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QUANTITY AND DURATION IN LATVIAN SONGS FROM WWI

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Almost 100 years ago, Wilhelm Doegen persuaded the German Academy of Sciences to establish a sound archive. The goal for the archive was to collect sounds such as poems, stories, Bible verses, and songs in a variety of languages. In part, the archivists planned to record samples of the many languages used by prisoners of war in Germany. The sound archive contains 156 recordings in Latvian, some are from POW's, others were added during 1920's. It is housed at Humboldt University in Berlin.

In this report, we focus on some of the songs and poems found in the archive. We describe the way duration, the acoustic-phonetic realization of quantity, is used in the texts. In the future we intend to compare the speech and singing styles recorded during WWI with more modern styles.

Our data set consists of 3 excerpts from spoken poems and 3 excerpts from sung folk songs. We examined the durations of vowels, syllables, and poetic lines. The recording technology was the best available at the time, but the recordings contain a great deal of noise making measurements challenging.

Both spoken and sung texts emphasize, sometimes overemphasize, stress and rhythm. In spoken poems, the contrast between long and short vowels appears to be maintained whereas in songs, contrastive vowel quantity is overridden by the melody. Both short and long vowels are prolonged when under emphasis in a poetic line. Some talkers used exaggerated adherence to the beat of the verse so that meter overwhelmed normal stress patterns.

PRODUCTION OF ESTONIAN VOWELS BY LATVIAN SPEAKERS

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L2 theoretical models such as the Speech Learning Model (SLM) (Flege 1995) and the Perceptual Assimilation Model (PAM-L2) (Best & Tyler 2007) state that the ability to acquire L2 sounds depends on the phonetic distance between similar segments in L1 and L2. Several studies have shown that L1 vowel inventory size effects the L2 perception, however, with contradictory results. Some studies show that if L1 vowel inventory is larger than the vowel inventory of the target language, then it may facilitate L2 vowel learning (e. g., Iverson & Evans 2007), other studies report that subjects with smaller L1 vowel inventory than the target language outperform subjects with larger L1 vowel inventory (e. g., Escudero et al. 2014).

In the case of Estonian and Latvian, six vowel phonemes (transcribed as /i e æ a o u/) are phonetically similar, while Estonian has three additional vowels /y ø ɤ/. Both languages exploit the duration cue to distinguish phonemic contrast between short and long vowels.

The current study explores the acoustic characteristics of Estonian vowels produced by L2 subjects of Estonian with Latvian language background. In the study, the recordings of 20 L2 speakers (all female) were used. Most L2 subjects (age 19–39) come from monolingual Latvian speaking families, four subjects from Latvian-Russian or Latvian-Polish bilingual families, and three subjects from monolingual Russian families. Most of subjects started to learn Estonian at the age of 18–20, the majority of them rated their proficiency in Estonian as “basic” or “intermediate”, two subjects as “advanced”.

We hypothesize that the L2 speakers (1) apply their native vowel categories in the production of the Estonian /i e æ a o u/ since these L2 vowels assimilate well with their L1 categories; (2) have deviant production of new vowel categories /y ø ɤ/. However, differences in L2 production depending on subjects’ language background and L2 proficiency are expected.

A *Praat* script was used to measure formant frequencies F1–F4 in the middle vowels in primary-stressed syllables. The L2 formant values were compared to the formant frequencies of the native Estonian vowels. The results confirm our hypothesis — the L2 vowels matching Latvian vowel categories were produced close to the native Estonian

subjects, and main deviations were found in the production of new vowel categories.

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ON ASSOCIATION LINES

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The aim of this talk is to answer two theoretical questions: (1) what is an association line; and (2) why do we need it to realize a value (i. e., a position or a feature)?

Distinctive operations in phonology are permutation and commutation (Hjelmslev 1943). Permutation is achieved by interchanging two units in the syntagmatic dimension (e.g., *dog* ~ *god*). Commutation is achieved by interchanging two units in the paradigmatic dimension (e.g., *dog* ~ *bog*).

Trubetzkoy (1939) and Hjelmslev (1961/1943) distinguish two types of distinctive units: phonemes and prosodemes. Phonemes can permute (1a.i, ii) and commute (1a.iii, iv). Prosodemes can only permute (1b.i, ii) or they can only commute (1c.iii, iv).*

(1)	a. <i>phoneme</i>	b. <i>prosodeme</i> (type A)	c. <i>prosodeme</i> (type B)
i.	[patɛʁ] 'peg'	[mu'ka] 'flour'	*[ɛɦt]
ii.	[paʁtɛ] '(he) left'	['muka] 'torment'	*[tɛɦ]
iii.	[paʁtɛʁ] 'flowerbed'	*['mu'ka] 	[ɦɛɦt] 'hate'
iv.	[patɛ] 'stalemated'	*[muka] 	[ɛɦt] 'eight'

Accordingly, the difference between a phoneme and a prosodeme is dimensional. A phoneme is defined by distinctive relations in two dimensions (2a). A prosodeme is defined by distinctive relations in one dimension (2b, c).**

(2)	a. <i>phoneme</i>	b. <i>prosodeme</i> (type A)	c. <i>prosodeme</i> (type B)
	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 100px; margin-right: 10px;"></div> <div style="border-bottom: 1px solid black; width: 100px; height: 100px;"></div> </div> <p style="text-align: center; margin-top: 5px;">s</p>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-bottom: 1px solid black; width: 100px; height: 100px;"></div> </div> <p style="text-align: center; margin-top: 5px;">s</p>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; width: 100px; height: 100px; margin-right: 10px;"></div> <div style="border-bottom: 1px solid black; width: 100px; height: 100px;"></div> </div> <p style="text-align: center; margin-top: 5px;">p</p>

* Data in (1a), (1b) and (1c) are from French, Russian and English, respectively.

** s and p mean *syntagmatic dimension* and *paradigmatic dimension*, respectively.

Units defined by the syntagmatic dimension correspond to the skeletal positions of Autosegmental Phonology. Units defined by the paradigmatic dimension correspond to features. Consequently, an association line between a position and a feature is an intersection between the syntagmatic dimension and the paradigmatic dimension (i. e., the phoneme in 2a).

Unlike prosodemes, phonemes are autonomous: they can be realized by themselves. It follows that a distinctive unit is autonomous if it results from an intersection. Why?

Dimensions can be represented with continuous lines. The points of a line cannot be distinguished from each other. However, the limits of one point can be determined by an intersecting line (2a). When delimited, the point becomes an autonomous item: it can be distinguished from the other points of the line. In the same way, positions and features become autonomous items iff they are delimited by an intersection (i.e., an association line).

To conclude, I claim that Autosegmental Phonology is not a theory but a theorem derived from the definition of distinctive units with respect to syntagmatic and paradigmatic dimensions. I conclude that association lines are intersections delimiting distinctive units in their own dimensions. Delimited units are autonomous, i. e., realizable by themselves.

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CROSS-FEATURAL POLARITY IN TENYIDIE TONE

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Polarity is a highly debated topic in the languages of the world because of its powerfulness, and true polarity is at least rare if not non-existent (Bye 2010; de Lacy 2012). Apart from reporting polarity in Tenyidie (Angami), this research also examines the observation that tonal alternations in the language apparently show a new type of polarity where one feature is polar to a feature of another type. Here we present an alternative analysis of this apparent polarity in terms of OCP-driven tone insertion in a non-parallel model of grammar.

Tenyidie is a Tibeto-Burman language spoken in Kohima, Nagaland, in northeastern India. Tenyidie has four level tones — Extra High, High, Mid, and Low (Blankenship et al. 1992; Meyase 2014). Featural representation of tones have been argued for in the literature by the likes of Yip (1980) and Pulleyblank (1986); and Tenyidie tones fit into Yip’s model as in (1).

(1) Featural representation of Tenyidie tones following Yip (1980)

Register	+Upper		–Upper	
Pitch/Tone	+high	–high	+high	–high
Tone in Tenyidie	Extra High /ě/	High /é/	Mid /ē/	Low /è/

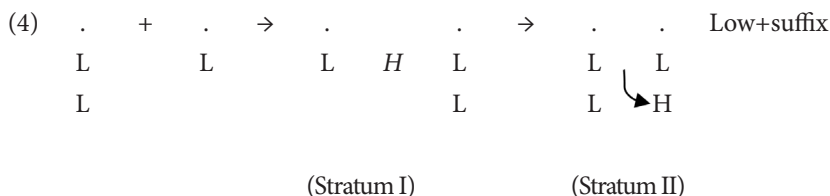
A class of suffixes in Tenyidie is underspecified for $[\pm\text{high}]$ and we see the polarity pattern here. In (1), the suffix /lie/ is specified $[-\text{Upper}]$, but the unspecified $[\pm\text{high}]$ is derived in accordance to the \pm value of the $[\pm\text{Upper}]$ in the stem, which is the observed polarity.

(2) vǒ	liè	sá	liè
$\left[\begin{array}{c} +\text{Upper} \\ +\text{high} \end{array} \right]$	$\left[\begin{array}{c} -\text{Upper} \\ -\text{high} \end{array} \right]$	$\left[\begin{array}{c} +\text{Upper} \\ -\text{high} \end{array} \right]$	$\left[\begin{array}{c} -\text{Upper} \\ -\text{high} \end{array} \right]$
	“to go” + IMP		“to repeat” + IMP
prū	liē	lè	liē
$\left[\begin{array}{c} -\text{Upper} \\ +\text{high} \end{array} \right]$	$\left[\begin{array}{c} -\text{Upper} \\ +\text{high} \end{array} \right]$	$\left[\begin{array}{c} -\text{Upper} \\ +\text{high} \end{array} \right]$	$\left[\begin{array}{c} -\text{Upper} \\ +\text{high} \end{array} \right]$
	“to jump” + IMP		“to go down” + IMP

The data here can be seen as rule in (3) using the alpha notation (Gregersen 1974). The novelty here is that the alpha rule applies cross-featurally.

$$(3) \left[\begin{array}{c} -Upper \\ \emptyset \end{array} \right] \rightarrow \left[\begin{array}{c} +Upper \\ \alpha high \end{array} \right] / [-\alpha Upper] \text{ ______}$$

We propose the reanalysis of this phenomenon by using Clements' (1983) tone features, which are essentially like Yip's, except that the features in both the hierarchical tiers are the same (H and L). Here we assume strata (Bermudez-Otero 2018) and propose that an OCP violation of L-L in the first stratum leads to an H insertion, which then moves to the next tonal tier to give the suffix a full tone status as is shown in (4).



