurs if the following vowel is unstressed (e.g. *concert* *[kənᵗˈsɜːt]), whereas in case of a stop the alternation is also found pretonically (e.g. *punctilious* [pʌŋ*k*ˈtɪliəs]). (iii) An optional [t] can be found before a fricative, but never before a stop (e.g. *melancholy* *[ˈmelənᵗkəli]). This is understandable if a nasal+stop+stop cluster must be underlying (as a [t] is generally ruled out from internal coda positions in English) but the [t] in forms like *concert* [ˈkɒnᵗsət] is excrescent in some way. (iv) [ŋ] is normally only permitted before a velar plosive morpheme internally at the stem-level, which would be contradicted by forms of type (1) if the [k] was not underlying. (v) Finally, voiceless stops are also optionally deleted in the parallel forms containing the word-level suffixes *-s* and *-ed*: e.g. *jumped* [ʤʌm*p*t], *prints* [prɪn*t*s], and *thanks* [θæŋ*k*s], where an insertion analysis is not feasible.

In a Strict CV analysis (in terms of Lowenstamm 1996), utilising trochaic (left-to-right) proper government (following Rowicka 1999), forms in (1) are represented as in (3).

(3)



(4)



V_1 properly governs the empty V_2 inside the homorganic cluster (indicated by the arrow), thus enabling it to remain silent. Being properly governed, however, V_2 can now not govern V_3. Therefore, the cluster is optionally simplified, by deleting the C_3V_3 sequence.

As the lexical representation in (3) is ill-formed, we do not expect another process to create it. The appearance of a stop in (2) thus cannot result from segment insertion. I propose that a contour structure is created, similar to that of affricates (see also Clements 1987), as in (4), using Backley's 2011 Element Theory (**U** 'labial', **A** 'coronal', **?** 'stop', **H** 'noise' and **L** 'nasal'), and the two root node analysis of affricates by Harris 1994. The stop and place elements of the nasal spread to the following fricative (expressing extension of oral closure), and an additional root node (•) is created to host them. I will show that this analysis captures all the differences between (1) and (2). It is also supported by the fact that affricates following nasal and oral stops optionally reduce to fricatives in English (if not preceding a stressed vowel): e.g. *angel* [ˈeɪn*ʤ*əl], *actual* [ˈæk*tʃ*uəl]. Here the process in (4) sort of applies in reverse, and affricates need to be represented as contour structures to be able to lose their stop half. (Insertion is not possible in this case, as it does not happen in forms like *action* [ˈækʃən].)

Associative plural in Shilluk: in between a clitic and an inflection

Bert Remijsen, University of Edinbrugh

We present a descriptive analysis of the associative plural, a recently discovered phenomenon in Shilluk grammar, and consider its implications for the nature of prosodic domains and morphophonology. The analysis is based on original fieldwork data. The associative plural serves the function of widening the scope of reference from a referent to entities that belong with it or are conceptually similar to it (Moravcsik 2003). In Shilluk, this construction involves the independent pronoun **jâā**, which is followed by a noun phrase referring to the entity that is central to the set. Crucially, the final word in this noun phrase is morphologically marked, and this marking is what we gloss as 'associative plural' (APL). The phenomenon is illustrated in (1). Note that the suffixed noun **gīɪɪl-ɔ̄** 'Gilo' is marked for associative plural through suffixation – **-īɪ** is added to the stem – whereas the suffixless noun **ɟúur** 'Jur' is marked through fusional morphological marking – the stem is lengthened and a High target is added, in this case vacuously.

(1) ɟɔ̂k = ání běeen **jâā gīɪɪl-īɪ** **jáā ɟúuur** ḍòk á-pÂʌŋì
men:CS = DEF all **IDP Gilo-APL IDP Jur-APL** cow.PL PST-divide:OV
'All those men – **Gilo's group, Jur's group** – cows were divided (among them).'

The morphological marking of associative plural is found at the right edge of the noun phrase. This is shown in (2), which shows a noun phrase with a verb modifier in (2a), and in (2b) the same noun phrase morphological marked for associative plural.

(2) a. **bɔ̀ɔn̪-ì** **à** **nîɪn**
craftsman-CS MDF sleep
'the sleeping craftsman'

b. **jáā bɔ̀ɔn̪-ì** **à** **nɪ̌ɪɪn**
IDP craftsman-CS MDF sleep:APL
'the group of the sleeping craftsman'

In this way, the marking for associative plural can attach to nouns, verbs and adjectives alike, and also to function words. This means that it is not part of the inflectional paradigm of any lexical category, but instead like a clitic. Similar questions have been raised in relation to the status of the possessive marker *'s* in English (Bloomfield 1926). Bloomfield (1926:156) discusses the example of *the man I saw yesterday's daughter*, where the possessive marker attaches to an adverb. Just as the Shilluk associative plural, the English possessive marker is a bound morpheme, even though it is not part of the inflectional paradigm of the host. Different from English possessive *'s*, the Shilluk associative plural interacts with the Shilluk noun class system, just as inflections do. For example, the nouns **wât** 'son' and **wât** 'relative' have the same specification for tone in the base form. Crucially, they diverge in the associative plural – **jáā wʌ́ʌʌt** vs. **jáā wă̋aat**, respectively – just as they do in inflections such as the construct state, which are **wʌ́ʌʌn̄** vs. **wâaan**, respectively. Evidently, associative plural is marked as if it were an inflection. We will lay out this phenomenon and evaluate possible analyses.

Elastic s+C and the record of s+C effects

Tobias Scheer, Université Côte d'Azur-CNRS, scheer@unice.fr

Elastic s+C is the idea that s+C clusters are always interludes (which they should be given their sonority slope), except when for some reason the coda-onset parse is impossible, in which case the s branches on the empty nucleus that occurs within the s+C cluster as a last resort repair (Scheer & Ségéral 2020). The most trivial s+C effect is the simple occurrence of s+C word-initially in languages that do not otherwise tolerate non-rising sonority slopes in this context (English, Italian, etc.). In many cases this is complemented with positive evidence that word-internal s+C is an interlude (e.g. there is no tonic lengthening before s+C in Italian, mid vowels are -ATR in Southern French in this context, etc.). In these cases, the s branches in #s+C in order to avoid ill-formedness, but has no reason to do so word-internally. Another type of s+C effect occurs when s+C clusters follow long vowels in languages where super-heavy rhymes are prohibited (as in Faifi Arabic, Alfaifi & Davis 2021): the ill-formedness of VVs.C is repaired by the branching of the s, which makes it an onset (its nucleus is filled) and VVsC inoffensive. Finally, a third type of repair is triggered when s+C comes to stand after another consonant. In the evolution from Latin to French, yod metathesis Cj > jC occurs when the preceding syllable is open and the yod can become a coda (rati$\underline{o}$ne > raj.ʦon > raison), but is blocked when it is closed, in which case the yod is lost (can.ti$\underline{o}$ne > chanʦon > chanson, not *chainson). Only s+C can accommodate the yod to its left: ang$\underline{u}$s.tia > °ang$\underline{u}$s.ʦia > °angoj.stse > angoisse). Here again, branching is on demand due to the illegal sequence Vj.s.CV created by metathesis: s becomes the onset of a filled nucleus and a preceding coda (yod) is no problem.

Import. The criminal record of the phonological object of wonder s+C is notorious (Goad 2011), and all attempts to understand its workings as a unified phenomenon have been to no avail thus far. Elastic s+C is based on the insight that s+C may have different syllabic identities in the same language, depending on context. There are three s+C mysteries: i) the syllabic mystery (what is its syllabic status?), ii) the singleton mystery (why is s only special when followed by a C, but never when occurring alone?), iii) the segmental mystery (why is only s (in fact, s,z, ʃ,ʒ, ɕ,ʑ) and no other fricative able to do what it does?). Elastic s+C answers i) and ii): since s+C effects occur when s branches on the following empty nucleus, there can be no effect when the following nucleus is filled, i.e. when s is followed by a vowel.

A striking argument in favour of elastic s+C comes from cases where the C of s+C shows intervocalic behaviour. This appears to be outlandish in an sCV sequence since C is preceded by a consonant. Under elastic s+C when s branches, though, the C is in intervocalic position, as it is surrounded by filled nuclei. In the French case mentioned, the C indeed shows intervocalic behaviour: °ang$\underline{u}$s.ʦia should produce °angoj.stse after yod metathesis, but the ʦ appears as s in Old French: angoi**s**se. It has undergone regular intervocalic spirantisation like all other intervocalic stops of the language.

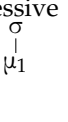
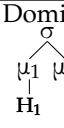
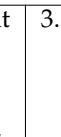
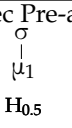
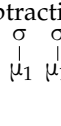
Customary analyses of s+C are mute wrt the singleton mystery, specific to the (left) word edge (extrasyllabicity, appendix), cannot account for the fact that s+C may show bipositional behaviour (contour segment) or are self-contradictory (Kaye's 1992 analysis whereby word-initial s+C is an interlude, though this is an ill-formed structure by his own standards).

The contention is that elastic s+C provides a uniform analysis for all s+C effects and identifies their raison d'être: an ill-formed structure that requires repair. In order to see whether the record of s+C effects can be fit into the elastic s+C pattern, I have undertaken a compilation of s+C effects that are reported in the literature: they are classified according to the different patterns and contexts (word-initial, word-internal) and regarding the phenomena producing them (reduplication etc.). It is shown that the empirical record massively supports elastic s+C. Of the many cases that are considered, here is just one: in Eastern Armenian (Vaux & Wolfe 2009), the plural suffix has two allomorphs, *-er* and *-ner*, the former occurring after monosyllabic (*k^{h}ar* - *k^{h}ar-er* "rock"), the latter after plurisyllabic (moruk^h - moruk^h-ner "beard") stems. But sCV stems take *-ner* (*spa* - *spa-ner* "officer"): s spreads on the following nucleus, which thus counts.

Lexical Tone in Tokyo Japanese: An Argument for Gradient Representations

Razieh Shojaei Leipzig University razieh.shojaei@uni-leipzig.de

Main Claim: The assumption of Gradient Symbolic Representations (GSR, Smolensky & Goldrick, 2016; Rosen, 2016) provides a unified representational account for the complex accentuation patterns in Tokyo Japanese, while maintaining the Indirect Reference Hypothesis. GSR derives all of the accentual patterns without reference to indexed constraints (Revithiadou, 1999; Alderete, 1999), Transderivational Anti-Faithfulness (Alderete, 1999), and co-phonologies (Inkelas, 1998) that are employed by alternative accounts on Japanese accent. Also, under gradient representations, there are no requirements for new complex mechanisms such as negative activation (Kushnir, 2018) and two-dimentional concatenation (Trommer, 2019). **Data:** Lexical tone is culminative in Japanese; at most one High-Low sequence is allowed per word (Kawahara, 2015). This effect leads to a competition between stem/affix tone where dominance/recessiveness of affixes is an important criterion. The recessive suffix retains its tone if combined with a toneless stem (1b), but loses to a toned stem (1a), whereas the dominant suffix always retains its tone (2) and deletes the stem tone (2a). Culminativity is, however, orthogonal to stem tone deletion induced by subtractive suffixes that are toneless themselves (5a+b). The pre-accenting suffixes are also toneless: dominant pre-accenting suffixes insert tone on the final syllable of a toned/toneless stem (4a+b) but recessive pre-accenting suffixes insert tone only on toneless stems (3a+b). The attractive suffix attracts the stem tone immediately to its left in pre-accenting position (6a) and has no effect on a toneless stem (6b). **Analysis:** The complex accentuation pattern in Japanese falls out in an account based on gradient activity and Harmonic Grammar (HG, Legendre et al. 1990; Smolensky & Legendre, 2006). This account exclusively employs independently motivated constraints on phonological elements (tones/TBU's) with gradient activity that compete for association. The crucial constraints that decide the winners of the competitions are H→μ and μ→H; they demand association of every H to a TBU (and vice versa) and are violated gradiently. The proposed representations for tonal types of suffixes are shown in the table below: 1) *Recessive* suffix's partially active $H_{0.5}$ loses to stem's fully active H_1 under the pressure of H→μ; 2) *Dominant* suffix's H_1 overwrites stem's H_1 as predicted by ALIGNR(H); 3) *Recessive pre-accenting* suffix's weak floating $H_{0.5}$ associates to the rightmost TBU of a different morpheme as required by ALTERNATION (van Oostendorp, 2006), H→μ, and ALIGNR(H) but a stem H (if present) wins against this weak suffix tone; 4) *Dominant pre-accenting* suffix's floating $H_{1.5}$ always docks on a stem-final TBU and triggers stem tone deletion, thanks to its high activity; 5) A *Subtractive* suffix, although underlyingly toneless, causes deletion of a stem H by its strong floating $\mu_{1.5}$ which usurps the stem H_1 under the pressure of μ→H (Zimmermann, 2017); 6) *Attractive* suffix's apparent H shifting effect follows from the strong μ_2's association to the stem H and the floating H_1 docking on the stem-final TBU. This is guaranteed by H→μ, μ→H, and ALIGNR(H). However, if the suffix is concatenated with a toneless stem, suffix H and μ exceptionally associate: μ→H is enforced by the high activity of μ_2 at the expense of ALTERNATION.

1.Recessive	2. Dominant	3. Rec Pre-acc	4. Dom Pre-acc	5. Subtractive	6. Attractive
					
a. **/tábe-tára/ [tábe-tara]** 'if eat'	a. **/adá-ppoí/ [ada-ppoí]** 'coquetish'	a. **/úra-si/ [úra-si]** 'Mr. Ura'	a. **/úra-ke/ [urá-ke]** 'family of Ura'	a. **/aná-teki/ [ana-teki]** 'logical'	a. **/káki-mono/ [kakí-mono]** 'thing to write'
b. **/ne-tára/ [ne-tára]** 'if sleep'	b. **/kaze-ppoí/ [kaze-ppoí]** 'sniffly'	b. **/ono-si/ [onó-si]** 'Mr. Ono'	b. **/ono-ke/ [onó-ke]** 'family of Ono'	b. **/bungaku-teki/ [bungaku-teki]** 'literature-like'	b. **/ni-mono/ [ni-mono]** 'cooked food'

Markedness drives base selection: experimental evidence

Juliet Stanton, NYU Donca Steriade, MIT

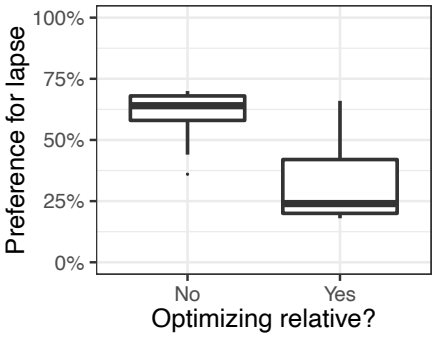
Overview. Previous work (Steriade 1999 *et seq*.; Stanton & Steriade 2014, 2019, in prep) claims that the stress of English Latinate forms is calculated with respect to their entire lexical families, and that markedness plays an important role in this calculation. *Humidify*, unlike its morphological base *humid*, is iamb-initial (0102): this is because its *optimizing relative*, *humidity*, contributes its stress. *Englishify*, by contrast, has a lapse (1002) because its only relative is *English*. We present experimental evidence in support of this claim from nonce derivatives ending in *–ify*, where participants prefer lapse avoidance only when an optimizing relative exists. Similar results were found with nonce derivatives ending in *–ee*, where participants prefer clash avoidance only when an optimizing relative exists (like *reservee* 201, after *reservation*; compare *deservee* 021, where only *deserve* 01 exists). The overall results confirm the conjecture that all rhythmic constraints can be satisfied by appeal to an optimizing relative, and thus support the general model presented.

Stimuli. 18 *–ify* items were constructed from nominal bases. All bases were trochee-final, so all *–ify* derivatives, if stressed like their bases, should contain a lapse (e.g. *coralify* 1002 after *coral* 10, *moralify* 1002 after *moral* 10). Items were created in pairs and matched as closely as possible within each pair for segmental properties and frequency. For example: *coralify* and *moralify* are segmentally similar, both nonce forms, and their bases are reasonably frequent. They differ only in the existence of an *optimizing relative* whose stress, if adopted by the *–ify* form, would avoid lapse: *moralify* has *morálity*, potentially licensing the lapse-avoiding stress 0102 in *moralify*; *coralify* has no such relative. Segmental and frequency information were controlled in this way to ensure that observed differences across items are due to differences in the words' lexical families and not some orthogonal factor. Additional *–ify* forms with iamb-final bases (e.g. *cigarify*, from *cigar* 01) were included as fillers; iamb- and trochee-initial versions of each item (e.g. *córalify* 1002, *corálify* 0102) were recorded by a native speaker of American English.

Methods. For each item, participants read a frame sentence, listened to two recorded pronunciations of the item (e.g. *córalify*, *corálify*), and indicated their preference. Item order was randomized by participant; pronunciation order was randomized by item and participant. Fifty participants, all native speakers of American English, were recruited online.

Results. Participants' preference for lapse in *–ify* depends on whether or not an optimizing relative exists ($p < .001$, mixed effects logistic regression, Fig. 1): participants prefer *córalify* but *morálify.* Predictors not found to affect participant judgments were the frequency of the *–ify* form and the frequency of its nominal base (cf. Collie 2008; all frequency information from the OED). In addition, the optimizing relative is equally frequent to or less frequent than the nominal base in all paradigms where such a form exists. This control excludes all plausible frequency-based interpretations of the effect (cf. Dabouis 2017).

Figure 1: experimental results



Implications. This work supports the claim that the stress of a complex form is calculated with respect to its entire lexical family (Steriade 1999 *et seq.*; Stanton & Steriade 2014, 2019, in prep) and that markedness is critical in determining the stress of a complex form: if an *optimizing relative* is available, the complex form resembles it. This point has been demonstrated in corpus studies (see above citations); the present work bolsters this conclusion by showing that speaker preferences match the corpus results. The effect of optimizing relatives is psychologically real.

Parasitic Palatalisation and Bipositionality in Ondarroan Basque

Shanti Ulfsbjorninn
University of Deusto, Bilbao
s.ulfsbjorninn@deusto.es

Katalin Balogné Bérces
PPCU, Budapest; KU, Ružomberok
berces.katalin@btk.ppke.hu

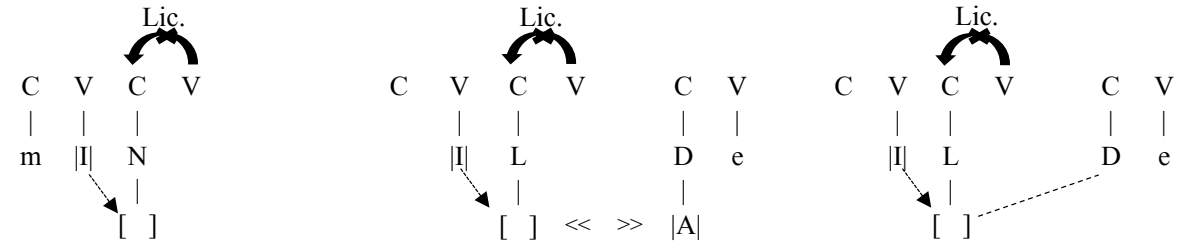
In Ondarroan Basque, palatalisation occurs within lexical items and across affixes and clitics. The trigger of palatalisation is a preceding /i/, syllabified either as a vowel or a glide. The targets of palatalisation are /n, l, t/ and /d/ (1a). (The sibilant /s/ is also sometimes palatalised but, as in most Basque dialects, it is a specific and separate process; Hualde 2004:109). Curiously, however, /d/ only ever undergoes palatalisation in sequences /l+d, n+d/ (1b), never as a singleton consonant.

(1a)	i. min-es	miɲes	'with pain'	(1c)	i. bide	bið/ɾe	'way'
	ii. mutil-a	mutiʎe	'boy-ASB.SG'		ii. idi	ið/ɾi	'ox'
	iii. bari-tu	bari-tʃu	'renew-PERF'				
(1b)	i. alegin-tu	aleɣiɲɟu	'make an effort-PERF'				
	ii. il-da	iʎɟe	'he died'				
	iii. egin-dau	eɣiɲɟau	'he made it'				

Hualde's analysis ties the explanation for the underapplication of /d/ palatalisation to the fact that /d/ must also undergo spirantisation (cf. (1c)). This has a certain attractiveness because it handily explains the difference between /t/ and /d/, since in Basque only voiced stops spirantise; it also handily explains why the /ld, nd/ context is different to singleton /d/ because /ld, nd/ are generally protected from spirantisation in Basque. However, this analysis forces a massive architectural rewrite, which is caused by a seemingly paradoxical aspect of the analysis. Ondarroan palatalisation largely affects suffixes and clitics, however, spirantisation is clearly an exceptionless post-lexical process. As such, spirantisation ought not to be able to block palatalisation. Hualde recognises this, but the solution is to have (in addition to extrinsic rule ordering elsewhere) spirantisation apply twice, once lexically and once post-lexically.

Our counteranalysis couched in GP/Strict CV (KLV 1990; Charette 1990; Scheer 2004) will instead focus on place distribution restrictions that are general to Ondarroan Basque. We will argue that certain consonants are underspecified for place features (see the word-final nasal in (2)) and that the "coda" position cannot contain underlying place contrasts unless these have spread from positions where they are licensed (in Ondarroan this is either V-to-C (2) or C1-from-C2 – (ordinary) place assimilation not discussed here). The palatalisation of /ld/ and /nd/ sequences is parasitic on the palatalisation of /l/ and /n/, since these are C1s that form a cluster with an ensuing C2 (cf. (3a-b)). In GP terms, C1 is in a dependency relationship with C2 and, a general fact about Ondarroan is that in these structures C2 preferentially holds the place features for the whole cluster. In this way, the palatalisation of /d/ is actually symptomatic of the bipositionality of the cluster explaining why it does not affect singleton /d/.

