BOOK OF ABSTRACTS

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JOHN PAUL II
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Contents

Keynote Speakers

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Explaining clusters using NAD and morphonotactics

This talk presents an overview of the development of a model of phonotactic grammar in which wellformedness of consonant clusters is measured by NAD. NAD stands for a Net Auditory Distance obtaining between segments in a cluster. The auditory distance is a net reflection of the differences between segments in terms of manner (MOA) and place of articulation (POA). It is calculated according to the Principle which states that a cluster is preferred if it satisfies a pattern of distances specified by the universal phonotactic preference relevant for its position in a word. Every position of a cluster in a word, i.e. initial, medial and final, is defined by a respective well-formedness ("goodness of cluster") preference. The NAD Principle makes finer predictions than the sonority sequencing generalization (SSG). For example, it predicts that initial **pr**- is "better" (more preferred) than **tr**-, and they are both better than **ps**- or **rt**-, while the latter two are of comparable value.

However, phonology alone does not fully account for clusters. Inflection, word-formation and compounding contribute to the creation of consonant clusters to an extent relative to a morphological type of a language. Therefore, a phonotactic grammar operates on basic, non-derived, lexical forms, while morphonotactics takes care of the remaining, morphologically complex, forms. Interaction between phonotactics and morphonotactics provides a richer insight into the understanding of cluster complexity.

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Understanding speech from its not fully fledged forms

Everyday speech is not always fully fledged. It may be in the process of acquisition, lack acoustic cues and/or be performed in a noisy environment. In this presentation I will focus on two types of speech, namely (i) children's speech, including their production and perception in the acquisition process, and (ii) adult speech deprived of fundamental frequency, i.e. whispered speech. Based on experimental results I will point to some mechanisms underlying "distorted" speech and their impact on understanding of fully developed speech, especially in terms of trade-off relations within the speech mode itself as well as between speech and gestures.

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Fine tuning phonotactics

The availability of consonant clusters, typologically, historically, synchronically, has attracted much attention in phonological theory. Explanations for the absence of certain clusters abound. Many involve representations, using principles and parameters that make certain clusters illicit (eg Government Phonology and its forks), others discuss the difficulty of perceiving or distinguishing some clusters (or single consonants) in some environments (eg Steriade inter alii). We show that consonant cluster types can be arranged in accessibility hierarchies. These scales follow from the acoustic complexity (encoded by the number of elements in the cluster in Element Theory, for example) and the perceptibility of the clusters.

The plosive-final cluster types can be arranged in the following implicational scale:

TT > NT < RT < ST < PT < MT
(where '>' = implies, '<' = is implied by, TT = geminate, NT = homorganic nasal+plosive cluster, R = liquid, S = fricative, PT = heterorganic plosive cluster, MT = heterorganic nasal+plosive cluster).

Languages select a contiguous interval of these scales. We predict that the further up a cluster type is on a given scale, the less available it is, ie the ratio of available and existing clusters of the given types decreases. (Interestingly, in the case of plosivefinal clusters, geminates are more "marked" than homorganic nasal-plosive clusters typologically, although representationally they are less complex.) We expect more or as many of the possible homorganic nasal+plosive clusters to be available than of the possible liquid+plosive clusters, and more or as many of the latter than of the possible fricative+plosive clusters, etc. The state that some clusters are very common in a language and the state that others are never found are just the two extremes of a gradually changing scale. Grammars often establish arbitrary cutoff points announcing rare clusters to be nonexistent.

The accessibility of clusters is also sensitive to the context they occur in: most of them are expected to be accessible before a vowel, less before more sonorous consonants, and even less word finally and before obstruents. This graduality of accessibily is also observable in the environment preceding the clusters. We will show some accessibility statistics to support these claims.

The aim of this enterprise is to reduce the number of phonological devices necessary for an explanation of observable phonological phenomena. More specifically, we argue that we do not need to posit syllabic constituents of any kind to explain phonotactic constraints, in fact, syllabic constituency cannot be detailed enough to get the fine distinctions found in the accessibility of consonant clusters.

Session Papers

Sultan Melfi Aldaihani

Assimilation in Harmonic Serialism (HS-OT)

This study is considered the first attempt to test the capabilities of the Harmonic Serialism Optimality Theory (henceforth, HS-OT) (McCarthy, 2000) investigating manner, and voice assimilations in Kuwait Arabic (KA).

Following McCarthy (2008, 2010), I have treated manner assimilation from the HS-OT perspective by introducing the intermediate candidate /D/ and constraints HAVEOBSTRUENT /LATERAL/CONTINUANT/NASAL and MAX-IO[NASAL]/[LAT]; I have also treated VOICE assimilation with the framework of HS-OT by establishing an intermediate candidate /V̥/ and constraints HAVEVOICE and MAX-IO[VOICE] (see Aldaihani, 2014). The HS-OT's GEN divides VOICE assimilation into two derivational steps by delinking the [+voice] or [-voice] feature of the target /θ/ or /ð/ and then copying the [-voice] or [+voice] feature of the trigger /θ/ or /ð/, respectively. i.e. (/θ/→/V̥/→/ð/ or /ð/→/V̥/→/θ/).

The harmonic steps will gradually change feature by feature at each step until there is no further harmonic improvement. The coronal triggers (/t, d, tˤ, θ, ð, ðˤ, s ,sˤ, ʃ, z, n, r/) of /ʔil-/assimilation in KA shows that laterality is the only feature distinguishing the target /l-/ from the coronal triggers. The lateral /l-/ not only has a single feature to undergo assimilation but also has many features which need to be gradually improved. Therefore, the single step of the parallel OT should be divided into multiple steps of harmonic serialism. The /l-/ is a sonorant and lateral whilst the triggers are either sonorants or obstruents. For instance, the sonorant triggers can be nasal /n/ or continuant /r/ whereas the obstruent triggers can be [–sonorant] (/t, d, tˤ/), continuant (/θ, ð, ðˤ, s ,sˤ, ʃ, z/), anterior (/t, d, tˤ, θ, ð, ðˤ),-distributed (/s ,sˤ, z/), voice, or emphatic [+RTR] (/tˤ, ðˤ,sˤ/). Then HS patterns show that the next derivational step of the coronal triggers of /ʔil-/ assimilation are divided into coronal sonorants (/n/ or /r/) or the coronal obstruents (/t, d, tˤ, θ, ð, ð, s, sˤ, ʃ, z/). In addition, the coronal obstruent triggers [t], [d], [tˤ], [θ], [ð], [ðˤ], [s], [sˤ], [ʃ], and [z], causing the assimilation of the prefix [ʔit-]. The manner /n/ assimilation of KA has also a gradual harmonic improvement of /n/ → /D/ → [l] and /n/ →/D/→ [r].

The symbol /D/, the best intermediate candidate, represents the lateral /l-/, the obstruent /t-/, and the nasal /n/ which makes the difference between features of the underlying form and surface form as close as possible because the /D/ has the same features of /d/ except it is a sonorant. HS-OT was applied to assimilations in KA; fixed constraint rankings were established in accordance with HS-gradual improvements of the input for each type of assimilation and the interaction of all types of assimilations. i.e. /ʔil-sajja:rah/ → [ʔis.saj.ja:.rah] "*the car*".

/l/ →	/**D**/ →	/d/ →	/ð/ →	/z/ →	/**V̥**/ →	/s/
[+~~late~~ral]	[-lateral]	[-sonorant]	[+continuant]	[-distributed]	[~~voi~~ce]	[-voice]
[+sonorant]	[+so~~no~~rant]	[-con~~tin~~uant]	[+dist~~rib~~uted]	[+~~voi~~ce]		
[+voice]	[+voice]	[+voice]	[+voice]			

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Bedar Amazigh and Lucie Quellec

l-alternations in Berber Kabyle

Our aim is to analyze the status of /l/ in standard Kabyle (StK) (Afroasiatic, Algeria) and the varieties of Ouadhia (OuK) and Chemini (ChK)[1]. In these varieties, /l/ is subject to lenition as shown in (1). We analyse these data in Element Theory (Harris 1990, Kaye, Lowenstamm & Vergnaud 1985, 1990) and propose that lenition results from three factors: i) the bipositional nature of /l/, ii) its subsegmental content and iii) its relationship with adjacent segments. Additionally, our approach leads to a reevaluation of the content of coronals.

As shown in (1), in the contexts where [l] appears in StK, this consonant is realized as [l]/[j] in OuK and [l]/[ɹ] in ChK. We take these alternations to indicate that StK /l/ contains |I| and |A| (Backley 2011), while OuK /l/ contains |I| and ChK /l/ contains |A|. However, this is not sufficient to account for all forms. Indeed, lenition does not obtain i) before a coronal stop /t, d/ (1b), or ii) if it is geminated (1c). Note that lenition takes place i) before any other coronal (1d) and ii) after any segment, including /t, d/ (1e).

(1)	StK	OuK	ChK	Gloss
a. VLV	[a**l**i]	[a**j**i]	[a**ɹ**i]	"climb.aorist"
b. LC[t/d]V	[**l**təf]	[**l**təf]	[**l**təf]	"massage.aorist"
c. CLV/CVLLV	[ð**l**u]/[ðə**ll**u]	[ð**j**u]/[ðə**ll**u]	[ð**ɹ**u]/[ðə**ll**u]	"visit.aorist/intensive"
d. LC¬[t/d]V	[i**ls**aw-ən]	[i**js**aw-ən]	[i**ɹs**aw-ən]	"tongue-plural"
e. CLV	[s**l**a-n]	[s**j**a-n]	[s**ɹ**a-n]	"hear-3mp.preterite"

We propose that the behaviour of /l/ in Ouk and ChK can be explained as follows:

i. in addition to |I| and |A|, /l/ contains |ʔ|
ii. in order to surface as such, /l/ must
    a) be associated to two consonant positions
    b) branch to its right (Lowenstamm 1996, Bendjaballah 2017).

If the conditions in ii) are not met (1a,d,e), part of the structure (more specifically |ʔ|) is lost and the segment surfaces as [j] (OuK) or [ɹ] (ChK). In geminates (1c), /l/ has access to two C-positions, and surfaces as [l]. Finally, /t, d/ have no melody element (Scheer 1998). This explains why /l/ is not lenited before these segments (1b): the consonant following /l/ has no melodic content and /l/ spreads to its right. The presence of melodic content in the consonant following /l/, e.g. /s/, blocks propagation and [j]/[ɹ] surface (1d). We conclude that in OuK and ChK, unlike other coronals, /t,d/ do not have melodic content.

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[1] Our data stems from original fieldwork with Kabyle native speakers in Algeria.

Andreas Baumann and Kamil Kaźmierski

Contributions of articulatory contrast to the quality of consonant sequences: a meta study

The segments forming non-geminate consonantal sequences differ as to their manner and place of articulation (MoA/PoA). There are various phonotactic hypotheses concerning the effects that articulatory contrast has on the well-formedness or quality of consonant sequences. These include the Sonority Sequencing Principle and the Obligatory Contour Principle, which assert that consonant sequences benefit from contrast in MoA and PoA, respectively (Clements 1990; Guy & Boberg 1997). Other approaches to phonotactics seek to provide a more holistic picture of articulatory contrast (most prominently Net Auditory Distance; Dziubalska-Kołaczyk 2014).