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ACOUSTICAL CORRELATES OF LITHUANIAN AND LATVIAN PITCH ACCENTS: A COMPARATIVE PERSPECTIVE

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At first glance, the phonetic nature of Lithuanian and Latvian pitch accents may seem different. Initial discussion of this topic dates back to the middle of the 19th century. Kuršaitis (1849) was the first to describe Lithuanian pitch accents in terms of acoustic properties (i. e., of tonal modulation). According to him, there are two pitch accents in Lithuanian: one with rising pitch (in Kuršaitis' German terminology, *Schleifton*) and the other with falling pitch (*Stosston*). Such an approach was widely adopted among European linguists. Although extensive investigative work was done afterwards to provide a more detailed picture, despite all efforts none of this appeared adequately reliable. Nowadays, the concept of acoustic complexity remains very popular among Lithuanian phoneticians. It is based on the common assumption that Lithuanian pitch accents can be distinguished by a complex of different acoustic features (i. e., duration, intensity, and F0).

In literature on Latvian prosody, the three pitch accents are usually called the broken tone, the falling tone, and the level tone. However, at present this ternary system remains functional only in some varieties of Latvian (to be more precise, in Standard Latvian and in a small area around the town of Valmiera). In fact, the original ternary system has been transformed into a binary one in all other varieties of the Latvian language. The acoustic profile of pitch accents varies from dialect to dialect. In the eastern dialects (High Latvian), the distinction of phonological accent is based mainly on glottalization (i. e., glottalized *vs.* unglottalized vowels), while in the central and western parts of Latvia, on pitch sustainability (sustained *vs.* unsustained vowels).

This presentation introduces an alternative formula, which opens a perspective for the investigation of pitch accent in terms of the rate of pitch change. The tone sustainability coefficient — i. e., a derivative of pitch acceleration with respect to time (in physics it is known as jerk (*j*)) proved to be a parameter of great reliability. Such a coefficient mainly refers to the evenness of pitch production, rather than its directional motion (rise or fall); i. e., it estimates to what extent the average acceleration decreases towards zero. Sudden and noticeable change in pitch acceleration (steep rise or fall, or rise-fall, fall-rise, etc.) results in decreased sustainability. In contrast, a zero-rate value occurs in cases of steady and

level pitch in pronunciation (although absolutely steady pitch is unattainable in real speech). This different kind of measurement leads to the assumption that pitch shape (i. e., rising *vs.* falling pitch) in fact has little to do with the acoustical essence of Baltic accents. In contrast to discrete parameters (vowel length, pitch range, extrema, shape, etc.), the sustainability coefficient is more reliable for our purpose, as it represents the ratios between the parameters.

INTONATION AND TONE REFLECTED IN HAKKA

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The goal of this article is twofold. One is to examine the interaction between tone and intonation on the basis of Hakka data. The other is attempting to test how far ToBI (Tones and Break Indices) can account for the intonation patterns of Hakka. In the Chinese literature, two theories of intonation representation were proposed, each supported in some empirical studies. The first one proposed that intonation came up with the accumulation of each tonal pitch. The second one was on behalf of fixed tone, claiming that there were fixed intonation patterns up to different tonal contours. With the advent of ToBI, various types of intonation representation and characterization were proposed.

The present research was based on a mini-corpus of 1500 utterances collected from authentic conversation. The analysis was carried out by an automatic program compatible with *Praat*. In brief, three points of each syllable (initial, middle, ending) were captured, which in turn lined with *MS Excel* so that the contour (ups and downs) of each utterance (sentence) can be characterized.

The findings are rather interesting. First of all, most of the intonation patterns are subject to the variation of tonal pitch. Most intonation in Hakka is mainly determined by lexical tones, no matter what sentence patterns they are, i. e., statements, interrogative (yes/no questions, wh-questions, or alternative questions), and/or narrow focus. To illustrate, consider the lexical tones in the following sentence: *Sin₅₃ sang₅₃ mai₅₃ ki₅₃ pen₅₃* ‘The teacher is buying an ice pop’ (Figure 1). The overall intonation shape is kind of consecutive units of 53 (from high to mid or low), although the down step makes the high falling lower than the first. Secondly, it was found that pragmatics (moods in angry, emotional, excited expressions) plays an essential part in intonation patterns. As for the ToBI framework, it was shown that, as a model of representation for intonation, the ToBI framework works well enough, if modified to a certain extent. For the Hakka intonation patterns, the number of tiers is more or less the same as the one proposed for Cantonese (Wong et al. 2004).

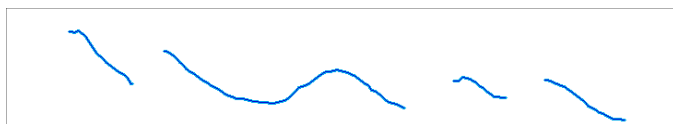


Figure 1. Intonation contour for the sentence *Sin₅₃ sang₅₃ mai₅₃ ki₅₃ pen₅₃* ('The teacher is buying an ice pop')

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THE STOIC CONCEPT OF THE *LEKTON* AS A HYPERNYM FOR INTONATION IN THE ANCIENT GREEK TRADITION

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In linguistics, it has been widely accepted that the Stoics, whose work ranged from 5th c. BC (Zeno) to approximately 2nd c. AD (Marcus Aurelius), were the first to dwell theoretically on the linguistic concept of the sign and the distinction between a sentence as a linguistic structure and the underlying thought as a cognitive structure. In this line of reasoning the ancient Greeks gradually realized that on the surface the problem could be remedied by means of punctuation marks, used in addition to the existing prosodic marks, and by the 2nd c. BC Aristophanes of Alexandria had been using them.

The term *intonation* is a medieval Latin coinage and followed similar usage (cf. for English, John Hart's use of *intonation* in connection with the discussion of punctuation marks way back in 1569). The problem was far more elusive when it came to the disambiguation of segmentally identical utterances (e. g., *He doesn't beat his wife because he \ likes her. vs. He doesn't beat his wife because he \likes her.*). In such cases the Stoics would refer to the *lekton*, pl. *lekta* (\approx 'sayables'). (Gk. *adjectivum verbale* from vb. *legein*, meaning not just the process of speaking but emphasizing the meaningfulness of the process, i. e., "having in mind", "implying", "presupposing".) "Three (elements) are amalgamated together — the signified (sense), the signifier (sounds) and the object. ... Of these elements two are material, i. e., the object and the sounds... It is only the signified that can be articulated (*lekton*), which can be true or false" (cf. Sextus Empiricus, *Adv. math. VIII, 11–12*). Thus, *lekton* is (1) the signified in the speech chain, i. e., it is bigger than a word; (2) it is always "immaterial" (or as it has come to be termed "abstract"), and (3) it can be true or false, but the latter feature is not mandatory. Intonation will be viewed with reference to the Stoic criteria of *lekta* and its relation to concepts such as 'presupposition' and 'implicature' shall be established.

TIME COURSE OF PHONETIC CONVERGENCE IN SPANISH-ENGLISH AND KOREAN-ENGLISH BILINGUALS

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Although articulatory patterns stabilize with increasing mastery of a native language, they are still susceptible to change. Numerous investigations have shown that conversational interaction, word shadowing, and listening to words lead to convergence among linguistic phonetic variables: phonetic accommodation (e.g., Shockley, Sabadini & Fowler 2004). In addition to investigations of speakers of a shared native language, phonetic accommodation has also been detected among non-native and bilingual speakers (Tobin, Nam & Fowler 2017).

The aim of the present investigation, was to induce and measure phonetic convergence in Voice Onset Time (VOT) in two groups of bilinguals (Spanish-English and Korean-English) in a word shadowing task. Spanish and Korean were chosen because of the relation of their voiceless stop VOTs to those of English. Spanish voiceless stops have short VOTs (~20 ms) and Korean aspirated stops have long (~120 ms) ones. English voiceless stops have intermediate VOTs (~70 ms).

Participants completed a baseline word-reading task, 10 repetitions \times 40 [k]-initial monosyllabic English words ($n = 400$). They then shadowed recordings of the same 40 words, spoken by a monolingual female native speaker of American English, presented over headphones. The shadowing task was to induce convergence towards English VOT. Ten repetitions of the shadowing task were also completed. After each two repetitions of the shadowing task, participants completed an additional two repetitions of the word-reading task as a test task ($n = 2$ repetitions \times 40 words \times 5 divisions = 400). We compared the test tokens to the baseline tokens.

In preparing the data, we divided VOTs by the duration of each VOT + following vowel (VOT quotient or VOTQ) because VOT is positively correlated with syllable duration (Allen, Miller & DeSteno 2003) — a potential confounder. Further, we centred participant response VOTQs (CRVOTQ) on participant mean baseline VOTQ, such that positive values indicate increases in participants' VOTQs from baseline, and negative values, decreases. We applied the same centring procedure to the model speaker's VOTQs (CMVOTQ), such that positive values indicate model speaker's VOTQs above participant mean baseline VOTQ and that negative values indicate model speaker's VOTQs below participant mean base-

line VOTQ. This allowed us to directly assess accommodation. Analysis of the data with polynomial mixed effects regression (Singer & Willett 2007) in the *R* statistical environment revealed convergence across the range of CMVOTQ among both groups. At the beginning of the test task, convergence correlated quasi-linearly with CMVOTQ. However, while this effect remained steady for the Korean group, the Spanish group showed reduced convergence at the extremes of CMVOTQ, following our predictions.

We conclude that the distance between a phonetic target and a speaker's typical productions impacts the likelihood of convergence but that this effect is language- and time-dependent.

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ENERGETIC EVALUATION OF THE ENGLISH FAIRY TALE'S PROSODIC ORGANIZATION

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A characteristic feature of modern linguistics is the tendency to renovate its paradigms using the tools of interdisciplinary studies. In phonetics there has been introduced an innovative speech energetics theory (Kalyta 2015) explaining the psycho-energetic nature of speech generation and perception. In this regard there is a need to introduce new methods of experimental phonetic research that can evaluate the speech energetic potential, thus increasing the effectiveness of interdisciplinary study of oral communication.

The aim of the paper is to experimentally verify the energetic potential of spoken English fairy tales by using such innovative methods of phonetic research as a quantitative K-criterion of the texts' emotional and pragmatic potential as well as formation of the text energy-grams.