(2) min miɲ 'pain' (3) il-da 'he died' (3a) *iʎde (3b) iʎɟe



Word-final consonants in Ondarroan Basque are unlicensed and have coronal place of articulation by default, except when preceded by /i/, which palatalises the C via V-to-C spreading (2). In /l+d, n+d/ sequences, palatality spreads on to C2 solely to satisfy place-sharing across the bipositional structure (3b).

Top-down or bottom-up generalization of L2 accented speech: An experimental study on lexically-guided phonetic retuning of a Dutch vowel contrast

Gil Verbeke, Ghent University, Belgium, gil.verbeke@ugent.be
Ellen Simon, Ghent University, Belgium, ellen.simon@ugent.be
Robert Hartsuiker, Ghent University, robert.hartsuiker@ugent.be
Holger Mitterer, University of Malta, holger.mitterer@um.edu.mt

Despite the extensive acoustic variability of spoken language, a plethora of studies have demonstrated that listeners can recalibrate the boundaries of phoneme categories when talkers consistently produce an ambiguous speech sound in their native language (e.g., Norris et al. 2003) as well as when L2 speakers produce non-native accented speech (e.g., Bradlow & Bent 2008; Reinisch & Holt 2014). The present study aims to gain further insight into how listeners generalize vowel contrasts across L2 speakers, as this could shed light on how long-term phonological representations of speech sounds are stored (Idemaru & Holt 2020: 1758). Moreover, most previous studies have focused on consonants and research on perceptual learning of vowels is scant.

To that end, the traditional experimental paradigm to study phonetic retuning is used. In an auditory lexical decision task, one hundred participants are exposed to 40 Dutch target words, which have either /ɪ/ or /i/ as nucleus of the stressed syllable, 60 fillers and 100 phonotactically legal non-words. All stimuli were produced by a female native speaker of Italian who is highly proficient in Dutch, but has a clearly noticeable Italian accent. Stimuli sentences containing the target words are presented in two conditions: the /ɪ/ sound in the stressed syllable is replaced by an ambiguous sound between [ɪ]-[i] (/ɪ/-ambiguous condition) or vice versa (/i/-ambiguous condition). Vowel continua were generated using the STRAIGHT-algorithm (Kawahara et al. 1999) and the most ambiguous vowel sound on each continuum was determined in a pre-test with 10 listeners who did not participate in the main experiment.

To assess if perceptual learning has occurred in the course of the lexical decision task, a phoneme categorization task is set up in which participants need to identify the vowel sound in five Dutch /ɪ/-/i/ minimal word pairs. Again, two conditions are tested: listeners were either presented with stimuli from the exposure female speaker or they heard stimuli that were modified using the Change-Gender function in *Praat*. This alternation controls for comparable spectral and similar duration cues of the speech signal, but the change in pitch and formants leads the listeners to hear a male voice.

We are currently running the experiment, but we hypothesize that if cross-speaker generalization can indeed be identified, this may indicate that listeners rely predominantly on spectral and temporal cues, regardless of the perceptually noticeable gender-change of the speaker (bottom-up approach). If generalization does not occur, conversely, top-down inference based on the altered gender may lead the listener to block generalization of the ambiguous vowel sound. The results of this study will contribute to our understanding of how native listeners process L2 accented speech, and inform us on the flexibility of L1 listeners' phonological representations.

Rhoticity in Mandarin /r/: phonetic and phonological perspectives

Kaiyue Xing & Patrycja Strycharczuk
The University of Manchester
kaiyue.xing@manchester.ac.uk; patrycja.strycharczuk@manchester.ac.uk

Introduction Mandarin Chinese has a number of variants transcribed /r/ and transliterated as *r*. Some of these are canonical rhotics, e.g. syllable-final /r/ can be a bunched or a retroflex approximant (Chen et al., 2017; King &Liu,2017,etc). Syllable-initial /r/, on the other hand, can be realised as a post-alveolar fricative /ʐ/ (Chen et al., 2017), whose phonological rhotic status has been questioned (Chabot,2019). This study presents new articulatory evidence confirming rhotic nature of Mandarin syllable-initial /r/, based on its behaviour in external sandhi.

Methodology The test items included the word-medial /r/s set in three contexts: syllable-initial (V#rV), syllable-final (Vr#CV), and a post-lexically derived ('fake') geminate /r/ (Vr#rV). The preceding vowel /au/ and following vowel /əu/ as well as their tones were controlled for. The following onset in Vr#CV context was either /t/ or /ʂ/. Midsagittal ultrasound and audio data were collected from 9 males and 9 females speaking Beijing dialect. The speakers read six repetitions of nine items. The midsagittal tongue contours were automatically tracked throughout the recording with hand correction as necessary. The acoustic duration of the entire /aur/ sequence was compared among the three contexts as there was no reliable boundary between the vowel and /r/. The articulatory analysis focuses on the gestural dynamics of /r/, and three ultrasonic frames were extracted at three landmarks: (i) acoustic onset of the vowel /au/ preceding /r/; (ii) maximum /r/ constriction; (iii) acoustic offset of /r/.

Result and Discussion The data confirm previous literature that syllable-final /r/ is either a bunched or a retroflex approximant, subject to individual variation. The syllable-initial /r/ varies idiosyncratically on a continuum from a retroflex approximant (bending backwards or raising of the tongue tip) to a post-alveolar fricative (grooving of tongue blade or a flat tongue). The fake geminate /r/ patterns closely with the canonical syllable-final /r/ at the acoustic onset of the vowel /au/, but shows an enhanced retroflex or bunched gesture at the maximum constriction as indicated by a higher tongue tip or tongue dorsum at the post-alveolar region compared with Vr#CV. Acoustically, the fake geminate /r/ is a single phase, with no frication present for most speakers. This suggests a pattern of perseverative assimilation, in which syllable-initial /r/ assimilates to the preceding syllable-final /r/. This assimilation is not clearly an instance of gestural blending, because for many speakers no residual syllable-initial gesture can be seen, suggesting that the gesture is deleted or extremely reduced. This pattern can be ascribed to phonological identity between two neighbouring rhotics, which violates the OCP, triggering a repair. Reduction of the syllable-initial gesture is not accompanied by durational reduction (fake geminates are on average 28ms longer from the syllable-initial /r/). The gestural enhancement of fake geminate /r/ can then be seen as a consequence of extended temporal window for the syllable-final gesture.

The observed assimilation can be interpreted as a form of gemination. Note however, that the gemination occurs also for phonetically dissimilar /r/ allophones. Therefore, the gemination must be triggered based on phonological, not phonetic identity. The argument is further reinforced by the fact that no such assimilation occurs in Vr#CV sequences, where the onset consonant is a fricative.

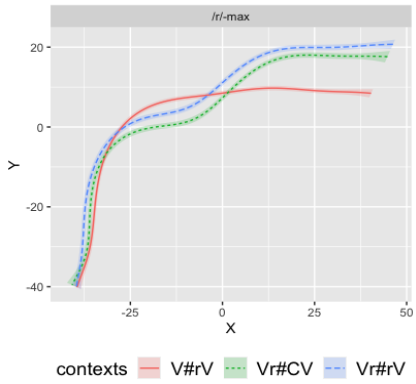


Fig.1 *Estimated tongue contours of an example speaker by contexts based on the polar GAMs results.*

Conclusion Even though phonetically, syllable-initial /r/ in Mandarin is not a canonical rhotic, its phonological behaviour is consistent with that of a rhotic. This type of duality is not uncommon in rhotics cross-linguistically, and it problematizes attempts to define rhotics as a class based on their shared phonetic characteristics.

The expressivity of liquid dissimilation in Yidiny

Tatevik Yolyan & Adam McCollum, Rutgers University
{tatevik.yolyan, adam.mccollum@rutgers.edu

Recent work has proposed that phonological patterns can be meaningfully understood in terms of their computational complexity. This body of work has also argued that phonological patterns are subregular within the Chomsky hierarchy (e.g. Heinz 2011a,b, 2018). Jardine (2016) and McCollum et al. (2020) have challenged this claim, offering evidence that some tonal as well as vowel harmony patterns are not subregular, but instead require the full expressivity of non-deterministic regular functions. In this paper we argue, contra Payne (2017) that liquid dissimilation in Yidiny is also non-deterministic, and as such, provides evidence that some consonantal patterns also require the full expressivity of the regular languages.

In Yidiny, a suffixal lateral dissimilates to [r] when followed by another lateral (1b). However, when the alternating lateral is preceded by a rhotic, dissimilation is blocked (1c). Dixon (1977; see also Walsh-Dickey 1997; Suzuki 1998; Bennett 2013) suggests that blocking in (1c) can be analyzed as the composition of two rules – one that maps /l/ to |r| before another /l/, and a second that maps |r| to [l] after a rhotic. Based on Dixon's analysis, Payne (2017) conjectures that the pattern is weakly deterministic, the most expressive class of subregular functions. Payne's analysis crucially depends on Heinz & Lai's (2013) proposal that weakly deterministic functions can be decomposed into two contradirectional subsequential functions that do not introduce abstract segments or increase the length of the intermediate string. This composition is exemplified in (2); triggers and targets are marked with boldface type.

(1)	a.	/dʸuŋga-ŋa**l**i-n/	[dʸuŋga:-ŋa**l**i:-ɲ]	'run-going-past'
	b.	/dʸuŋga-ŋa**l**i-ŋa-**l**/	[dʸuŋga:-**r**i-ŋa:-**l**]	'run-going-com-past'
	c.	/bu**r**wa-ŋa**l**i-ŋa-**l**/	[bu**r**wa:-**l**i-ŋa:-**l**]	'jump-going-com-past'

(2)	Input	/bu**r**waŋa**l**iŋa**l**/
	Leftward lateral dissimilation	|bu**r**wa**r**iŋa**l**|
	Rightward rhotic dissimilation	[bu**r**wa**l**iŋa**l**]

The proposed weak determinism of this mapping is inconsistent with work like Jardine (2016), which notes that a pattern is non-deterministic (Jarinde's *unbounded circumambient*) if the output quality of some symbol depends on long-distance information in both directions. This is precisely the nature of the dependency in Yidiny; the output of /l/ in the comitative suffix depends on information a potentially unbounded distance in both directions – a following /l/ as well as a preceding /r/.

This dissonance suggests that Heinz & Lai's (2013) definitions does not distinguish weakly deterministic from non-deterministic functions because non-deterministic input-output mappings can be generated without introducing abstract segments or augmenting the length of the string, as in the Duke of York derivation in (2). In contrast, Meinhardt et al's (2020) definition of weakly deterministic functions properly characterizes the expressivity of the Yidiny pattern. Meinhardt et al. argue that function interaction is key – weakly deterministic mappings can be decomposed into two contradirectional functions that can be simultaneously applied; non-deterministic mappings cannot. Liquid dissimilation in Yidiny is non-deterministic because the two functions in (2) are crucially ordered; lateral dissimilation feeds rhotic dissimilation. In turn, our findings also support Jardine (2016) and McCollum et al's (2020) case that phonology is not categorically subregular.

Local cooperation between phonological elements instead of non-local grammar adjustment: An argument against Cophonology by Phase theory

Eva Zimmermann (Leipzig University) Eva.Zimmermann@uni-leipzig.de

Main Claim: Doubly morphologically conditioned phonological alternations (=DMP, Sande, 2020) are restricted by phonological locality and should be analysed as cooperation between adjacent elements; in contrast to the claim in Sande (2020) that DMP obeys phase-based locality and should be analysed within Cophonology by Phase theory (=CbP, Sande and Jenks, 2018).

CbP and DMP: In CbP, phonological evaluation applies within every syntactic phase and vocabulary entries can trigger weighting adjustments of the phonological base grammar. DMP emerges if multiple morphemes in one phase adjust the grammar. In Guébie, for example, full vowel harmony only surfaces if a triggering suffix ($_{TA}$) and an undergoing stem ($_{US}$) cooccur. If a non-triggering suffix ($_{A}$) and/or a non-undergoing stem ($_{S}$) is present, harmony is blocked (e.g. *jili*$_{US}$-ɔ$_{TA}$→*jɔlɔ* 'steal him' but: *jili*$_{US}$-*e*$_{A}$→*jile* 'steal me' and *sijo*$_{S}$-ɔ$_{TA}$→*sijɔ* 'wipe' (Sande, 2020)). This follows in CbP if both $_{US}$-stems and $_{TA}$-suffixes adjust the grammar in a way that makes harmony more likely and both adjustments are necessary for it to surface. DMP is an argument for CbP if there are ① DMP patterns that surface although the triggering morphemes are not adjacent (but in one phase) and ② DMP patterns that fail to surface although the triggering morphemes are adjacent (but not in one phase). In contrast, phonological locality predicts that adjacency between elements is a necessary and sufficient condition for their interaction.

Cooperation in GSR: In an item-based account of DMP where all linguistic objects have a certain activity (Gradient Symbolic Representations=GSR, Rosen, 2016; Smolensky and Goldrick, 2016), one phonological element is taken to have insufficient activity for triggering a certain change. It only surfaces if it can cooperate with another phonological element with an exceptionally strong or weak activity. DMP in Guébie, for example, follows under the assumption that $_{TS}$-suffixes contain a strongly active vowel that induces a high number of ALIGNL(V) violations if it is not aligned with the left edge of the word (1A+C). Even this high violation is not enough to overcome the MAXV violations induced if an $_{S}$-stem vowel is deleted (1C). Vowels in $_{US}$-stems, however, are taken to have less activity and hence induce less MAXV violations (1A+B). Full vowel harmony thus only surfaces when a relatively weak stem vowel and a very strong affix vowel cooperate (1A). An added bonus of this reanalysis is that it naturally predicts the (optional) deletion of $_{US}$-stem vowels (Sande, 2020); a fact which is only a coincidence in a CbP account. All DMP patterns in Sande (2020) can be reanalysed as cooperation of adjacent phonological elements. Patterns ① fall out since the GSR account only requires surface-adjacency between the cooperating elements and implies that, for example, two non-adjacent morphemes can cooperatively trigger overwriting of material from an intervening morpheme (e.g. Donno So). And all apparent patterns ② in Sande (2020) involve not only a phase-boundary but also intervening phonological material (e.g. Amuzgo).

(1) Guébie: DMP as cooperation

	MAXV 22	ALIGNL 10	$\mathcal{H}$
A. US+TA	Input: j_1 i_1 $l_1 i_1$ – $ɔ_3$		
i_1 – $ɔ_3$		-3	-30
☞ $ɔ_3$ – $ɔ_3$	-1		-22
B. US+A	Input: j_1 i_1 $l_1 i_1$ – e_1		
☞ i_1 – e_1		-1	-10
e_1 – e_1	-1		-22
C. S+TA	Input: s_1 i_2 $j_1 o_1$ – $ɔ_3$		
☞ i_2 – $ɔ_3$		-3	-30
$ɔ_3$ – $ɔ_3$	-2		-44

Discussion: Whereas there is abundant evidence for autosegmental locality in phonology (following, e.g. Goldsmith, 1976), the empirical adequacy of phase-based locality has been repeatedly under attack (e.g. Bonet et al., 2019). CbP in fact assumes prosodic constituents as domains for phonological processes as well and thus relies on both phonological and syntactic locality restrictions. It can hence be considered an overly powerful superset-theory and an alternative account that only employs one of these concepts should be preferred.

Contiguity in Tawala Reduplication

Sam Zukoff, Leipzig University (samuel.zukoff@uni-leipzig.de)

INTRODUCTION: Hicks Kennard (2004) [HK] and Haugen & Hicks Kennard (2011) [HHK] develop an atemplatic analysis of reduplication in Tawala (Austronesian; Ezard 1997). I show that an unconsidered candidate for the CVCV pattern requires a revision of the analysis based on a more articulated version of CONTIGUITY-BR (McCarthy & Prince 1995), which might be better understood as Base-Reduplicant identity for phonetic properties, namely, CV-transitions.

DATA: The Tawala durative exhibits four reduplicant shapes, whose distribution is phonologically predictable (see HK). I focus on two: $C_1V_1.V_2$-initial bases reduplicate as C_1V_2 (1), while CVCV-initial bases reduplicate that whole string (2). [Exx. from HK:307, 313.]

(1) $C_1V_1.V_2X \rightarrow C_1V_2$ e.g. *be.i.ha* → *bi-be.i.ha* 'search/be searching'

(2) $C_1V_1.C_2V_2X \rightarrow C_1V_1.C_2V_2$ e.g. *hu.ne.ya* → *hu.ne-hu.ne.ya* 'praise/be praising'

PRIOR ANALYSIS: HK & HHK derive (1) from the operation of *REPEAT, which bans adjacent identical syllables, and ALIGN-ROOT-L, which has the effect of minimizing the length of the reduplicant (cf. Hendricks 1999). These constraints must outrank CONTIGUITY-BR in order to generate (1)'s discontiguous copying (3d). However, this ranking wrongly predicts discontiguous copying also for type (2), i.e. candidate (4d), which was not considered by HK & HHK.

(3) /RED, beiha/	*RPT	ALN-RT-L	CNTG-BR
a. be.i.ha-be.i.ha		5!	
b. be.i-be.i.ha		3!	
c. be-be.i.ha	*!	2	
d. ☞ bi-be.i.ha		2	*

(4) /RED, huneya/	*RPT	ALN-RT-L	CNTG-BR
a. hu.ne.ya-hu.ne.ya		6!	
b. ☹ hu.ne-hu.ne.ya		4!	
c. hu-hu.ne.ya	*!	2	
d. 💣 he-hu.ne.ya		2	*(*)

PROPOSAL: The two patterns are distinguished by the nature of their discontiguity. Type (1) skips only vowels (base V_1). The problematic discontiguous candidate (4d), on the other hand, skips a consonant (base C_2) in addition to a vowel (base V_1). If we relativize CNTG-BR to consonants (5) and vowels, and rank CNTGC-BR ≫ ALN-RT-L ≫ CNTGV-BR, we derive the right results (6,7).

(5) **CONTIGUITYC-B(→)R** ("*Don't skip C's–BR*"):
For a reduplicant string $r_1...r_n$ standing in correspondence with a base string $b_1...b_n$, assign one violation for each **consonant** between b_1 and b_n which lacks a correspondent in $r_1...r_n$.

(6) /RED, beiha/	CNTGC-BR	ALN	CNTGV-BR
a. be.i.ha-be.i.ha		5!	
b. be.i-be.i.ha		3!	
c. ☞ bi-be.i.ha		2	*

(7) /RED, huneya/	CNTGC-BR	ALN	CNTGV-BR
a. hu.ne.ya-hu.ne.ya		6!	
b. ☞ hu.ne-hu.ne.ya		4	
c. he-hu.ne.ya	*!	2	*

DISCUSSION: The relativized CONTIGUITY approach not only solves the CVCV copying problem, it clarifies HK & HHK's "gradient" evaluation of CONTIGUITY. For example, HK (314) uses CONTIGUITY-BR to prefer copying V_2 (*bi-beiha*) rather than V_3 (**ba-beiha*) in type (1) forms. In contrast to the traditional definition (McCarthy & Prince 1995:123), which only cares whether the base and reduplicant comprise contiguous sub-strings of the other, the definition in (5) spells out a method for categorical violation assignment over multiple loci. Alternatively, the role of CNTGC-BR could be handled instead by a faithfulness constraint on consonant-vowel transitions (8), which would be violated by (7c), but vacuously satisfied by (6c). If this approach can be upheld, it would support using phonetic properties in phonological constraints (Hayes et al. 2004).

(8) **IDENT[CVTRANS]/V-BR:** If V_b and V_r both have CV transitions, they must be identical.

Posters

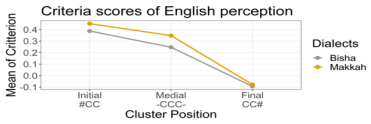
L2 production and perception as a diagnostic for the phonological status of L1 vocoids/ 'interconsonantal intervals' (ICIs)

Obied Al-Aqlobi (oaa532@york.ac.uk), Sam Hellmuth (sam.hellmuth@york.ac.uk), University of York

Speakers of Arabic dialects are known to insert ICIs to break up illicit consonant clusters in their L1 and/or L2 (Broselow, 1984). These vowels might vary in underlying status: epenthetic vowels are phonological units used to modify illegal structures; intrusive vowels are phonetic transitions "produced between consonants through a retiming of existing articulatory gestures" (Hall 2006:388). We explore here the status of inserted vowels in L1 Bisha Arabic (BA) and Makkah Arabic (MA) using Hall's (2006) diagnostics (± variable quality of ICIs / ± heterorganicity of cluster) in tandem with production and perception of L2 English clusters by the same speakers and show that evidence from L2 processing can provide independent support for Hall's phonological account. Further, we use the Signal Detection Theory (SDT) to explore the Perceptual Assimilation Model (PAM) for phonotactics (cf. Best, 1995).

Consonant sequences in word-initial and -medial position were tested in L1 BA/MA and L2 English. Two groups of male low-proficiency L2 English speakers (25 BA/29 MA) aged 18-22 participated in three experiments. In Experiment 1, participants produced 33 target items (real Arabic words) where in which the sonority slope of potential clusters was systematically varied, in isolation (picture-naming task) then in connected speech (sentence context). In Experiment 2, participants produced 36 target items (real English words) with word-initial CC and word-medial CCC, in a grammar-based distractor task. In Experiment 3, a subset of the same speakers (8 BA/ 11 MA) performed an AXB discrimination task on in English pseudoword minimal pairs e.g. [smǝʊ~sǝmǝʊ] containing the same target clusters as in Experiment 2.