While the concept of well-formedness is intuitively clear, it is often not so evident how it should be quantified. In this meta study, we compare a number of different quantitative operationalizations of phonotactic well-formedness. To do so, we focus on consonant diphones in English. We quantify differences between the respective MoA/PoA of their constituents, and investigate eleven different measures that are associated with -- and could be thought of as consequences of -- phonotactic well-formedness: production frequency (tokens/types); production diversity; production accuracy (adults/children); perception accuracy; familiarity; affective valence; reaction speed in naming experiments; diachronic growth rate; and acquisition rate. Data are taken from a variety of extant studies and databases (Coltheart 1981; Bernhardt 1990; Balota et al. 2007; Pitt et al. 2007; Warriner et al. 2013; Kaźmierski & Baumann 2017; Baumann & Ritt 2018).

In a thorough statistical analysis involving generalized additive modeling and hierarchical clustering techniques, we identify which measures of phonotactic well-formedness are affected similarly by articulatory contrast (both in terms of MoA and PoA).

Our study yields multiple insights. First, we demonstrate that the respective roles of differences in manner and place of articulation on well-formedness are by no means uniform across the datasets. We do not find tendencies for monotone relationships between well-formedness and distance (such as 'large distances are beneficial'), or uniform behavior of articulatory differences across the investigated measures (for example, high difference in MoA is beneficial to perception accuracy but not to diachronic growth). Second, we show that the measures of well-formedness in our study can be divided into three different groups, each of which features similarly behaving operationalizations (see Figure 1). We conclude that the concept of phonotactic well-formedness highly depends on the specific field of research one is focusing on.

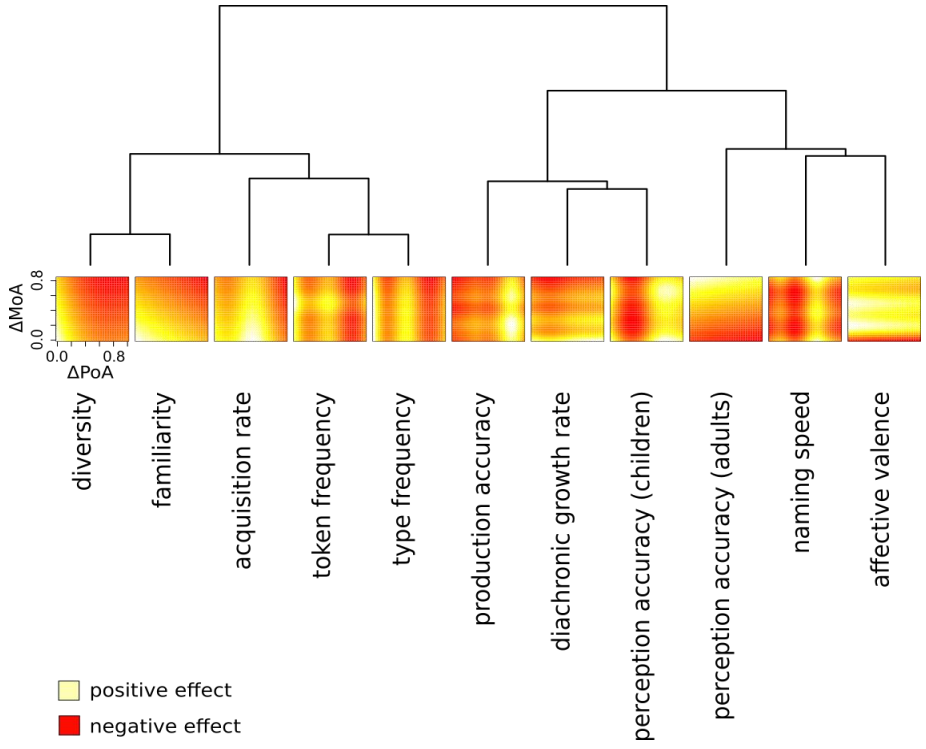

Figure 1. **Hierarchical clustering of well-formedness heatmaps** (GAMs depending on difference in PoA and MoA).

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Karolina Broś

Unnatural patterns and the learnability of incipient language change

Spanish is known to be a language with substantial dialectal variation, most of which concerns consonant weakening. Typically, syllable- and word-final segments lenite by devoicing, spirantisation, debuccalisation and, often, deletion (Hualde 2011). Consonant elision abides by the Spanish syllable structure rules, according to which complex margins are avoided, onsets are preferred over codas (Harris 1983), and onsetless syllables are 'repaired' by resyllabification. As for complex codas, they are very restricted and do not occur or are simplified word-finally.

In this paper, we analyse a curious example of incipient language change which is taking place in insular Spanish. Interestingly, while word-final consonant deletion is well-extended in this dialect, it is optionally accompanied by vowel apocope. In our analysis of spontaneous speech we observe a tendency to delete both the final consonant and the preceding vowel of a given word phrase-finally. For instance, the word *pasos* 'steps' is reduced to [pás] with a lengthened [s]. Quite surprisingly, apocope can lead to the creation of a final complex margin, as in *ofertas* 'offers' > [ofért] with a strong plosion on the [t] or *metros* 'metres' > [métr]. The change seems to be driven by ongoing generalised lenition and by the simultaneous compensation for this process: in each case, unstressed post-tonic vowels are removed, and the loss of the whole final syllable tends to be compensated by strengthening the final segment.

In OT terms, the observed changes can be modelled with constraints on codas and on unstressed (final) vowels. However, note that only the underlying word-final coda is removed, whereas the coda created by apocope is strengthened rather than weakened, hence the relevant faithfulness constraints cannot be repeatedly violated. Furthermore, given the marked outputs of weakening – a process which normally leads to the simplification of phonological structures – the data cause several problems for formal analysis. We discuss different options: Harmonic Serialism, Stratal OT and Harmonic Grammar. Only the latter framework is able to account for the changes. However, after submitting the data to the GLA (Boersma & Hayes 2001), we conclude that the learnability of certain sound changes in progress is compromised. Nevertheless, since sound change is an intergenerational property of adult grammars and often a transition stage in apparent rather than real time, the very **need** to learn the resultant patterns is put into doubt.

Agnieszka Bryła-Cruz

The role of phonetics in listening comprehension – hesitation phenomena under investigation

Until recently focus on how learners use contextual cues (knowledge of the topic, the speaker, the world, the text itself) in L2 listening was far greater than research into how they handle the speech signal itself. Yet, owing to their insufficient command of the language, L2 listeners usually make less accurate linguistic predictions in their reconstruction effort and rely on the acoustic signal to a greater extent than native listeners. One of the usually neglected problems is that materials for developing listening skills used in the classroom are predominantly (if not exclusively) scripted (written down and then read out) and do not reflect spontaneously occurring speech. They also lack features of unplanned spoken texts such as false starts, redundancies, filled and unfilled pauses, repetitions and fillers. Negligible exposure to authentic speech results in learners' difficulty to process spoken language in real life.

The extent to which hesitation phenomena (hence HP) influence L2 users' comprehension is worth investigating and, to the best of our knowledge, has not been examined in the Polish context. Moreover, the studies conducted so far report conflicting views on HP as a both hindering (Voss, 1979; Griffiths, 1991) and facilitative (Vandergrift & Goh, 2012) factor in non-native listeners' comprehension.

The paper reports on the results of the experiment in which the proper decoding of HP is checked by means of dictation. The main aim of the study is to investigate the controversial role of HP in listening comprehension. 58 advanced Polish learners are asked to transcribe as accurately as possible an extract of spontaneous and authentic discourse in English (321 words) with naturally occurring HP. The text is divided into smaller units allowing the listeners sufficient time to write down what they hear without overburdening their memory. The comparison between the input and the transcriptions will provide information about whether HP posed perceptual difficulty and gave rise to misinterpretations.

The listeners are predicted to adopt the following possible strategies:

1) they recognize and transcribe the HP correctly
2) they do not identify the HP correctly and attach semantic meaning to them
3) they recognize the HP and ignore them in their transcriptions, which shows their proper decoding of the speech signal as they do what competent users of language usually do, i.e. idealize the spoken message.

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FP1

Malgorzata Cavar and Steven M. Lulich

Phonetics explains phonotactics: the case of velar consonants followed by front vowels in Polish

Palatalization of velars in Polish (1) is a well-known process. The constraint on *kɨ sequences (2) is, however, less often discussed. Unlike palatalization, the constraint seems arbitrary. Interestingly, velar fricatives co-occur with [ɨ] without limitations (*chyba*, *wymach+y*). Further, *kɨ and *k+ɨ are not equally bad. [kɨ] sequences can occur morpheme-internally, though mainly in foreign vocabulary (*kynolog*). Further, *kɨ is by far better than a potential *cɨ or *çɨ (3). Then, palatalization of a stop by a mid vowel is not obligatory morpheme-internally but obligatory across a morpheme boundary (*maki+em* but *kelner*) (4), but for fricatives – the default is actually no palatalization (*wymach+em*).

These intricate, sometimes contradictory, effects involving frontness and height of vowels, place and manner of articulation of consonants and the morphological structure are not arbitrary. This becomes clear if we look at static phonotactics of consonant+vowel sequences rather than think in terms of phonological rules, and – if we step beyond the phonemic analysis and look at phonetics. Recent ultrasound studies prove that phonetically, [ɨ] is usually a centralized front vowel (also, e.g. Wierzchowska 1967) that differs from [i] in the position of the tongue root (Lulich et al. 2017). Thus, *kɨ shold be incompatible in the frontness of the tongue body. However, stem-internally, [ɨ] in [kɨ] is articulated differently from other contexts, namely, with an extremely long constriction extending into the back-vowel area and could be described as [-back] and [+back] (5). If both [c] and [ɨ] are front segments, the sequence should be fine. Yet, articulatory studies show that although [c] and [ɨ] share the position of the dorsum – the two sounds differ in the position of the tongue root rendering the sequence incompatible, with [c] articulated with an advanced tongue root, and [ɨ] – retracted. These requirements to strictly adjust the articulation of the two subsequent sounds, summarized in (6), are crucial if stops are involved – but not in case of fricatives, and if the vowel is high – but not mid, that is, when the raising of the tongue dorsum is more extreme for either element. We will present the results of the ultrasound analysis and a phonological interpretation of the phonetic facts in terms of Harmonic Serialism which allows for capturing the multiple gradual effects present in the Polish data.

k = {k, g}, c={c, ɟ}

(1)	*ki	*k+i	versus	ci	c+i	kino, mak+i
	*xi	*x+i	versus	çi	ç+i	Chiny, wymach+iw+a+ć
(2)	*ʔkɨ	*k+ɨ				kynolog
	xɨ	x+ɨ				chyba, wymach+y
(3)	*cɨ	*c+ ɨ				
	*çɨ	*ç+ɨ				
(4)	ke	*k+e	versus	ce	c+e	kelner, kiedy, maki+em
	xe	x+e	versus	çe	*ç+e	chemia, hiena, wymach+em

(5)

	[back]	[ATR]
[i]	-	+
[ɨ]	-(+)	-
[k]/[x]	+	-
[c]/[ç]	-	+

(6) Sequences Compatible? Yes or No

C\V	[i]		[ɨ]	
	Dorsum	Tongue Root	Dorsum	Tongue Root
[k/x]	no	no	no	yes
[c]/[ç]	yes	yes	yes	no

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Faith Chiu and Bronwen G. Evans

Acquiring and adjusting for a phonemic split: the FOOT/STRUT contrast for Northern British English speakers in London

British English accents in the North of England and the Midlands differ from Southern British English (SBE) accents in terms of their vowel inventory. Words like *took* and *tuck* are produced as /tʊk/ and /tʌk/ respectively, in southern varieties, but with a vowel that approximates /tʊk/ in both words in northern varieties (Wells, 1982). This paper examines the way in which British English speakers from the Midlands and North of England acquire and adjust for the SBE the FOOT/STRUT split.