We have chosen the fairy tale as a material of our study since it is a didactic story that accumulates in its plot the archetypal ideas of folk wisdom and thus can be regarded as an effective means of realizing a subliminal influence on its recipients having a considerable energetic potential.

The undertaken study comprised realization of several methodological steps. Within its first step we searched for a structural pattern of the fairy tale plot (Taranenko 2017), whose algorithmic model contains exposition, development of the events, climax, and denouement. Within the second step, to solve the problem of quantitative measurement of the level of the text emotional-and-pragmatic potential as well as to define a differential scale of evaluation of speech energetic phenomena we have theoretically substantiated the quantitative K-criterion (Kalyta & Taranenko 2012). The third step presupposed formation of graphical models of energy-grams, including intono-, emotion- and pragma-grams.

The evaluation of energetic characteristics of the fairy tale showed that in the "exposition" there is a gradual increase in its emotional potential within a low level ($17 \leq K \leq 22$) since it is pronounced within a mid-level voice range, moderate tempo and loudness. It lacks pitch fluctuations and its final rhythmic group has a low falling or level tone. We also registered a gradual increase of emotional potential in the "development of the

events” towards a low zone of the high level ($27 \leq K \leq 89$), its steady flow at the same level in the “climax” ($K = 103.4$) and a sharp drop to a low level within the “denouement” ($K = 29.4$). The prosodic organization of the “denouement”, whose function is to sum up the outcome of the problem raised in the fairy tale, is characterized by low falling terminal tones, expressing an inference of the characters’ deeds and serving the realization of socio-instructive function of the whole text.

The energy-grams also confirm that the spoken fairy tales have the highest level of emotional potential in the “development of the events” and “climax”. At the prosodic level this is reflected by emotional intonation patterns (descending sliding or broken stepping heads, emphatic melodic contour of a high falling tone of a wide range, pitch intervals between pre-terminal and terminal parts of the syntagm).

The study showed that the fairy tale’s energetic potential varies depending on the changes of the speaker’s psychoemotional state while perceiving the pragmatic loading of the text structural components and uttering them with definite prosodic organization.

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ENGLISH PRONUNCIATION IN INTERNATIONAL COMMUNICATION — ENGLISH AS A LINGUA FRANCA VERSUS ACCENT ATTITUDES: IMPLICATIONS FOR FOREIGN LEARNERS' PHONETIC INSTRUCTION

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Two major areas in pronunciation research that have developed vigorously in the last decades carry important, but also contradictory implications for international communication in English, the choice of appropriate phonetic models for foreign learners and their pronunciation instruction.

On the one hand, the concept of English as a Lingua Franca (e.g., Jenkins 2000; Seidlhofer 2011; Walker 2011) stresses the importance of international communication via English, mostly between nonnative speakers, in which mutual intelligibility is of primary significance. In this approach all varieties of accented, but intelligible English are acceptable, also as pedagogical models for foreign learners (e.g., Walker 2011). This means a high degree of tolerance for learners' many L1 accent features which do not need to be eliminated in the course of phonetic instruction.

On the other hand, research in foreign accent perception and assessment, i.e., in accent attitudes (e.g., Lippi-Green 1997; Moyer 2013), demonstrates that accented speech is usually negatively evaluated by both native and nonnative listeners, which in extreme cases can even lead to cases of accent-based discrimination. This implies that a foreign accent might involve the risk of learners' stigmatization in contacts with other users of English. Consequently, the goal of phonetic instruction should be eliminating as many nonnative accent features in learner English as possible.

It seems that the above conflict can be meaningfully addressed by means of experimental studies with representative groups of foreign learners of English in which their perception and evaluation of various native and nonnative accents of this language is examined. This paper is an attempt to study these issues in the Polish context, typical of many countries, e.g., Latvia, in which English is a frequently learnt foreign language, but where it is not in common use. 40 Polish EFL learners first completed a questionnaire concerning their use of English and opinions on the global spread of English. Next they listened to 11 samples of English produced by both native and nonnative speakers, attempted to identify their nationality and assessed the samples' degree of accentedness, comprehensibility and acceptability. The participants also expressed their

views on the suitability of each of the 11 accents as possible instructional pronunciation models. According to the collected data, all of them want to learn native English pronunciation and reject other options, providing thus some evidence for the correctness of the approach that is implied by accent attitude research.

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PHONOLOGICAL MARKEDNESS IN APHASIC SPEECH ERRORS: A STUDY IN HINDI

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Linguistic markedness has been based mainly on the distribution of phonemes in the languages of the world, and to lesser extent on data on language acquisition: the unmarked phonemes are those more widely distributed and acquired earlier by children. The analysis of data from the speech errors of children and adults with language impairments is an important tool in understanding the nature of phonological markedness. While languages such as English and Italian boast research and treatment studies in high figures, languages such as Hindi have very few (Beveridge & Bak 2011).

This study analysed the change in phonological markedness of phoneme substitution errors of five Hindi speaking aphasia patients from Delhi, India and compared them to data from Italian and English aphasia patients. Hindi belongs to the larger Indo-European family of languages which includes English and Italian. Modern Hindi has an inventory of 10 vowels and 33 consonants in its native phonology (Kachru 2006). Hindi distinguishes between voiced and unvoiced obstruents which are also phonemically contrasted for aspiration (the production of a distinctive breathy voice in producing them). Hindi also has a feature that is rare in Europe but common in the Indian speech area: retroflex consonants which are produced with the tongue curved back behind the alveolar ridge.

The analysis looked across the following metrics: (1) voicing (unvoiced less marked than voiced), (2) aspiration (unaspirated less marked than aspirated), (3) fronting (coronals less marked than labials and velars), (4) stopping (stops less marked than fricatives and affricates), and (5) retroflexion (non-retroflex consonants less marked than retroflex consonants).

The analysis found markedness effects for aspiration, fronting and retroflexion (with consonant substituting towards less marked forms), but not for voicing and stopping. It is also worth noting that moving away from aspirated and retroflexed consonants has a higher percentage of errors than other features. This suggests that aspiration and retroflexion in Hindi implies a higher degree of complexity than voicing or stopping. By neutralizing these features, the patients may achieve a stronger reduction of complexity. This difference may be due to different language groups

using different strategies to simplify output forms. While the outcome would be structurally/segmentally simpler, the process used to arrive there is different for different languages. Hindi patients tended to simplify along different feature criteria such as moving away from aspirated and retroflex consonants (which are absent as underlying representations in Italian and English). The tendency to simplify fricatives and affricates into stops (similar to Italian) shows that there is also some common ground between these languages. The inference would be that phoneme complexity may also have a hierarchical structure where the most marked forms such as aspiration and retroflex place values need to be simplified before coming to other feature dimensions. Further research is required in such languages to explore these issues.

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VOWEL QUANTITY: ANALYSIS OF THE LATVIAN LANGUAGE LEARNERS' DATA

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This study examines the acquisition of Latvian vowel quantity by native speakers of Russian (as well as other East Slavic languages — Ukrainian and Belarussian). The transcribed data of the oral part of the state language proficiency test are used in the study. These are interviews, in which language learners answer interviewer's questions and tell about a picture.

Latvian and Russian differ in their use of prosody. In Latvian, vowel quantity is phonemic and plays an important role in the language; while in Russian and other East Slavic languages, the short and long vowels are not differentiated. The Latvian language employs syllable rhythm and syllable intonation (pitch inflections on syllables); in the Russian language are no analogue to syllable intonations. Latvian is a language with fixed word-initial stress, while Russian uses variable stress.

The differences between the prosodic system of Latvian and Russian prevent Russian speakers from mastering the contrasting vowel of the Latvian language. In the analyzed data, the following deviations from the language norm were found:

(1) Russian speakers do not clearly differentiate between long and short vowels. In Latvian, vowel length ratio is about 1 : 2.5, while in the analyzed data it is about 1 : 1.5. Long vowels produced by Russian speakers are shorter than ones produced by native Latvians.

(2) The use of short or long vowel interacted with stress assignment. Russian speakers prolong short vowels in stressed syllables, e.g., *māns ūzvards* [ma:ns u:zvaɾts] 'my surname', and shorten long vowels in unstressed syllables, e.g., *rakstīt* [rakstīt], *skolotāja* [skuoluotaja]. This is also stated in the studies by Markus and Bond (Markus & Bond 1999; Markus, Bond & Stockmal 2003).

The higher the Latvian language proficiency level of language learners is, the duration of short and long vowels more corresponds to duration of native Latvians.

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ALLOPHONIC VARIATION OF LITHUANIAN MONOPHTHONGS PRONOUNCED IN CVC SEQUENCES, WORDS AND ISOLATION

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The main aim of this paper is to discuss spectral characteristics and relationship between Lithuanian monophthongs pronounced in isolation, CVC sequences and words and provide as accurate symbols (transcription) of the International Phonetic Alphabet (IPA) for all the vowel phonemes and allophones as possible.

In Lithuanian linguistics, *Lithuanian Grammar* edited by Vytautas Ambrazas (1997) was one of the first attempts to use IPA for representing Lithuanian sounds. Before, there were some more attempts to use IPA in some individual publications and studies (cf. Ekblom 1922; Mikalauskaitė 1975, etc.).

In this study, monophthongs of Standard Lithuanian /i: e: æ: α: o: u: ɪ <e> ε ɐ ɔ ʊ/ (cf. Girdenis 2014) were analyzed. The diphthongs were produced in zero context, symmetric and asymmetric CVC sequences and words by 12 native speakers (6 males and 6 females aged 20–50) with faultless articulation. It appeared that native speakers of Standard Lithuanian do not regard the short [e] (the variant of the *Janus* phoneme /e/) as a separate sound and therefore cannot pronounce it in isolation (zero context).

The analysis of the sounds was performed using free license sound processing and analysis software *Praat* (developed by Paul Boersma and David Weenink) and *WaveSurfer* (developed by Kåre Sjölander and Jonas Beskow). Mean value was calculated as the average of all realizations of a sound. To achieve statistical reliability, the data were obtained by summing up all realizations of a sound (from all informants); the quantity or qualitative features of each sound were measured no less than 30 times. The obtained data were further processed using *MS Excel*. To compare female pronunciation data to male data, normalization of the results was performed.