Results of these experiments were analysed using GLMMs in R. In L1 Arabic, BA speakers produce more word-initial clusters than MA speakers, but incidence of ICIs is affected by sonority slope in both dialects; the modified #CC clusters are heterorganic and broken up with schwa [ǝ], meeting the diagnostics of intrusive vowels. Word-medial CC.C is avoided by speakers in both dialects; these are homorganic clusters broken up with [ǝ, a], meeting the diagnostics of epenthetic vowels. In L2, all speakers typically produce and perceive English word-initial clusters (especially those with plateau sonority) without an inserted vowel. In contrast, word-medial English clusters are rarely maintained in production and frequently misperceived, by both BA/MA speakers. SDT analysis of the AXB results reveals that BA and MA speakers show highly conservative sensitivity to #CC but neutral sensitivity to word-medial CCC. L2 English #CC presents little difficulty even though MA speakers lack such clusters in their L1 and 50 % of L1 #CC are broken up by BA speakers. Why is #CC easy, but C.CC difficult, for BA and MA speakers?



We argue that BA and MA speakers employ intrusive vowels to break up word-initial onset clusters in their L1. Phonologically, this vowel is not a syllable nucleus (Hall, 2006) thus both BA and MA allow underlying word-initial consonant clusters, and, consequently, word-initial English clusters are easy for them. In contrast, BA and MA speakers use epenthetic vowels in L1 word-medial clusters, which are phonologically considered a syllable nucleus (Hall, 2006); negative transfer of L1 phonology results in difficulties in production of word-medial English [C.CC]. Interestingly, here is a way to apply PAM to syllable phonotactics. Neutral sensitivity in perception of L2 word-medial clusters further supports absence of such clusters in the speakers' L1 phonology: these clusters are difficult but do not attract speakers' attention. In contrast, highly conservative sensitivity in perception of L2 word-initial clusters indicates the presence of similar underlying clusters in the L1 phonology of the speakers: speakers' attention is strongly attracted to differentiate between their L1 underlying consonant clusters and English surface clusters.

East Slavic Parallels to the West Germanic Gemination

Scott Brewer, University of South Carolina, brewerd@email.sc.edu

This paper seeks to provide typological evidence in favor of palatalization as the conditioning factor in one portion of the West Germanic Gemination (WGG). This has been one of the more dominant positions among researchers within the field of Germanic linguistics for over a century (Scherer 1878: 127-28, Lessiak 1933: 269-71, Prokosch 1939: 87; more recently in Liberman 1992: 203-04 & Denton 1998: 201-03) as opposed to rival theories (e.g., accentual conditions & syllable restructuring; see Goblirsch 2018: 41-57 for a detailed overview of all approaches). However, while scholars have provided sound theoretical and phonetic explanations for why a change of Cj > C:^{j} > C: best explains the data, the antiquity of the sound change makes it difficult for one to marshal decisive proof one way or the other. The key, however, may be found through comparison with the East Slavic language family.

As the Slavic language family began to break apart at the end of the first millennium AD, the overshort vowels /ĭ/ and /ŭ/ began to be lost in 'weak' positions. This had the effect of producing new consonant clusters when the vowels were lost to syncope. One nominalizing morpheme in particular, *-ĭje*, produced a large number of Cj clusters in medial positions. While in Russian these clusters usually survive to the present day with a simplex palatalized obstruent followed by the glide or, in some cases, a vowel is epenthesized between obstruent and glide (e.g., Common Slavic *žitĭje* 'life' > Rus. *житьё* /ʐɨtʲˈjo/ 'life, existence [coll.]' or *житие* /ʐɨtʲiˈje/ 'life, existence, biography'), Ukrainian and Belarusian instead have incorporated the glide into the obstruent, creating palatalized geminates (e.g., Ukr. *життя* /ʐɨˈtʲːa/ and Bel. *жыццё* /ʐɨˈt͡sʲːo/ 'life'). I call this the East Slavic Gemination (ESG).

Comparison of the distribution of WGG and ESG lends credence to the gemination theory in Germanic studies. However, attention is also paid to the differences in the incidence of each phenomenon (e.g., appearance of WGG before other resonants, differential treatment of labials in ESG) to ensure that the parallels are more than 'skin-deep' and account for potential mitigating factors (e.g., stress position). Special attention is also paid to the textual evidence for the process of the WGG seen in Gothic and Old Saxon to demonstrate the possible commonalities between Russian and the former and Ukrainian & Belarusian and the latter.

Slavic data are drawn from a range of dictionaries of Russian, Ukrainian, and Belarusian (Zaliznjak 1977, Kolas et al. 2002, Ivanyc'kyj & Šumljans'kyj 2003, Cyxun et al. 2006, Derksen 2008), all representing the current state of the languages in question. Germanic data, on the other hand, are gleaned from the *Proto-Germanic Etymological Dictionary* (Kroonen 2013) and various monographs and studies (e.g., Prokosch 1939, Goblirsch 2018) that detail the phonological character of the old Germanic languages, given the disproportionately larger scholarly attention that WGG has received which provides ready data sets.

The implications of this study are the reinforcing of the palatalization theory of the WGG and the encouraging of further interdisciplinary typological work with the goal of testing theories of sound change against similar phenomena in other languages.

Data on /n/ place assimilation before glide /w/ in Italian:

when phonology is sensitive to orthography

Piero Cossu, University of Pisa, piero.cossu@fileli.unipi.it

As other languages, Italian is characterised by place assimilation of /n/ in coda position, both word-internally and at word boundary. Place assimilation causes /n/ to surface as homorganic to the following consonant (Padgett, 1995). It is claimed that all consonants but glides may trigger /n/ place assimilation in Italian (Bertinetto, Loporcaro, 2005).

Nevertheless, this study addresses the possibility that nasal place assimilation may occur before labiovelar glide /w/ at word boundary. In /n# #w/ context, nasal surfaces as alveolar, the default form: /un ˈwɔmo/ > [un ˈwɔːmo] "a man". Initial labiovelar glides are rare in Italian (/wɔmo/ "man" and /wɔvo/ "egg" being the only instances in the native lexicon). However, this class of words is enlarged due to borrowings such as "western", "workshop", "whiskey", "word", which are commonly used in contemporary Italian.

Thus, initial glides are dually orthographically represented in contemporary Italian: either by the vocalic grapheme ⟨u⟩ or the consonantal grapheme ⟨w⟩. Taft (2006) proposed that among Australian English (AusE) speakers graphemic ⟨r⟩ is phonologically represented as /r/ even though AusE is a non-rhotic variety of English. Accordingly, we hypothesise that such double written form of glide /w/ may lead to two phonological representations, which reflect its graphemic status (vocalic vs. consonantal). This should lead to a resyllabification of /n# #w/ string. We suppose that if /n/ precedes /w/:⟨u⟩, the nasal will occupy the onset position (/u.nwɔ.mo/), but if /n/ precedes /w/:⟨w⟩, /n/ will stand in coda position (/un.wis.ki/). Therefore, we should observe /n/ place assimilation in the second case only (/nw/ > [ŋw] if /w/:⟨w⟩).

The acoustic analysis of preliminary data from a reading task involving native words (/wɔmo/ "man", /wɔvo/ "egg") and borrowings ("whiskey", "word") within a noun phrase ("*un* TARGET_WORD") indicate that /n/ surfaces as velar [ŋ] when it precedes /w/:⟨w⟩, but as alveolar when it precedes /w/:⟨u⟩. Our analysis proposes that the nasal place assimilation observed is an epiphenomenon of /n##w/ resyllabification that implies /n/ to occupy the coda position if following glide is consonantally represented in the written form (given the prohibition of tautosyllabic NC clusters in Italian). We argue that such a scenario is possibly permitted by the ambiguous phonological status of glides which may be orthographically biased toward a consonantal vs. vocalic representation by Italian L1 speakers.

REFERENCES

Bertinetto P. M., Loporcaro M. (2005) "The sound patterns of Italian, as compared with the varieties spoken in Florence, Milan and Rome", in *Journal of the International Phonetic Association*, 35/2, pp. 131-151.

Padgett J. (1995) "Partial Class Behavior and Nasal Place Assimilation", in *Arizona Phonology Conference Vol. 5. Proceedings of South Western Optimality Theory Workshop 1995*, pp. 145-183.

Taft M. (2006) "Orthographically influenced abstract phonological representation: Evidence from non-rhotic speakers", in *Journal of Psycholinguistic Research*, 35, 67-78.

Cophonologies require reference to the morphosyntactic category of the base

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

Cophonology Theory (Anttila 1997, 2007), which predicts multiple construction-specific grammars, must be extended to include reference to the morphosyntactic category of the base. Locative Nouns (LN) in Polish furnish an example of allomorph selection driven by liquid dissimilation. Among the suffixes that are used to derive LNs are [alɲa] and [arɲa]. The former suffix is used to derive LNs from verbal bases (a), while the latter serves to derive LNs from nominal bases (b). A quantitative analysis reveals two regularities driven by dissimilation. In LNs that derive from verbs and whose bases contain [l]s, [arɲa] is used instead of the expected [alɲa] (c). Second, although LNs in [arɲa] with an *r* in the base are attested, in denominal LNs in which the use of [arɲa] would lead to repeated *adjacent r*s the truncated allomorph [ɲa] is used instead (d). Additionally, the two OCP effects are restricted to morphologically derived environments; root-internal sequences of identical liquids are acceptable, e.g. [lal-k-a] ‘doll’.

a. $[X]_{Verb} \approx [X\ alɲ\ a]_{LN}$ [pwɨv-atɛ] ‘to swim’ - [pwɨv-alɲ-a] ‘swimming pool’

b. $[X]_{Noun} \approx [X\ arɲ\ a]_{LN}$ [tɛastk-ɔ] ‘cake’ - [tɛastk-arɲ-a] ‘cake shop’

dissimilation

c. $[X(...l...)]_{Verb} \approx [X\ arɲ\ a]_{LN}$ [pɔvjɛl-atɛ] ‘to duplicate’ - [pɔvjɛl-arɲ-a] ‘dupl. center’ *[pɔvjɛl-alɲ-a] *identical liquids in the stem > different suffix*

d. $[X(r)]_{Noun} \approx [Xr\ ɲ\ a]_{LN}$ [papjɛr] ‘paper’ - [papjɛr-ɲ-a] ‘p. mill’ *[papjɛr-arɲ-a] *identical liquids in the same syllable > truncation*

cf. [trup] ‘corpse’ - [trupj-arɲ-a] 'morgue' *non-adjacent rs tolerated*

The scope of the conjoined OCPLiquid&OCPLateral (Alderete 1997, Jurgec 2016) is different for deverbal and denominal LNs. In deverbal LNs identical liquids are categorically avoided anywhere within the stem, while in denominal LNs, identical liquids are prohibited only if they are in the same syllable. $OCPLiq\&OCPLat_{Stem}$ is ranked high in the cophonology of deverbal LNs (G1), while $OCPLiq\&OCPLat_{Syllable}$ is active in the cophonology of denominal LNs (G2).

In a constraint-based analysis, I use Mascaró's (2007) proposal that inputs may contain multiple allomorphs in an ordering relation. The less preferred allomorph is selected to avoid repeated liquids (OCP >> PRIORITY). Multiple correspondence (McCarthy & Prince 1995) serves to account for the emergence of the truncated allomorph of the suffix [arɲa] -> [ɲa] (OCP >> UNIFORMITY). Construction Morphology (Booij 2010) provides the tools to designate the two subgrammars: source-oriented schemas, which refer to the morphosyntactic category of the derivative as well as to that of the base. Thus, the two subgrammars are delimited by the syntactic information about the *base,* consistent with the assumptions of Jackendoff (2002). OCP_{Stem} is ranked high in G1, but not in G2. These findings demonstrate that OCP effects are construction specific, from which it can be extrapolated that each morphological construction can have its distinct grammar with a specific constraint ranking or specifically designated constraints (Inkelas 2014, Itô & Mester 1999). The novelty is the fact that the difference in OCP effects does not pertain to two different morphosyntactic categories of the derivative, but to the category of the *base* of LN formation: a verb or noun.

G1: $[X]_{Verb} \approx [X\ \{alɲ,\ arɲ\}]_{LN}$

	$[[pɔvjɛl]_{Verb}$ $\{alɲ,\ arɲ\}\ [a]]_{LN}$	OCP_{Stem}	PRIORITY
	a. [[[pɔvjɛl]alɲ]a]	*!	
☞	b. [[[pɔvjɛl]arɲ]a]		*

G2: $[X]_{Noun} \approx [X\ [arɲ]]_{LN}$

	$[[papjɛr_1]_{Noun}$ $[ar_2ɲ]\ [a]]_{LN}$	OCP_{Syll}	UNIFORM	$MaxV_{Suff}$
	a. [[[papjɛr$_1$]ar$_2$ɲ]a]	*!		
	b. [[[papjɛr$_{1,\ 2}$]ɲ]a]		*	*

The multiple phonologies of English

Quentin Dabouis [A] & Pierre Fournier[B]
[A] *Université Clermont Auvergne, Laboratoire de Recherche sur le Langage (EA 999)*
[B] *Université Sorbonne Paris Nord, Pléiade (UR 7338)*

The study of languages such as Norwegian (Rice 2006) or Japanese (Itô & Mester 1995, 1999) has shown that their lexicons could be analysed as being subdivided into subsystems, which are often based on etymology. It has been proposed that these subsystems have different, although possibly interacting, phonological grammars. Although Chomsky & Halle (1968) used a similar distinction between the Germanic and non-Germanic parts of the lexicon, more recent work is unclear on whether certain phonological processes should be limited to certain parts of the lexicon. However, analyses of English morphology regularly use the native/non-native distinction (Bauer *et al.* 2013), and studies of English spelling regularly use subsystems such as §French or §Italian (Carney 1994; Ryan 2017).

This paper argues that the English lexicon should be divided into different subsystems and that these subsystems have phonological, segmental, orthographic, morphological and semantic specificities. The distinctions between these different systems are based on a number of studies on stress, spelling-to-sound correspondences or morphology which have identified differences between parts of the lexicon and seek to bring all of these analyses together. We assume four main subsystems:

- **§Core:** Most of the vocabulary, with regular spelling-to-sound correspondences, non-specialized semantics and productive morphological processes. This subsystem may be further subdivided between §Core-Native and §Core-Latinate, although the two are often merged;
- **§French:** Words associated to French pronunciation (e.g. final stress) and spelling-to-sound correspondences. They often carry semantics associated to a form of "prestige" (Chadelat 2000);
- **§Foreign:** Words borrowed from or associated to Romance languages such as Italian, Spanish or Portuguese (to the exclusion of French) but it may also include words from other language families such as Russian or Japanese. These are massively stressed on their penultimate syllable and often refer to foreign cultures (e.g. food, clothes, traditions);
- **§Learned:** Technical or scientific vocabulary, often borrowed directly or constructed from elements borrowed from Greek or Latin. These include neoclassical compounds.

For example, J.-M. Fournier (2010) finds that words with closed penults more often have penultimate stress in what we analyse as §Foreign (e.g. *ànacónda, extràvagánza, dìlettánte*) or §Learned (e.g. *enígma, meménto, alúmnus*) than words from §Core (e.g. *mínister, índustry, cháracter* vs. *advénture, seméster, elíxir*).

We also report evidence from reading (Fitt 1996; P. Fournier 2018) and psycholinguistic studies (Treiman *et al.* 2019) that native speakers appear to be sensitive to the differences between these different subsystems. Many words in English come from other languages (i.e. loanwords) and therefore, the subsystems can be said to be related to etymology, but we assume that they have a form of independence from the source languages. This independence predicts that mismatches between the source language and English will occur when there is a conflict between the pronunciation of the words in the source language and the generalizations found in the subsystem that they are assigned to. Evidence from P. Fournier (2018) also suggests that, in borrowings, patterns which differ from those found in §Foreign words will more often be maintained for speakers with higher proficiency in the related source language.

Finally, we argue that it is crucial to take these subsystems into consideration when conducting production experiments with speakers as the stimuli could be perceived as belonging to a subsystem and so it is necessary to control stimuli in order to control which subgrammar might be used by speakers.

A Radical Substance Free account of Camuno parasitic harmony

Paolo Danesi (Université Côte d'Azur) paolo.danesi@univ-cotedazur.fr

Vowel Harmony (VH) normally affects all vowels of a word. VH is asymmetric when spreading is limited to a subset of environments. Parasitic harmonies are a kind of asymmetric harmony in which the agreement on one feature dimension depends on agreement on another feature. They are currently analyzed by applying a condition on the VH process (Nevins 2010, Hulst 2018), or by constraining the possible feature composition of vowels (Charette & Göskel 1996). I argue that none of those strategies works for Camuno height harmony (Cresci 2015), while SFP (Substance Free Phonology) can account for the Camuno pattern. In addition, I argue that the representation of VH is better understood if it is considered as an assimilation of non-universal primes arbitrarily related to a phonetic exponent.

Data: Camuno, an Italo-Romance dialect spoken in Lombardy (Northern Italy), displays asymmetric raising harmony triggered by stressed high vowels and targeting preceding mid vowels. High vowel [i] raise all mid vowels [e], [ɛ] (1a, 2a) and [o] (3a). High vowel [u] raise only pre-tonic rounded vowels (3b), leaving [e] and [ɛ] unaffected (1a, 2a). Risen mid vowels act as triggers for the vowels that precede them (4a). Vowels not affected by raising, intervening [a] (6ab) and non-risen [e] (4b), act as opaque, and do not allow the process to iterate. Intervening consonants are unaffected. The diminutive [-ì / -ìnɔ] and the augmentative [-ù / -ùnɔ] show the difference raising effects of [i] and [u].

	a. DIM.	b. AUG.			a. DIM.	b. AUG.	
1) 'lɛt	li'ti	le'tu	*bed*	4) ho'rɛk	huri'gi	hore'gu	*mouse*
2) be'rɛt	biri'ti	bere'tu	*cap*	5) 'legor	legu'rinɔ	legu'runɔ	*hare*
3) tʃot	tʃu'di	tʃu'du	*nail*	6) fon'tanɔ	fonta'ninɔ	fonta'nunɔ	*fountain*

Analysis: VH of Camuno behave asymmetrically only when the harmonic trigger is [u]. Implementing a condition on the process that results in its non-application when [e] precedes [u] will produce the correct result, but simply restates the description and does not allow us to understand the workings of the intricate asymmetry (as noticed by Sandstedt 2018). It is shown that other strategies that are entertained in the analysis of asymmetric VH cannot capture Camuno and other parasitic patterns: a condition requiring agreement on roundness such as R requirements (Nevins 2010) or Bridge Licensing (Hulst 2018) would have to be switched on only when [u] acts as a trigger. In Radical SFP (Odden 2019, Blaho 2008) primes are not universal but emergent, unary and abstract features assigned according to language-specific contrasts and alternations (Mielke 2008, Odden 2019). The relation between phonological and phonetic categories is lexicalized during acquisition. In the case at hand, alternations caused by raising harmony inform the learner of the presence of two different processes of assimilation that target two different sets of vowels, which spread two different height features (here named H1 and H2). The fact that both processes are phonetically implemented as raising has nothing to do with phonological computation. The processes are represented as rewrite rules: E{[e],[ɛ]}→H1/_C0H1{[i]} ; O{[o],[ø]}→H2/_C0H2{[i],[u]}. Stressed [i] contains both H1 and H2, which are in a dependency relation ([e] receive both H1 and H2) since risen [e] affects preceding rounded mid vowels (4a). Unstressed [i] has a feature H0 that does not participate in assimilation. An arbitrary mapping between phonetics and phonology allows for a one-to-many relation between objects. The phonetic implementation [i] corresponds to two different phonological objects. The first contains H1, H2 and triggers harmony; the second contains only H0 and behaves as inert. This model is in direct competition with Sandstedt (2018) analysis, which assume emergent features but derive the parasitic behavior of VH from the contrastive role of the harmonic prime. I argue that this proposal is more complex that it needs to be, and that while contrast is relevant in the emergence of phonological primes, it does not bear any effect on computation.

Rhymes in Spanish *romances* as evidence of internally layered ternary feet.

Mirella De Sisto
Tilburg University
M.DeSisto@tilburguniversity.edu

Rhyme reveals aspects of phonological structure (Golston 2016, Sytsema & Lahiri 2018). This paper shows how the use of proparoxytonic words in assonant rhyme in Spanish *romances* constitutes evidence for internally layered ternary feet (ILT) (Martínez-Paricio 2013, Martínez-Paricio & Kager 2015, Krämer 2018).

Rhyme in Spanish *romances*

Romances are poems with a specific rhyme pattern: odd lines do not rhyme and all even lines are connected by assonant rhyme (Torre 2001, Domínguez Caparrós 2014). Since this poetic form does not have a fixed number of lines, the assonant rhyme between even lines represents its main defining trait, structurally speaking. (1) contains an example of *romance heroico* (hence with eleven syllables per line); the syllables in bold indicate the rhyming elements of even lines.

(1) Quietud, quietud... Ya la ciudad de oro
ha entrado en el misterio de la **tarde.**
La catedral es un gran relicario.
La bahía unifica sus cris**tales**
en un azul de arcaicas mayúsculas
(Ruben Darío)
de los antifonarios y mi**sales**.
Las barcas pescadoras estilizan
el blancor de sus velas triangu**lares**
y como un eco que dijera: «Ulises»,
junta alientos de flores y de **sales**.