Behavioural and electroencephalographic (EEG) data was collected from the two major participant groups, Northern British English participants (*n*=21) and SBE participants, (*n*=7), for the following tasks:

(1) a production task in which participants were recorded producing keywords;
(2) a 3-alternative forced choice discrimination task where participants identified deviant words drawn from synthesized vowel continua within the pairs *book-buck* (/ʊ/-/ʌ/), *back-buck* (/æ/-/ʌ/) and *back-book* (/æ/-/ʊ/);
(3) a vowel change detection task with EEG recording in Attend and Ignore conditions. Participants responded to changes from *back* to *book* or *buck* (/ʊ/ and /ʌ/) within a standard oddball paradigm.

All participants were university students who had moved to London for university from either the North of England or the Midlands ("Northern" group), or from the South of England ("Southern" group). Of the Northern group, 14 were tested within a month of their arrival in London (*unfamiliar* group). The remaining 7 northerners had been in London for about two years (*familiar* group).

To investigate potential change over time, we contrasted task performance from the *unfamiliar* Northern group against the *familiar*; data from both groups were also compared with the Southern group. There are differences in the way northerners (both *unfamiliar* and *familiar*) and southerners perceive the STRUT-FOOT vowel split. EEG results from the Southern group and the Northern *familiar* group indicate that although Northerners are able to acquire and detect vowel changes with a surprisingly high degree of accuracy under attention, they still differ from the Southern group in terms of their passive Event Related Potential (ERP) responses (in Ignore). Furthermore, lexical interference mediates discrimination ability in *familiar* Northerners even if this improved over time for the non-native STRUT vowel. These findings are in line with existing work that has shown that whilst northerners living in the south of England might change their production, such changes do not appear to be accompanied by changes in perceptual processing (Evans & Iverson, 2007).

Csaba Csides

English word-stress in strict CV

Empty categories have been around in linguistics for a long time already. In phonology empty nuclei or vocalic positions have been recognized in particular. Strict CV phonology has attempted to push these observations to their logical conclusion by promoting a strictly alternating CV skeleton, and as a result, some of the vocalic positions must be designated as empty while others as contentful, i.e., ones that have phonetic substance. It is even more intriguing that among the empty vocalic positions we find statically empty positions that are never realised phonetically, and also alternating empty vocalic positions that are realised depending on the phonological environment. Moreover, contentful vocalic positions can also be of different types: some of them are always stressed (strong) while others are always unstressed (weak). To complicate the picture, we also encounter contentful vocalic positions that are sometimes strong, sometimes weak depending on a lot of factors. Furthermore, strong vocalic positions can host different degrees of stress, and therefore they can also belong to different subgroups.

The aim of the proposed presentation is to seek a principled account for the distribution of different degrees of word-stress, the phenomenon of vowel reduction and syncope in English, perhaps by proposing a single algorithm that treats all vocalic positions deployed in the phonological skeleton by a unified algorithm. I will attempt to demonstrate that vowel-reduction and static/dynamic silence are but two different sides of the same coin, manifestations of *relative* and *absolute* silence in the phonological string. The structural force that seems to control the distribution of stresses and empty vocalic positions is government, which has two different manifestations: *proper government* and *metrical government*. Ideally the system should also make predictions about the distribution of different cluster types.

Contrary to mainstream assumptions, I wish to argue for bidirectional government in Phonology. Unidirectional theories have been promoted mainly in the phonological literature. For Scheer (2004) government is strictly right-to-left, while for Rowicka (1997) it is left-to-right. I will attempt to demonstrate in my presentation that government goes in both directions but in a principled manner, following a strict algorithm and also that the minimal CV-foot plays an important role in the assignment of stress to vocalic positions.

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Bartłomiej Czaplicki

Construction-specific phonology: Evidence from Polish vowel-zero alternations

The study of the interactions between phonology and morphology has established that phonological processes are often restricted to particular morphological constructions (Chomsky & Halle 1968, Kiparsky 1982, Inkelas 2014). The focus of this paper are cases in which construction-specific extrinsic considerations determine the phonological output, that is, when certain constructions show properties that do not derive from input morphemes but conform to an output shape defined on a construction-specific basis (Arabic verbs, McCarthy 1979; Hausa tone melody replacement, Newman 2000). In Polish nouns, final clusters of rising or equal sonority show two regular patterns: (i) e ~ zero alternations (*wiadr-o* 'bucket' – *wiader* gen.pl., *trumn-a* 'coffin' – *trumien* gen.pl.) and (ii) no vowel alternations (*wiatr-y* 'wind' nom.pl. – *wiatr* nom.sg., *pasm-o* 'streak' – *pasm* gen.pl.). However, in diminutives in *-(e)k* and double diminutives in *-ecz-(e)k-* this distinction is neutralized and the vowel *e* surfaces whether it is present in the base forms or not. The appearance of the vowel *e* in the diminutives in (1) does not follow from their input representations but from the extrinsic properties of the constructions.

(1)

e ~ zero in CC# in the base		*no vowel in CC# in the base*	
wiadr-o/ wiader	trumn-a / trumien	wiatr-y / wiatr	pasm-o / pasm
wiader-k-o	trumien-k-a	wiater-ek	pasem-k-o Dim1 pasem-ecz-k-o Dim2

Similar behavior is observed in diminutives of nouns in *-stw-*, adjectives in *-n-y* and nouns in *-nic*-a and *-nik* (Gussmann 2007).

This is taken as evidence for construction-specific schemas that are superimposed on the structures in the base (Booij & Audring 2017, Czaplicki 2019). For example, the schema representing the diminutive takes the form as in (2) and states that the diminutive requires the vowel *e* to separate a cluster of a given sonority profile.

(2) $<((...C_ieC_j)_x(ek, k)_y)_z \leftrightarrow [N_x\ Suffix_y]_z \leftrightarrow [\text{Smallness of } SEM_x]_z>$
The sonority of consonant C_i is lower or equal to the sonority of consonant C_j.

Two alternative analyses are considered and rejected: an analysis referring to vocalization of the vowel before extrasyllabic consonants and an analysis making use of the storage of both allomorphs of the stem and selection of one of them before the diminutive suffix. It is argued that patterns previously analyzed as driven by markedness might require construction-specific resolutions.

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Masanori Deguchi

The Syllable Contact Condition in Pawnee

In this paper, I discuss phonotactic constraints in Pawnee, a North Caddoan language of North America. I specifically examine conditions on the coda and demonstrate that certain phonological alternations observed in the coda are triggered by a syllable contact condition (Vennemann 1988).

As schematized in (1), /t/ undergoes alternations when followed by certain consonants.

(1) Alternations in Pawnee [Parks 1976]
a. /t/ + /t/ > [ct]
b. /t/ + /s/ > [ct]
c. /t/ + /c/ > [ct]
d. /t/ + /p/ > [tp]
e. /t/ + /k/ > [tk]

While /t/ in the coda surfaces as [t] in (1d) and (1e), it is instead realized as its affricate counterpart [c] in other cases as shown in (1a) through (1c). In other words, /t/ is tolerated in the coda before /p/ and /k/, but it is not allowed in the coda when followed by a homorganic consonant.

I argue that /t/ affricates before homorganic consonants in order to improve syllable contact by making the coda more sonorous than the adjacent onset. Let us assume the sonority scale in (2), adopted from Hankamer and Aissen (1974).

(2) Sonority Scale

Stops	< Affricates	< Fricatives	< Sonorants
Least sonorous			Most sonorous

Given this sonority scale, observe that the coda and the onset are equal in sonority in the input in (1a); however, the affrication makes the coda more sonorous than the following onset. Similarly, the coda in (1c) also becomes more sonorous than the adjacent onset due to metathesis. In conclusion, while the avoidance of /t/ in Pawnee, at first, appears to be due to a constraint on the coda, I argue that the relevant condition is imposed on the syllable contact between the coda and the adjacent onset, not on the coda alone. Recall that whether a given coda undergoes an alternation hinges on its sonority relative to that of the following onset. In other words, reference must be made to the adjacent onset. We also saw that alternations are triggered only when the coda and its adjacent onset are homorganic. This condition requires reference to the adjacent onset as well. The phonotactic constraint discussed above is, therefore, not an absolute condition on the coda but is a relative condition involving the adjacent onset.

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Jerzy Dzierla

The effects of auditory training on the perception and production of English word-initial laryngeal contrasts by Poles

The aim of the experiment was to study the nature of the connection between the domains of perception and production by investigating the effects of a few short sessions of implicit computer-based auditory training on the perception and production of word-initial voicing contrasts in English stops by native speakers of Polish. The research was motivated by the hypothesis that pronunciation inaccuracies in L2 have perceptual grounds and that the two domains are tightly linked (Liberman and Mattingly 1985; Flege 1995). As a consequence, increased perceptual accuracy (resulting, for example, from the exposure to

auditory training) should automatically be reflected in improved pronunciation, which has been demonstrated in a number of studies (e.g. Bradlow et al. 1997; Hazan et al. 2005; Wong 2015).

The experiment focused on the lenis stops. The training was designed to target the negative transfer of pre-voicing (VOT lead) into English (which is much more difficult to suppress relative to the acquisition of aspiration for the fortis stops). The perception part of the pre-test/post-test and the training featured minimal-pair identification and AX discrimination tasks. In the production part, the participants read a list of Polish and English words and sentences.

The perception results revealed a ceiling effect for the identification task in both the experimental and the control group. Significant rise in the preference for unvoiced versions of lenis stops was observed in the experimental group (but not in the control group). There was no significant change in the discrimination rates in both groups. When it comes to production, there was a slight increase in the pre-voicing suppression rates in the experimental group, but the mean VOT for the lenis series did not differ significantly. What is interesting, despite the fact that fortis stops were not trained, there was a small, yet statistically significant increase in the voicing lag for /p t k/.

All in all, the results seem to contradict the hypothesis (at least for the parameter of VOT). There appears to be a weak connection between the domains of perception and production and the improvements in perception are not reflected in pronunciation. The results demonstrate how difficult it is for Polish learners of English to suppress pre-voicing in the production of word-initial /b d g/. They also suggest that the implicit approach to training may not be the optimal solution.

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Luke Green

The articulation of consonant clusters in a foreign language in people with Down syndrome

Research on second language learning in children and adults with Down syndrome has thus far largely focused on aspects such as syntax and vocabulary in the L2 as opposed to pronunciation, with studies on aspects of speech production generally being limited to the speakers' L1. The articulation of speech sounds in the L2 of people with Down syndrome therefore remains largely under-investigated. This study aims to contribute towards filling this research gap by elucidating potential phenomena concerning the pronunciation of consonant clusters in an L2. To this end, a case study was conducted on a 20-year-old L1 speaker of Austrian German with Down syndrome (trisomy 21), whereby 8 German words and 12 English words were elicited three times each, among a series of distractor words. All tested words contained word-initial biconsonantal or triconsonantal clusters beginning with a voiceless sibilant /s/ or /ʃ/, the latter for German words only. The elicited words were then transcribed using broad transcription, and acoustic analysis was undertaken in order to confirm and illustrate the findings. The aim of the study was to investigate how, if at all, the consonant clusters were simplified or complicated in their articulation, and how the pronunciation of words from the L1 compares with that of words from the L2, with particular attention being paid in the latter case to potential phonological interference from the L1. It was found that, contrary to findings from previous research, clusters were not readily reduced to singleton consonants. Furthermore, clusters were not only simplified, but also complicated in both the L1 and the L2 by means

of plosive insertion. However, the inconsistency of articulation across repeated words appears to corroborate findings by Dodd and Thompson (2001) and Buckley and Sacks (2012), among others, that intra-speaker consistency among people with Down syndrome is generally low.