Despite different productions and the context (adjacent sounds and other factors), the results of the experimental research show distinction between long and short Lithuanian monophthongs both on combined cues of the formant structure and the relative duration. Lithuanian short monophthongs significantly differ from their long counterparts displaying the effect of the acoustic centralization in comparison with the corre-

sponding long ones (cf. Grigorjevs & Jaroslavienė 2015a; 2015b; Jaroslavienė 2014; 2015; 2017).

Possible IPA symbols for monophthong allophones of Standard Lithuanian (based on their acoustic qualities and other features analyzed in this study) to be discussed as well.

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INTERPRETATION OF FINAL UNSTRESSED VOWELS AFTER SOFT CONSONANTS IN RUSSIAN NOUNS: DOES MORPHOLOGY MATTER?*

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The aim of our study was to experimentally check the assumption that morphological information can influence the perception of unstressed vowels after soft consonants in the endings of homonymous forms of Russian nouns (such as *pol'e* that can be either 'field.NOM.SG', 'field.ACC.SG' or 'field.LOC.SG'). Šaxmatov (1941/1925) mentions this idea and then Panov (1960) proposes a way of its experimental verification.

Our study consisted of two experiments. In the first one, we used the method described by Panov. We asked 100 native Russian speakers to read two phrases ((*grad padal*) *na eto pol'e* 'the hail was falling on the field.ACC.SG' and (*rabotal'i*) *na etom pol'e* 'worked.PL in this field.LOC.SG') and answer in which of them the final sound was closer to the [i] sound. The results supported the hypothesis about the morphological influence as 69% of the participants reported that the final sound is closer to the [i] sound in the Locative form, whereas only 11% reported the opposite and 20% regarded the final vowels in both contexts as being the same.

For the second experiment, we recorded a list of phrases containing three Russian nouns with an unstressed final vowel expressed by the letter *e* after a soft consonant (*pol'e* 'field', *mor'e* 'sea', and *gor'e* 'grief') in Nominative/Accusative, Locative, and Genitive. Then we extracted these words from the phrases and presented them as stimuli in the experiment where 30 native Russian speakers read the beginnings of the phrases (for example, *Eto širokoje ...* 'This is a wide ...') and had to decide whether a word that they heard afterwards suited the context. Besides the stimuli, we used 18 other nouns as fillers. The preliminary results we got contradict the hypothesis about the morphological influence as the participants did not differentiate between the majority of the homonymous stimuli.

In our talk, we will compare the results we got in both experiments and discuss methodological implications of this research for further psycholinguistic studies of phonology.

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CHARACTERISTICS OF LABIALIZED VOWELS IN THE STANDARD LITHUANIAN LANGUAGE

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In the linguists' works on Lithuanian, the attention has been devoted to the research of acoustic and articulatory characteristics of vowels and consonants since the beginning of 20th century. However, only in the middle of the 20th century more intensive experimental research period has started, after modernized research methodology opened broader possibilities to analyze sounds of both standard language and dialects more efficiently and more precisely. The features of vowels and consonants of the Lithuanian language have been studied by many scholars, but of all the acoustic characteristics, the duration of the vowels is studied most thoroughly.

Traditionally, there are two variants of vowels usually recognized in phonetics: positional and combinational. Positional variants depend on accent. This feature has been extensively investigated in the Lithuanian language. Combinational variants of vowels is another phenomenon which occurs due to the influence of adjacent sounds. There are only few research works on combinational variants in Lithuanian. Therefore, the aim of this paper is to describe one type of the combinational variants, i.e., labialized vowels, and compare the main qualitative and quantitative characteristics of labialized and isolated Lithuanian vowels found by instrumental research.

The main properties of labialized vowels found by in this study are as follows: (1) for labialized vowels, F1 in most cases is higher than F1 of the corresponding isolated vowel; (2) front vowels have lower F2 than the isolated ones, while for back vowels the tendency is opposite — F2 is always higher; (3) F3 is always lower for labialized vowels.

ADAPTATION OF THE VOICED AFFRICATE IN ENGLISH LOANWORDS INTO RUSSIAN

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This paper reports on an online adaption experiment in which native speakers of Russian with no command of English were asked to transcribe using Cyrillic characters a set of English words containing the voiced palato-alveolar affricate in different positions, i. e., word-initially, word-medially and word-finally. The asymmetry in voice contrast for the Russian affricates, and therefore the absence of the voiced affricate from the Russian phonemic inventory makes the issue of its adaptation particularly interesting. While the examination of the established loanwords has shown that in Russian the sound in question is predominantly adapted as a combination of two sounds: the dental stop /d/ and the retroflex fricative /ʒ/, the data of our experiment demonstrates that when the perception of the sound is involved it is predominantly adapted as /t͡ʃ/ or even /t/ by the Russian speakers. Thus, the present paper aims at establishing phonetic as well as phonological factors behind the uncovered adaptation patterns. Moreover, the comparison of the two sets of data, i. e., established and online loans, sheds light onto the nature of /dʒ/ nativisation in the Russian language as well as adds to the debate of the loanword adaptation process in general.

CHANGES IN THE SYSTEM OF INITIAL BE-PHONEMIC CONSONANTAL CLUSTERS THROUGH THE HISTORY OF ENGLISH

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It is known that the accumulation of the results of different studies of phonemic syntagmatics into a unified scientific picture can form a solid basis for a further comprehensive research of their phonosemantic and phonotactic possibilities from both diachronic and synchronic points of view. We believe that the results of our study focused on qualitative and quantitative changes in initial bi-phonemic clusters throughout the historical development of the English language can promote the fulfillment of the stated task.

According to *An Anglo-Saxon Dictionary*, the OE period was characterized by 19 initial clusters (*bl, br, fr, gl, gr, hl, hr, hw, sc, sl, sm, st, sp, sw, tr, tw, wr, þr, þw*), in ME in *A Middle-English Dictionary Containing Words Used by English Writers From the 12th to 15th Century* 29 clusters (*bl, br, ch, cl, cn, cr, dr, fl, fr, gl, gr, hl, hw, pr, qv, sc, sh, sk, sl, sm, sn, sp, st, sw, tr, tw, þr, þw, vr*) were registered, while in MnE (*Longman World Wise Dictionary*) there are 23 bi-consonantal clusters (*bl, br, ch, cl, cr, dr, fl, fr, gl, gr, kn, sc, sh, sl, sm, sn, sp, st, sw, th, tr, wh, wr*).

The comparative analysis of these clusters' functioning allows us to state that in all the historical periods the consonant /b/ easily combines with the sonorants /l/ or /r/, though with a two times higher frequency of *br*. It is worth noting that the cluster *br* was mentioned by J. Wallis in 1653 as a frequent one, having an associative meaning of abrupt and, as a rule, loud and unpleasant breakage or splitting into pieces (e. g., break, breach, brook).

Unlike the OE period, in ME *c*-clusters appeared, *cl* and *cr* being the most frequent ones. This period is also characterized by the introduction of *ch* and *cn* digraphs, that were absent in OE. Another fact is that the frequency of *hl* and *hw* cluster considerably decreased in ME and they totally disappeared in MnE.

In comparison with the OE period, *gr* was gaining its functional force in ME, being registered three times as frequently mainly in the words with a common denotative meaning of something unpleasant, grand, or cruel.

The evaluation of qualitative changes that took place in the MnE period makes it possible to state that similarly to the previous periods,

the highest recurrence at the beginning of the word continues to have a bi-phonemic cluster *st*, which has acquired the status of a phonosteme in the language system. The most varied combinations of clusters beginning with the sibilant /s/ are *sc, sh, sl, sm, sn, sp, st, sw*.

The initial clusters *bl, br, gr, tr, sp, sl, sc* remain the most active and productive ones throughout the three periods of the English language development.

MnE is characterized by a high frequency of functioning of such initial clusters as *dr, fl, fr, cr* and digraphs *ch* and *kn*, which were not registered in previous periods of the language development.

We believe that results of the initiated diachronic analysis aimed at registering the most stable consonantal clusters in the system of English can serve as a tool for further comprehensive research of phonosemantic possibilities of English phonemes.

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POSITIONAL VARIATION OF /l/ IN STANDARD LATVIAN: PERCEPTION EXPERIMENT

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Although the Latvian /l/ has never been described in terms of light and dark allophones, in a current study a certain amount of systemic acoustic variation was observed (Taperte 2017) suggesting higher degree of velarization of /l/ in final position, as well as considerable, although less pronounced, contextual variation. The aim of this paper is to test whether native Latvian speakers are able to perceive this kind of variation. For this purpose, a perception experiment was carried out.

To create stimuli, speech recordings of [l]V[l] sequences (V — one of the vowels /i e æ a o u/) from two native speakers of Latvian were used. 50 ms portions of both initial and final [l] and adjacent vowel were extracted from every sequence and then combined into four types of stimuli: (1) initial [l] + vowel; (2) final [l] + vowel; (3) vowel + final [l]; (4) vowel + initial [l]. Then a web-based survey was created following the 4IAX model suggested by Pisoni (1975): the stimuli were presented in two pairs (one consisting of two repetitions of the same stimulus and another one consisting of two different stimuli) and subjects (20 native Latvian speakers without speech or hearing disorders) judged which of the pairs sounded more similar. According to the results, listeners, with some exceptions, are mostly unable to perceive the position-induced changes in the acoustic quality of the Latvian /l/.

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SOME REMARKS ON LITHUANIAN CONSONANT-VOWEL COARTICULATION IN CVC SEQUENCES

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This presentation analyses interaction of Lithuanian consonants with vowels in CVC sequences; thus, anticipatory adjacent coarticulation (A←B) is explored. Consonant recognition is vowel-dependent and vowel formant trajectory must be evaluated before consonants can be reliably identified. The quality of consonants (obstruents, in particular) is observed at the starting point of the vowel formants; it is likely that the starting point of vowel formant transitions (loci) may help to interpret the patterns of coarticulation. In acoustic phonetics, the method of locus equations is used to explore the sensitivity of consonants to coarticulatory effects. Locus equations are linear regressions based on two data points: the frequency of the onset F2 and the frequency of the steady-state F2. The change of the two constant values, slope and y-intercept, depends both on the place of articulation in consonants and the effects of coarticulation (high slope and low y-intercept mean that consonants are most sensitive to coarticulation; low slope and high y-intercept mean that consonants are not very much resistant to the influence of the neighbouring vowels).

