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ABSTRACTS

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**TOWARDS ARTICULATORY-ACOUSTIC CHARACTERISATIONS
OF HIATUS RESOLUTION STRATEGIES:
AN EMA STUDY OF LINKING /ɪ/ IN BRITISH ENGLISH**

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Linking /ɪ/ in standard British English (e.g., *car* [kɑ:ɪ] *engine* vs. *car* [kɑ:] *park*), together with intrusive /ɪ/, has been investigated within various theoretical frameworks (e.g., Monpeán & Monpeán-Guillamón 2009; Pavlík 2016; Uffmann 2007). In contrast, there are few studies which focus on articulatory organisation of the linking /ɪ/. One influential study by Gick (1999) examines the tongue tip height of /ɪ/ (*pa* *rotter*, *pa* *botter*, *pa* *otter*) produced by two speakers of American English, reporting that ‘...only the C-gestures...have a greater magnitude in initial allophones, a significantly reduced magnitude in final allophones and an intermediate magnitude in intervocalic allophones...’ (Gick 1999, 47). This observation serves as evidence for his claim that the intervocalic /ɪ/ (i.e., linking /ɪ/) is ambisyllabic and it is underlyingly present. However, there are still uncertainties about the /ɪ/ gesture in question and the above observation needs further examination.

This exploratory study reports on the continuing investigation into the articulatory nature of linking /ɪ/ across word boundary in British English. This work constitutes part of a larger research into articulatory-acoustic characterisations of hiatus resolution strategies. The current study aims at (i) providing initial empirical data for the linking /r/ gesture, in comparison with the word-initial /ɪ/ gesture, (ii) capturing the production characteristics within and across speakers, and (iii) discussing the realisational patterns in the light of prosodic positions and articulatory tasks.

The speech materials came from the multichannel articulatory database, MOCHA-TIMIT. This database comprises articulatory-acoustic data of 460 phonetically-balanced sentences read by native speakers of English. Data acquisition was made with Electromagnetic Articulograph (EMA), Reading Electropalatograph, Laryngograph and acoustic recordings.

In this study, the EMA data (the tongue tip, the blade, and the dorsum) and the laryngograph waveform were analysed for the utterances spoken by three speakers of British English, SE (female), SA (male), and AP (male). Linking /ɪ/ tokens were collected from a dataset of 210 potential contexts (70 × 3 speakers). Variable realisations were coded by the four categories: (i) linking /ɪ/, (ii) hiatus, (iii) glottalised (glottal stop, creaky voice), and (iv) other (e.g., a weak vowel/syllable deletion). For the analysis of the word-initial /ɪ/s, a dataset of 54 tokens (18 words × 3 speakers) was used.

Two major findings are summarised. First, phonetic realisations in the potential linking /ɪ/ environment vary with speakers significantly. The realisation rate of linking /ɪ/s is 17% (12/70) for SE, 72% (51/70) for SA, and 45% (32/70) for AP. For SE, the glottalised realisation is the commonest (60%, 42/70) and for AP, ‘other’ patterns (29%, 20/70) are more frequent than the other speakers. Secondly, the linking /ɪ/s involve a smaller degree of tongue displacement and shorter articulatory durations than the word-initial /ɪ/s. These spatiotemporal variations are systematically constrained by the tip-up (SA) and the tip-down (AP) constriction gesture of the /ɪ/. Variability of the /ɪ/ gesture correlates with the tongue shape used by a speaker as well as the prosodic positions in an utterance. A hypothesis concerning invariable articulatory tasks will be formulated and the implications for hiatus resolution strategies will be discussed.

REFERENCES

- Browman, C. & Goldstein, L. (1992). Articulatory phonology: An overview. *Phonetica*, 49, 155–180.
- Gick, B. (1999). A gesture-based account of intrusive consonants in English. *Phonology*, 16(1), 29–54.
- Hagiwara, R. (1995). Acoustic realization of American /r/ as produced by women and men. *UCLA Working Papers in Phonetics*, 90, 1–187.
- Keating, P., Cho, T., Fougeron, C. & Hsu, C. S. (2004). Domain-initial articulatory strengthening in four languages. In: J. Local, R. Ogden & R. Temple (eds.). *Papers in Laboratory Phonology*, VI. Cambridge: Cambridge University Press, 145–163.
- Mompeán, J. R. & Monpeán-Guillamón, P. (2009). /r/-liaison in English: An empirical study. *Cognitive Linguistics*, 20, 733–776.
- Pavlik, R. (2016). A usage-based account of /r/-liaison in Standard British English. *Journal of Phonetics*, 54, 109–122.
- Uffmann, C. (2007). Intrusive [r] and optimal epenthetic consonants. *Language Sciences*, 29, 451–476.
- Wrench, A. (1999). *MOCHA-TIMIT*. The Centre for Speech Technology Research, University of Edinburgh. URL <http://www.cstr.ed.ac.uk/research/projects/artic/mocha.html>.