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Carlos Gussenhoven

The phonology of Zwara Berber syllables and words

Zwara Berber shares a number of phonotactic properties with other Berber and Afroasiatic languages, while also having so far unreported features.

- It has 4 vowels and 31 consonants.
- The syllable structure is (C)V(C)(C).
- All segments (vowels and consonants) can appear in the syllable nucleus (V).
- All consonants have single and geminate versions.
- Geminates can appear in all positions in which geminates have been reported in other languages. A universal constraint would appear to ban geminates from straddling the onset-rime boundary.
- Contrastive pharyngealization applies to alveolars, /m/ and /ʁ/.
- Pharyngealization is syllable-based and may thus change within geminates.
- Pharyngealization may switch within syllables at morpheme boundaries.
- Stress is penultimate (84%) or final (10%) and antepenultimate.
- Intonational pitch accents appear on most words.
- All segmental nuclei can be accented, i.e., also voiceless obstruent nuclei.

John Harris, Faith Chiu and Gisela Tome Lourido

Is #sC special? A dichotic listening study of Cypriot Greek initial consonant clusters

There is a growing body of morphophonemic and speech-production evidence suggesting that word-initial #sC clusters (e.g. English *spin*) are not syllabified as complex onsets, as clusters of rising sonority are. Is the anomalous syllabic behaviour of #sC is due to some property specific to sibilants or to some more general property of falling-sonority clusters? We investigate this by means of a dichotic-listening experiment.

Existing studies show that English listeners, when simultaneously presented with words containing different initial singleton consonants to each ear, hear certain pairs as fusing into single-word percepts, but not others. Pairs consisting of an obstruent (*pay*) and a liquid (*lay*) are readily fused and sequenced in the order obstruent-liquid (e.g. *play*), i.e. as a complex rising onset (Cutting & Day 1975). However, pairs consisting of /s/ (*sigh*) and another consonant (*pie*) are much less likely to be fused (Chiu *et al*. 2016).

To understand whether sibilance uniquely accounts for the non-fusing behaviour of #sC, we turned to Cypriot Greek, which has both #sC and clusters with initial non-sibilant fricatives (fC), including /#fc, #xt/. Morphophonemic evidence shows that #sC and #fC pattern together and are not syllabified in the same way as rising clusters. For example, the consonant of the proclitic /en/ assimilates to a following consonant in rising clusters (e.g. /ek-klameni/ 'she is tearful') but deletes before #sC or #fC (e.g. /e-spasmeno/ 'it is broken', /e-ftanos/ 'he is silly').

42 native Cypriot Greek listeners were binaurally presented with pairs of nonwords containing different initial singleton consonants in varying sonority combinations (e.g. /kovi/ and /sovi/). Participants then indicated which of four alternatives they heard (e.g. /kovi/, /sovi/, /skovi/, /ksovi/).

2 × 2 chi square tests were conducted per pair to test for the relation between fusion (fused or unfused) and sonority sequencing (rising or falling). In line with previous studies, obstruent-liquid pairs were found to favour fusion and, when fused, there were more rising clusters than expected. For fricative-stop pairs, in contrast, observed values did not deviate at all from expected values in both fusion and sequencing behaviour. Crucially, this result was found for both sibilant and non-sibilant fricatives. This co-patterning is consistent with the shared morphophonemic behaviour of #sC and #fC and suggests that neither is syllabified like rising onset clusters. It also suggests that sibilance is not special and that there is some more general constraint disfavouring the syllabification of falling clusters as complex onsets.

Haike Jacobs

The moraic theory of the syllable, geminates and stress in Wolof

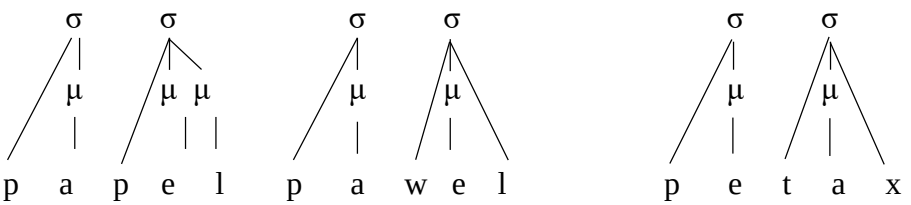
If long vowels exist in a language they almost always will attract stress, a classical example being Latin where main stress is on a pre-final open syllable if that syllable contains a long vowel, if not, main stress is on the pre-pre-final syllable (cf. *manicam* 'sleeve' with a short **i** and *amicam* 'girlfriend' with a long **i**, stressed as [ˈma.ni.kam] and [a.ˈmiː.kam]. Long vowels in Wolof, similarly, attract stress. Main stress is on the first syllable, as in [ˈbaː.si] 'couscous', [ˈpe.tax] 'pigeon' or [ˈɟa.bar] 'woman', but when the first syllable contains a short vowel and the second syllable a long one, main stress is on the second syllable, as in [ga.ˈnaːr] 'chicken' or [ɟi.ˈgeːn] 'wife'.

Coda consonants show a different behaviour. They either, just as long vowels, make a syllable heavy and attract stress, as in Latin and Spanish or they don't have an effect on the weight of the syllable, that is the syllable stays light, as in Polish (compare Spanish *casa* [ˈka,sa] 'house', but *papel* [pa.ˈpɛl] 'paper' or *matador* [ma.ta.ˈdɔr] 'matador' with a final closed and stressed syllable and Polish *cawa* 'coffee' and *pawel* [ˈpa.vɛl] 'Paul' or *pomidor* [po.ˈmi.dɔr] 'tomato' with a final closed, but unstressed syllable) or Wolof.

In a moriac theory of the syllable, this differential behavior of coda consonants has been described by invoking a constraint WBP (Weight-by-Position) which requires coda consonants to have a mora. If, in a language this constraint is respected, closed syllables and long-voweled syllables will both be bi-moraic and will both attract stress as in Latin. If WBP is not respected, as in Wolof and Polish, a closed syllable contains only one mora, the mora of the vowel, and will not attract stress. The WBP constraint is independent from existing vowel length. Spanish has no long vowels, but WBP is respected and Lenakel has long vowels, but WBP is not respected.

The difference in the mora-syllable structure between on the one hand Spanish *papel* and on the other hand Polish *pawel* and Wolof *petax* is visualized in (1),where σ represents the syllable and μ the mora.

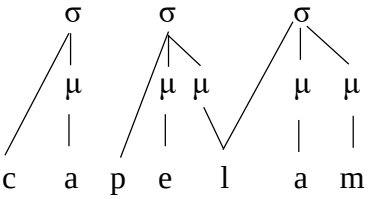
(1)



An intervocalic consonant, in onset position of the following syllable, does not have a mora and will not influence stress.

A long intervocalic consonant, a geminate, however, does contain a mora and is syllabified both as coda and as onset, as illustrated in (2) for Latin *capellam* ‘chapel, goat’.

(2)



Given that a geminate by definition has a mora, the prediction is that it will always make the preceding syllable bi-moraic which is then predicted to attract stress as in Latin *capéllam* or Italian *ragázza* ‘girl’.

This precisely what makes Wolof interesting. It has geminate consonants that do not have an effect on stress, as in for instance *deggoo* [deg.ˈgo:] ‘understanding’. Given that in a word like *miineel* ‘habit’ stress is on the first syllable, because that first syllable is bi-moraic, one would expect a word like *deggoo*, which also has a first bi-moraic syllable, to be stressed on the first and not on the second syllable.

In this talk we will provide phonetic and phonological arguments in favour of a moraic representation of geminates, based on the one hand on consonant duration measurements of recordings of 6 Wolof speakers and on the other hand on phonotactic constraints of Wolof. After that, we will discuss the theoretical implications for the representation of syllable structure.

Krzysztof Jaskuła and Jolanta Szpyra-Kozłowska

Tczew [tt͡ʃɛf], *Strwiążek* [strfʲɔ̃ʒɛk] and *Pilszcz* [pʲilʃt͡ʃ] – a new look at the phonotactics of Polish place names

This paper focuses on the structure of Polish phonotactics in relation to a remarkable but not sufficiently explored or discussed problem of word-initial and final consonant combinations in Polish place names which either are unattested in the lexicon or occur only in isolated forms, as shown in the examples included in the title. The presentation of the relevant language data is followed by a short description of the historical sources of such clusters which involve sound changes such as, for example, disappearance of weak vowels, segment metathesis and palatalization, as well as borrowings from local dialects and other languages. Subsequently, the discussion concentrates on the place which the names in question should occupy in the Polish phonotactic system. We argue that equating phonotactic well-formedness with structures attested in language and ill-formedness with those which are unattested is too simplistic. A comprehensive analysis of Polish place names demands a considerable modification of this approach and an introduction of several indirect distinctions. We claim that phonotactic constraints are scalar. In particular, well-formed and ill-formed consonant groups appear at the extremities of this scale, while rare consonant clusters and those occurring exclusively in place names and some loanwords are located in the middle.

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Kamil Kaźmierski

Durational reduction in American English words (again) shows contextual frequency effect

Frequency of use has long been known to influence phonetic form (cf. Jurafsky et al. 2001). Recently, it has been shown that the frequency of occurrence in a context favoring a particular realization – known as 'contextual frequency' (Forrest 2017) or FFC: Frequency in Favoring Conditioning (Bybee 2017) / Frequency in a Favorable Context (Brown and Raymond 2012) – might either complement or replace overall lexical frequency as a predictor of phonetic variation. For example: English /t/-final words typically followed by consonants show /t/-glottalization more often than words typically followed by vowels (Eddington and Channer 2010), English *-ing* words that often occur in contexts favoring /ɪn/, prefer /ɪn/ over /ɪŋ/ more often than other words (Forrest 2017), and word-final /t, d/ deletion in English is more frequent for words that are typically followed by consonant-initial words (Raymond *et al*. 2016). With regard to durational reduction, Seyfarth (2014) showed that the degree to which a word in usually predictable from its surrounding context influences its duration in general: words that are typically predictable are, on average, shorter. These effects support rich-storage theories of phonology, in which words are stored with information about their usage. The present study investigated the durational variation in content words, and in their stressed vowels, in the spontaneous speech component of the Nationwide Speech Project Corpus (Clopper and Pisoni 2006). The study had two goals: (1) to replicate Seyfarth's effect of variation in word durations on another dataset and (2) to look for a type-frequency effect in variation of vowel durations, to attest a type-frequency effect that would support the role of abstractions in phonological storage (cf. Richtsmeier 2011). Combined, these two effects would provide support for hybrid models of phonology.

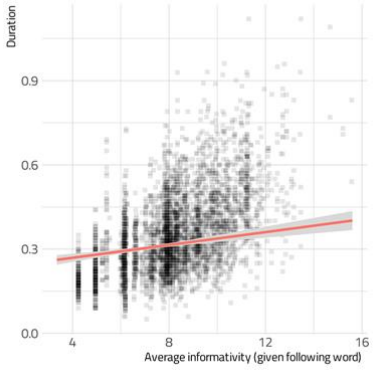

Figure 1: **An increase in informativity is associated with an increase in duration**. (Dots are all raw data points, *N* = 9134. The regression line shows fitted duration contingent of informativity, with the influence of other predictors averaged. The grey ribbon shows 95% confidence intervals.)