The results of the locus equation analysis show that Lithuanian velars (i. e., [k], [g], [x]), labials (i. e., [p], [b]) and alveolars (i. e., [tʃ], [ʃ]) are more sensitive to coarticulatory effects. Dentals (i. e., [z], [dʒ], [s], [ʈ]) and alveolars (i. e., [ʒ], [dʒ]) are almost not affected by coarticulation at all. Comparison of these results with the analysis of palatalized and correspondent non-palatalized consonants by Girdenis (2000) shows that in both cases the strongest coarticulation was observed in velars [k], [g] and alveolars [ʃ], [tʃ], while the weakest interaction was observed between dentals [z], [dʒ], [s], [ʈ] and their neighbouring vowels. However, Girdenis considers labials [p], [b] entirely resistant to coarticulation and alveolars [ʒ], [dʒ] sensitive to coarticulation. Variation of results may have occurred because of methodological differences: Girdenis used the substitution test to compare palatalized and non-palatalized consonants. The results correlate with the results in other languages based on the method of locus equation, cf.: results of English consonants (Reetz & Jongman 2009), Latvian consonants (Grigorjevs 2008; Indričāne 2013). Results of the analysis also show that Lithuanian pal-

atalized and voiceless consonants are more resistant to coarticulation than non-palatalized and voiced consonants.

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LATVIAN OCCLUSIVES IN THE PHONETIC CONTEXT OF DIFFERENT VOWELS: PERCEPTION EXPERIMENTS

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The current research deals with the occlusives of the Standard Latvian: plosives — bilabial /p b/, dental /t d/, palatal /c ɟ/, velar /k g/ and affricates — dental /ts dʒ/, alveolar /tʃ dʒ/ (LVG 2013). The aim of this study is to test the role of formant transitions in a recognition of the occlusives pronounced in the phonetic context of long vowels of Standard Latvian, i. e., /i: e: æ: a: ɔ: u:/. The long vowels are used to obtain the stimuli, as short vowels may be affected by reduction.

To achieve this aim, two perception experiments were carried out using two different sets of stimuli, where each occlusive (a release phase for the voiceless occlusives and a release phase preceded by voicing for the voiced occlusives) was combined with a 50 ms long portion of the following vowel, measured at its onset (Experiment 1) or at its middle part, i. e., stable stage (Experiment 2). The segments of 50 ms for the vowel were used, as it corresponds to the duration of the formant transitions reported in the literature (see, e.g., Kent & Read 1992, 116).

The stimuli were presented (1) to the group of 18 native Latvian speakers (native listeners) and (2) to the group of 18 foreign students at Rīga Stradiņš University that indicated German as their native language (non-native listeners).

To obtain the stimuli, naturally produced, isolated CVC syllables were used, e. g., [gi:g, ge:g, gæ:g, ga:g, gɔ:g, gu:g]. These syllables were pronounced by native male speaker of Standard Latvian and were edited by the *Praat* software.

The results show that formant transitions play significant role in the recognition of the occlusives at least for native listeners (in Experiment 1, all the occlusives are recognized almost equally well). However, similar difficulties are observed in recognizing occlusives in both experiments for non-native listeners. In the data of non-native listeners, labial, dental and velar occlusives have higher rate of correct answers, while palatal and alveolar occlusives are least recognized, as all non-native listeners have low rate of the correct answers for the occlusives [c], [ɟ] and [dʒ]. In Experiment 1, the greatest variation in responses for the occlusives is observed in the phonetic context of the vowel [ɔ:], while in Experiment 2 —

in the phonetic context of the vowel [ɑ:]. The most variable responses are obtained for the palatal plosives [ç] (Experiment 1 and Experiment 2) and [ʝ] (Experiment 2), since these sounds are not found in German.

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PARTIAL ADAPTATION AND IMPORTATION IN LOANWORD PHONOLOGY — AN OPTIMALITY THEORETIC APPROACH

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Loanwords are lexical items borrowed from one language (L2, the source or the donor language) into another linguistic system (L1, the target or the recipient language). In the course of borrowing, source items usually undergo various modifications so as to conform to the L1 grammar, a process called loanword adaptation (also integration, assimilation, accommodation or nativization). These changes may take place at different levels of phonological organization, including phonemic, phonotactic and prosodic ones.

However, sometimes loanwords are only partially adapted and retain certain foreign structures, for instance some French loanwords in Polish undergo complete phonemic substitution but preserve the original final stress, even though the default stress placement in Polish is on the penultimate syllable (e. g., *attaché* [ata'ʂɛ], *[a'taʂɛ]). Furthermore, there are cases of importation of foreign structures, e. g., *Knesset* may be pronounced in English with an initial [kn] cluster in spite of its ill-formedness in the native phonology. Both partial adaptation and importation pose a challenge to any phonological theory as they constitute violations of the surface generalizations of the language.

In this paper we argue that importation as well as different degrees of nativization attested in loanwords can be accounted for in a straightforward manner in an Optimality Theory analysis similar to Itô and Mester's (1995) account of lexical stratification in Japanese. There is no need to postulate a separate loanword phonology component when the fundamental assumption of the Extended Richness of the Base principle is adopted (Davidson et al. 2004, 340) which states that "[t]he final state of the grammar is in general a partial ranking containing floating faithfulness constraints." This means that the phonological grammar of a given language is understood not as a fixed ranking of markedness and faithfulness constraints but rather as a partial ranking, where the latter may occupy different positions. This has an important consequence for the nativization of loanwords. As argued by Davidson et al. (2004, 341), "[i]nputs that are not drawn from the native lexicon will in general yield variable outputs; with Faithfulness elevated from the base grammar, outputs of non-native inputs will in general violate the surface generali-

sations of the language.” In other words, cases of partial adaptation or non-adaptation of foreign items occur due to the promotion of FAITH with respect to the base ranking, i. e., the one producing core native outputs. Gradual elevation of FAITH results in deactivation of subsequent markedness constraints, which, in turn, produces increasingly faithful outputs violating the surface generalizations of the language.

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SELECTED PHONETIC PARAMETERS OF POLISH DERIVED FROM THE BABEL PHONETIC DATABASE FOR THE USE IN FORENSIC SPEAKER CHARACTERIZATION

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The Polish phonetic database was part of a European joint effort prepared under the title *BABEL: An Eastern European Multi-Language Database* (Roach et al. 1996) as a Copernicus Project No. 1304 that comprised corpora for Bulgarian, Estonian, Hungarian, Polish and Romanian. The project was conducted by an international group of phoneticians (the present author being one of the Project Leaders), under the auspices of scholars from Great Britain (P. Roach, J. Wells), France (L. Lamel, A. Marchal) and Germany (W. Barry, K. Marasek). The resulting data were supplied to the European Language Resources Association (ELRA). Upon its completion in 1998, *BABEL* was the largest high-quality speech database available for research purposes in the aforementioned languages and regarded as one of the most significant recent development in corpus linguistics, both in its contents and in setting up standards for spoken language corpora collection. It has been used for research in pronunciation modelling and automatic speech recognition. To this day *BABEL* continues to be a goldmine for obtaining information about the phonetic features (“parameters”) of its languages.

The aim of the present paper has been to subject the recordings of 50 women and 50 men from the Polish section of the Project to an analysis on Praat to obtain a list of parameters presented in the Voice Report, comprising Pitch, Pulses, Voicing, Jitter, Shimmer and Harmonicity. These data do not only broaden and bring up to date the knowledge about the working of speech mechanism of Polish, but also define the crucial normative ranges for comparing the sound pattern of Polish with those of other languages. They can also constitute the database background for the likelihood ratio used in forensic speaker characterisation. As illustration, statistics of selected phonetics parameters of Polish will be presented to draw conclusions as to the general abilities of human sound producing mechanism.

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THE PHONETIC CHANGES IN THE AREA OF SOUTHERN AUKŠTAITIANS OF THE NORTH

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The northern subdialects' area of Southern Aukštaitians (part of Elektrėnai, Kaišiadorys, Trakai, and Vilnius regions) is rather small yet variegated, consisting of several areas defined by dialects, other languages (Polish, Belorussian), and suburbs. The dialectal areas are rather composite as well: this is where the isoglosses of as many as three dialects (those of Southern Aukštaitian, Western Aukštaitian, and Eastern Aukštaitian) meet, yet the precise dialectal differentiation of the area is yet to be fully investigated.

This paper deals with some features of the phonetic changes in the area researched. In the second half of the 20th century, because of the narrowing of the vowels [i:], [u:] [ɑ:], [ɛ:] (< [ɑ:], [ɛ:]) and the preservation of the mixed diphthongs [ɑ], [ɛ] + [n], [m], [l], [r] the northern subdialects were attributed to the other Southern Aukštaitian subdialects. However, many other features of vocalism and consonantism (affricates [t͡s], [d͡z]; open word inflections [ɑ], [ɛ]; the unstressed [ie], [uo] stems of words; open unstressed [o:], [e:] word inflections, etc.) demonstrate that this area is markedly broken up to the smaller parts. The research data of the twenty-first century reveal that at present new phonetic changes ([ɑ:], [ɛ:]/[i:], [u:]; [t͡ʃ], [d͡ʒ]/[t͡s], [d͡z], etc.) are not stimulated by the neighbouring Aukštaitian subdialects, but rather by Standard Lithuanian, which has acquired higher prestige, as well as by increased population migration and other sociocultural factors.

PHONOCONCEPTS REPRESENTING ENGLISH UTTERANCES OF SYMPATHY

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A rapid development of cognitive linguistics, based on the ideas of synergetics, makes it possible to appeal to a deeper study of mechanisms stored in the individual's memory that form standard patterns of different types of utterances. According to recent studies (Kalyta 2015), such patterns, termed phonoconcepts, form an individual's phonoconcept sphere.

The phonoconcept is defined as a specific cognitive entity, formed on the basis of a person's communicative experience, that comprises a content minimum of knowledge, and is capable (1) of being stored in an individual's long-term memory in the form of a sound image or symbol and (2) of being reproduced in speech with the help of definite phonetic structures (Kalyta 2016). In view of this, it seems expedient to search for typical phonoconcepts that represent English utterances of sympathy of different pragmatic loading.

As a result of conducting an auditory and synergetic analyses of utterances of sympathy we have come up with the four patterns of their phonoconcepts, corresponding to four types of their pragmatic loading (expression of sympathy proper, compassion, consolation, encouragement) (Kutsenko 2017).