Rhymes with proparoxytones

When a proparoxytonic word occurs line-finally, the expected result would be to have a sequence of proparoxytones rhyming to each other (e.g. *música, túnica, púdica,* etc.). Nevertheless, what is actually attested is that proparoxytonic words can be used as rhyming elements together with paroxytonic words by 'ignoring' their first post-tonic syllable. In (2), we can observe the rhyme chain *nocturna, música, tumba, túnica* and *figuras* (the underlining marks word stress). Therefore, *música* and *túnica* are rhyming with the rest of the words, even though they have an extra syllable intervening within the rhyming material consisting of the stressed vowel and the word-final vowel (i.e. u-a). This claim is made stronger by the fact that the two proparoxytones do not occur in two consecutive even lines; in fact, *tumba* divides the two.

(2) Entre las montañas que alumbra la luna
traza un aquelarre su ronda noc**turna,**
y repercutiendo en las peñas abruptas
resuena en el aire el son de una **música.**
Al genio evocadas de humana locura
(Salvador Rueda)
saltan de las fosas y dejan la **tumba**
Mitrídates, Safo, Cleopatra la impura,
Elena arrastrando la espléndida **túnica,**
la vil Mesalina, la Cava perjura,
y reyes y vates y egregias fi**guras** […]

Proposal

We propose an analysis of this use of proparoxytonic words in rhyme to be evidence of ILT feet (Martínez-Paricio 2013, Martínez-Paricio & Kager 2015, Krämer 2018). ILT feet are binary feet with an adjoined weak syllable. By assuming ILT feet, proparoxytones like *música* have the foot structure $((\sigma_H\ \sigma)\ \sigma)$, in which σ_H is the head of the foot and the other two syllables are foot dependents; the rightmost syllable is adjoined to the right of the binary foot. The structure ((músi)ca) allows us to conclude that in the examples in (2) the material selected for rhyme in proparoxytones is the foot head with the right-adjoined foot dependent. The foot dependent adjacent to the head is weaker, hence, can be ignored in the rhyming process. Consequently, ((mú~~si~~)ca) can rhyme with (tumba).

Mojeño Trinitario syncope and stress in Strict CV metrics

Noam Faust, Université Paris 8, CNRS SFL. noam.faust@univ-paris8.fr

Mojeño Trinitario (Rose 2008 *et passim*) presents an interesting set of phenomena revolving around metrically-conditioned syncope. Syncope applies to every odd syllable starting from the left, except the final vowel (a,b – targets underlined in UR). In words with even-numbered syllables, main stress ends up on the underlying penult (a,b); but in words with odd-numbered syllables it surfaces on the underlying antepenult (c). In a smaller set of forms, however, syncope applies to even, not odd-numbered syllables (d). Furthermore, some vowels are immune to syncope. In (e), syncope targets odd syllables, but the penult [o] is not syncopated. Again, stress surfaces on the underlying antepenult, which here is also the surface antepenult. In (f), syncope targets even syllables, but [a] is not syncopated. Finally, syncope feeds other processes. When a preconsonantal /r/ would be created, that /r/ is not pronounced and the vowel lengthens in compensation (g). And when an initial onsetless syllable is syncopated, the result is a [ʔC] cluster (h).

a.	/nu-huma/ => [nhúma]	'1SG-illness'
b.	/ʧunusihi-re/ => [ʧnushíre]	'cushion-NPSD'
c.	/tiko-huma-numo/ => [tkohmánmo]	'3-VZ-illness-SMOT'
d.	/kojure-çira/ => [kojréçra]	'bird-DIM'
e.	/ʧineno-ko/ => [ʧnénoko]	'daughter-in-law-NPSD'
f.	/oni-çira-rine/ => [on-çiraríne]	'DEM-DIM-RESTE'
g.	/nu-woro-ʔo/ => [nwó:ʔo]	'I want'
h.	/emotone-ko/ => [ʔmotnéko]	'work-NPSD'

Rose (2019) proposes an iambic parse for all items except (d,f), with vowels in weak branches syncopating. Main stress is on the last foot, which must not be aligned with the right edge. As a result, in e.g. (a), the final syllable is unfooted /(nu-hu)ma/. In (c), the footing is /(tiko)-(huma)-numo/, deriving the stress on the underlying penult. (d,f) are lexically marked as having a trochaic parse, e.g. (d) /(koju)(re-çi)ra/ with a final unparsed syllable. (g) is also given a moraic explanation: after syncope of /ro/, the mora is associated to the /r/, and then taken over by the preceding vowel.

There are several problems with this account. First, it has to assume two types of motivations for syncope: weak branch and unfootedness (last /u/ in (c)). Second, final Vs are exempted by assumption. Third, two parses must be assumed. Fourth, only iambic feet are subject to non-finality – trochaic feet can in fact be right-aligned: (f) is /(oni)-(çira)-(ríne)/.

I propose an account in Strict CV metrics, based on the notion of incorporation (Ulfsbjorninn 2014). The projection of one V is incorporated into that of an adjacent V: /V^1V^1/ => [V^0V^2] (superscripts show projection levels – space considerations exclude fuller representations). Assuming all regular vowels project once, and incorporation is to the right, the iambic parse in e.g. (c) is derived: /ti^{1}ko^1-hu^{1}ma^1-nu^{1}mo^1/ => [ti^{0}ko^2-hu^{0}má^2-nu^{0}mo^2]. Vowels with no projection syncopate, and stress falls on the first vowel to project to line 2 within a right-aligned 3 V-slot window. The trochaic parse is assumed to begin with a free-standing projection (in red): for (d) /^{1}ko^{1}ju^{1}re^1-çi^{1}ra^1/ => [^{0}ko^{2}ju^{0}ré^2-çi^{0}ra^2]. It is therefore not "trochaic", but also "iambic". Syncope-immune vowels are lexically marked as projecting twice, such that even when incorporation applies, they are pronounced (green): (e) /ʧi^{1}ne^{1}no^2-ko^1/ => [ʧi^{0}ne^{2}no^1-ko^2]; (f) /^{1}o^{1}ni^1-çi^{1}ra^2-ri^{1}ne^1/ => /^{0}o^{2}ni^0-çi^{2}ra^1-ri^{2}ne^1/. This approach does not suffer from the shortcomings mentioned above: there is only one reason for syncope (V^0); final vowels always project; there is only one parse; and there is no alignment difference between iambic/trochaic feet. Moras, extrametricality or unparsedness are unnecessary.

I contend that the segmental effects in (g) and (h) also receive a more elegant explanation in Strict CV than in a moraic approach. Assume /r/ need to be licensed by a realized nucleus. In /nu^0-wo^{2}ro^0-ʔo^2/ it precedes an empty one. Since it cannot hold its position, "good old" template satisfaction (McCarthy 1979) applies and the preceding vowel spreads to occupy the following V-slot. This, of course, is only possible *because* /r/ does not interfere. Moras are again unnecessary. Finally, as for (h), in Strict CV there are no onsetless syllables. The initial 2 syllables in (f) and (h) are in fact /Coni/ and /Cemo/ respectively. In /Coni/, /o/ is not syncopated, and may govern the C-slot, thus inhibiting its realization (Charette 1991). But in /Cemo/, syncope of /e/ leaves an ungoverned C-slot, which is realized as [ʔ].

Silke Hamann (University of Amsterdam) & Chao Zhou (University of Lisbon)
silke.hamann@uva.nl & zhouchao@edu.ulisboa.pt

Modeling the prosodically-conditioned orthographic influence on the Mandarin L2 acquisition of Portuguese /ɾ/

When acquiring the European Portuguese tap /ɾ/, L1-Mandarin learners sometimes replace this sound by the Mandarin retroflex /ɻ/, which seems to be conditioned by prosodic position: this substitution only occurs in coda position (Zhou 2017; Liu 2018). A prior experimental study demonstrated that the replacement by /ɻ/ is due to the fact that both EP /ɾ/ and Mandarin /ɻ/ are represented by the letter <r> (authors). This interaction between L2 suprasegmental phonology and orthography has not been reported before in the literature.

To account for this prosodically-conditioned orthographic effect, we modeled the experimental findings with a Neural Network (NN), where the bottom layer (AudN) represents auditory-phonetic cues, the top layer (PhoN) prosodically structured phonological forms, and one node on the right (OrthN) the letter <r>. We first created a NN simulating naïve Mandarin perception and let it categorize the L2 tap (Fig.1). The strengths of the connections between AudN/OrthN and PhoN were determined on the basis of Mandarin allophonic categories, their auditory cues and the Pinyin written form. Phonotactic restrictions are not implemented directly but reflected by connection weights between AudN and PhoN (in line with exp. data by Chang 2018). Fig.1 shows that without orthography, naïve listeners categorize L2 /ɾ/ as L1 /l/ both in onset (a) and in coda (b). With orthography activated, Mandarin /ɻ/ emerges in coda (d) but rarely in onset (c) (onset /.l/ is activated by two AudNs, while coda /l./ only by one, simulating context-dependent cues).

Based on the naïve listener's NN, we then created another NN for L2 learners (Fig.2), adding the important L2 cue of duration, that eventually allows for a /l/-/ɾ/ distinction. Our L2 NN shows that in the absence of orthography, for both prosodic positions, /l/ and /ɾ/ are activated (e/f), reminiscent of category confusability in perceptual tasks (Cao 2018). It furthermore predicts that when the OrthN node is switched on (g/h), Mandarin /ɻ/ still is not activated, suggesting that the use of Mandarin /ɻ/ by naïve and by L2 speakers is presumably due to different underlying mechanisms. The present modeling thus provides a testable prediction for future L2 studies that allows for a falsification of the model.

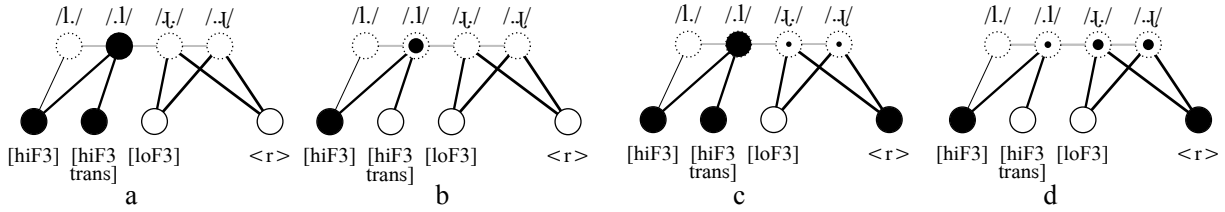


Fig 1: Mandarin naïve perception of EP /ɾ/ in onset (a/c) and coda (b/d), without (a/b) and with orthography (c/d). Larger black circles in the top layers of nodes indicate stronger activation.

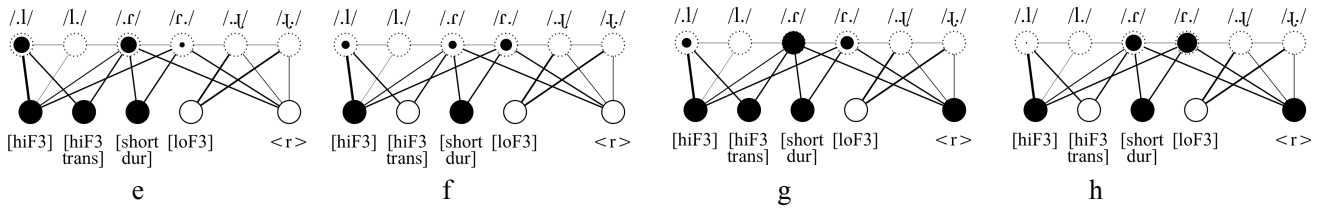


Fig 2: Mandarin learners' perception of EP /ɾ/ in onset (e/g) and coda (f/h), without (e/f) and with orthography (g/h).

Prosodic status of case and discourse markers in Urdu

Farhat Jabeen[1] & Nicole Dehé[2]
University of Bielefeld[1]; University of Konstanz[2]
farhat.jabeen@uni-bielefeld.de[1]; nicole.dehe@uni-konstanz.de[2]

Urdu has seven case markers (*ne, ko, se, pər, ʈ̪ək, mẽ, k(ɑ, i, e)*), and three discourse markers (*hi, ʈ̪o, $b^h i$*). The case markers attach only with nouns and pronouns whereas discourse markers can modify all content words. There is as yet no analysis of the prosody of case and discourse markers in Urdu. The current study aims to address this and offers an analysis of their prosodic structure. It also shows that, despite the difference in their syntactic distribution, case and discourse markers have the same prosodic structure.

We extracted case and discourse markers from the Urdu Speech Corpus developed by the Center for Language Engineering, Lahore, Pakistan. We found 16 instances of *ʈ̪o*, 18 examples of *hi*, and 48 sentences with the marker *$b^h i$*. The prosody of each discourse marker was compared with that of case markers occurring in the same sentence (N = 71).

Jabeen (2019b) has shown that the assimilation of nasal consonants with the immediately following plosives and the position of lexical stress help determine prosodic word (PWd) constituency in Urdu. The assimilation in (1-a) and its absence in (1-b) shows that the host and the case marker in (1-b) do not form a PWd together. Moreover, the use of case and discourse markers does not affect the position of lexical stress in their host. Due to their monosyllabicity, it is not possible to use lexical stress to determine if case and discourse markers are PWds on their own. However, we found that the vowels in discourse markers and case markers have similar duration as their lexically stressed counterparts. Therefore, we propose that case markers and discourse markers are PWds on their own as illustrated in (1-c).

(1) a. g^ho**n**.pɑ — Phonemic transcription
($\text{ˈ}g^h$o**m**.pɑ)$_{PWd}$ — Phonetic transcription
pierce.Perf.M.Sg.
'to pierce'

b. (ˈkɑː**n**)$_{PWd}$=pər
ear=Loc
'on the ear'

c. (ˈkɑːn)$_{PWd}$=(ˈpər)$_{PWd}$ (ˈkɑːn)$_{PWd}$-(ˈb^hi)$_{PWd}$

Our analysis further showed that, when produced in wide focus, case and discourse markers share a rising F0 contour with their host and thus form an Accentual Phrase (AP) (Jabeen, 2019a). However, all the case markers and two discourse markers (*hi, $b^h i$*) can be contrastively focused and, in that context, carry a rising contour and form APs on their own.

Jabeen & Delais-Roussarie (2019) have proposed a rhythm constraint for Urdu that results in the production of two F0 rises (LHLH) in an AP comprising six or more moras. We found that both case and discourse markers trigger this constraint. Moreover, when a discourse and a case marker are attached to the same host, the application of the size constraint results in their parsing in two separate APs. This is indicated by the insertion of a small pause between the case marker and the discourse marker. As a result, the first marker shares a rising contour with the host and the second marker and the following word carry a separate rising contour.

(2) (Host Marker1)$_{AP}$ Pause (Marker2 Word)$_{AP}$

To summarize, the prosodic analysis of case and discourse markers in Urdu provides evidence that they form PWds and may constitute APs on their own. Even though discourse markers and case markers are clitics morpho-syntactically (Butt & King, 2004), prosodically they are not deficient. Based on Selkirk's (1996) analysis of function words, case and discourse markers in Urdu have the following structure: (Host)$_{PWd}$ (Clitic)$_{PWd}$.

“Phrases, not Phases, in Ojibwe: Hiatus and prosodic structure”

Max J. Kaplan (UC Santa Cruz)
mkaplan2@ucsc.edu

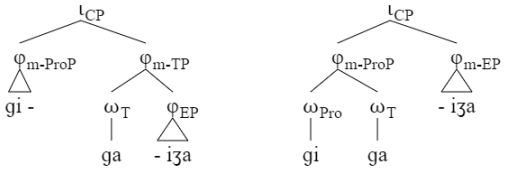
The morphological conditioning of phonological processes is a widely described phenomenon in natural language, and has led to the development of several theories of the nature of the interface between morphosyntax and Phonological Form. Ojibwe (Algonquian) presents such a phenomenon in its several strategies for the resolution of vowel hiatus (sequences of consecutive vowels). The language deploys three strategies in different positions, allowing hiatus in some while resolving these sequences in others by either deletion of a vowel or epenthesis of /d/.

Hiatus allowed	Hiatus resolved by deletion	Hiatus resolved by epenthesis
b**ii**ʒa ‘he comes’	nam**e**:g ‘sturgeons’	ni**d**iʒa ‘I go’
Ø -b**i** -**i**ʒa	nam**e**: -**a**g	n**i**-**i**ʒa
3 -twrd.spkr -√go	√sturgeon -pl	1-√go

Prior work proposes that the hiatus pattern is attributable to syntactic phase boundaries (Newell & Piggott 2014). The present work instead argues that this distribution can be explained by surface prosodic structure in Prosodic Hierarchy Theory (PHT; Selkirk 1978), with prosodic structures and surface forms generated in Optimality Theory (OT; Prince & Smolensky 1993). Deletion is conditioned by hiatus within φ-phrases, but hiatus is allowed across φ boundaries, due to an anti-deletion constraint MAX(φ-EDGE) that privileges faithfulness in these positions. Similarly, epenthesis is a reflex of positional strengthening (Beckman 1998), occuring only at the onset of a *maximal* φ (Ito & Mester 2013), due to the activity of high-ranked ONSET(φMAX) (Flack 2009). In most cases, the locations of these prosodic boundaries are predictable from the XPs in the syntax. However, in certain cases, epenthesis appears at what is predicted to be the edge of a non-maximal φ.

This is resolved by allowing the mapping from syntactic to prosodic structure to be guided by surface-oriented markedness constraints, particularly STRONGSTART (Selkirk 2011) and BINARITY, alongside ALIGN and DEP(φ). These promote an unfaithful mapping in exactly those configurations where epenthesis occurs but is not predictable from the syntax.

gigad**d**iʒa
[CP [C Ø] [TP [ProP gi] [T' [T ga][EP iʒa]]]]
gi -ga -iʒa
2 FUT √go
‘You will (probably) go’



Faithful mapping predicts * gig**ai**ʒa

Unfaithful mapping makes correct prediction

The previous analysis of the Ojibwe pattern, utilizing a *direct reference* theory of syntax-prosody, proposes that the different phonological processes are conditioned by syntactic phase boundaries, as a consequence of cyclic spell-out (Newell & Piggott 2014). In this view, hiatus can be resolved via deletion within phases, but vowels across phase boundaries are insensitive to each other’s presence, such that hiatus is tolerated. In order to account for cases of epenthesis, this view requires a post-syntactic readjustment rule of *phonological merger*. This rule is sensitive to lexical category, and incorporates a phase-external prefix into the “prosodic word” (PWd; not entirely analogous to ω in PHT) projected by that phase at spell-out. This thus posits a limited degree of independent prosodic structure, despite proposing to eschew exactly that. The readjustment rule significantly weakens the predictions of phase impenetrability – which has also been argued not to apply in phonology (Embick 2014). Further, this analysis does not provide a phonological motivation for the distribution of epenthesis, versus deletion, as a phase-internal repair strategy. This kind of analysis also requires a complex theory of copy spell-out in order to explain epenthesis in positions that are not predictable from the syntax. The PHT account, in contrast, explains these cases within the phonology.

Clitics and contractions in Galician

Itamar Kastner, University of Edinburgh (itamar@itamarkast.net)

The Galician definite article and direct object clitic exhibit allomorphy which raises a number of questions for the morphology-phonology interface (Nevins 2011). I highlight challenges for a number of possible analyses, indicating a way forward which relies on the prosodic weight of the two.

Allomorphy. The vowel-initial form, e.g. *-o* 'M.SG', appears phrase-initially or postvocalically, (1)–(2).

(1) o_{DEF} *pan* [**o** paŋ]
'the bread'

(2) *como* o_{DEF} *pan* [komo **o** paŋ]
'I eat the bread'

Otherwise the article cliticizes onto the preceding preposition or verb, whereby /r/- or /s/-final hosts change to /l/, (3)–(4). This much is true for both the article DEF and the direct object clitic ACC.

(3) a. *comes* ['kɔmes]
'you eat'

b. (*ti*) *cómelo*$_{\text{DEF}}$ *pan* ['kɔmel**o** paŋ]
(**cómeso pan*)
'you eat the bread'

(4) a. *comer* [ko'mer]
'to.eat'

b. (*por*) *comelo*$_{\text{DEF}}$ *pan* [ko'mel**o** paŋ]
(**comero pan*)
'to eat the bread'

Existing analyses. Kikuchi (2006) posits competition in OT between *-o* and *-lo* which is resolved by PRIORITY in the phonology. In contrast, Ulfsbjorninn (2020) suggests within CV Phonology that the UR is always *-lo*, with *-o* derived from it in the phonology. Neither analysis is satisfactory in and of itself: the flaws with the competition analysis have already been discussed in these two works, while the UR of the derivation analysis rules out word-final clusters such as the plural indefinite masculine article *uns*. More importantly, neither can be extended to the ACC data I introduce below, indicating that important aspects of the morphology-prosody interface are not yet properly understood.

Potential analyses. A third way of explaining the patterns involves phonologically sensitive outward-looking allomorphy: DEF is pronounced as *-lo* when the outer element ends in /r/ or /s/, and *-o* otherwise. But such sensitivity should not exist (Carstairs-McCarthy 1990 et seq); cases where it has been argued to exist are often amenable to alternative explanations (e.g. Kalin 2020). The cliticization data below also point towards a different kind of analysis.

A fourth and final alternative is a phonological rule. Codas are marked in Galician, so this allomorphy could be the result of neutralization: /r/ and /s/ are [r] and [s] word-finally, but if the phonological word is extended by an enclitic, they neutralize to [l]. The problem is that the phenomenon is more restricted than what a phonological process would suggest; it is difficult to test predictions since there are not many environments for cliticization in the language, which is why I explore cliticization next.