The results of mixed-effects linear regression modeling replicate Seyfarth's finding that words that are typically predictable show shorter durations. An increase in the 'informativity' of a word, i.e. in the degree to which it is unexpected given the word right after it (averaged over all instances in a corpus), is associated with an increase in word durations. A partial-effect plot of a model which included a number of control variables known to affect word duration is presented in Figure 1. The type-frequency driven effect of abstractionist storage has not been confirmed.

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Kateryna Laidler

The role of perception and segmental context in the adaptation of /a/ in English loanwords into Russian

The underlying principle of the phonological adaptation of loanwords is compliance of the original forms with the rules governing borrowers' native phonology. Since the front mid-low English vowel /æ/ is absent from the Russian phonetic inventory, in established borrowings from English into Russian it is most frequently nativized as two Russian vowels it resembles most, i.e. /ɛ/ and /a/, as in, for example, *backhand* /bɛk hɛnt/ and *jazz* /dʐas/. However, to the best of our knowledge, so far there has been no attempt to analyse the factors behind this phenomenon. The present paper aims to examine the major mechanisms and patterns of ash-adaptation in Russian.

Towards this goal, we report on an online adaptation experiment in which 41 native speakers of Russian with no command of English listened to a list of English words containing ash in different segmental contexts and were asked to transcribe them using Cyrillic characters. The results of this perception study show that the participants choose /a/ and /ɛ/ with equal frequency. While 55% of the subjects used /a/ in the place of the original vowel, 45% employed Russian /ɛ/ showing that varied adaptation of English /æ/ can be attributed to diversified perception by different listeners. Moreover, the interpretation of the vowel in question turned out to be context-dependent; Russian /a/ was a more frequent choice when ash was followed by obstruents whereas /ɛ/ commonly appeared before nasals and the interdental fricatives. Finally, we juxtapose and compare the two sets of data, i.e. established and online loans which contain /æ/ in the original. Our analysis sheds light onto the nature of /æ/ nativisation in the Russian language as well as adds to the debate of the loanword adaptation process in general.

Tionenji Lishomwa

Effect of L1 Phonology on L2 Fricative Production for Speakers of British English

Speakers acquiring a second language are stereotypically identifiable by 'quirks' of pronunciation in L2 not consistent with standard practice. Out of all countries in the Anglosphere, the UK in particular has been said to be lacking with regards to foreign language teaching,[2] perhaps exacerbating existing L2 learner self-consciousness about orally practising a foreign language.[3]

It seems highly likely that any differences (between native English speakers' articulation in an L2 and that of native speakers of that language) vary widely from speaker to speaker. It may also be the case, however – possible even between levels of proficiency, sex and native dialect within Britain – that there are common patterns in L2 production This paper will investigate, using recordings of audio from native English speakers speaking Spanish and Mandarin Chinese, in order to begin to develop an idea of what deviations from L2 phonology are consistent for L1 English speakers. Tendencies among English speakers will be compared with de Manrique & Massone's (1981) comprehensive log of fricative consonants in

[2] Leslie, D., & Russell, H. (2006). The importance of foreign language skills in the tourism sector: A comparative study of student perceptions in the UK and continental Europe. Tourism Management, 27(6), 1397-1407.

[3] De Saint Léger, D., & Storch, N. (2009). Learners' perceptions and attitudes: Implications for willingness to communicate in an L2 classroom. System, 37(2), 269-285.

Spanish, and with Lu's (2014) critical analysis of classification work done with Mandarin Chinese fricatives thus far. Gorden et al. (2002) will also be a central piece of literature, with its cross-linguistic examination of voiceless fricatives in particular, and links to numerous other studies in Mandarin Chinese and Spanish. It will also help in accounting for any universal patterns they may be in non-standard fricative production by L2 speakers.

Fricatives are of interest in this paper because, in standard British English, they are the most common 'type' of consonant, with a greater variety of place of articulation as well as distinctive appearance at the point of waveform and spectrogram analysis. It is, as such, perhaps easier to examine the influence of English fricatives – using both narrow phonetic transcription and spectral analysis – on the production of fricatives in other languages, where the speaker's native language is English.

Xiaoliang Luo

OCP, branching and consonant / zero alternation

Compared to vowel / zero alternation, there are few discussions on consonant / zero alternation (Vaux 2002 for example). In CVCV framework (Lowenstamm 1996; Scheer 2004), Carvalho (2002) proposes that just as Government between nuclei, accounting for vowel / zero alternation, Government also exists between onsets and goes from left to right. He analyses German ['kaos] vs [ka'ʔo:tiʃ], shown in (1):

(1)

Following this idea, Luo (2013) has proposed an analysis of the glottal stop/zero alternation in Mandarin compounds.

However, recent claims in CVCV framework such as Enguehard (2018), Luo & Enguehard (to appear), Enguehard & Luo (to appear a) propose that lateral relations can be derived from branching and contour: consonants branch to each other as long as No-crossing-lines constraint is not violated, and OCP conditions vowel / zero alternation. Furthermore, Enguehard & Luo (to appear b) propose that symmetrically, vowels should behave as consonants: in a diphthong, vowels branch to each other.

One of the consequences of their claim on vowels is to simplify immediately the account of consonant/ zero alternation. As examples, data in (1) can be reanalysed as follows:

(2)

In ['kaos], no glottal insertion since this would violate No-crossing-line constraint; in [ka'o:tiʃ], glottal stop must be inserted since otherwise, O_2 and O_3 will be both empty, violating OCP.

Another major consequence is to forbid two consecutive onsets or more to be empty phonetically. Evidence from Mongolian, when a root ends by a vowel and the suffix begins with a long vowel, an epenthetic [g] must arise: dalai + aas 'sea-ABLATIVE' must give dalai[g]aas (Rialland & Djamouri 1984).

This prediction may be contested, but we must take into account that epenthetic consonants are often not noted in language specific academic traditions. In Japanese phonology, glottal stops (and other epenthetic consonants) are never noted. Consider: anei 'shadow', interpreted as [aN.e:] (N as moraic uvular nasal). In hereby attached recordings from http://research.nii.ac.jp/src/en/ETL-WD.html database, both native speaker pronounce [ʔaN.je:], since [aN.e:] implies four consecutive empty onsets, thus ill-formed. Of course, further studies must be done to verify the range of the present framework.

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Xiaoliang Luo and Zhao Qianwen

Chinese learners of French with English as L2 in the learning of vowel system

The influence of L2 in L3 learning is discussed in many studies (Hammarberg 2001; Gut 2010; Llama et als. 2010 among others), but specific case study on Chinese learners of French having English as L2 are still very few.

Our corpus has been recorded at the end of 2016-2017 academic years, with 44 students who had never studies French before 2016. All students are native speakers of Mandarin and some of them have another dialect, and had at least 8 years English learning experience. In order to limit the influence of the eventual native dialect, we will focus on vowel system, since dialects can have very different influences in the learning of voiced consonants, absent in Mandarin.

Taking into account of the vowel systems of all the three languages, the occurrences of vowels in the corpus can be organized into two categories: the influence of Mandarin and that of English.

(1) Mandarin's influence:
  a. nasal vowels realized as VN sequence
    - [ɑ̃] realized as [ɑŋ], [ɔ̃] realized as [oŋ], [ɛ̃] realized as [an]
  b. Chinese diphthongation of monophthongs
    - [ɛ] realized as [aɪ], [ɔ] realized as [aʊ]
  c. schwa, [ø] and [œ] merged as [ɤ]
(2) English's influence:
  a. lax realization of tense vowels
    - [i] realized as [ɪ], [u] realized as [ʊ]
  b. English diphthongation of monophthongs
    - [e] realized as [eɪ], [o] realized as [əʊ], [y] realised as [ju]

The surprising observation is that in (1), the Chinese learners adapt all absent sounds to L1, but in (2), they adapt all L1 existing sounds to L2 English. Tense vowels [i] and [u] exist in Mandarin (See Duanmu 2007), but the learners are phonologically deaf to them and choose the L2 adaptation. In the same way, monophthongs [e], [o] and [y] exist in Mandarin, but the learners again are phonologically deaf to them and choose the L2 adaptation.

These results confirm Trubetzkoy's old "phonological deafness", that in language acquisition, it is not the phonetic sounds that are learned, but the phonological system, otherwise, one cannot explain why Chin

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Milena Milenova

The acquisition of similar sounds – evidence from novice Bulgarian learners of Modern Greek

The aim of this acoustic study is to explore the attainment of similar sounds investigating the production of Modern Greek /s z/ by beginner Bulgarian learners. Our data reveal that spectrally Modern Greek /s z/ are an intermediate category regarding Bulgarian /s ʃ/ and /z ʒ/, respectively. Following the Speech Learning Model (SLM) (Flege, 1995; 2002) the target sounds are classified as 'similar'. They are subject to "*category assimilation*" which blocks L2 category formation. The SLM predicts that in such cases a merged category that combines the properties of the corresponding L1 and L2 speech sounds will be created.

The participants in the study were ten native Bulgarians (8 females, 2 males, M_{AGE} 19.2) who studied Modern Greek in non-naturalistic settings. In addition, twelve native Greek speakers (8 females, 4 males, M_{AGE} 27.4) served as a control group.

The Bulgarian learners and the native Greek speakers participated in three production experiments. Experiment 1 investigated the Bulgarian and Greek participants' productions of the sibilants in their native languages. Experiment 2 investigated the Bulgarian learners' productions of the target Greek sibilants prior to pronunciation instruction. Experiment 3 investigated the learners' productions of the target Greek sibilants after 15 pronunciation-training sessions.

The stimuli comprised real words embedded in carrier sentences. The target sounds were recorded in initial and medial stressed and unstressed syllables with the vowels /i e a o u/ which are common in Greek and Bulgarian. To assess phonetic learning, the centroid frequencies were used as a reliable indicator of sibilants' place of articulation.

The learners' /s z/ produced in Experiment 2 and Experiment 3 were compared to investigate possible changes in the centroid frequencies. In addition, the learners' productions were compared to the productions of the control group.

The average group performance revealed a steady trend for producing the target sibilants with lower centroid values, without reaching statistical significance. However, the investigation of the individual speakers' performance showed that some learners' productions approximated the centroid values of the control group. This finding suggests that category formation is possible in the case of similar sounds.

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Marta Nowacka

Polish university students' beliefs and practices in pronunciation learning

This paper aims to make a contribution to questionnaire studies on formal and informal pronunciation practice of Polish university students of the English language. It reports on selected results, collected from 125 first year English philology students in a 3-year BA programme.

The first part of the questionnaire with 31 Lickert items is a replication of a study by Pawlak et al. (2015) that investigated the relationship between learners' perceptions of phonetic instruction and attainment in pronunciation as well as speaking skills. It provides information about the importance of pronunciation instruction, the type of syllabus, the design of pronunciation classes, the implementation and practice of pronunciation features and the role of pronunciation error correction.

The second part of the survey offers quantitative and qualitative data on such aspects of pronunciation instruction as its effects on learners' pronunciation, phonetic knowledge and the skills of speaking and reading aloud; most preferred and disfavoured instructional techniques; the useless, surprising and most challenging phonetic issues, respectively; the usefulness of transcription and modifications to the course;

'likes and dislikes' of learning pronunciation; the influence of the course on the participants' future pronunciation learning.