The prosodic organization of the first type of utterance aimed at expressing sympathy proper (*I'm |truly \sorry ... |for your \loss*) can be qualified as a phonoconcept of sincere sympathy. It is characterized by the following prosodic pattern: an ascending-descending melodic contour, comprising a low pre-head, ascending head, and a low falling tone; the presence of untypically long pause at the juncture of syntagms; a slowed down tempo on the final words, and a soft voice timber of the whole utterance actualization.

The analysis of utterances expressing compassion (*\Oh, |sweetheart,
-I'm \sorry. | \Really I \am. ||*) allows us to view the following prosodic means as its phonoconcept pattern: a whisper-like pronunciation of the first intonation group; pitch intervals between a high pre-head and a falling-rising nuclear tone; combination of several nuclear tones within one intonation group.

The phonoconcept of sympathy that conveys the speaker's intention of consolation (*-It's all /right |, you're |doing .really \well ||*) can be rep-

resented by: a descending-ascending melodic contour and a moderate tempo of the first syntagm; a mid-long pause at a syntagmatic juncture; an ascending-descending melodic contour and a slowed down tempo of the second syntagm; decreased loudness, delicate voice timbre and a lowered key of the whole utterance pronunciation.

The forth phonoconcept of sympathy aimed at encouraging its addressee (*\Nobody's .ready for \any of this, /dear. || But \you'll be surprised at how \strong you're |gonna |be ||*) comprises such an interplay of prosodic means: a wavy-like melodic contour, achieved by a sliding head and an emphatic high falling nuclear tone; similar rhythmic patterns in adjacent syntagms; increased loudness; light timbre.

The results of the analysis confirm that a prosodic pattern of sympathy is actualized due to the presence of certain phonoconcept-prototypes in the speaker's psychic sphere that generate one of the four described intonation patterns. All the varieties of sympathy utterances are realized within each of the four typical invariant intonation models and are conditioned by a communicative situation (formal/informal), the speaker's social status, and by the results of interaction between the elements of the acquired macro- and micro-society cultures present in the speaker's psyche.

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WORD STRESS PLACEMENT DIFFICULTIES IN L2 ACQUISITION*

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The languages of the world fall into two broad classes in terms of stress position — fixed-stress languages and free stress languages. However, the English language is neither a wholly fixed-stress nor a wholly free-stress language, but there are some general rules which do allow stress placement to be predicted in English words (McMahon 2002, 120). On the other hand, Slovak belongs to a group of fixed-stress languages with stress placement on the first syllable of the word.

This paper discusses problems with correct word stress placement in pronunciation of English by Slovak speakers of English as one of the most common mistakes in L2 production which contributes to misunderstanding in communication and affects the whole prosody of English language production. It is an example of a negative transfer from L1 to L2 (from Slovak to English).

The paper shows results of an experiment in which participants were university students whose native language is Slovak. We tested two groups of students: 30 post-entry bachelor students and 30 master degree students. Both groups are students of British and American Studies at the University of Pavol Jozef Šafárik in Košice, Slovakia. Our intention was to test both groups of students in order to investigate if English language acquisition during their university studies proves the expectation that master degree students will be more aware of word stress placement than post-entry bachelor students.

The experiment included two types of tests: (1) marking the stressed syllables of the words and word families without listening to a correct word stress placement, (2) listening to words and word families and marking the stressed syllables of the words and word families. The word list in (2) was identical with the word list in (1).

The results show that word stress placement difficulties refer to both groups of students, however, participants with a higher level of English language proficiency achieved better results.

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SINGING TO ENHANCE EFL LEARNERS' SPEECH CONTINUUM

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Native English speakers tend to articulate in a most effective manner. The effect of this is that linguistic units flow in a speech continuum, words are smoothly connected together without clear-cut boundaries between them, various linguistic and articulatory simplifications occur and certain connected speech processes take place. These processes include but are by no means limited to: sentence stress and rhythm, reduction, elision, intrusion, assimilation, juncture, liaison and other.

It is often suggested that the target for teaching pronunciation in EFL must be authentic connected speech as well since it helps the learner not only achieve native-like pronunciation, but boosts the learner's listening intelligibility and linguistic sense. Various methods in ELT have come into play for the achievement of EFL students' natural connected speech production and perception.

The current research aimed at testing the effect of musical activities to the development of EFL university students' connected speech skills. Taking the advantages of music, it can not only serve for relaxation purposes or strengthen the rhythmic and melodic sense of the learners as well as the awareness of particular (foreign) sounds, it also serves as an ideal space for mutual hemispheric interaction in the brain that results in better information retention, as it has been proved by many scholars. Moreover, while singing successive phonetic segments overlap in time and form a continuum, i. e., singing requires careful linking of words, in consequence natural acquisition of speech continuum takes place. The current research proved a statistically significant difference that was noticed in the use of music in order to develop the students' English connected speech. In particular, the texts were put into a song format, then practiced with the controlled group of students and later read. The results indicated that the respondents' speech was smoother and more fluent, exhibited stronger linguistic rhythm and stress placement sense, weak forms were used more often, assimilation and linking processes took place. The research suggests the use of music is a valuable tool for connected speech enhancement.

LEXICAL FREQUENCY EFFECTS AND SINGING ACCENT AMERICANISATION: THE *LOT*, *PRICE* AND *BATH* VOWELS IN FOCUS

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Style shifting involved in pop singing in general and Americanisation of British singing accent in particular have been analysed from various perspectives (Trudgill 1983; Simpson 1999; Beal 2009; Gibson & Bell 2012 among others). Depending on the theoretical standpoint, the notions of identity, reference style or default accent have been attributed fundamental explanatory power. Trudgill (1983) provides the list of six characteristic features of this stylisation, three of which, i. e., the *lot*, *price* and *bath* vowels, are addressed in the present paper. A number of questions regarding the exact mechanisms of singing accent stylisation call for further research, e. g., distinct behaviour of various words exhibiting the feature at stake within a given phonetic process, the phenomenon that may be discussed with the reference to lexical frequency effects. Frequent words tend to be processed faster, recognized quicker and articulated more easily (e. g., Bybee 2002; Shockey 2003; Erker & Guy 2012). Various sound changes — mainly reductive in nature — are more common in highly frequent words (e. g., Hooper (Bybee) 1976; Hay, Jannedy & Mendoza-Denton 1999; Bybee 2000).

The aim of this paper is to assess the potential significance of lexical frequency effects, i. e., to check whether more frequent words prove to be the carriers of Americanised singing style. In order to do this, the singing accents two vocalists: Joe Elliott of *Def Leppard* and Liam Gallagher of *Oasis* are analysed with regard to three processes: *lot* unrounding, *price* monophthongisation and the (lack of) the *bath-trap* split. Both auditory and acoustic methods are used for the analysis of the audio material. *Praat* (Boersma & Weenink 2016) is used to provide acoustic verification of the auditory analysis whenever isolated vocal tracks are available. The statistical significance of the obtained results regarding lexical frequency effects is verified by means of chi-square test with Yates' correction. In all six analysed cases, the percentage of frequent words undergoing the change is higher compared with infrequent ones and in half of them the results are statistically significant, which suggests that word frequency may affect singing style variation.

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WORD REDUCTION IN CHILDREN'S SPEECH: METHODOLOGICAL ISSUES*

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Word reduction (i. e., omission of at least one sound in a word) is quite common in adult speech. Numerous studies on different languages show that around 20% of all words are reduced in spontaneous speech. Although we still do not know the exact rules of reduction, there are some plausible tendencies of how an adult speaker can phonetically shorten his/her speech: the end of the word suffers from reduction more often than the beginning, words of high frequency have typical reduced variants that are used even more often than the canonical ones, etc.

However, the psycholinguistic nature of this phonetic phenomenon remains unclear, and one of the essential questions to answer is how reduced variants are integrated into the mental lexicon of a speaker and a listener. A phonetic study of children's speech can contribute to solving the problem.

The most important methodological questions to answer at the beginning of the research are about the age of children involved in the study and the ways of obtaining the data. Concerning the former, we decided to analyze the speech of monolingual Russian-speaking children between 3 and 5 years old. By the age of three, children without serious speech disorders, despite not pronouncing some phonetically difficult sounds, normally can talk in phrases. Thus, we can expect the general tendencies of word reduction to develop during this time period. For obtaining the data, we propose the following three-part methodology in our research: phonetic transcription and further analysis of the existing corpora of Russian children's speech (such as the corpus *Konduit* (Eismont 2017)), several longitudinal studies of children between 3 and 5 years old (records once a month during a year), and an experiment with three larger groups of children (3-, 4- and 5-year-old) where they will be asked to produce narratives about a sequence of pictures. In the presentation, I will show and discuss the first results of the data analysis.

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ARE MONOPHTHONGS REALLY MONOPHTHONGS AND DIPHTHONGS REALLY DIPHTHONGS?

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Vowel inherent spectral change (VISC) refers to the notion of vowels displaying characteristic time-varying patterns of formant frequency change. On this account, the conventional phonetic distinction of monophthongs versus diphthongs is redundant because all vowels display some spectral change which varies in a gradient-like fashion from small to large magnitudes of change.

The present study tests whether VISC is perceptually relevant for identifying two front vowels in Australian English (AusE) — the nominal monophthong /i/, e. g., in “bid” — and the nominal diphthong /iə/, e. g., in “beard”. The first (F1) and second (F2) formant frequencies of both vowels are virtually identical when measured at midpoint or as a whole-formant mean. Both vowels are also phonetically centring, as shown by $F1 \times F2$ trajectories proceeding in the same direction (F1 increases and F2 decreases over time). The two vowels differ primarily due to duration (/i/ is short, /iə/ is long) and $F1 \times F2$ trajectory magnitude (smaller for /i/, larger for /iə/). The present study tests whether this latter acoustic property is exploited by listeners to perceive English /i/ and /iə/.

The auditory stimuli for two experiments were three front vowels which were identical except for $F1 \times F2$ trajectory magnitude: 0 ERB (an ambiguous spectrally static front vowel), 1.5 ERB (\approx /i/) and 3.9 ERB (\approx /iə/). Experiment 1 tested 20 native monolingual AusE listeners’ categorization of the three vowels as /i/ or /iə/. In the Deviant condition of Experiment 2, 11 native monolingual AusE individuals passively listened to repetitions of the 0 ERB vowel which were interspersed with the 1.5 ERB and 3.9 ERB tokens. In the Control condition, the same AusE individuals passively listened to each of the 1.5 ERB and 3.9 ERB vowels presented on their own. In both conditions, event-related potentials (ERPs) were obtained using electroencephalography.