DEF ≠ ACC. The object clitic has not factored into discussions in the literature. I argue that ACC and DEF differ prosodically: the former must find a host while the latter need not. Empirically there are three differences. First, ACC contracts with a preceding dative clitic, but DEF does not (examples cut for space). Second, prepositions that can cliticize onto D do so with DEF but not ACC:

(5) a. *de* + *aquel* 'of that' → *daquel*
b. *de* + *el* 'of him' → *del*

(6) *pensar* + *en* + *o* + *futuro* 'to think about the future':
a. *pensar no*$_{\text{DEF}}$ *futuro*
b. *pensar niso* 'thinking about that'
c. * *pensar en* o_{ACC} 'thinking about it'
d. * *pensar no*$_{\text{ACC}}$ 'thinking about it'

Third, the post-vocalic form of ACC prepends /n/ (unexpected for Ulfsbjorninn 2020):

(7) a. *comes* + o_{ACC} 'you eat it' → *come**lo***$_{\text{ACC}}$
b. *comeu* + o_{DEF} pan 'he/she ate the bread' → *comeu* ***o***$_{\text{DEF}}$ pan
c. *comeu* + o_{ACC} 'he/she ate it' → *comeu**no***$_{\text{ACC}}$

These follow if ACC must cliticize onto a host, incurring repairs which heavier DEF does not.

Conclusion. Regardless of how the allomorphy of DEF/ACC is analyzed, differences between the two indicate that they differ prosodically. While this does not yet provide a full analysis, it does show what kind of work is necessary in order to understand prosodic phrasing, cliticization and contractions.

Compensatory shortening, semisyllables and mora-sharing in Lebanese Arabic

Niamh E. Kelly nk114@aub.edu.lb American University of Beirut, Lebanon

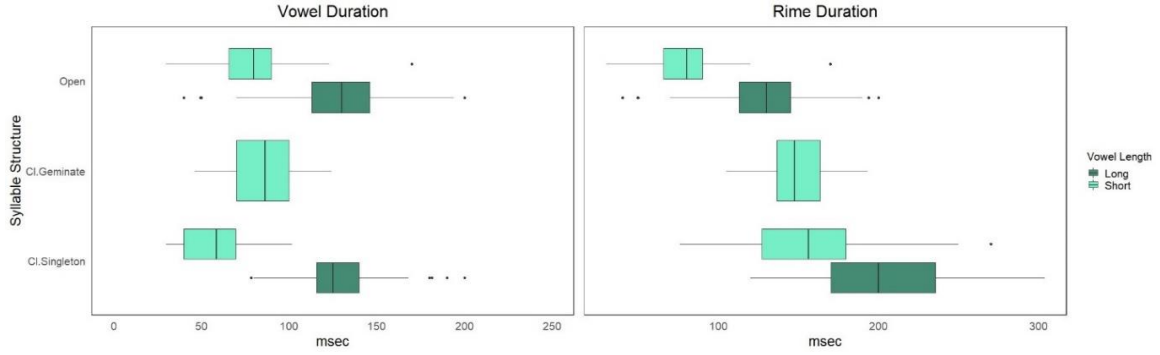
In Levantine Arabic, duration has been shown to be a reliable correlate of phonemic length (e.g., Hall 2017, Khattab & Al-Tamimi 2014). The phonological concept of a mora has been shown to relate to duration (Port el al. 1987, Hubbard 1993, Cohn 2003), and phonetic measurements have been used to describe patterns of mora-sharing in Arabic.

It is widely accepted that in non-final syllables in Levantine Arabic, a coda C has a mora in VC rimes but shares a mora in VVC, so both are bimoraic (Broselow et al. 1997). This was supported by measurements in a small-scale study showing that long vowels in VVC rimes were shortened (because V and C share a mora), but short vowels in VC rimes were not (V and C each have their own mora). Similarly, in a recent phonetic study of Lebanese Arabic, phonologically long vowels were found to be shortened before intervocalic geminates (C**VV**G.GV), while short vowels were not (Khattab & Al-Tamimi 2014). (Intervocalic geminates are ambisyllabic, with the first half counted as a coda and the second half counted as an onset.) However, previous phonetic work on Lebanese Arabic only examined a very small number of tokens, involving just one speaker and one lexeme (Broselow et al. 1995, Broselow et al. 1997), or examined vowels only before geminates, not singletons or clusters (Khattab & Al-Tamimi 2014). There is no quantitative research on Lebanese Arabic specifically examining vowel duration in syllables closed by a non-geminate, that is, a singleton consonant that is part of an intervocalic cluster, C**V(V)C**.CV.

In the current study, six speakers produced 472 tokens in sentence-medial position, with the following structures: C**V.**CV, C**VC**.CV, C**VG**.GV, C**VV.**CV, C**VVC**.CV. Vowel duration was examined in an LMM in R (R, 2008).

Short vowels in syllables closed by a singleton (C**V**C.CV) were significantly shorter than those in open syllables (C**V**.CV) (p<0.001) and than those followed by a coda geminate (C**V**G.GV) (p<0.01) (see figure). There was no difference in duration between short vowels followed by a coda geminate vs those in an open syllable (p=0.999), as also found by Khattab & Al-Tamimi (2014). A coda singleton (CV**C**.CV) was found to be longer than a coda geminate (CV**G**.GV). These results suggest that, phonologically, both VC and VG rimes are bimoraic, but C weighs more than G, so in a VC rime, the vowel gets shortened in a compensatory way, to maintain bimoraicity.

Long vowels did not differ in duration regardless of whether they were in an open syllable or a syllable closed by a singleton (C**VV**.CV vs C**VV**C.CV, p=0.994) (see figure). This is interpreted as follows: long vowels followed by an intervocalic consonant cluster (C**VV**C.CV) are parsed as open syllables, with the first consonant of the cluster forming a semisyllable on its own (Kiparsky 2003) (C**VV.C**.CV). As previously described, long vowels followed by geminate consonants (C**VV**G.GV) partake in mora-sharing (Broselow et al. 1995, Khattab & Al-Tamimi 2014). In this way, trimoraic syllables are avoided but by two different processes. These results add new insight into the phonology of syllable weight in Arabic by providing quantitative evidence that questions previous assumptions about mora-sharing in VVC rimes.



Performing regional and class identity in a minimalist postpunk singing accent: the significance of frequency effects in the processes of h-dropping and FACE diphthong lowering

Monika Konert-Panek, University of Warsaw
m.konert@uw.edu.pl

Singing accent stylisation has been investigated from various perspectives (Trudgill 1983, Simpson 1999, Beal 2009, Gibson and Bell 2012, Watts and Morrissey 2019 among others). Depending on the theoretical standpoint, the notions of identity, reference style or default accent have been attributed fundamental explanatory power. As Trudgill (1983) observes, Americanisation became less noticeable among British vocalists with the arrival of new wave and punk rock in the 1970s. Beal (2009) argues that the use of local accent in singing indexes authenticity and anticommercialism. With the above observations as departure points, the paper examines the use of local accent and stylisation in staged performance of Sleaford Mods, a minimalist post-punk/alternative hip-hop duo based in Nottingham, England. The use of local features (East Midlands accent) indexes independence, positioning the duo outside the musical mainstream. At the same time, the use of some Cockney features, typical of punk performance, is interpreted as indexing working class identity. The main aim of the study is to assess the significance of frequency effects in singing accent stylisation with regard to selected features indexing "Northerness" and "working class" (h-dropping) and Cockneyisation (the FACE diphthong lowering). The paper adopts the perspective of the usage-based paradigm (Bybee 2001), represented as an exemplar model (Johnson 1997, Pierrehumbert 2001), in which frequency effects and sociophonetic variation occupy central positions.

The quantitative auditory analysis was based on the album "Key Markets" (2015), as well as five interviews (conducted in the years 2014-2015) to compare the singing and speaking styles of the vocalist. As regards the singing accent, the data was extracted from the album to compile two corpora including 75 and 277 tokens (h-dropping and FACE lowering processes, respectively). For reference, the spoken accent data was extracted from the interviews, comprising, respectively, 34 and 65 tokens. Frequency was measured locally, i.e. the word frequency of the sample itself was used, following Hay at al. (1999) and Erker and Guy (2012). All the words potentially exhibiting h-dropping and the FACE lowering processes were identified as frequent (occurring 5 or more times) or infrequent (occurring fewer than 5 times). The statistical significance of the obtained results regarding lexical frequency effects was verified by means of a chi-square test with Yates' correction.

As regards the FACE lowering process (Cockneyisation) in singing style, the percentage of frequent words undergoing the change was higher compared with the infrequent ones (77% vs. 55%) and the results are statistically significant (Yates' chi-square=13.094, $p<0.001$), which suggests that word frequency may affect singing style variation. In the case of the h-dropping process (Northerness and working class), the percentage of frequent and infrequent words undergoing the change turned out to be similar (100% and 91%, respectively) and the statistical analysis showed no difference between the two groups (Yates' chi-square=0.666, $p>0.3$). Moreover, the results indicate that both examined northern and Cockney pronunciation traits are more frequent in the vocalist's singing rather than spoken accent: the overall singing accent h-dropping score amounts to 93%, compared with 47% in the spoken mode, while FACE lowering is present in only 9% percent of cases in the spoken mode, with the singing mode overall score reaching 65%. This shows the reflexivity of staged performance and a play with authenticity that it entails.

The Special Status of Coda Nasals in Early Germanic Languages

Andrew Kostakis, *Austin Peay State University*

Coda nasals in Germanic languages conditioned sound changes that onset nasals did not participate in. For example, coda nasals caused Proto-Indo-European (PIE) *[e] to raise to *[i]. As a result, the *[i] in Proto-Germanic (PGmc) ***fi**n**f**- 'five' corresponds to [e] in other Indo-European languages, e.g. Greek *πέντε* [p**e**nte]. Onset nasals, by contrast, did not produce a similar raising. Accordingly, PIE *[e] is retained both in PGmc words like ***ne**man*- 'to take' as well as Indo-European cognates, cf. Greek *νέμω* [n**e**mo]. Nasal allophony is also evident in the process of Northwest Germanic (NWGmc) a-umlaut. This development caused a stressed *[u] to shift to *[o] when a non-high vowel followed in the neighboring syllable. For instance, *[u] in examples like PGmc **hrussan* 'horse' corresponds to [o] in the daughter languages of NWGmc, e.g. Old High German (OHG) *(h)ros*, Old Norse (ON) *hross,* etc. While NWGmc a-umlaut occurred across an onset nasal, it was blocked by an intervening coda nasal. In consequence, forms like PGmc **buman* 'bud', with an onset nasal, show expected reflexes with an [o] (e.g. OHG *brom*), while the reflexes of words like PGmc **dumbaz* 'dumb', with a coda nasal, retain *[u], cf. OHG *tumb*, ON *dumbr*.

Given their interaction with vocalic segments, I claim that coda nasals in Germanic languages are endowed with the vocalic feature [low] and that the above processes fall out from that specification. The analysis adopts a representation of mid vowels that is doubly-marked with the features [high] and [low], akin to Element Theory and its related frameworks (Dependency Phonology, Government Phonology, etc.). As a convention, I use subscripted '$_{L}$' and '$_{H}$' to denote the features [low] and [high], respectively. Thus, coda nasals are [n_{L}], onset nasals are [n], and the front and back mid vowels are represented as [e_{HL}] and [o_{HL}].

I argue that pre-nasal raising in PGmc is a process of lowness dissimilation. Since forms like Early PGmc *$fe_{HL}n_{L}f$- contain a sequence of two contiguous [low] segments, they are marked by the Obligatory Contour Principle (OCP). To repair that OCP violation, the feature [low] is delinked from the mid vowel, whereby [e_{HL}] shifts to [i_{H}]. The process of NWGmc a-mutation is argued to involve the spreading of the feature [low] from an unstressed syllable to a stressed one. On account of that spreading, PGmc *$hru_{H}ssa_{L}n$ shifts to NWGmc *$hro_{HL}ss(a_{L}n)$, with subsequent loss of the segments in parentheses. The reason why this change does not occur in words like PGmc **dumbaz* is because the coda nasal is marked with the feature [low] (PGmc *$du_{H}m_{L}ba_{L}z$): the [low] feature of [m_{L}] blocks the feature [low] of [a_{L}] from spreading regressively to [u_{H}] on account of the no-crossing constraint.

Although these data have been discussed since the latter half of the nineteenth century, there is no unified phonological explanation for the behavior of the early Germanic nasals. One reason why these data have remained difficult to characterize is because phonological theory has developed models of consonants and vowels that are largely independent of each other. That compartmentalization makes interactions between consonants and vowels difficult to understand. A second reason why these processes are obscure is because they involve identical sounds – [n], [m], [ŋ] – with phonologically disparate representations. Related conclusions have been drawn independently in recent work on sonority sequencing. For example, Krämer and Zec (2016) find that nasal codas are cross-linguistically more sonorous than nasal onsets. That finding intersects with the present analysis of early Germanic in so far as the higher sonority of coda nasals may be the factor that licenses the vocalic feature [low].

An integrated approach to Vowel Height harmony and ATR harmony

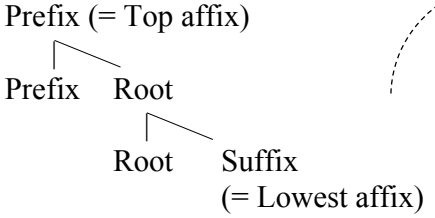
Nancy C. Kula & Kuniya Nasukawa
University of Essex & Tohoku Gakuin University

Bantu languages contrast height harmony (HH) and ATR harmony (ATRH), which apply in different domains and contrast in directionality. More prevalent HH in 5-vowel systems (e.g. in Chichewa, Bemba) is more restricted and predominantly only applies from left to right triggered by a verb root and targeting following suffixes, and manipulates height {i→e; u→o}. ATRH (e.g. in Kinande, Budu) applies in a wider domain, affecting both prefixes and suffixes and can be triggered by any of the verb root, prefixes or suffixes affecting the whole word and thus involving both anticipatory and preservatory agreement. ATRH manipulates frontness {i→ɪ; u→ʊ}. There are in addition, 7-vowel languages (e.g. Kimatuumbi, Kinyamwezi) where HH is accompanied by a restricted form of ATRH. HH applies in the domain [ROOT-SUFFIXES] while ATRH in the [PREFIXES-ROOT-SUFFIXES] domain of the Bantu verb.

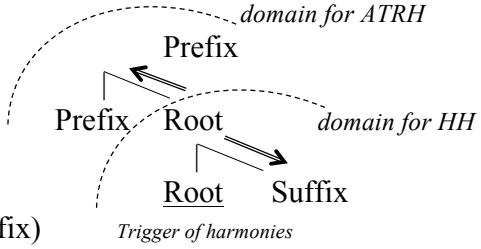
To account for this contrast in domain and harmony pattern we adopt a minimalist view of morpho-syntax to derive the structure in (1a) where the topmost layer is occupied by prefixes, rather than by the root, derived from the operation Merge.

(1) [PREFIXES [[ROOT] -SUFFIXES]]

a.



b.



Coupled with Precedence-Free Phonology (Nasukawa 2011), we assume that the source property for both types of VH is usually present in the root (though exceptions exist). If a domain is formed at the level containing the root head, its structural dependent, the suffix, receives the source property from its head. On the other hand, if the source of the root must be shared in a wider domain, the property manifests itself not only in the suffix but also in the prefix (the head of the root-headed set). As a result, the former produces rightward harmony while the latter produces both rightward and leftward harmony at the phonetic (surface) level. This matches the minimalist view that no precedence relations between constituents are formally encoded in morpho-syntax.

With respect to vowel height and ATR-ness in the two types of harmony, the difference is attributed to the degree of phonetic modulation of the active source property in a given harmonic process. In both types, we claim the same property |A| (base element) is involved, and when it is specified in the narrower domain (at an embedded level), it has a greater phonetic salience and contributes to the phonetic manifestation of vowels in terms of height. On the other hand, when |A| is shared by a wider domain—that is, when it is specified at the topmost level of a more complex recursive structure—its phonetic effects are weaker and it contributes only ATR-ness. Thus, the position of |A| in the recursive structure determines whether we get [e] or [ɪ].

Gemination and vowel reduction as markers of the Soikkola Ingrian ternary foot

Natalia Kuznetsova

Università Cattolica del Sacro Cuore, Milano — Institute for Linguistic Studies, Russian Academy of Sciences, St. Petersburg (natalia.kuznetsova@unicatt.it)

Ternary feet represent challenges for metrical stress theories and are often contested in formal phonological accounts. For example, they are represented as recursive binary feet, binary feet with extrametrical syllables, or as an alternation of stressed and stressless feet (Martínez-Paricio & Kager 2015; Torres-Tamarit & Jurgec 2015; Golston 2019). In such accounts, surface ternary feet are generally claimed to consist only of binary or of binary and unary prosodic feet.

I will present data on the ternary foot in Soikkola Ingrian, a minor Finnic variety of Russia, in comparison with the binary foot and the combination of the binary and the unary foot. Two prosodically conditioned processes are considered: specific types of gemination at the 1st/2nd syllable boundary the reduction of long vowels in the 2nd syllable. These processes were seen as interrelated and pertinent to the ternary foot as early as in Sovijärvi (1944: 182–184).

1. Prosodic rules of **gemination** in binary and ternary feet, historically a phonetic but by now a phonologised process in Soikkola Ingrian, can be summarised as follows:

— (a) in the binary and ternary foot: before long vowels: **kurkī* > *kur**ǩk**ī* ‘crane:ILL’, *kerkīmä* > *ker**ǩk**īmä* ‘be_in_time:1PL’;

— (b) in the ternary foot ONLY: before two light syllables *-CVCV(C), and:

(i) if the first syllable of the foot was light (C)V, the second syllable vowel, which was phonetically half-long, became phonologically long: **omena* [ˈomeˑna] > *o**m̆m**ēna* ‘apple’;

(ii) if the first syllable of the foot was heavy (any other structure), the second syllable vowel remained phonetically and phonologically short: **murkina* > *mur**k̆k**ina* ‘breakfast’.

2. Second syllable **long vowel reduction** is a more recent and still ongoing process, which we phonetically studied in 22 types of ternary feet, four shortest of which were compared to the binary feet with the same structure of the first two syllables. Its rules go as follows:

— (a) binary feet always maintain the second syllable long vowel: *kur**ǩk**ī* etc;

— (b) ternary feet undergo reduction of the second syllable long vowel: *kerǩk**ī**mä* > *kerǩk**i**mā̆* = *murkk**i**na*, apart for the shortest structure (with the former stressed light syllable) **omena* [ˈomeˑna] > *o**m̆m**ēna*, where the second syllable long vowel is still maintained.

3. In the trisyllabic structures with a long vowel in the third syllable, which consist of a binary and a unary foot, the first foot behaves like a normal binary foot in both respects:

— (a) there is gemination only before a second syllable long vowel but not before a short one: *kerkīmā̆* > *ker**ǩk**īmā̆* ‘be_in_time:SUP’, but **murkinā* [ˈmurǧiˌnaː] > *mur**k̆k**inā* ‘breakfast:PRT’.

— (b) the second syllable long vowel does not undergo reduction: *kerǩkīmā̆* [ˈkerkˑ**i**ːˌmäː].

The idiosyncratic features of the Soikkola Ingrian disyllabic foot are summarised below:

Structure type	**Gemination before a short vowel**	**Reduction of the 2nd syllable long vowel**
2-syllabic foot	× *kurki* [ˈkurǧi] ‘crane’	× *kurǩkī* [ˈkurkˑiː] ‘crane:ILL’
2+1-syl. bifoot	× *murkinā* [ˈmurǧiˌnaː] ‘breakfast:PRT’	× *kerǩkīmā̆* [ˈkerkˑiːˌmäː] ‘be_in_time:SUP’
3-syllabic foot	✓ *mur**k̆k**ina* [ˈmur**k**ˑina] ‘breakfast’	✓ *kerǩkīmä* > [ˈkerkˑ**i**mä] ‘be_in_time:1PL’

These data show that the third syllable in the Soikkola Ingrian ternary foot cannot be simply considered extrametrical, as it directly contributes to the prosodic processes within the first two syllables. Neither can it be considered as a separate foot, as the bifoot trisyllabic structure behaves differently. As for the foot recursion, it is still unclear whether recursion at the prosodic levels below the word is a valid and uncontroversial theoretical concept (cf. the proceedings of RecPhon2019). Therefore, I rather maintain the view that the ternary foot in Soikkola Ingrian has an independent prosodic status from both the unary and the binary foot.

The Cognitive Phonetics of Malayalam Velar Palatalization

Sayantan Mandal

Given that phonological theories are usually of a computational-representational variety – abstract and algebraic – whereas speech signals are analog and continuous, a persistent open issue in the literature concerns bridging the gap between the two. The issue is further complicated by the fact that by the time utterances are externalized, they come to manifest grammar-external effects, such as those stemming from constraints of production (e.g. co-articulation) and perception (e.g. perceptual assimilation). As pointed out by many psycholinguists (Cutler, 2012; Fromkin, 2013) and phonologists (Idsardi & Raimy, 2013; Volenec & Reiss, 2017) alike, a failure to distinguish between these two types of effects on speech, phonological and phonetic, often leads to category errors. We present results from two experimental studies of Malayalam velar palatalization with early-L2 dominant Malayalam-Aus. English bilinguals, and discuss their implication for issues concerning form and substance in phonology and phonetics.