We also report on the findings of the most recent and comprehensive pronunciation attitude surveys with students of English representing different L1 in ESL (Foote et al., 2011) and EFL context (Henderson et al. 2015) and in a monolingual environment at universities in Poland (Nowacka, 2012; Pawlak et al. 2015: Szyszka, 2015; Waniek Klimczak et al., 2015; Krzysik and Lewandowska, 2017).

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Paula Orzechowska

The psychological reality of place and manner features in Polish phonotactics: Evidence from response latencies

This paper investigates the processing of word-initial CC clusters in Polish. Cross-linguistic studies have demonstrated that online processing is affected by sonority violations (e.g. Pitt 1998, Moreton 2002, Berent et al. 2007) and place constraints (e.g. Frisch & Zawaydeh 2001). In Polish, the psychological reality of sonority was investigated in ERP experiments by Wagner et al. (2012) and Wiese et al. (2017). However, so far no studies have tested the processing of consonant clusters in Polish explicitly in terms of reaction times, and using constraints related to the place of articulation. Therefore, in this study, we report on a reaction time (RT) experiment, which tests the following factors: (1) *existence*, (2) *well-formedness* and (3) *phonetic distance* (Orzechowska in press).

Existence distinguishes between clusters found in real words (existent, EX) and hypothetical clusters (non-exitent, NEX). Well-formedness specifies whether CCs follow the *Sonority Sequencing Generalization* (Selkirk 1984) (well-formed, WF) or violate it (ill-formed, IF). Four test conditions involved: WF-EX, WF-NEX, IF-EX, IF-NEX represented by, e.g. /dl lj/, /dʒm tsx/, /ɕtɕ sk/ and /lk jm/, respectively. Additionally, in each condition, CCs were matched in terms of the place of articulation distances between constituent segments along the following scale: bilabial(1)–labio-dental(2)–dental(3)–alveolar(4)–palatal(5)–palato-alveolar(6)–velar(7). The smallest distance=0 holds between segments, which share place features (e.g. dental+dental /dl/). The largest distance=6 holds between consonants, which represent extreme articulatory regions in Polish (e.g. velar+bilabial /gm/). 84 CCs (=21 per condition) were embedded in three types of nonce monosyllables CCVC, where VC was represented by /es/, /ot/, /um/. The total of 252 stimuli were presented to subjects auditorily in 2 blocks. 38 native speakers of Polish (av.age: 21, 33 women), volunteered to take part in the experiment. Subjects were requested to decide whether the words they heard sounded as if they could exist in Polish by pressing a 'yes' or 'no' keyboard button (*E-Prime* software, ver. 2.0).

The statistical modelling involved the quantile regression (Fasiolo et al. 2017). First, we demonstrate that response latencies are primary affected by place distances. Clusters with medial distances (dist=2-4)

involve the longest RTs suggesting that they are cognitively most costly. To the contrary, larger distances (dist=5-6) entail the shortest RTs and therefore facilitate processing. This result lends support to the cognitive principle of the *clarity of perception* according to which contrast serves perception. Statistically significant results were obtained neither for existence nor for sonority in the processing data. These factors were shown to contribute to the statistical model for accuracy rates. This finding suggests that the SSG and frequency are consulted when intuitive judgements are made.

Overall, although phonotactic well-formedness is consulted by native speakers of Polish when intuitive judgements are made, the processing of phonotactics is governed by principles other than sonority. It is proposed that the SSG *per se* does not fully account for phonotactic complexity of cluster-rich languages. Among various factors which require a series of studies, we have demonstrated that the *place of articulation* should be considered when formulating phonotactic generalizations in Polish.

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Marek Radomski

Online nativisation of Polish voiceless affricates by native speakers of English and its implications for the general theory of loan adaptation

Loanword adaptation is a highly complex phenomenon, shaped by a number of linguistic and extra-linguistic factors, such as the nature of the input to this process, the potential role of the borrowing community bilingualism as well as the influence of orthography (e.g. Kang 2011). In this light, it comes as no surprise that various theoretical approaches to this process have been proposed in the literature. These models attach different degrees of importance to factors such as the role of native phonological constraints or the role of perception in loan assimilation.

This paper is intended as a contribution to this on-going loan nativisation debate. We report on an online loanword adaptation experiment in which 30 native speakers of Southern British English reproduced Polish words with initial and final CC consonant clusters disallowed in English. The major goal of the study has been to find out the most frequent repair strategies applied by native speakers of English in the nativisation of foreign phonotactic structures. The focus of the present paper is not however on phonotactics but on the patterns of segmental adaptation of Polish voiceless affricates (dental /t͡s/, post-alveolar /t͡ʂ/ and pre-palatal /t͡ɕ/) in initial and final CC consonant clusters.

The major problem posed by the data is the divergent adaptation of the post-alveolar /t͡ʂ/ vs the pre-palatal /t͡ɕ/ with the former substituted mainly with the coronal plosive [t] and the latter realised as the palato-alveolar affricate [t͡ʃ]. It is argued that these patterns of nativisation are due to the highly-ranked IDENT-IO[dist] constraint, which militates against the modification in the value of the feature [distributed].

Furthermore, it is demonstrated that the experimental results provide evidence in favour of the fundamental assumptions underlying the phonological approach to loan assimilation, namely the phonological input view as well as the faithful perception view.

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Arkadiusz Rojczyk and Andrzej Porzuczek

Is *odda* as voiced as *oda*? The voicing profile of Polish stop geminates

Maintaining voicing is obstruents is an aerodynamic challenge, because the build-up of intraoral air pressure during stop closure impedes maintaining sufficient transglottal air pressure that is necessary to sustain glottal vibration (Westbury and Keating 1986). It is especially difficult with geminate obstruents due to increased closure duration. As a result, corsslinguistically, voiced geminates are considered as marked and are less frequent in the world's languages than voiceless geminates (Hayes and Steriade 2004). Since voicing is difficult to sustain in geminate consonants, it may be predicted that voiced geminates will be characterised by devoicing processes. However, previous studies have yielded mixed results. Intervocalic devoicing has been observed in e.g., Japanese (Kawahara 2016), Berber (Ridouane 2010) or Sienese Italian (Stevens and Hajek 2004). On the other hand, languages such as Arabic maintain voicing throughout the whole geminate closure (Ham 2001).

In the current study, we investigate the data obtained for Polish. Forty-two native speakers of Polish were recorded producing target geminates in controlled carrier sentences. Both temporal and spectral measures were taken from the target geminates and surrounding vowels to investigate the voicing profile. The results will allow the comparison of Polish with other geminating languages in terms of the degree of voicing/devoicing in obstruent geminates.

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Michela Russo

Sonority and Syllabification. Cross-linguistic evidence from Italian dialects

In Italian dialects, we have heterogeneous consonant clusters that appear to be branching onsets of (a) sonority rise /TR/, (b) sonority fall /RT/, and (c) equal sonority (/TT/, a plateau). Romagnolo (in the Emilia-Romagna region) is characterised by the deletion of unstressed vowels and the consequent formation of secondary clusters and complex onsets (OL Obstruents-Liquids / tl dl zl /).

Analysing data from Romagna and from Emilia (Ferrara), we find several secondary branching onsets OL (derived from syncope) with increasing sonority /tl dl zl km tn zn.../ and word-initial complex groups with decreasing RT:

-Branching onsets with increasing sonority – Linear layout TR -

C∅L : ʃă**tl**a lat. médiev. SANC**T(Ŭ)L**US [AIS 36 *madrina/godmother*] - **zl**owʃ [AIS 66 ***g(e)l****oso/jealous*] - nu**vl**ɑ [AIS 111 *l'u****g(o)l****a/uvula*] - **ʃl**er et **tl**er [AIS 266 *il sellaio/saddler* 1512 *telaio/loom*]

C∅M : **km**er [AIS 36 ***c(o)m****are/godmother*]

C∅N : **tn**aj [AIS 224 ***t(e)n****aglie/pincers*]

Complex groups with decreasing sonority (heterosyllabic ?) - Linear layout RC –

N∅C : (a)**nv**ut AIS 18 *n(i)pote/nephew*

The data above show branching onsets that are a product of syncope with increasing sonority /tl dl / (like *tler*). In GP, these are termed Bogus Clusters by Harris (1994 for English *choc(o)late, fact(o)ry*) and interpreted by Scheer (2004), in the framework of strict-CV, as two independent onsets, separated by an empty nucleus, without a licensing relationship between the two consonants.

According to GP, one argument in favour of a difference between Bogus Clusters with increasing sonority and branching onsets is distributional. Bogus clusters with a lateral C_2 cannot be found in initial position (*tl, *dl, *gl), for example either in English or Standard Italian. However, this is not the case in *Romagnolo* dialects: type **ʃl**er, **tl**er or **tn**aia it. *tenaglia* in Ferrara, etc.

Moreover, (unlike Tuscan Italian), in these dialects lenition applies to those groups identified as bogus clusters /G(U)L/ →/vl/ (nu**vl**ɑ), contrary to what is advocated by the strict-CV theory, according to which bogus clusters don't undergo lenition, since they always have an empty nucleus to their right. Conversely, in these dialects Bogus Clusters do lenite.

Furthermore, primary groups with rising sonority can also be split by epenthesis, that is a process of syllabic optimization: in the sequences like /vr dr../ a *svarabhakti* vowel breaks the complex onset /VvRv/.

This phonological process also contradicts what is advocated by the theory of strict-CV to the extent that monopositional branching onsets may be subject to lenition, but not to epenthesis.

This paper debates the conditions that determine the structuring of these clusters:

i. the notion of a syllabic constituent, on which there is no consensus within all GP sub-frameworks
ii. the principle of sonority hierarchical scale (*SSP*, see Clements 1990; Blevins 2004; Zec 2007; Parker 2012).
iii. the derived status (non-lexical) of syllabicity

Do sonorants have a syllabic role?

Within a GP Word-Syntax approach, complex onsets are small CV syllables: ((CV) (V)). One could propose an analysis in which the syllabicity of consonants is a direct possibility. A branching onset with increasing sonority reiterates the structure of a CV syllable.

The dialects of Romagna would then behave like Tashelhit, which does not exclude any segment as the head of a syllable (Dell & Elmedlaoui 1985; Legendre, Sorace & Smolensky 2006; Tupper & Fry 2012). This situation does not exclude any sonorant: in the onset /km, tn, mr.../. According to this logic, the syllable is a constituent potentially recursive.

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Geoff Schwartz

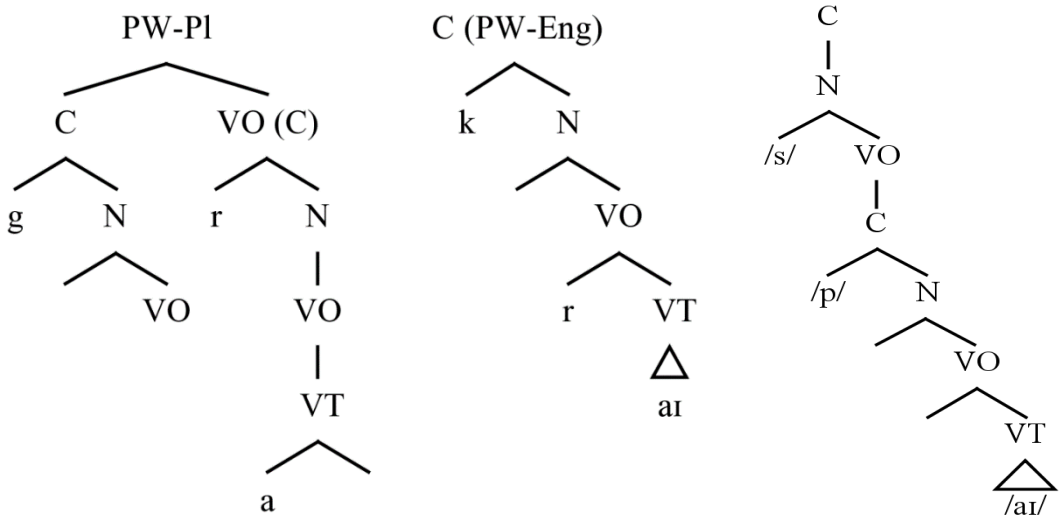
When is a cluster really a cluster?