A mixed-effect model fitted to the categorization responses from Experiment 1 revealed that labelling of the 0 ERB and 1.5 ERB vowels did not reliably differ, whereas labelling of the 0 ERB and 3.9 ERB vowels did differ. A mixed-effects model comparing ERPs from the Deviant and Control

conditions in Experiment 2 indicated no change was detected when the 0 ERB vowel was switched to the 1.5 ERB vowel, whereas a change was detected when this was switched to the 3.9 ERB vowel.

Taken together, these results confirm that, whilst both AusE /ɪ/ and /ɪə/ display substantial magnitudes of spectral change in speech production, VISC is only perceptually relevant for identifying the nominal diphthong /ɪə/ and not for the nominal monophthong /ɪ/. Accordingly, change spectrally “inherent” in vowels is not always inherent for their perception, suggesting the conventional monophthong-diphthong distinction better reflects speech perception rather than speech production.

VOICE COARTICULATION IN C#[V] CONSONANTAL CLUSTERS ACROSS WORD BOUNDARIES IN RUSSIAN: NEW FINDINGS

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The voiced labiodental consonant [v] ranks specially in the phonetic system of Modern Standard Russian as, on the one hand, a number of grounds close it with a group of sonorant consonants (it does not cause voice assimilation of preceding obstruents within a phonological word), while on the other hand it approaches obstruents (being devoiced word finally and before voiceless obstruents). This state of things is historically determined: the Old Russian consonant phonemic system inherited from Common Slavic contained the only (voiced) non-plosive bilabial approximant [w].

Knyazev et al. (2007) have found the presence of anticipatory as well as carryover voice coarticulation in homorganic clusters of labiodental consonants /v/ (/f/) and /v/ in an external sandhi position in Standard Russian within an intonation group. It results in [ff], [vv] or [fv] pronunciation (with the decreasing abundance), while the percentage ratio of the above mentioned pronunciation types depends on

- the right context of the labiodentals cluster (a vowel, a sonorant or /v/),
- the phonemic status of the final consonant of the first word,
- the genre/style of the text,
- the rate of frequency of certain word combinations,
- the prosodic type of the utterance,
- the strength of the prosodic boundary between two words,
- the speakers age.

It was also found that the most preferable position for such a coarticulation is the position [v/# (/v/ + sonorant)] rather than [v/# (/v/ + vowel)].

The present paper reports some new results of the research aimed at finding out whether the progressive (carryover) voice coarticulation is available in nonhomorganic clusters of [velar # (/v/ + sonorant)] in an external sandhi position in Modern Standard Russian (in combinations of words not divided by syntactic boundaries), and if yes, to which extent this phenomenon is dependent on some supplementary conditions — segmental, prosodic, genre, stylistic, or extralinguistic.

The results obtained show that

- the carryover voice coarticulation in [velar # (/v/ + sonorant)] clusters in an external sandhi position was detected in 75% out of all cases

- studied;
- the presence of carryover voice coarticulation depends on the right context of the [velar + /v/] cluster: before an occlusive sonorant (dental nasal or lateral [n], [l]) it is detected much more often than before palatal approximant [j];
 - on the contrary, no influence of the manner of articulation of the velar consonant (stop or fricative) on the voice coarticulation was found during present experiment;
 - the way of phonetic realization of the clusters studied is speaker-specific to a very high extent.

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PORTUGUESE *esC*, *exC* AND (*h*)*isC* FORMS REVISITED: THEORY AND DATA

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There is a current theoretical clear-cut divide in European Portuguese between orthographic *esC* forms (*escola* ‘school’) on one side, and *exC* (*externo* ‘external’) and (*h*)*isC* forms (*história* ‘history, story’) on the other (e. g., Delgado-Martins, Harmegnies & Poch-Olivé 1996; Freitas & Rodrigues 2003; Henriques 2012; Rodrigues 2003; Valada 2017; Veloso 2002). This distinction is expressed in a phonological word-initial empty nucleus assigned to *esC* forms, and a word-initial filled nucleus assigned to *exC* and (*h*)*isC* forms. It should be pointed out that in European Portuguese *esC*, *exC* and (*h*)*isC* forms can be realized without word-initial vowel, but with possible phonetic insertion in *esC* forms, and phonetic deletion in *exC* and (*h*)*isC* forms.

Having in mind a Portuguese as a foreign language (PFL) perspective, with indications provided by the absence of a systematic correlation (e. g., Davies & Preto-Bay 2008) between, for instance, forms in English and in Portuguese (*exC* converges in *exponent* and *expoente* but diverges in *excoriation* and *escoriação*), comparative studies were made to identify common phonological patterns among two groups: a target group composed of native speakers of English with PFL (with L2 and L3+) and a control group composed of native speakers of European Portuguese with English as a foreign language (predominantly L2, in some cases L3). This research aims at identifying patterns, such as consistent word-initial vowel realization or non-realization, obtaining comparable data from all participants, with a special attention paid to possible L1 transfer issues in the target group.

Two sets of interviews were already conducted, with the members of both groups answering in Portuguese to questions asked in English, to avoid direct interference from the interviewer (a native speaker of European Portuguese). Relevant target words such as ‘foreign’ (*estrangeiro*) and ‘external’ (*externo*), etc. were elicited for obtaining these words or words with the same morphological root in Portuguese. Results were evaluated by performing acoustic measurements and manipulations using *Praat* software (Boersma & Weenink 2010).

This paper is an opportunity for both working upon the first results already obtained and for understanding to what extent the cur-

rent theoretical framework provides satisfactory explanations, considering data from both native and PFL speakers.

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THE USE OF ACOUSTIC CHARACTERISTICS OF SIBILANT [s] FOR INDIVIDUALIZATION OF TEMPORARY RESTORATIONS IN PATIENTS WITH SEVERE TOOTH ABRASION FOR ACHIEVING OPTIMAL PHONETIC ADAPTATION TO THE PERMANENT RESTORATIONS

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Abrasion is the progressive loss of tooth hard substances caused by mechanical actions other than mastication, namely parafunctional activity otherwise called bruxism. Bruxism is a common behavior, reports of prevalence range from 8–31% in the general population. The cause of bruxism is not completely understood, probably it has multifactorial etiology, but most commonly it is related to stress and anxiety. Aside of symptoms such as teeth hypersensitivity, aching of jaw muscles and headaches, the most evident one is an extensive loss of tooth structure that causes both esthetical and functional limitations. Several methods have been suggested for treatment of bruxism, but in the contemporary scientific literature, there is still no evidence that any of them can effectively limit parafunctional activity.

From prosthetic point of view, the treatment of patients with abrasion is pretty challenging because in most cases patients are not aware of bruxism for a long period of time (10–30 years) and start to seek professional help only when faced with functional limitations and unacceptable esthetics of the smile. The only way to improve esthetics and functionality is by restoring the lost structure of teeth thus opening the vertical dimension. In most cases, it is extensive oral rehabilitation of both dental arches with adhesive ceramic restorations. Due to rapid progress in dental materials and technologies nowadays there is an effective way to assess patient's situation and to restore the length of teeth in harmony with the facial features.

It should be kept in mind that tooth structure has been lost gradually and a patient has had time to adapt to changes. However, when the prosthetic treatment is performed, changes in the vertical dimension of the facial lower third (caused by form and length of teeth) appear rapidly, and a patient has limited options to adapt. There is little information about the phonetic adaptation of patients to the extensive dental rehabilitation in cases of the severe dental abrasion. The aim of the current study

is to examine the practical use of the acoustic characteristics of selected speech sounds before and after rehabilitation in order to individualize the dental restorations, thus providing patients with the phonetically corrected length and design of teeth.

Methods. Three speech samples for a patient were recorded before the restoration and twice in the process of phonetic adaptation. During these three recordings the patient (native Latvian speaker) pronounced the following Latvian text three times: *Vasaras saulainajos rītos es brokastoju terasē, šodien cepšu šokolādes kūku, pagatavošu biezpiena plāceņus* ('On sunny summer mornings I have breakfast on the terrace, today I will bake a chocolate cake and make cottage cheese scones'). The acoustic analysis of the acquired material was performed using software *Simplitude* (by *Magix*). The acoustic characteristics of 3 manifestations of /s/ were examined in the words *saulainajos rītos*. The upper and lower frequency of the noise band with the major energy was measured for each [s], as well as the average intensity and the intensity of the highest spectral peak of each sound.

Results. In the first set of temporary restorations the lower limit of the major energy band had the mean frequency of about 4 kHz (4.3 kHz; 4 kHz; 4 kHz) and the upper limit — of about 5.5 kHz (7 kHz; 4.7 kHz; 4.7 kHz). After phonetic correction of the restorations, mean value of the lower limit of [s] changed to 3.4 kHz (3.8 kHz; 3.2 kHz; 3.2 kHz) and mean value of the upper limit changed to about 8.5 kHz (9 kHz; 8 kHz; 8 kHz). The intensity of the sound also changed. It is evident that before the corrections the acoustic characteristics of [s] were altered, and the quality and intelligibility of the sound was distorted. After the correction the characteristics of [s] became similar to the standards described in literature and to those observed in speakers with natural dentition.

Conclusions. The acoustic analysis of speech production performed during the dental treatment can help achieving better results in dental treatment from the phonetic point of view. All the alterations can be performed on temporary restorations, so that the permanent ceramic crowns are produced of the quality favorable for the fastest and easiest phonetic adaptation.

PERSPECTIVE DIRECTIONS OF PHONETIC RESEARCH DEVELOPMENT

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Scientific practice has proven that to adequately predict the prospects for further development of phonetic research it is expedient to proceed from the present-day theoretical and experimental achievements of the interdisciplinary studies adjacent to phonetics. Therefore, the aim of our prognostication is to outline the perspective directions of phonetic development through the analysis of new directions of its research that emerged at the juncture of two or more sciences.

In the process of considering the origin and formation of such most interesting directions of phonetic studies as cognitive and energetic ones, we compared them with the known directions of the classical functional approach (functional and communicative, functional and pragmatic, functional and cognitive, etc.). The results of the carried out comparison showed that, for instance, functional and cognitive direction has already reached the stage of its inevitable transformation into an autonomous branch of linguistic knowledge, known as cognitive linguistics.