Malayalam single-melody velars are palatalized when preceded by [i, e, a], both within and across word boundaries. Two palatalizing suffixes figured in our experiments ([k:uka] “INF” and [k:ə] “DAT”), alongside a non-palatalizing plural suffix ([kal]). The first experiment involved a modified-WUG test designed to test productivity of the process in production. Participants listened to randomly selected nonce-stems, and produced affixed forms. Phonetic analyses revealed that mean F2 values were highest for [i] and lowest for [a], with all palatalized forms showing higher F2 values for vowels. A mixed-ANOVA model revealed a main effect of preceding vowels ($F(1,14) = 10.38$, $p < 0.01$) and suffix-type ($F(1,14) = 1747.79$, $p<0.01$), but no interactions. The two licensed suffixes triggered palatalization with all three preceding vowels with no significant difference in rate, while both differed significantly ($p < 0.001$) from the unlicensed suffix which only exhibited accidental palatalization on occasion. Likewise, a planned contrast revealed no difference in triggering rate between preceding [i] and [e] ($p > 0.05$), but both differed from [a] ($p < 0.01$). Similar results were obtained in a perceptual Forced-Choice test, with significant effects of preceding vowel ($F(1,14) = 24.13$, $p< 0.01$), suffix type ($F(1.14)= 917.72$, $p < 0.01$), but this time with a vowel*suffix interaction ($F(1,14)=7.09$, $p = 0.01$).

The data in the results above are performance data, but they stand to constitute indirect evidence for underlying competence when couched within a scientific framework for the phonology ~ phonetics interface. We argue that Logical Phonology (LP; Bale & Reiss, 2018) and Cognitive Phonetics (CP; Volenec & Reiss, 2017) provide just such a framework. LP assumes that phonological computations are logical set theoretic operations. Segments are sets of valued features, and natural classes are sets of sets of valued features. Crucially, LP argues that both the input to and output of phonological operations are purely algebraic. CP, likewise, argues that two distinct transductive interfaces assign to the output of phonological computations the neuromuscular and temporal information (substance) necessary for said outputs to be legible to the sensory and motor systems. In the minimalist spirit, we argue that behavioral patterns that can be explained by appeals to articulatory and perceptual constrains should not be attributed to the phonological grammar. For instance, all three triggering vowels [i, e, a] in our experiments showed significant success rates in distinguishing the licensed and unlicensed suffixes in contexts of velar palatalization. However, the two non-back vowels [i, e] show statistically significant higher rates compared to the back vowel [a]. The discrepancy between [i, e] is accounted for within CP, by appealing to the physics of co-articulation. Crucially, however, we show that this discrepancy is purely grammar-external. From a purely computational perspective, we show that the Malayalam of process of velar palatalization is best formalized as a result of two distinct set operations – subtraction and unification – that are triggered by the natural class of [-Round] vowels, and targets the class of [+Back] consonants. In our talk we (a) outline the formal properties of subtraction and unification, (b) illustrate their efficacy in providing a phonological account of Malayalam velar palatalization and (c) sketch out a hypothesis for how formal phonological forms are transduced into articulatory and acoustic patterns that fits our experimental observations of Malayalam velar palatalization.

Vowel Compression, Stress and Rhythm in Altiplateau Mexican Spanish

Gillian Marchini, Michael Ramsammy
University of Edinburgh

Vowel compression in Spanish, i.e., the phonetic shortening of vowels relative to the number of segments in a syllabic unit, is much debated. Here within, we present evidence from Altiplateau Mexican Spanish (AMS) that coda-driven vowel compression is a variety-specific phenomenon in Spanish.

Previously considered a cross-linguistic phenomenon, language-specific research has shown that vowels in closed syllables are not universally shorter than those open (e.g., Katz 2012). Particular to Spanish, Aldrich and Simonet (2019) demonstrated that it is the presence and complexity of the onset, not the coda, that shortens vowels in Spanish, concluding that, "we are aware of no published finding suggesting that, in Spanish, coda presence (or complexity) drives compensatory vowel shortening" (Aldich & Simonet 2019:268).

Whilst this statement holds true for Aldrich & Simonet's cross-dialectal findings, our analysis of AMS reveals that coda-induced compression occurs in simple syllabic structures, correlates strongly with stress and is potentionally a variety-specific phenomenon. Our variable context was outlined as the mid and low stressed and unstressed vowels in word-final syllables in elicited, continuously read speech. The speech of five female speakers of Altiplateau Mexican Spanish was segmented using the Montreal Forced Aligner and manually checked following well-attested protocols (Turk, Nakai & Sugahara 2006). Tokens were coded for stress, vowel type and syllable structure.

Descriptive analysis and mixed effects linear regression models of normalised formant-frequency, duration and intensity measurements reveal that all vowels in this variety centralise in closed syllables and that this is most extreme for unstressed vowels. For shortening, coda-induced compression is only noted for /e/ and /a/ in CVC structures. Complexifying codas, i.e., CVC~CVCC, or onsets, i.e., CV~CCV or CVC~CCVC, is not significant in driving further changes in duration. As with centralisation, unstressed vowels experience greater relative shortening than stressed. Overall intensity varies negligibly across syllable structure and stress.

In addition to highlighting the potentially variety-specific nature of these compression effects, the results bear further upon classifications of Spanish as a prototypical, syllable-timed language (Dauer 1983; Pike 1945). They suggest that, with regard to compression and vowel reduction, dialect-specific, phonetic-phonological interactions allow certain varieties of Spanish, like AMS, to behave in a way typically associated with stress-timed languages, e.g. English.

Nonetheless, given the controversial nature of phonological rhythm (e.g., Arvaniti 2009, 2012; Turk & Shattuck-Hufnagel 2013), we further see scope to explore the relation of these effects to dialect-specific marking of stress. Results highlight that variety-specific phonologies exist in Spanish and strongly correlate with stress. We therefore posit that this compression phonology conditions the way in which unstressed vowels are phonetically signalled in this variety, namely through centralisation and shortening. In sum, they are suggestive that the acoustic marking of stress is not only governed by language-specific phonetic-phonological interactions, but that stress is not invariant across varieties owing to dialect-specific phonetic-phonological interactions, as demonstrated in English (Smith & Rathke 2020). Although previous analysis has examined the acoustic marking of stress in Spanish (Ortega-Llebaria 2006; Ortega-Llebaria & Prieto 2010), dialect-specific representations of stress remain unexamined.

Andrei Munteanu

A Union of Quantitative and Traditional Approaches in Historical Linguistics

Comparative reconstruction has always been one of the key endeavors of linguistics, and yet there exists no widely accepted method for evaluating its applications (Michalove, 1998). Instead, evaluation is conducted through debate, often spanning decades, as in the case of Altaic (Georg et al., 1999; Norman, 2009). There have been numerous attempts to introduce quantitative measures for genetic relatedness (Chang et al., 2015; Downey et al., 2008; Kondrak, 2003; Atkinson & Gray, 2003; Rexova et al., 2003). However, these approaches generally do not incorporate the notion of sound change regularity into the model, and most researchers agree that manual comparative reconstruction is still the gold standard (Kiparsky, 2015; Downey et al., 2008; Bostoen, 2007).

I introduce a quantitative framework which attempts to merge traditional reconstruction and quantitative methods. In this framework, the probability that a reconstruction could have been evidenced by random chance is calculated based on the number and type of changes that it requires. Given a parent and child wordlist, it is assumed that the child wordlist was sampled at random from a set of wordlists that share its phonological properties. The proportion of this set that could have been reached from the parent wordlist through a reconstruction of the same size is the probability that a randomly generated wordlist is as similar to the parent.

I focus on a number of corollaries of the framework that have theoretical and practical implications for the field historical linguistics and diachronic phonology. The most striking observation is the importance of phonotactics and phonology for the model. As can be seen in Figure 1, which maps the proportion of wordlists reachable by the same number of changes, the measure of *word complexity*, an estimate of the number of phonological word shapes in the child wordlist, has a drastic effect on the result. In general, languages with a greater word complexity require less evidence, and reconstruction operating on these languages are less arbitrary. For example, raising word complexity from 2000 to 4000 the same effect as removing 6-7 sound changes from the reconstruction.

This methodology is primarily intended to estimate the arbitrariness of a given reconstruction and thereby evaluate the likelihood that a language subgrouping is motivated by chance resemblance only. Because the framework evaluates the reconstruction, not the wordlists themselves, it also allows for the comparison of competing reconstructions for the same data. Preliminary tests show that the framework can be implemented computationally, with a case study conducted on wordlists from 6 Oceanic languages from the Austronesian Comparative Dictionary (Blust & Trussel, 2013).

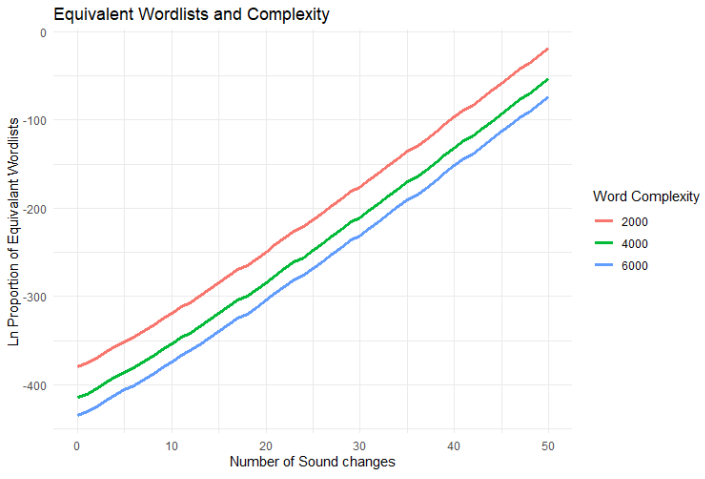


Figure 1: A log plot of the proportion of wordlists that share the phonological properties of the child and could have been reached from the parent by the same number of changes. Number of regular sound changes is on the x-axis. As the proportion depends on the type of sound change proposed, only the maximum proportion is plotted here.

Vowel fronting in Serbian noun inflection

Andrija Petrovic, Stony Brook University andrija.petrovic@stonybrook.edu

Fronting and OCP. In Serbian nominal inflection, in Inflectional Class I (i.e. masculine and neuter nouns), the form of the suffix can be affected by the final consonant of the stem: the example of the instrumental singular suffix (1) shows that, in suffixes that are normally [o]-initial (1a), posterior coronal consonants [j ʎ ɲ ʧ ʤ ʨ ʥ ʃ ʒ] in stem-final position yield suffix-initial [e] instead of [o] (1b). If the stem-final vowel is [e], however, vowel fronting in the suffix is blocked in the instrumental singular of masculine nouns (1c).

(1) a. niz-om b. kriʒ-em c. jeʒ-om
sequence.INS.SG.M cross.INS.SG.M hedgehog.INS.SG.M

Additionally, the dental affricate [ʦ] triggers the same effect, even though it is not a posterior coronal consonant. Therefore, I define the class of FRONTING CONSONANTS (FC) – I assume that, in terms of the morphophonological effect of fronting, the category of posterior coronal consonants expands to include all affricates in the language.

Finally, there are [ʎ]-final masculine stems that allow vowel fronting after stem-final [e] in the instrumental singular. However, all of these stems end in the agentive suffix *-teʎ*; this can therefore be regarded as a morpheme-specific effect.

Corpus study. Counterexamples are attested in all cases. In order to account for the variation, I use the MaxEnt Grammar Tool (Wilson & George 2009), which allows for adjusting constraint weights to fit the data observed in the *Serbian web corpus srWaC 1.1* (Ljubešić & Klubička 2016). The model uses the observed frequencies of the two allomorphs of the instrumental singular suffix as the dependent variable. With its default settings ($\mu = 0$, $\sigma = 100{,}000$), the grammar was trained on the frequencies extracted from the corpus, which included 8,665 words. The constraints used in the analysis are defined in (2), (3) and (4); their effect is seen in the tableau, with the weights assigned by the MaxEnt grammar tool.

(4) *FC-[o]: * for every [o] immediately following an FC across morpheme boundaries
(5) *[e]-[e]: * for every occurrence of 2 subsequent [e]'s across morpheme boundaries
(6) *FC_L-[o]: * for every [o] immediately following an FC, exponent of a morpheme specified as L, across morpheme boundaries

/rad-om/	Obs. freq.	*FC-[o] *w* = 8.17	ID(back) *w* = 4.91	*[e]-[e] *w* = 4.26	*FC_L-[o] *w* = 3.87	$\mathscr{H}$	*p*
a. radom	6770					0	**.99**
b. radem	50		-1			-4.91	.01
/muʒ-om/							
c. muʒom	64	-1				-8.17	.04
d. muʒem	1662		-1			-4.91	**.96**
/jeʒ-om/							
e. jeʒom	60	-1				-8.17	**.73**
f. jeʒem	22		-1	-1		-9.17	.27
/uʧiteʎ$_L$-om/							
g. uʧiteʎom	2	-1			-1	-12.04	.05
h. uʧiteʎem	35		-1	-1		-9.17	**.95**

Variability. The theoretical assumptions outlined above correctly account for 98.43% of the corpus data; the MaxEnt analysis then accounts for the variation. Looking at the remaining 1.57% of the corpus data, additional reasons for the variability of the suffix-initial vowel are also identified: the status of a word as native or borrowed (effect of a stratum-specific, I-O faith constraint), and the historical palatality of now depalatalized consonants ([r] and [t]).

Finally, I consider evidence for a possible sound change in progress. Fronting occurs after [s] and [z] asymmetrically in the instrumental singular (*om/em*) and the long plural forms (*ov/ev*); the fronted vowel in the long pl. is more widespread (Polančec 2017). The FC category, after expanding to include all affricates, may be expanding to include all stridents in Serbian.

The German past participle prefix *gə-*: a typological analysis

Anna Katharina Pilsbacher – UIT-The Arctic University of Norway/Università degli studi di Verona
anna.k.pilsbacher@uit.no

Introduction: The Standard German (StG) past participle is, in part, marked by the presence of the prefix *gə-*. Its surfacing seems to be determined by the phonological environment it occurs in. Crucially, important theoretical questions arise regarding its status and its presence within the lexicon. Here, I present the StG data in a typological continuum together with two Bavarian dialects that shed light on the phenomenon from a typological perspective.
Previous analyses of StG: *Gə-* surfaces in the past participles if the root verb is monosyllabic or bears main stress on the first syllable (Wiese 2000). In instances where a syllable other than the first is stressed, the past participle is not prefixed. This behaviour differs markedly from that of related languages such as Dutch, where prefixation is obligatory.

(1)	a. **laʊ̯** .fən	gə.**laʊ̯** .fən	'*run*'
	b. mu.zi.**tsi**:.ʁən	__ mu.zi.**tsi**:**ʁt**	'*make music'*

Kiparsky (1966) analyses StG past participles as underlyingly prefixed. As lexically specified temporal prefix, gə- is involved in the formation of the past participle. Its subsequent deletion occurs in phonology and functions as a repair mechanism put into action whenever the prefix is followed by a syllable not bearing main stress. Wiese (2000), on the other hand, takes gə- to be absent from the underlying representation of the verb. Under this account, gə- is inserted as repair for a phonologically dispreferred stress pattern (i.e. whenever the prosodic root word is monopedal) as long as a past participle is already present. The prefix is in found in the lexicon or the syntactic representation, it is connected to the perfect by association only, and added in phonology.
Dialectal data: As StG does not provide compelling evidence to reject either of the hypotheses, I employ Bavarian dialects to more shed light on the issue: A Central Bavarian dialect spoken in North-eastern Austria (CB) (own fieldwork) and two Tyrolean varieties spoken in Northern Italy, specifically in the Passeiertal (TB-a) and in Meran (TB-b) (Alber & Lanthaler 2015). Note that, in Bavarian dialects, syncope affects prosodically light elements like the prefix at hand.
As shown in (2), TB and CB vary from the pattern observed in StG. They crucially show prefix reduction so that the prefix cannot function as stress repair. In the more heterogeneous TB dialect cluster, the prefix surfaces as a velar plosive as long as it does not result in a CC-cluster that is illicit in this particular variety (compare 2b in TB-a and TB-b). In all other environments, the prefix surfaces as a CV syllable. In CB, on the other hand, the prefix is never syllabic. In the case of phonotactically illicit plosive-plosive clusters, the prefix is deleted completely instead of surfacing with an epenthetic vowel.

(2)		**Root**	**StG**		**TB-a**		**TB-b**		**CB**	
	a.	dɛŋk	**gə**.daχt	(*gd)	**gɪ**.dɛŋkxt	(*gd)	**gə**.dɛŋkxt	(*gd)	dɔχt	(*gd)
	b	vɪs	**gə**.vust	(*gv)	**gɪ**.vɪst	(*gv)	**g**vɪst		**g**vʊ:st	
	c.	fʁa:g	**gə**.fʁa:gt	(*gf)	**k**fʁɔk		**k**fʁɔk		**k**fʁɔgt	

These findings suggest that the prefix exists as a mono-segmental consonant, and not as a syllable in the underlying structure. The typological cross-section clearly shows that Germanic varieties address the balance between segmental markedness and faithfulness to a morphological template in varied ways.
Conclusion: I propose that, although in StG the prefix *gə-* has the form CV, in CB and TB it exists as a mono-segmental consonant and cannot serve as stress repair. These typological findings are in line with Kiparsky's hypothesis that prefixation precedes phonology and show that phonology does not provide any lexical content to syntactic heads.

Tone and stress in Southern Tsotsil (Mayan): a preliminary analysis

Gilles Polian, Eduardo López Mendoza (CIESAS)

gillespolian@yahoo.com, edu-1024@hotmail.com

Southern Tsotsil (ST, also known as San Bartolo or Venustiano Carranza Tsotsil), a Mayan language spoken in Mexico, was described as tonal by Sarles (1966) and Kaufman (1972), with a low-high opposition. However, Herrera (2013, 2014) discards the tonal status of ST: she claims that no minimal pair exists and that the vocalic F0 variation may be an effect of the following consonant, in particular with a F0 fall before a [+constricted glottis] consonant.

In this paper, we contest Herrera's conclusions and confirm that ST has contrastive tone. There are in fact many minimal pairs contrasting L/H tones, before both glottalized and non-glottalized consonants, such as *ʔìk'* 'black' / *ʔík'* 'air', *mìj* 'to go up' / *míj* 'sapodilla', *jàl* 's/he fell' / *jál* 's/he said', *ʔòlil* 'middle' / *ʔólil* 'son'. Based on first-hand data, we present phonetic evidence showing that the realization of tones are affected by phrasal intonation: in particular, tonal contrasts are neutralized on the last syllable of an intonational phrase. This explains why monosyllabic words uttered before a pause cannot reveal their tones and thus we set adequate sentence frames for the study of word-level prosody in ST.

Once sorted out the role of phrasal intonation, we focus on word-level tonal and stress patterns (Hayes 1995). We show that non-compound words distinguish two basic patterns, I and II, characterized by the alternation of high-toned and low-toned syllables (stress indicated by underlining, tone by acute/grave accents).

# of syllables	1	2	3	4	5	6
Pattern I	σ́	σ́σ̀	σ́σ̀ σ́	σ́σ̀ σ́σ̀	σ́σ̀ σ́σ̀ σ́	σ́σ̀ σ́σ̀ σ́σ̀
Pattern II	σ̀	σ̀σ́	σ̀σ̀ σ́	σ̀σ̀ σ́σ̀	σ̀σ̀ σ́σ̀ σ́	σ̀σ̀ σ́σ̀ σ́σ̀

High-tone is always associated with stress, whose secondary cues are length and intensity. The main stress falls on the leftmost high-toned syllable in the word, the following high-toned syllables bear secondary stress. Stress can also fall on a low-toned syllable, as a marked option (de Lacy 2002): monosyllabic σ̀ words and words with three or more syllables with an initial σ̀σ̀ foot; in that case, stress is realized through length and intensity. This panorama shows that high tone is a predictable manifestation of stress on syllables without a low tone. Accordingly, we posit a tonal inventory with a unique low tone which contrasts with the absence of tone, and this only in the initial syllable of roots (low tones on other syllables are the manifestation of their unstressed status). We show that this is enough to explain patterns I and II: Pattern I is a simple quantity-insensitive trochaic alternation of stress on odd-numbered syllable from left to right, whereas Pattern II differs from the former in the first and second syllable of the word, where the low tone of the first syllable enforces a low pitch and, for bisyllables, an iambic footing (σ̀σ́). This research contributes to the typology of tone and stress and to the understanding of these phenomena in Mayan languages, family in which a few tonal languages have been described, such as Uspanteko (Bennett & Henderson 2013, Kohnlein 2014, 2019).

Defectivity caused by templaticity

Péter Rebrus[12] rebrus@nytud.hu, Péter Szigetvári[1] szigetvari@elte.hu, Miklós Törkenczy[12] tork@nytud.hu; [1]Eötvös Loránd University, [2]Research Institute for Linguistics

Much of Hungarian morphology is additive suffixation, complex words typically contain their stem in full (**concatenativeness**). The vowel of most suffixes is harmonically controlled by the vowel(s) of the stem (**harmony**). Paradigms are generally not defective (**completeness**).

A single vowel of the stem may be missing: [bɑrn**ɑ**]~[bɑrn-ul] 'brown-VRBZ', [ʃɑr**o**k]~[ʃɑrk-uk] 'corner-PL3.POSS' (**minor truncation**). Suffixes with a neutral vowel ([i(:)], [e:]) may be invariant: [ha:z-**i**g] 'house-TERM', [bor-**e**:rt] 'wine-CAUS' (**disharmony**). Derivational affixation is less systematic cross-linguistically than inflectional affixation: *black-en* vs **pink-en* (**noncompleteness**).