Traditionally, research into phonotactics has concentrated on the relative markedness or preferability of consonant sequences in terms of frequency, learnability, or speaker judgements. While inspiring valuable empirical work, the traditional approach is based on a phonetically naïve view that a cluster is simply a string of consonantal phonetic symbols. This perspective is unable to make predictions with regard to cases in which the 'same' cluster behaves differently in different languages, often with dramatically different phonetic realization. Some clusters are more cluster-like than others with regard to the synchronicity of the individual consonants in a sequence, yet a segmental string makes this difficult to represent.

The Onset Prominence (OP) framework offers tools for the representation of three different degrees of cluster synchronicity (Schwartz 2018), shown in (1). *Adjoined* clusters such as /gr/ in Polish *gra* 'game' (left in (1)) are contained in separate constituent structures, and thus are the least cluster-like of the three types. The prosodic status of the /g/ in *gra* is evidenced by the fact that it contributes to word minimality: CCV-shaped words in Polish are inflected normally (e.g. *gra-grze* 'game'), but CV-shaped words are not. The adjoined configuration is posited for nearly all clusters in Polish. Consonant sequences *absorbed* at the same representational level, shown in *cry* in the center tree in (1) are highly synchronous, structurally equivalent to singleton onsets. This configuration obtains in 'rising sonority' clusters in English – evident in processes such as approximant devoicing (e.g. *clear*), and TR affrication (*try*). Finally, in *submerged* clusters such as /sp/ in English *spy* (right in (1)), the second consonant constitutes a recursive iteration of the OP hierarchy, yielding an intermediate degree of synchronicity. Crucially, these configurations are the products of independently motivated mechanisms in the OP representational system.

This presentation will consider wider implications of the typology in (1) with respect to the cluster-like status of consonant sequences, both in terms of phonetic realization and phonological behavior. The goal is to provide a more refined answer to the question posed in the title of this paper than may be formulated in models based on a linear string.

(1) From left: OP representations for Polish *gra* 'game', English *cry*, and English *spy*



Piotr Steinbrich

Czy smufisy są dygestywne? Towards a socio-phonetic description of English borrowings in Polish breakfast tv shows

It is a truism to say that recent years have witnessed a rather rapid influx of a substantial number of English borrowings into the Polish language. Their distribution seems uneven as it appears to prefer specific semantic domains over others or it characterizes certain social strata to a greater extent. The following paper seeks to address the issue of English lexical items assimilated into the Polish language according to the phonological and orthoepic rules using the CAT model. I take it as a working hypothesis that the motivation

for incorporating such items into Polish is multifold and involves the need-filling, prestige and expressiveness motives. The analysis focuses on three semantic fields: food, leisure and lifestyle and uses the typology whereby borrowings are divided into the following categories: 1. straightforward adaptation, 2. loan blending, 3. loan adaptation, 4. loan shift. The analytical core of the paper is based on the mini-corpus compiled of Polish breakfast television shows and aims to determine the extent to which speakers converge or diverge with native-speaker forms in their language performance. The secondary goal of the analysis is an attempt to categorize such items in accordance with the typology presented above so as to gauge whether it is possible to delineate the linguistic criteria for a particular process to occur, depending on the phonological and orthoepic form of a lexical item under scrutiny.

Łukasz Stolarski

Phonetic Corpus of Audiobooks - a new free tool for linguistic research

"Phonetic Corpus of Audiobooks" is a new tool designed for phoneticians, phonologists and other linguists, but it could also be applied in other domains related to natural language. It was created on the basis of "librivox.org", which is a non-profit library of more than 12 000 free audiobooks recorded by volunteers. The website was initiated in 2005 by Hugh McGuire.

At the initial stage of the project, 104 English audiobooks were downloaded from "librivox.org". In order to obtain a sample representing different dialects and genders, only these audiobooks were chosen which were read by groups of readers, rather than an individual person. After that, the corresponding text versions of the novels were found at "gutenberg.org". With the use of a Python script, the texts were divided into syntactically and prosodically independent units. Next, these units were automatically aligned with the corresponding parts in audiobooks using *Aeneas*, which is a Python/C library designed to automatically synchronize audio and text. Additionally, with the use of various scripts written in Python, all the text units and the corresponding recordings were classified according to numerous criteria, such as context (narrator vs. dialogue), pragmatic function (statement/directive vs. question vs. exclamative statement), reader's gender (female vs. male), reader's dialect (American vs. British vs. Australian vs. non-native), author's gender (female vs. male), number of words, syllables and phonemes, duration, etc.

On the basis of the database obtained, a free online corpus with an intuitive graphic user interface was created. Although it is still in the development stage, it offers versatile functionality. The user may search for individual words and phrases in the audiobooks. The fragments containing such words or phrases are available for audio playback directly from a web browser and for download as mp3 files. Such files may later be used for acoustic analysis in programs such as *Praat* or *SFS*. Moreover, search options allow filtering the results according to most of the criteria mentioned previously, which is particularly useful in sociolinguistic investigations. Additionally, with the use of standard wildcards applied in many language corpora (e.g. "?" for "one character" or "*" for "one or more characters") and additional ones designed especially for the corpus under discussion (e.g. "=v" for any "vowel letter" or "=c" for any "consonant letter") the user may search for word and speech sound combinations in a more flexible way.

The basic functionality described above will be presented on the basis of the research conducted on the production of neighbouring affricates in English. While several authors reject the possibility of unreleased articulation in such positions, there is no empirical evidence for this assumption. The case is problematic because of the frequent phonetic reduction of occlusives in various contexts in English. With the use of queries involving wildcards such as "*ch ch*", "*ch j*", "*ge ch*", etc., it was possible to find several hundred expressions in which the first word ends with an affricate and the next one begins with an affricate. An analysis of the recordings downloaded confirms the aforementioned intuitive claims. There is no substantial phonetic reduction of affricates followed by other affricates regardless any text or reader characteristics.

Jolanta Sypiańska

Some characteristics of Ukrainian Polish

Foreign-accented Polish has been gaining attention in the recent years (e.g. Szpyra-Kozłowska and Radomski 2012, 2013a, 2013b, 2014). To date, no descriptions of Ukrainian-accented Polish is offered in the literature even though Ukrainians most likely constitute the largest minority in Poland with estimations at almost 1 milion people (Chmielewska et al. 2018). Thus the aim of the paper is to present initial findings of a larger project on L3 Polish of a group of L1 Ukrainian, L2 Russian speakers learning Polish as an L3. The current paper is limited only to describing the main segmental characteristics of L3 Polish in this linguistic repertoire based on an acoustic and auditory analysis.

The stimulus was developed with the aim to elicit a number of potential characteristics of Ukrainian-accented Polish including /w/-/l/, /tç/-/t͡ʃ/, /ɕ-s/ distinctions, vowel quality and the realisation of /l̪,n̪/ and the devoicing of final obstruents. The choice of characteristics under study was motivated by a comparison between Polish and Ukrainian, and to some extent Russian. Unlike Polish, Ukrainian has no /tç̪,n̪,ɕ/ or final devoicing (Buk et al. 2008) whereas /w/ is realized as [β] or [v] and /l/ as [ɬ] (Pompino-Marchall et al. 2016). As opposed to standard Polish, Ukrainian reduces vowels in unstressed syllables resulting in a change in duration and quality though the pattern of reduction is different than in Russian (Rusanivsjkyj et al. 2004).

The research group included 23 L1 Ukrainian, L2 Russian, L3 Polish speakers who at the time of the study were students at a Polish university and had been residing in Poland for 4 to 5 months. By means of an adapted version of the Bilingual Language Profile (Birdsong et al. 2012), they were classified as Ukrainian-Russian bilinguals though with different degrees of dominance in the Ukrainian language ranging from -156 to -32. In order to assess their L3 Polish level of proficiency, a Polish placement test (Burkat et al. 2008) was run prior to collecting the acoustic data. It included 120 questions on grammar, vocabulary and use of Polish and allowed to place the participants on a scale from A2 to B1 in terms of CEFR (Common European Framework of Reference).

The results provide evidence for all the hypothesised characteristics of Ukrainian-accented Polish. They also manifest enough inter-subject variability to allow for a factorial analysis of language dominance and level of proficiency in L3 Polish at a later stage in the project.

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Jolanta Szpyra-Kozłowska & Paulina Zydorowicz

Determinants of Polish native speakers' acceptability judgements of nonwords with two-consonant clusters

The paper presents the first study devoted to Polish native speakers' phonotactic intuitions concerning the well-formedness of nonwords with two-consonant clusters. 50 Polish students were requested, using a five-point scale, to make acceptability judgements of 80 monosyllabic nonwords with either initial or final sequences of double consonants which follow the phonotactic restrictions of Polish. The experimental results were next examined from the perspective of three possible determinants of the participants' decisions: the sonority profile of the clusters measured in terms of the Sonority Sequencing Generalization (Selkirk 1982) and Net Auditory Distance (Dziubalska-Kołaczyk 2009, 2014) as well as corpus frequency of the examined sequences. It is demonstrated that while all these factors appear to play some role in these judgements (with cluster frequency being the best predictor), other possible determinants of this phenomenon have to be studied as well.

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Jana Taperte

The perception of nasals in Standard Latvian

It is known that murmur spectrum of nasal consonants contains mainly cues for nasal manner of articulation, while the primary information for indicating place of articulation regardless consonant manner is found in the formant (mostly F2) transitions of adjacent vowels (Delattre et al. 1955, 769; Ladefoged 2003, 53). Still, the results of perception studies suggest that murmur structure is relevant for distinguishing between nasal places as well and complements the cues encoded in the adjacent segments (Repp 1986; 1988).

In Repp (1986), it was concluded that nasal murmur contributes to recognition of nasal place significantly for /m/-/n/ distinction in prevocalic position. The present study, which is currently in progress, deals with perception of Latvian nasals in CV syllables. There are three nasal phonemes in Standard Latvian: bilabial /m/, dental /n/ and palatal /ɲ/ (Laua 1997, 35, 39–40, 51). The aim of the paper is to investigate the relevance of murmur segments and vowel formant transitions for the perception of /m/-/n/, /n/-/ɲ/ and /m/-/ɲ/ contrasts. For this purpose, a perception experiment have been carried out. Stimuli have been created using laboratory speech recordings from two native Latvian speakers (one male and one female) by extracting murmur and vowel formant transition portions from the CV parts of CVC sequences, where C is one of the nasals /m, n, ɲ/ and V is one of the vowels /i, ɑ, u/.