Further analysis allowed us to distinguish the following most general directions of phonetic research: classical directions (functional and communicative, functional and pragmatic, etc.), cognitive and energetic ones. As for the classical directions, its extensive development is limited by the ideas and theoretical basis of the functional approach. Though researchers apply some principles and ideas of cognitive linguistics, psychology, psychiatry, etc. within the classical direction, the obtained results have a narrow range of their application.

Unlike classical directions, the cognitive field has a high potential, sufficient to ensure an intensive development of phonetics. This can be realized by means of integrating directions that study unique types of person's activities: logical thinking, emotional behavior, perception, processing, accumulation and use of information as well as their connection with utterances used in communication. Thus, there is every reason to expect that cooperation of specialists in cognitive, neuro- and computer sciences will lead to new theoretical achievements capable of activating interdisciplinary research and accelerate the transition of phonetic studies to the new higher level.

However, phonetics should not go beyond the study of factors, mech-

anisms and sources of the language sound structure generation and development. Therefore, the problem of describing and explaining the prime reasons or energy sources underlying such a development has been of a particular relevance in recent times. In view of this, another new approach to phonetic studies, designated in the paper as energetic, deserves special attention. The quintessence of this approach consists in an attempt to describe phonetic phenomena as the result of stochastic speech generation, psychophysiological energy being its driving power with the inherent ability of its redistribution between the individual's consciousness and subconscious and unconscious spheres.

As to the technical means of experimental verification of the results of further elaboration of the energetic approach, there are numerous devices able to register the speakers' psychological and physiological states: e. g., tomographic scanners, encephalographs, emotional state detectors, indicators of blood pressure, pulse, and pupillary dilatation and others.

Thus, the application of cognitive and energetic directions or an appeal to the energy of a word/utterance can facilitate the study of the person's psychic energy transformations in the process of his/her communicative activities as well as justify our hypothetical expectations regarding the correlation of the language suprasegmental level with the individual's psychophysiological energy and sociocultural factors, and the linkage of its segmental level with his/her psycho-energetics and genetically inherent capabilities.

EMUR: AT LAST, AN ALTERNATIVE TO PRAAT SCRIPTING?

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The typical workflow in acoustic phonetic research currently involves *Praat* scripts to extract measurements from signals at places specified in TextGrid annotations. These measurement values then make their way into a statistics package (very often *R*), possible via a spreadsheet application. This setup is far from ideal both because it calls for programming of custom scripts and because it leaves the responsibility for managing the relationships between signals, annotations, speakers etc. entirely to the researcher.

A potential solution to these problems has been offered by the *EMU* speech database system for some time already in the form of its database management system, in connection with its *R* interface. Unfortunately, though, the original database system was cumbersome and slightly unreliable to use; an even bigger problem was the forced withdrawal of the *emuR* package from the CRAN repositories only a relatively short time after its publication. Now, though, a completely reworked new incarnation of the whole system has been made available, including an official *emuR* CRAN package in addition to a webapp replacement of the old Tcl/TK implementation of the database viewer. It is possible to convert old-style *EMU* databases into the new format, as well as convert sets of WAV and TextGrid files, or create new databases from scratch. The main advantages of the new *EMU* Speech Database Management System include a rigorous database structure with explicitly defined relations between annotation levels of virtually unlimited complexity, a sophisticated database query language (rendering tailor-made *Praat* scripts unnecessary) and complete integration of the speech and annotation database in *R*.

The presentation will demonstrate how existing resources like the Buckey Speech Corpus or a collection of electropalatograms with accompanying recordings and transcriptions can be converted into an *emuR* database and then efficiently searched, visualized and analyzed directly in *R*. It will also outline the limits of such work and suggest improvements and extensions to the present system.

INTON@TRAINER COMPUTER AIDED SPEECH INTONATION TRAINING SYSTEM AND ITS USAGE IN TTS PROSODIC QUALITY ASSESSMENT

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Inton@Trainer software system was originally designed to train learners in producing a variety of recurring intonation patterns of speech. The system is based on comparing the melodic (tonal) portraits of a reference phrase and a phrase spoken by the learner and involves active learner-system interaction. Since parametric representation of intonation features of the speech signal faces fundamental difficulties, we show how these difficulties can be overcome. The main algorithms used in the training system proposed for analyzing and comparing intonation features are considered. This work is a follow up study to the previously introduced model of universal melodic portraits (UMP) of accentual units (AU) for the representation of phrase intonation in text-to-speech synthesis. At the moment demo versions of the *Inton@Trainer* system focused on learning Russian and English intonation are available for free download at <https://intontrainer.by/>.

The paper describes an experiment on an instrumental evaluation of the prosodic quality of synthesized Russian speech by using of *Inton@Trainer* computer system. Our approach to assessing the intonational quality of speech allows treating a synthesized speech with the same strict requirements as are applied to students studying Russian as a second language. We describe the technology used for the instrumental evaluation of the intonation quality of synthesized speech and the acoustic database of reference phrases used to assess the intonation quality of synthesized speech. The paper presents the results of testing the intonation quality of two Russian synthetic voices. We discuss the results of the experiment and outline the ways for improving the methods for objective evaluation of synthesized speech prosodic quality, as well as the possibility of applying the developed system in other linguistic tasks.

BULGARIAN ToBI

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The aim of this paper is to present a Bulgarian Tone and Break Indices (BGToBI) system for prosodic annotation of Bulgarian spoken corpora, based on the general principals of ToBI (Beckman & Hirschberg 1994) and the Autosegmental Metrical (AM) model of intonational phonology (Pierrehumbert 1980). BGToBI is designed to represent the prosodic system of Contemporary Standard Bulgarian as spoken in Sofia. Bulgarian is a South Slavic language and belongs to the group of stress languages (Cruttenden 1997, 10) or intonation languages (Ladd 1996, 118). Bulgarian has an unbounded weight-insensitive lexical stress system (Hulst et al. 2008) and occupies an intermediate position on the stress- vs. syllable-timed scale of rhythm (Dimitrova 1998). BGToBI comprises different levels of description (tiers), containing labels for (a) prosodic words, (b) words, (c) syllables, (d) tones, and (e) break indices. Tiers (a) to (c) provide an orthographic transcription of the respective unit. On the tone tier the perceived pitch contour is transcribed in terms of pitch accents and boundary tones. Phrase boundary strength information (1 — between prosodic words, 2 — between intermediate phrases and 3 — between intonation phrases) is recorded in the break index tier. Other information may be added in an optional miscellaneous tier.

We used a corpus containing both quasi-spontaneous speech acquired in map tasks (Anderson et al. 1991) and strictly-controlled read speech data. The map task speakers included five female and three male speakers, aged between 21 and 42. The read material comes from ten speakers (six female and four male), aged between 25 and 50. The controlled material was read aloud from a *PowerPoint* presentation in response to pre-recorded questions or as a reaction to a described situational context. All of the speakers were born and raised in Sofia. The corpus comprises intonational patterns of different types of sentences such as statements in different focus conditions, yes-no questions, wh-questions and imperatives.

The AM model used in BGToBI is the first fully developed model of the Bulgarian prosodic system (Andreeva 2007) and suggests an inventory of pitch accents (L^* , L^*+H , $L+H^*$, $(!)H^*$, $H+!H^*/H+L^*$), phrase accents ($L-$, $H-$ and $!H-$) and boundary tones ($L\%$, $H\%$ and $!H\%$). L^*+H is predominant in pre-nuclear position. The default nuclear pattern for declaratives is $H+!H^* L-\%$, and for yes/no questions $L^*+H L-\%$. There is a clear evi-

dence for the secondary association of the phrase accent. Bulgarian solves the tonal crowding (i.e. a context where two or more tones are associated with the same segmental element) by means of tonal truncation. Given information does not necessarily have to be de-accented. Givenness lowers the pitch accent in pre-nuclear positions and usually cancels them out in a post-nuclear position (Andreeva et al. 2001; Avgustinova & Andreeva 1999). The same focus type is not always expressed with the same pitch accent (Andreeva & Oliver 2005; Dimitrova & Jun 2015; Andreeva et al. 2016).

This research contributes to the study of Bulgarian intonation and of intonation grammar in general.

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TRANSCRIPTION OF LITHUANIAN DIALECTS USING IPA SYMBOLS: THE MOST DIFFICULT CASES OF THE ŽEMAITIAN SUBDIALECTS

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In the texts of the Lithuanian dialects (e. g. atlases, text sets, dictionaries of dialects, etc.), sounds are marked using distinctive national transcription. However, such marking causes problems when comparing the research results of several languages, developing international research projects, etc. During last years, there have been attempts to apply IPA symbols to the sounds and texts of the Lithuanian dialects: characters are already selected, and their suitability has been examined by transcribing texts of various subdialects, performing dialectometric research, etc. This report will present the possibilities to transcribe sounds and prosodic units of the Žemaitian subdialects — one of the most distinctive and complicated (in respect of transcription) group of Lithuanian subdialects — using IPA and discuss the most problematic cases of these subdialects' transcription.

After reviewing the relation of Žemaitian sounds and IPA characters, it can be concluded that there are suitable IPA characters for almost all Žemaitian sounds. Only a few sounds, like [e̞], [o̞], should be marked with additional diacritics. Strongly reduced Žemaitian sounds in the words endings should be marked by IPA diacritic [˘] 'extra short', e. g., [ˈjâ·ʊt̪e̞] 'ox.GEN.SG', [ˈjâ·ʊt̪o̞] 'idem.INSTR.SG' (cf. traditional Lithuanian transcription: [jâ.ute], [jâ.ut'o]). The transcription by IPA symbols of the Southern Žemaitian sounds [i:ĩ], [u:ũ] is very similar to the traditional marking [i·ĩ], [u·ũ], cf. [ˈdû·ũna] – [dû·una] 'bread', [ˈpî·ĩns] – [pî·ins] 'milk'. The most problematic is finding IPA symbols for Žemaitian prosodic units, especially broken toneme. The Žemaitian broken toneme should be marked by diacritics [ˆ] 'falling tone' and [ʔ] 'stød' (e. g., [ˈsʊ̞i̞ʔɪst̪s]), cf. traditional transcription [sv̞e̞ɪst̪s]. It is a subject for future discussions.

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