The DIM forms (= diminutive/hypocoristic/informal) of nouns and adjectives (nominals) often undergo radical truncation (involving more than a single vowel):

(1) a. [tørte:nɛlɛm]~[tør-**i**] 'history-DIM', [unɑlmɑʃ]~[un-ʧ**i**] 'boring-DIM'
b. [tsɛruzɑ]~[tsɛr-k**ɑ**] 'pencil-DIM', [boɲolult]~[boɲ-**ɑ**] 'complicated-DIM'
c. [tɛtova:la:ʃ]~[tɛt-k**o**:] 'tatoo-DIM', [tɛlɛfon]~[tɛl-**o**:] 'phone-DIM'
d. [fizɛte:ʃ]~[fiz-**u**] 'salary-DIM', [pɛlɛŋkɑ]~[pɛl-**u**ʃ] 'diaper-DIM'
e. [pa:liŋkɑ]~[pa:l-**ɛs**] 'brandy-DIM', [kɑlɑuz]~[kɑl-:**ɛr**] 'conductor-DIM'

The DIM forms in (1) are all bisyllabic, and they are neither concatenative (their stems are radically truncated to fit the bisyllabic template), nor (necessarily) harmonic (the vowels of the DIM endings involved are invariant). There also exist DIM forms that are concatenative and harmonic: [tɛtovɑ:la:ʃ-(oʧ)kɑ] 'tatoo-DIM', [fizɛte:ʃ-(ɛʧ)kɛ] 'salary-DIM'. Compare the concatenative and harmonic DIM names [tɛre:z-kɛ], [miʃi-kɛ] and the templatic and disharmonic DIMs of the same names [tɛr-kɑ], [miʃ-kɑ].

Nominal DIMs are parallelled by verbal frequentatives. FREQs are also typically templatic, however, they do not involve truncation and only a few FREQ endings are harmonically invariant.

(2) a. [ja:r-**ka:l**] 'walk-FREQ', [bu:j-**ka:l**] 'hide-FREQ', [u:s-**ka:l**] 'swim-FREQ'
b. [dob-**a:l**] 'throw-FREQ', [ugr-**a:l**] 'jump-FREQ', [sa:ml-**a:l**] 'count-FREQ'
c. [sa:l-**doʃ**] 'fly-FREQ', [te:p-**dɛʃ**] 'tear-FREQ', [løk-**døʃ**] 'push-FREQ'
d. [lop-**kod**] 'steal-FREQ', [le:p-**kɛd**] 'step-FREQ', [tøm-**kød**] 'stuff-FREQ'
e. [sɑb-**dɑl**] 'cut-FREQ', [le:p-**dɛl**] 'step-FREQ', [ty:z-**dɛl**] 'stitch-FREQ'

The FREQ suffixes in (2) may only be added to monosyllabic verbal stems (*[olvɑʃ-ka:l] 'read-FREQ', *[hɑrɑp-a:l] 'bite-FREQ', *[pihɛn-dɛʃ] 'rest-FREQ'), since verb stems cannot be truncated. Furthermore, the invariant (and back-vowelled) suffixes in (2a–b) may only be added to stems governing back harmony (*[his-ka:l] 'believe-FREQ', *[lɛp-a:l] 'cover-FREQ').

(3) Concatenative and templatic DIMs and FREQs

Constraint	concatenative	T (nouns/adjs)	T (verbs)
Concatenativeness (no truncation)	yes	no	yes
Harmony (no invariance)	yes	no	no/yes
Completeness (no defectivity)	yes	yes	no

Templatic DIMs can violate concatenativeness and harmony. Templatic FREQs cannot violate either, and consequently are defective.

The Featural Makeup of the Lebanese Vocalic Inventory: from Shape and Size to a System that fits the Typology

Georges Sakr, The University of Edinburgh

Most references speak of Arabic (eg. Al-Ani, 1970) as a three-vowel system. I show here, however, that both the surface and underlying (or contrastive) vocalic inventory of Central Mount Lebanon Lebanese (henceforth CMLL) have seven distinct vowel qualities, and I situate this result within the established typology of vowel inventories in terms of symmetry and inventory sizes.

I base my phonological analyses on a phonetic analysis of 4355 vowel tokens of acoustic CVC data I collected from 19 native speakers of CMLL in 2018-2019. The vowels were hypothesised from the literature and through native intuition. Participants were asked to complete sentences that elicited these words, in Lebanese Chat Orthography to reduce influence from Standard Arabic. The words were suggested by their consonants to avoid lexically equivalent forms (eg. *gate* for *door*).

I employ Dresher's Successive Division Algorithm (2009) as a means to isolate the most economical set of contrastive features from my set of contrastive segments: that is, by successively redividing the entire inventory into increasingly smaller subsets as per a chosen feature for each division. The output of this algorithm suggests that the most sensible division of the underlying vocalic inventory (monophthongs and diphthongs included) of CMLL is into four distinct systems: short monophthongs, long monophthongs, long monophthongs that vary, and diphthongs.

Two of these systems do not fit typological expectations in that they freature a front-back contrast in low vowels. While this is regularly attested in six-quality systems, of which the CMLL long monophthong system is one, it is particuarly peculiar in the CMLL three-quality short monophthong system, in which the high vowels have undergone a merger (as suggested by eg. Haddad, 1984; Watson, 2002). Another important divergence from typological expectation is the fact that this merger of short high vowels goes against Maddieson's (1984) assertion that, for languages with multiple vowel systems, vowels in one system can usually be matched with vowels of similar qualities in other systems, such that 'the overall number of vowel phonemes is greater than the number of dierent vowel qualities'.

Central Mount Lebanon Lebanese vowel qualities follow a 6L1 structural configuration for vocalic inventories (see Becker-Kristal, 2010), which makes it comparable to Babine, Estonian, Gujarati, Dutch, Occitan, Chichimeca, Albanian and Wolof. A comparison with Maddieson (1984) shows that, since the CMLL vocalic inventory I proposed consists of 9 non-varying monophthongal phonemes, it has more monophthongal vocalic phonemes than 63.8%, and less than 27.4%, of the world's languages. These phonemes cover 7 vowel qualities, which means that CMLL has more monophthongal vocalic qualities than 63.7%, and less than 21.5%, of the world's languages.

High vowel shortening in Turkish

Elif Sarmış & Stefano Canalis · Boğaziçi University

This paper presents the preliminary findings of a quantitative study on high vowel shortening in Turkish and discusses the phonological status of this process.

The tendency for higher vowels to be, all else equal, shorter than lower vowels is so widespread that it is considered a phonetic universal (Maddieson 1999). In most languages, shortening results from inherent articulatory properties of speech mechanisms; lower vowels require more lowering of the tongue and jaw, thus requiring more time than a higher vowel to reach their articulatory target. At the same time, while in most languages high vowel shortening appears to be purely phonetic (mechanical, articulatorily or aerodynamically based, gradient), in some languages it is at least in part governed by phonology: it is (semi)categorical and controlled. For instance, it has been argued that "[Japanese] CV [sequences] containing high vowels are substantially shorter before voiceless consonants, whilst non-high vowels do not exhibit comparable shortening" (Tanner et al. 2019), suggesting that duration is phonologically controlled in Japanese to favor high vowel devoicing between voiceless consonants.

We want to argue that high vowel shortening is not (purely) phonetic in Turkish either, but an allophonic rule controlled by phonology. We conducted a preliminary experiment (a larger study is underway, with more subjects and also analyzing high vowel devoicing) with four Turkish native speakers to test high (/i, y, ɯ, u/) and non-high (/a, e, ø, o/) vowels in open and closed syllables, while controlling the preceding and following consonantal environment for voicing. All experimental items were bi- or tri-syllabic words with a final stressed syllable.

High vowels were indeed found to be shorter than non-high ones (Table 1). If Turkish vowel shortening only depended on articulation and/or acoustics, we would expect 1) a broadly linear correlation between it and vowel height, 2) such a correlation to exist even when *phonetic* vowel height is not closely related to the *phonological* status of vowels. This is not uncommon in Turkish; the phoneme traditionally described as /ɯ/, a high back unrounded vowel, is actually slightly lower than /i/, /u/ and /y/ (as well as more central than back vowels; cf. Kilic & Öğüt 2004), and Turkish /e/ has a lower allophone [æ] when followed by a tautosyllabic non-glide sonorant consonant (Göksel & Kerslake 2005).

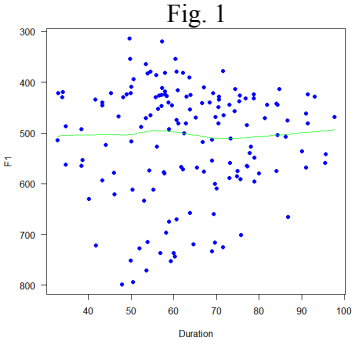
However, in our data the correlation between a vowel's F_1 and its duration *within* the [–high] and [+high] categories is very poor – in fact, non-existent. Fig. 1 shows the absence of a positive correlation between F_1 and duration within non-high vowels, while Fig. 2 shows the absence of a positive correlation between F_1 and duration within high vowels. In contrast, if the duration of [–high] and [+high] vowels is compared, a conspicuous difference between these two classes emerges, non-high vowels being rarely as short as, or shorter than, high vowels (Fig. 3).

This suggests that Turkish high vowel shortening is not a purely gradient phenomenon only shaped by physiological constraints, but the near-categorical output of an allophonic rule sensitive to phonological rather than phonetic factors.

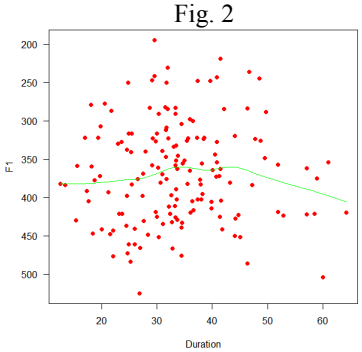
Table 1. Average duration of individual vowels in open syllables in all environments (in ms)

Vowel	/a/	/e/	/o/	/ø/	/ɯ/	/i/	/u/	/y/
Avg. Duration	56.4	61.7	67.6	71.6	40.9	41.4	42.7	41.3
Avg. Across V Height	56.4		67.2			41.6		

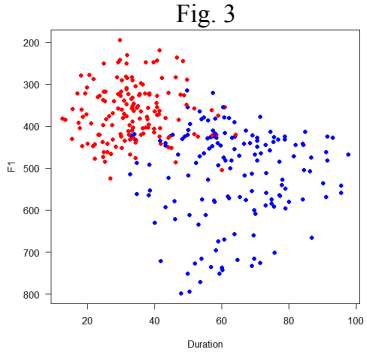
Non-high vowels, lowess line superimposed
Fig. 1



High vowels, lowess line superimposed
Fig. 2



High (red) and non-high (blue) vowels
Fig. 3



Abstract: Underlying Representations in Harmonic Serialism

Author: John Nate Shaftoe

The advent of Optimality Theory in the early 1990s rapidly led the depreciation of much study on underlying representations in phonological theory (Kramer 2012). In a single-step system which expressed all 'operations' as effectively occurring in parallel, there was little need for a complicated theory of URs, since the candidate set was so varied it could produce the correct output no matter the details of its input. Furthermore, Lexicon Optimization ultimately predicted the full specification of all lexical forms in order to minimize faithfulness violations (Prince & Smolensky 1993/2004; Kramer 2012). However, recent developments in OT have undermined this context. Harmonic Serialism, a serial variant of OT with a strictly limited candidate set, requires a reexamination of the nature of the UR, of the use of faithfulness constraints, and consequently, the input of the derivation.

A coda-stop lenition process in Chilean Spanish, in which /t d/→[j] in coda position (Pineros 2001), functions as an excellent example of this new context. While the final step of the derivation makes sense, with both UR and SR being coronal segments, it is much more difficult to determine how such a drastic change can occur under the strict Gradualness requirements of HS. It becomes even more difficult to provide a clean derivation when one considers the feature changes at play, building on the standard HS assumption that deletion is gradual (McCarthy 2008), requiring changes to [continuant], [sonorant], [approximant], [consonantal], and in some cases [voice] features. It furthermore requires a shifting of the specific place features if full feature specification is assumed, making for a long derivation in which several required steps, most pointedly the place-shifting and the jump to [+approximant], are not necessarily harmonically improving.

Thus, this study concerns the implications for HS when one ceases to treat the segment as an abstract unity and instead decompose it into an emergent product of the deeper feature-geometric structure. In Feature Geometry (Clements 1985), phonological features are organized hierarchically, with groupings based on the tendencies of features to spread or delete together. Assuming that changes between segments are just the emergent surface result of feature changes, then there must be some principle to the feature changes apart from a simple need to realize it as a different surface segment. Such a decomposition is ultimately required by the nature of gradual operations in HS. It thus becomes necessary to examine the nature of the input itself. Since the specified place features of underlying /t d/ cause trouble for the derivation, it is reasonable to consider whether the CORONAL node may in fact be underspecified, as is held for many languages (Cummings et al 2017). Similarly, since there is difficult competition between [r] and [j] as the final output on account of [consonantal], [consonantal] or some other ROOT node feature, may not be specified in Chilean Spanish.

This leads neatly into the examination of the implications of step-specific faithfulness in HS in the context of underspecification. When a segment is primarily defined by its featural structure, operations must refer to components of that structure, with whole-segment effects arising from these individual changes made on a smaller scale. Considering the nature of HS faithfulness, in which constraints refer to the input at the present step rather than the UR itself, it becomes apparent that researchers must be closely concerned with what exactly they are choosing as the input. If operations really target components of the segmental structure, then what underlying structure exists must be known. Furthermore, in HS each step is treated as a 'fresh start', without reference to earlier steps. The structure must be known at each step, so that possible operations can be determined and ruled out.

Influences on Mutation in Irish Toponyms: A Corpus Analysis

Pamela Sugrue
pamelasugrue@uchicago.edu

Introduction. *Initial mutation* is a morphophonological process of Celtic languages where certain word-initial consonants systematically change in the presence of a trigger (1).

(1) [**k**arənə] ⟶ [i **g**arənə]
'cars' ⟶ 'in cars'

Though most grammars treat the process as always-or-never, in practice speakers may apply mutation sporadically, despite the presence of a trigger. This paper argues for the treatment of initial mutation as a variable process in Irish and presents new evidence that its application is governed non-randomly, conditioned by factors including the status of the mutable word as a Gaelic word or a foreign word and the identity of the radical (underlying) consonant.

Background. We investigate one mutation process in Irish, *eclipsis* (1); it is the morphophonological process by which word-initial voiceless stops and f become voiced, and voiced stops become homorganic nasals. Following Sleeper (2020) on Welsh, we restrict our analysis to a single mutation trigger and a single mutation target: the trigger here is the two exponents of the preposition meaning 'in,' and the target is any toponym. Among the factors which have been hypothesized to influence initial mutations in Celtic are: lexical frequency (Hammond et al. 2020), radical consonant (Sleeper 2020; Welby et al. 2017), speech register (e.g. Prys 2016; O Broin 2014; Ball 1985), and speaker dialect (Hickey 2011). In the specific context of place names, the Official Standard Grammar of Irish prescribes that the status of a toponym as gaelicized or foreign should dictate whether it undergoes mutation (An Caighdéan Oifigiúil).

Methods. We selected corpora of Irish print media and Irish tweets and isolated all instances of *i* or *in* followed by a place name (Nua-Chorpas na hEireann; Scannell, p.c.). A total of 6,213 tokens were included in the analysis, tagged for register (Twitter, Print); radical consonant (p, f, t, k, b, d, g); speaker dialect (Connacht, Munster, Ulster); lexical frequency (High, Low); language of toponym (Gaelicized, NonGaelicized); location of reference (Ireland, Outside); trigger (i, in); and finally, whether the toponym was realized in its radical or eclipsed form. We follow Sleeper (2020) in performing conditional inference and random forest analyses on Realization as a function of all other factors.

Results and Conclusions. The statistical tests show that the best predictors of mutation in this case are the trigger morpheme, the location of the toponym, and the language of the toponym. These findings accord with the prescriptive norms outlined in An Caighdéan Oifigiúil, but taken as a whole the model rejects the notion that prescriptive forces alone systematically contribute to mutation. Our findings provide evidence that additional factors, including the identity of the radical consonant and the dialect of the speaker, underlie the variability observed in the mutation process. Notably, we find only slight effects of register and lexical frequency— the relative low importance of these variables compared with others in the model qualifies, but does not contradict, theoretical claims about their import (e.g. Hammond et al. 2020, Ball 1985). In demonstrating that our Irish mutation is multi-variate and systematized beyond traditional descriptions, this work bears on ongoing debates in Celtic linguistics about whether such morphophonological variation signifies the decline of linguistic adeptness by many speakers of Irish (e.g. Dillon 1973, Stockman 1988, McGahan 2009) or the inadequacy of many prescriptive grammars (see Welby et al. 2017).

VOT for plosives in Balochi: Implications for learners of English in Balochistan

Nasir A. Syed (nasirabbassla@gmail.com)
Shah Bibi (sb.niaz@yahoo.com)

Influence of an already acquired language, L1 or L2, on acquisition of a new language (L3/Ln) is a widely discussed topic. On the basis of empirical studies, a group of researchers have reached the conclusion that L2 has stronger influence on L3 acquisition [1-5]. Their view-point is called 'L2 Status Factor' (L2SF). Contrary to this, some studies found that both L2 and L1 contribute in L3 acquisition cumulatively [6]. This is called 'Cumulative Enhancement Model' or CEM. Typological Primacy Model (TPM), on the other hand, claims that among the already acquired languages, the structurally and typologically similar language transfers more properties to L3 or Ln [7-9]. The current paper contributes in this debate by presenting data collected from learners of English in Balochistan. At the time of experiment, they were learning a property of British English (BrE) (i.e. aspiration contrast) after having acquired Pakistani English (PakE) as adult L2 learners. Thus, Balochi was their L1, PakE L2 and BrE L3 in this study. PakE (Rahman, 2020) and Western Balochi have only unaspirated plosoives while Eastern Balochi has only aspirated stops (Jahani, 2019). It was hypothesized that if the influence of only L2 is dominant, both groups of learners will feel facilitated in learning unaspirated stops but they may face difficulty in learning aspirated stops of English. In that case, the predictions of L2SF will hold. And if structural proximity between the target language and the already acquired languages facilitative effect on these learners, Eastern Balochi speakers will be more facilitated in acquisition of aspirated stops by positive transfer from the L1 and Western Balochi speakers will face difficulty in acquisition of aspirated stops; and both will acquire unaspirated stops without any difficulty because of facilitative effect of the PakE (L2). Similarly, if the predictions of CEM are more valid, both L1 and L2 will have facilitative effect in that Eastern Balochi speakers will be facilitated by their L1 in production of aspirated stops and by the L2 in production of unaspirated stops, whereas, Western Balochi speakers will face difficulty in production of aspirated stops since they do not have any facilitative transfer for this feature from the previously learnt languages.

To test these conflicting predictions, we recorded productions of British English (BrE) plosives by two groups of learners. One group comprised of twenty native speakers of Eastern Balochi and the other comprised of twenty native speakers of Western Balochi. These learners had already acquired Pakistan English (L2). After one year of learning BrE, productions of English plosives by these learners were analyzed acoustically. Their teachers' (N=20) productions were also recorded to confirm whether the input they were now receiving also maintains aspiration contrast in plosives (as in BrE). The results show that even those learners whose L1 (Eastern Balochi) has aspirated stops were better able to produce unaspirated stops of BrE. Both groups experienced difficulty in acquisition of aspirated stops of English. Thus, the results support viewpoint of the L2 Status Factor that L2 has stronger effect on L3. Previous studies have mostly tested these predictions in the field of syntax and morphology. Very few studies have tested these predictions in phonology. The current study fills this gap in the literature.

Getting stronger or weaker at every stratum: A new approach to tonal morphophonology

Jochen Trommer & Eva Zimmermann (Leipzig University)
jtrommer@uni-leipzig.de & Eva.Zimmermann@uni-leipzig.de

Main Claim: The novel Harmonic Layer Theory (=HLT) where tones can predictably gain or loose activity at every stratum provides a unified explanation for strata straddling and inter-stratal conspiracies; two persistent problems in the research on tonal morphophonology.

Tonal morphophonology as a challenge Instances of (A) *inter-stratal conspiracies* (Myers, 1991, 1997) where the same process happens in a language at different strata under slightly different conditions seemingly require related cophonologies and hence challenge the assumption of a single phonological grammar for a language. In Shona, for example, OCP-violations are avoided by fusion inside of words but by deletion of the second tone ('Meeussen's Rule') in phrases (Myers, 1997). And probably the main problem tonal phonology poses for cyclic approaches is (B) *strata straddling* where representations made opaque by processes of earlier cycles or predicted to be inaccessible by Bracket Erasure still play a role at later strata (Hyman, 1993). In Luganda, for example, an earlier word-level process neutralizes specific H-tones and underlying L-tones, but later (phrasal) spreading processes treat underlying and derived L-tones differently (Hyman, 1993; Hyman and Katamba, 1993).

Harmonic Layer Theory combines the assumption of Gradient Symbolic Representations (Smolensky and Goldrick, 2016; Rosen, 2016) with a stratal model where tone activity can incrementally decay or become stronger at every stratum. This predicts attested instances of inter-stratal conspiracies and strata straddling from a single ranking throughout all strata. The (A) *inter-stratal conspiracy* in Shona, for example, follows if the interaction of constraints against any tonal activity (e.g. gradient $*\Sigma_{\mathrm{H}}$ penalizing any H-tone activity) with faithfulness constraints demanding preservation of of tonal activity (e.g. $|\Delta\mathcal{S}| \leq \mathrm{X}$ penalizing tonal activity changes beyond amount X) will ensure that all H-tones decay by a fixed amount (=0.25) at every stratum. Tableaux (1+2) show that this predictable activity difference in the inputs to the word and phrase level results in different OCP-repairs while maintaining the same constraint weighting. Whereas fusion under violation of INTEGRITY becomes optimal at the word level (1-b), deletion of the now weaker tone becomes optimal at the phrase level (2-a). This follows since INTEGRITY is (following Smolensky and Goldrick (2016)) categorically violated whereas MAX is violated gradiently depending on the activity of the tone.