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Andressa Toni

Do children who produce C/ɾ/V as C[l]V also detect C[l]V as C/ɾ/V? Acquiring branching onsets in Brazilian Portuguese

This study explores the relation between production and perception in the development course of CCV branching onsets (Consonant$_1$+Consonant$_2$+Vowel) in Brazilian Portuguese (BP). In BP, CCVs are formed by plosives plus liquids (lateral /l/ or tap /ɾ/), as in /**pla**ka/ *sign*, /**pɾa**to/ *dish*. Previous studies[1,2] show that /ɾ/→[l] switches are common both in CCV and CV children's productions: /**bɾu**ʃa/→['**bl̲u**.ʃɐ] 'witch'; /ba**ɾa**ta/→[ba'**l̲a**.tɐ] 'cockroach'. We raise two hypotheses to account for this liquid switch: i) children's CCV outputs are due to an underspecified[3] representation of the liquids, which becomes more detailed as the Phonology develops; or ii) liquid switches reflect adult-like representations that are affected by articulatory constraints. Considering these hypotheses, our goal is to investigate 1) whether the underlying lexical representations have fully specified liquids since the beginning of the syllable acquisition process; and 2) whether a child who produce liquid switches can recognize the same switches in the input. We conducted a word-repetition and a mispronunciation detection tasks testing if children would be sensitive to liquid mispronunciations (/l/→[ɾ]; /ɾ/→[l]); as control, we also tested the liquid mispronunciation detection in CV syllables. Participants were divided into three groups according to their productions: **Target_Group**: consistent target-like liquid production in CCV; **Swap_Group:** consistent liquid swapping; **Deletion_Group**: consistent liquid deletion. Results show that the Target_Group can detect mispronunciations in both liquid directions and syllable contexts, as expected. Deletion_Group accepted CCV and CV liquid mispronunciations in both directions at a random level. In Swap_Group an asymmetry is observed: liquid substitutions were productively detected in CV, but only partially detected on CCV. The detection pattern of the three groups agree with their production patterns: if liquids in CV and CCV are productively produced, they are also productively detected as mispronounced. Regarding the mispronunciation direction, in Swap_Group /tap/→[lateral] CCV mispronunciations were detected significantly more than /lateral/→[tap], which points out that children who produce a switch can perceive the same switch in their inputs, but not switches on the opposite way of their productions. Given these results, we argue that lateral-tap variability is tied to the phonotatic development of the child, and the asymmetry on /l, ɾ/ detection results from the specification process of segmental features in lexical representations[3,4]: considering /l/ as the default liquid segment[5], we predict the unidirectional /tap/→[lateral] (/non-default/→[default]) detection. We conclude that CCV production and perception is tied to the phonotatic development and to the process of specification of the segmental properties on lexical representations.

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Ewelina Wojtkowiak

Is there really a Prosodic Hierarchy in Polish?

Prosodic Phonology (e.g. Nespor and Vogel 1986) postulates the existence of a universal Prosodic Hierarchy that imposes structural domains on all languages. The Prosodic Hierarchy is claimed to interact with segmental phonetics, and different theories have been proposed with regards to both the nature of this relationship and the direction of prosodically-induced variation in segments (e.g. Keating 1984, Cole et al.

2007, Cho and Jun 2000). The phonetic experiments designed to test these theories appear to provide conflicting data; e.g. findings from English suggest that voiceless plosives in general have higher VOT values at higher prosodic domains (Choi 2003, Fougeron and Keating 1997), whereas Dutch shows VOT shortening at the start of higher domains (Cho and McQueen 2005).

This paper presents a status report on an ongoing project that investigates the relationship between prosody and segmental phonetics in Polish. The materials included 24 disyllabic words starting with /p, t, k, b, d, g/ and followed by /a, ɛ. ɔ, ɨ/, couched in carrier sentences; the items were elicited in three different prosodic positions: utterance-initial, phrase-initial, and phrase-medial, in both accented and unaccented conditions. Production data from 20 monolingual native speakers of Polish were collected, yielding a total of 2727 tokens. Linear Mixed Models were run with six different acoustic measures as dependent variables (VOT, vowel duration, F1 at vowel onset, pitch at vowel onset, and the degree of laryngeal contrast in the F1 and *f*0 cues), Position*Accent as fixed factors, and Speaker*Item as random factors. The table below summarises the findings.

Dependent Variable	***Results***
VOT duration: /p, t, k/	INCONCLUSIVE: difference found only between phrase-initial and phrase-medial stops ($p<.05$, contrast estimate: 1.7ms).
(Negative) VOT duration: /b, d, g/	INCONCLUSIVE: in general pre-voicing longer in the accented condition; significant effects of position found only in fully pre-voiced items; 18% of items produced with a voicing break.
Vowel duration	INSIGNIFICANT
F1 and *f*0 at vowel onset	INCONCLUSIVE: no effects on utterance-initial and phrase-initial items, but pitch generally lowered in phrase-medial tokens.
The degree of laryngeal contrast in the F1 and *f*0 cues (voiced and voiceless items paired up and the contrast calculated)	INSIGNIFICANT with regard to F1; INCONCLUSIVE with regard to *f*0 – different effects under the accented vs. unaccented conditions.

These results seem to corroborate the claim that the Prosodic Hierarchy may not be universal (cf. Schiering et al. 2010) and go in line with Schwartz's (2016) account of how different prosodic domains may emerge in different languages, allowing for two different types of predictions with regard to the phonetics of segments, shown in Figure 1 with respect to the consonant /t/. 'Submersion' systems (right) build prosodic structure by embedding smaller units inside larger domains Since the first /t/ is housed at the top of the representational hierarchy, significant strengthening effects are predicted (Choi 2003 for English). 'Adjunction' systems (left), in turn, place initial and non-initial 'segments' on the same hierarchical level. This results in negligible strengthening effects, if any, since the structure is flat, which has so far been observed in Polish.

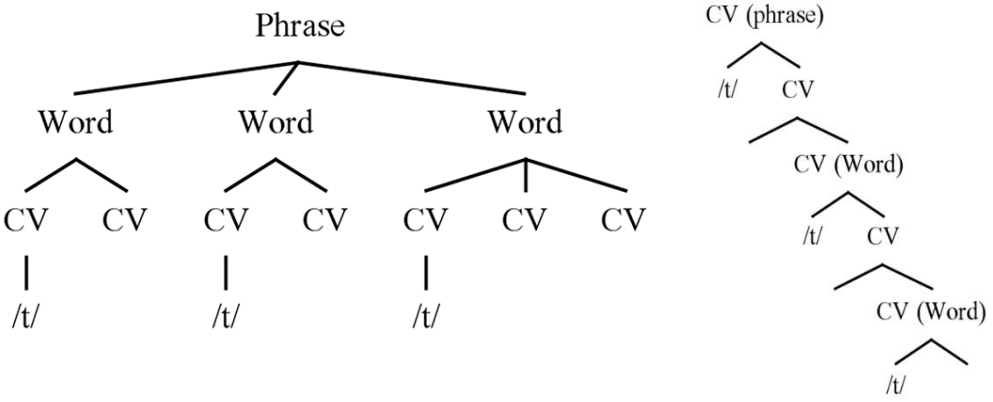

Figure 1. 'Adjunction' (left) and 'submersion' (right) systems (after Schwartz 2016)

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Connor Youngberg

The moraic nasal in Tokyo Japanese: the phonetics of nasalisation

In this talk, I present fieldwork data examining nasalisation triggered by nasal consonants in Tokyo Japanese (**TJ**) and I consider the impact of empirical data on the existing phonological hypotheses. I aim to clarify 1) the existence or absence of nasalisation preceding nasal onsets and the moraic nasal, and to examine the 2) onset and 3) duration of nasal airflow in the five vowels of Japanese {a, i, u, e, o}.

Japanese has both onset nasal consonants {n, m}, as in [hana] 'flower' [kami] 'spirit', and an underspecified moraic nasal, or **N**, which is uvular/dorso-uvular finally and intervocalically, e.g. [hoN~hoɯ̃] 'book', or homorganic preceding a consonant, e.g. [hondana] 'bookshelf' (McCawley 1968, Itō 1987, Vance 1987, 2008; Labrune 2012, Kubozono 2015). However, it has recently been proposed that a vowel-moraic nasal (VN) sequence is in a long nasal vowel in TJ (Youngberg 2017, 2018). This hypothesis is supported first by the existence of nasalisation of the vowel preceding N as well as the patterning of VN with long vowels and diphthongs in tone assignment and spreading.

Until now, nasalisation has not been empirically investigated for TJ. Vance (1987, 2008) simply notes that it exists preceding N and not a nasal onset. Intrumentally, the existence of nasalisation has only been verified in TJ for the sequence <eN> by Ushijima & Hirose (1974), with oral closure during the production of N being the focus of their investigation. The following issues must be clarified: 1) do both onsets and N trigger nasalisation? 2) how regular is nasalisation? 3) Where nasalisation exists, when does it occur and what is its duration?

In this talk, I will first present the arguments for N as a coda consonant or a nasal vowel. I then present results from 4 speakers of Tokyo Japanese recorded in Japan. Recordings are made using an accelerometer microphone placed on the lateral nasal cartilage and an oral head-worn microphone, following similar studies from Tronnier (1999) for Osaka Japanese and Audibert & Amelot (2011) for French. Results from a timed reading task and a word repetition task are discussed, focusing on the vowels preceding nasal onsets and N. This paper will clarify the nature of nasalisation in Tokyo Japanese in an empirical manner and will also impact the debate regarding the nature of N and its representation. Future directions are discussed in the conclusion.

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The acquisition of Polish consonant clusters: A corpus study

Phonotactics investigates permissible sound combinations in a language. Polish is a phonotactically rich language which allows for as many as 5 consecutive consonants intramorphemically, 6 consonants intermorphemically and 11 consonants in sandhi contexts. Numerous cluster types in Polish do not comply with any available scales predicting the goodness of a cluster, e.g. *Sonority Sequencing Generalisation* (Selkirk 1984) or the *Net Auditory Distance* principle (Dziubalska-Kołaczyk 2009).

Traditionally, the goodness of clusters has been determined by *Sonority Sequencing Generalisation* (Selkirk 1984; henceforth SSG). The principle entails measurements of distances between consonants expressed by the manner of articulation, which reflects the degree of aperture of the vocal tract. The SSG states that sonority of adjacent segments should decrease from the nucleus outward, and clusters which obey this pattern are deemed unmarked. An alternative approach to cluster evaluation has been proposed by Dziubalska- Kołaczyk (2009). The *Net Auditory Distance* principle (henceforth NAD) formulates universal preferences for optimal clustering, depending on the length of a cluster and its word position. Cluster quality (preferred or dispreferred) is based on *three* criteria of consonant description: manner and place of articulation as well as the distinction between an obstruent and a sonorant in a sequence. The condition for a preferred word-initial or -final CC cluster states that the distance between the two neighbouring consonants (C_1C_2) must be greater than (or at least equal to) the distance between the vowel and the neighbouring consonant. Clusters which violate the NAD condition(s) are considered dispreferred. The principle allows for a binary and scalar evaluation of clusters.

The goal of this contribution is to investigate the process of phonotactic acquisition by Polish children. The main hypothesis predicts that preferred / unmarked clusters will obtain lower reduction rates than dispreferred clusters. The assumptions of the NAD principle will be tested empirically in a corpus-based study (CHILDES; MacWhinney, 2000; Weist et al. 1984, Rose & MacWhinney, 2014). A mixed effects logistic regression model has been fitted to the dataset with the lme4 package (Bates et al. 2015) in R (R Core Team 2018) to examine factors affecting cluster rendition (intact or modified) including NAD, word position, cluster size, the presence of a morphological boundary, logarithmic frequency, word length, and age.

It is hoped that the study will enrich the crosslinguistic data pool regarding phonotactic acquisition.

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