(1) Word Level: Tone Fusion

$\mathrm{H}_{1.0}\ \mathrm{H}_{1.0}$	OCP 100	MAX 11	UNIF 10	$\mathcal{H}$
a. $\mathrm{H}_{0.75}$		-1.0		-11
☞ b. $(\mathrm{H}_{0.75}\ \mathrm{H}_{0.75})$			-1.0	-10
c. $\mathrm{H}_{0.75}\ \mathrm{H}_{0.75}$	-1.0			-100

(2) Phrase Level: Tone Deletion

$\mathrm{H}_{0.75}\ \mathrm{H}_{0.75}$	OCP 100	MAX 11	UNIF 10	$\mathcal{H}$
☞ a. $\mathrm{H}_{0.5}$		-0.75		-8.25
b. $(\mathrm{H}_{0.5}\ \mathrm{H}_{0.5})$			-1.0	-10
c. $\mathrm{H}_{0.5}\ \mathrm{H}_{0.5}$	-1.0			-100

(B) *Strata straddling* in Luganda, on the other hand, can straightforwardly be captured in HLT if the neutralization process is incomplete and thus gradient at the word level. Changing H into L at the word level hence results in a (relatively) weak L-tone that is still different from an underlying (fully active) L-tone. Neutralization only achieves categorial status at the phrase level so that phrasal faithfulness constraints might still react differently to the two types of L-tones although the difference is obliterated in the output.

Discussion The incremental decay or gain of activity in HLT excludes various imaginable but empirically unattested strata straddling or inter-stratal conspiracy patterns. Monotonicty of activity change, for example, excludes ABA markedness resolution patterns across strata (e.g. H-tone deletion at stratum 1 and 3, but fusion at stratum 2).

GENDER-CONDITIONED PROSODY IN ENGLISH PET NAMES: A STUDY OF NIGERIAN TERTIARY INSTITUTIONS

Ememobong Udoh (ememobongudoh@uniuyo.edu.ng)
Department of Linguistics and Nigerian Languages
University of Uyo, NIGERIA

&

Nkereke Essien (nkerekemfon@yahoo.com)
Department of English
University of Uyo, NIGERIA

Abstract

Pet naming is a unisex practice, fashionably intended to perform the functions of acquaintance, endearment, casualness, and even ridicule between a user and the named, who may be family, friends, mates, colleagues, *et cetera*. Pet names may be truncations or lengthened modifications of a person's real name, depending on the bearer's gender; or just intimate or sarcastic names not related to one's given name. This work examines pet names of the former category as used by students of tertiary institutions in Nigeria. Here, we explore the paradigm in the prosodic structure of English-based real-name-derived pet names with specific attention to differences in gender. Data for the study were gathered from Nigerian university and polytechnic students in the six geo-political zones that make up the country (four universities in the South-south, North-central, North-west and North-east and two polytechnics in the South-east and South-west). Thirty students were randomly selected from each of the six institutions, and ten pet names derived from given English personal names were elicited from each of these one hundred and eighty students. Findings show that the pet names used by the students are mostly unary and binary footed, with very few ternary-footed cases. The unary-footed pet names are mainly bi- or tri-moraic, while all categories of binary footed names have the heavy-light and light-light trochees. For instance, the di-syllabic female names 'Mary' /mɛə.ri/ and 'Maurine' /mɒ.rin/ respectively have the pet names /mɔ:mɔ:/ and /me:me:/ with a rising intonation on each of the two syllables. The poly-syllabic name 'Cecilia' /se.si.li.ə/ takes as a pet name, /si:si:/ with a high intonation on the first syllable and a rising intonation on the second syllable; or /se.si/ with a high intonation on the first, and a low intonation on the second syllable. In a similar manner, "Victoria' /vik.tɔ.ri.ə/ is pet named [vi.ki], also with a high intonation on the first, and a low intonation on the second syllable. One commonality in all of this is that, irrespective of the syllable make-up of the personal name, the derived pet names are constantly disyllabic with either a heavy-heavy or light-light foot; implying that none of them bears less than two moras. The male name 'John' /ʤɔn/ becomes /ʤɔ.nee/ (with a low intonation on the first, and a falling intonation on the second syllable) as pet name; while 'Victor' is pet named /vi:k/ (falling intonation) or /vi.ko:/ (low intonation on the first, and falling on the second syllable). Again, none of the male-related pet names is less than two moras, but they distinctly have a falling intonation pattern as against the rising pattern for female-related pet names. In addition, the female-related pet names tend to be pronounced in softer tones. Since this is an on-going work, we are, among other things, still working on possible socio-phonetic and phonological explanations for these exceptionalities in their trochaic make-up. The implication of the study is that similarities or differences in the foot structure and intonation patterns of the pet names are along the lines of gender of the bearers from which these pet names are derived.

The Typology of the distribution of a Feature: Occlusion and Bipositionality

Shanti Ulfsbjorninn
University of Deusto

Aim: A Melody-to-Structure Licensing Constraint (MSLC) is used in Ulfsbjorninn & Lahrouchi (U&L) (2016) to correctly model two attested language types and it excludes a further type (with occlusion exclusively in singletons and not in bipositional structures). This is achieved without actually reducing occlusion to bipositionality (*contra* Jensen 1994; Kaye & Pöchtrager 2013), in fact the typology cannot be captured by such an approach. However, the typology in U&L looks more symmetrical than it is. One type relates to all obstruents (inc. hard-sonorants) |ʔ| (1b), and the other only to stops/affricates (headed |<u>ʔ</u>|) (2a). I will expand this typology. **Typology:** *Melody-to-Structure Licensing Constraints* (MSLCs) are a mechanism to express grammatical statements regulating the distributional co-occurrence of a given feature/melody (M) and a certain state of syllable structure (S). MSLCs are bidirectional, restricting M in relation to S *or* S in relation to M. This leads to different surface outcomes: (1b) Tamazight/(2a) Kingi Soninké.

(1)	a. Bottom up (M → S)	b. Top down (S → M)
S	C C	C C
M	|ʔ|	|ʔ|
Implication	**Soft-occlusion only in (P)-Gems**	**(P)-Gems must be (soft)-occlusive**
Example	*??*	*Kingi Soninké, Somali, Maranungku*

(2)	a. Bottom up (M → S)	b. Top down (S → M)
S	C C	C C
M	|<u>ʔ</u>|	|<u>ʔ</u>|
Implication	**Stops only in (P)-Gem**	**(P)-Gems must be stops**
Example	*Tamazight, Ontena Gadsup*	*??*

Tümbisa (Uto-Aztecan) fills the gap of (1a) (*caveat* word-initially). It has post-lexical spirantisation of stops, but also of hard-sonorant nasals (Dayley 1989): /n**ɨmɨ**/ [n**ɨ̃w̃ɨ̃**] ‘person’, /se**n**u/ [s**e̋j̋**ũ] ‘therefore’. Geminates, including (initial) inherent geminates, fail to lenite, as do nasals preceding stops. Nasal spreading shows these are not ^{N}Cs: /kim:akin:a/ [k**i̋m**:ãɣ̀ĩ̯:a̯] ‘to come here’, /ohpimb/ [óɸ**ĩmbɨ**] ‘mesquite tree’. In Tümbisa all occlusion, without exception, is only permitted bipositionally. Meanwhile, the gap (2b) is filled by Anejom^{w} (Blevins 2005) where only stops can be geminates. A number of typological predictions follow from the structures shown in (1-2). **Implications:** Blevins (2005) and Honeybone (2005) both contain separate and compelling motivations for the positive correlation of occlusion and bipositionality, however, what is especially interesting is that phonological UG allows this relationship to be phonologised as either bottom up or top down. This research encourages study of other feature distributions in terms of bidirectional MSLCs.

Phonology and Phonetics of L2 Telugu English

Veno Volenec (Concordia University, veno.volenec@concordia.ca)
Katerina Pisegna (McGill University, katerina.pisegna@mail.mcgill.ca)

Introduction. The few existing phonological and phonetic descriptions of Telugu English (TE) – a variety of English spoken as a second language in the Indian states Andhra Pradesh and Telangana – have been carried out in the context of a more general notion of Indian English (IE) (Babu 1976; Wiltshire 2005; Pandey 2015). IE displays great phonological variability due to the influence of many different native languages spoken in India (Sirsa & Redford 2013). Therefore, the properties of TE as distinct from other varieties of IE (e.g., Gujarati English) have largely remained unexplored. This study provides a selective phonological and phonetic description of the segmental structure of TE. We have only focused on areas that previous research identified as prominent issues in the study of IE: vowel inventory and production, representation and realization of liquids, word-final obstruent phenomena, and allophones of /w/ (Wiltshire 2006; Dinkar 2013; Fuchs 2016; Masoko 2017). To account for these aspects of TE, we have combined a generative approach to the study of an individual's linguistic competence with linguistic fieldwork as a means of collecting first-hand data (Vaux & Cooper 1999). Thus, a single native speaker of Telugu, whose second language is TE, participated in a series of elicitation sessions designed to obtain representative data in both isolated words and in connected speech. On the basis of these data, we have conducted a spectrographic analysis of TE vowels and a distributional analysis of TE consonants.

Results. *Figure 1* is a scatterplot of average F1 and F2 values for every vowel of TE. Color-coded circles represent acoustic spaces for particular vowels. In *Figure 2*, the TE vowels in red have been compared to the vowels of General American English (GAE; as described by Ladefoged & Johnson 2010: 193) in black. *Table 1* shows the contextually conditioned realizations of the four classes of consonants under examination.

Rhotics – free variation	*raspberry* [ræzbɛɻi]	*crashing* [kɻæʃɪŋ]
	rabbit [ɻæbɪt]	*crab* [kræb̚]
	grass [græs]	*breeze* [bris]
	gravity [gɻævɪɾi]	*arrow* [æro]
Realization of /l/	*oatmeal* [otmiˡ]	*shield* [ʃiˡlt]
	legal [ligəˡ]	*royal* [rɔiˡ]
	novel [nɑvɛˡ]	*hotel* [hoʈɛˡ]
Word-final obstruent devoicing	*trees* [ʈɻis]	*judge* [ʤəʧ]
	smooth [smuˌ]	*bathtub* [bæʈəb̚]
	hug [həkˌ]	*cobweb* [kɔbʊɛb̚]
	bathe [bẹˌ]	*gave* [gẹf]
Allophones of /w/	*wood* [wʊˌ]	*wave* [vẹʊ]
	water [wɔʈər]	*wheel* [ʊɪˌ]
	wall [wɑˌ]	*whale* [vẹˌ]
	award [əwɑrˌ]	*waffles* [væfʊˌs]
	flower [flæwə]	*highway* [haɪʊẹ]
	shower [ʃæwə]	*twinkle* [tʊĩ̞kəˡ]
	towel [ʈæwʊˡ]	*tweeting* [ʈʊiɪʈɪŋ]

Table 1

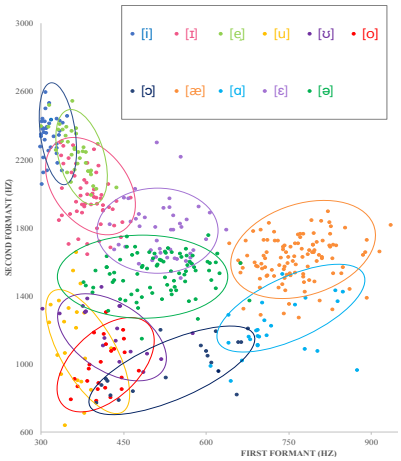


Figure 1

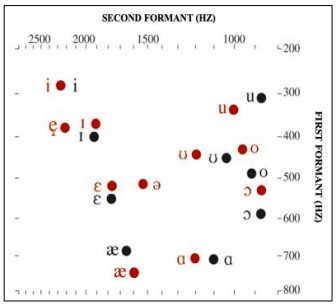


Figure 2

Discussion. This paper provides the first phonetic description of TE vowels in the vein of Hillenbrand et al. (1995) for GAE. We found that all vowels except [ɔ] and [i] are more central in TE than in GAE. /r/ was realized as either [ɾ] or [ɻ] without a specific pattern, and occasionally as [ʈ] in the intervocalic position. /l/ was realized as [l̩] only in word-final position and as [l] elsewhere. TE displayed word-final obstruent devoicing for all obstruents except /b/ which was consistently unreleased. /w/ was realized as [ʊ] before front vowels and as [w] elsewhere. While previous research that concentrated on the broad notion of Indian English recognized the issue of /w/-allophony, it has not provided a principle that governs the exact distribution of /w/'s allophones (Wiltshire 2005). By combining the generative framework with linguistic fieldwork, we have accounted for this long-standing puzzle with a single rule: /w/ → [ʊ] / __ [–CONS, –BACK].

An Element Theory-Harmonic Grammar account of glide insertion in Polish

Sławomir Zdziebko (Catholic University of Lublin, s.zdziebko86@gmail.com)

In Polish, the presence of /u/ or /i/ in the context of vowel hiatus often provokes glide insertion (see Zajda 1977, Sawicka 1995). Precisely, the presence of /i/ on any side of the hiatus may result in the presence of /j/ in between two vowels, including /u/ (cf. *Genu[j]i* 'Genoa, loc.', *mi[j]ukro[j]ić* 'cut for me'). /w/ may break up the vowel sequence if one of the flanking vowels is /u/, while the other is not /i/, (*domu[w]Ewy* 'Ewa's house, loc.', *za[w]uważyć* 'notice' but **tu[w]idzie* vs. *tu[j]idzie* 'is coming here').

The glide insertion in Polish hiatus is, therefore, a clear case of competition, where the repair which derives the most harmonic output in one form, e.g. spreading in *u[w]e*, gives rise to a suboptimal derivation in a minimally different environment, e.g. **u[w]i*.

The glide insertion is apparently conditioned by the presence of feature [+high] in the input vowel(s). The hiatus of mid and open vowels never triggers glide insertion. The spreading must, therefore, minimally involve features [+high] and [+/-round]. Unfortunately, such a minimal account predicts the possibility of glide insertion being triggered by the central high vowel *y* /ɨ/, which is normally assumed to be specified as [+high, +back, -round] and never triggers glide insertion (*przy[w]uczyć* 'teach' vs. **przy[j]uczyć*).

The paper argues that the absence of glide insertion triggered by the presence of *y* /ɨ/ is accounted for under the following assumptions (A1): vowel initial words begin in an empty consonantal (or C) position (Scheer 2004), (A2): in Polish /i/ is represented as element |I|-head, while vowel /ɨ/ is represented as |I|-operator (Gussmann 2007); (A3): the spreading of element |I| from /ɨ/ to form the glide /j/ involves the violation of constraints against the multiple linking of element |I| (*MULTLIPLE (I), Polgárdi 1998), against the spreading across prosodic domains (CRISP EDGE, Itô and Mester 1999) and against a single element being interpreted as an operator in one or more segments but as the head in one or more different segments (UNIFORMITY). Note that, the glide /j/ must contain element |I|-head as only segments containing |I|-head in Polish may be followed by vowel /i/ (but not by vowel /ɨ/). The sequence /ji/ is grammatical in Polish, while */jɨ/ is not. The violation of the three constraints outweigh the violation of the constraints against empty onsets and against vowel hiatus ((CV Phonology-specific versions of constraints ONSET and *VV). Thus the spreading of element |I| from the vowel *y* /ɨ/ at syllable/prefix/word boundary is impossible.

If the hiatus involves vowels /i/={I} and /u/={U}, the spreading to the right (as in *domu[w]Ewy* 'Ewa's house, loc.', *kuchni[j]Ewy* 'Ewa's kitchen, loc.') does not trigger the UNIFORMITY violation as /j/={I} and /w/={U}. The violation of *MULTIPLE |I/U| and CRISP EDGE is not enough to outweigh the violation of ONSET and *VV and glide insertion is typically attested.

In the case of the leftward spreading of elements |I|/|U| (as in *za[w]uważyć* 'notice' and *tu[j]idzie* 'is coming here'), the violation of ONSET and *VV outweigh the violation of constraints *ji/wu (Kawasaki 1982, Staroverov 2014) and ALTERNATION, which effectively prohibits spreading within a single morpheme (van Oostendorp 2007). Thus, the glide insertion by spreading of elements |I| and |U| leftward is typically attested. On the assumption that *MULTIPLE |U| carries a greater weight than *MULTIPLE |I|, the spreading of |I| is more harmonic in a situation in which vowels /i/ and /u/ form a hiatus.

Furthermore, since filling the empty C-position requires the spreading of the entire Place node from the neighbouring vowel, the spreading of the Place node from the mid and open vowels triggers the violation of a heavy-weighted constraint against the element |A| being multiply linked. The weight of this constraint, together with the weights of CRISP EDGE (in the case of rightward spreading across CV units) and ALTERNATION (for leftward spreading within a single CV), decides against the glide insertion/spreading in the environment of non-high vowels in Polish.

No Need for Syllables as the TBU: Typological and Empirical Evidence

Yuhong Zhu & Björn Köhnlein (OSU)
zhu.1447@osu.edu; koehnlein.3@osu.edu

The Issue. Based on an overview of existing literature as well as on new empirical evidence from Suzhou Chinese (Northern Wu), we argue that the syllable can be eliminated as the TBU. Our evidence comes from tone systems that have constraints against contour tones on syllables (and even feet) even though the TBU is (arguably) the mora. If constraints against contours on syllables in systems with moraic TBUs are needed anyway, it follows that languages that appear to have TBU=σ are in fact languages with TBU=μ and high-ranked NoContour (σ). While previous literature indicates that multiple NoContour constraints can be phonologically active at the same phonology or successfully model differences between lexical and post-lexical phonology, our Suzhou data show that they can also capture differences in tone association based on speech style.

Existing evidence. A considerable amount of literature has convincingly identified the need to include constraints against contours at domains other than the TBU in analyses of, e.g., different Franconian dialects (NoRise-σ, active phrase-medially; Gussenhoven 2004, Köhnlein 2011), Kera (NoContour-σ, NoContour-Ft, regulating tone association, Pearce 2006), Thai (high-ranked NoContour-σ in postlexical phonology, Morén & Zsiga 2006) or Kagoshima Japanese dialects (high-ranked NoContour-σ, Ito & Mester 2019); yet only Ito & Mester have explicitly suggested to accordingly eliminate the syllable as a TBU altogether (though see also Köhnlein 2010).

Additional evidence. We present our fieldwork data on the sandhi and citation tonal patterns of a complex lexical tone language, Suzhou Chinese (Northern Wu; Authors 2021). Word-initial contour tones (e.g. a /LH/ bimoraic tone = /LH/$_{\mu\mu}$) in the input typically delink and reassociate to second syllables to avoid within-syllable contours, although contours within syllables are allowed in certain cases. This is shown below (/T/: any lexical tone; [Ø]: toneless).

(1a). /LH/$_{\mu\mu}$ + /T/$_{\mu\mu}$: [L$_{\mu\mu}$.H$_{\mu\mu}$] e.g. [mã:.nɪn], *blind people*

(1b). /HL/$_{\mu\mu}$ + /T/$_{\mu\mu}$: [H$_{\mu}$L$_{\mu}$.Ø$_{\mu\mu}$] e.g. [sɨ:.nɪn], *dead people*

(1a) shows tonal redistribution while (1b) demonstrates that it is possible to preserve a contour within a syllable, which we attribute to the tones being prelinked in /HL/$_{\mu\mu}$ (Max-Link >> NoContour (σ); Morén 2001). However, no sandhi form ever allows a contour on one *mora*:

(2a). /LH/$_{\mu}$ + /T/$_{\mu}$: [L$_{\mu}$.H$_{\mu}$]/*[LH$_{\mu}$.Ø$_{\mu}$] e.g. [ba.sə], *white flea*

(2b). /LHL/$_{\mu\mu}$ + /T/$_{\mu\mu}$: [L$_{\mu}$H$_{\mu}$.L$_{\mu\mu}$]/*[LHL$_{\mu\mu}$.Ø$_{\mu\mu}$], e.g. [ŋæ:.tɛɪn], *glasses* (a lexically marginal but robust pattern)

Crucially, both of these contour tones surface faithfully in isolation (i.e. *citation tone*, a speech register specifically for pronouncing monosyllables in isolation):

(3a). /LH/$_{\mu}$ (citation): [LH$_{\mu}$], e.g. [ba], *white*

(3b). /LHL/$_{\mu\mu}$ (citation): [LHL$_{\mu\mu}$], e.g. [ŋæ:], *eye*

An alternating TBU analysis does not offer any insight into the distributional difference between sandhi and citation tones: A general NoContour (TBU) constraint does not capture both the dispreference for syllabic tone sandhi contours in (1a) and the ban on moraic contours in (2), no matter which prosodic unit one selects as the TBU; moreover, NoContour is simply inactive in (3), making the choice of TBU indeterminate. Yet if we assume two domains of NoContour and the mora as the TBU, the alternation between sandhi and citation tones can be captured by a simple constraint reranking based on speech style (more formal = more faithful, van Oostendorp 1998):

(4a). Sandhi (less formal): NoContour (μ), Max-T >> Max-Link >> NoContour (σ)

(4b). Citation (more formal): (Max-Link,) Max-T >> NoContour (μ), NoContour (σ)

In sandhi forms, contours within a syllable are dispreferred but allowed if tones are pre-linked; contour tones on a mora, however, are always forced to displace (violating Max-Link) but are not deleted (obeying Max-T). In citation forms, contours within both a mora and a syllable are allowed, being maximally faithful to the input.