THE ORAL STOPS OF GA: AN INSTRUMENTAL VIEW

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In this study we examine the Voice Onset Time (VOT) and duration of Ga plosives and affricates to determine what differences and/or similarities exist between the voiced and voiceless plosives and affricates. In view of the fact that affricates start off as plosives and finish off as fricatives, we wish to establish the acoustic cues that set the two groups of stop sounds apart. The paper describes the VOT of seven Ga plosives (/b/, /p/, /d/, /t/, /k/, /kp/, /gb/) and two affricates (/tʃ/ and /dʒ/) at word initial positions preceding seven different vowels /i/, /e/, /ɛ/, /a/, /ɔ/, /o/, /u/. Data was collected primarily from ten native Ga speakers from University of Education, Winneba. The participants produced monosyllabic words, containing target sounds in a carrier phrase. The results show that the average Voice Onset Time (VOT) of Ga plosives is +44 ms for the voiceless plosive [p], +53 ms for the voiceless alveolar [t] and +67 ms for the voiceless velar plosive [k]. The VOT values of the voiceless oral stops fall within the long voicing lag (Kent & Read 2002) whereby voicing starts way after the release of occlusion. The voiced alveolar plosive has VOT of -72 ms while the voiced bilabial plosive [b] has VOT of -83 ms. Thus these sounds can be classified among the “Voicing Lead” or “Pre-voicing” category of VOT. The study shows also that there is a vowel effect on the VOT of consonants but the effects of the vowels in the different consonants are not uniform across the consonants.

REFERENCES

- Kent, R. D. & Read, Ch. (2002). *The Acoustic Analysis of Speech*. 2nd edition. San Diego, CA: Singular Publishing Group, Inc.

VOWEL SYSTEMS OF CHILDREN AND ADOLESCENTS — SIMILARITIES AND DIFFERENCES CAUSED BY AGE

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Until recently there was lack of acoustic data on Latvian vowels produced by children of both genders. This issue was addressed in the scope of the Fundamental Research project No. 148/2012 “The acoustic characteristics of the sound system of Standard Latvian by age groups (5–15, 16–39, 40–59, 60–80)” funded by the Latvian Council of Science. In this study, the acoustic characteristics of vowels produced in zero context were measured to acquire data on production that is maximally close to acoustic vowel targets. The numeric values for duration, fundamental frequency (F0) and the first four formants (F1, F2, F3 and F4) were registered for each vowel produced in zero context by 20 male and 20 female informants. For monophthongs, mean F0 and formant values were acquired from a steady state interval about 2/3 of the total duration. Each diphthong was split into 10 intervals of equal length, and the numerical values of mean F0, F1, F2, F3 and F4 were acquired for each of these intervals, as well as the value of the total duration of a diphthong.

To study the influence of the informants’ age and gender upon the acoustic characteristics of vowels, the first age group (5–15 years) is addressed in this report. It turned out that the monophthong and diphthong data reflect both individual and age-related peculiarities. In both male and female data it can be observed that with increase in age the size of the vowel space gradually reduces approaching the size and shape characteristic to adults. The corner vowels (monophthongs /i(:)/, /a(:)/ and /u(:)) display greater stability in their mutual spacing than other monophthongs and diphthong trajectories. The greatest individual variation in quality is observed for front non-close and back mid monophthongs, and all the diphthongs (requiring additional articulatory skills), while the general pattern characteristic to the Latvian vowel system is preserved (cf. Figure 1 and Figure 2).

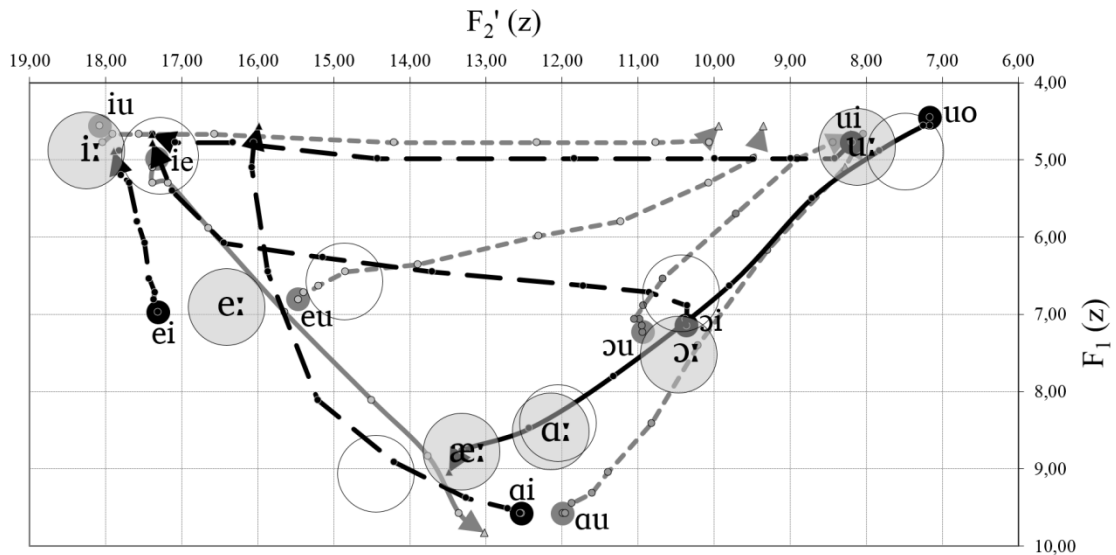


Figure 1. The vowel system of a 7-year-old girl on the psychophysical F_2'/F_1 plane. Long monophthongs are shown with grey filled circles; short monophthongs — with empty circles; diphthongs ending with i-like component — with black dashed lines; diphthongs ending with u-like component — with grey dashed lines; diphthong [ie] — with grey solid line; diphthong [uo] — with black solid line; arrows show directions of the trajectories on the plane.

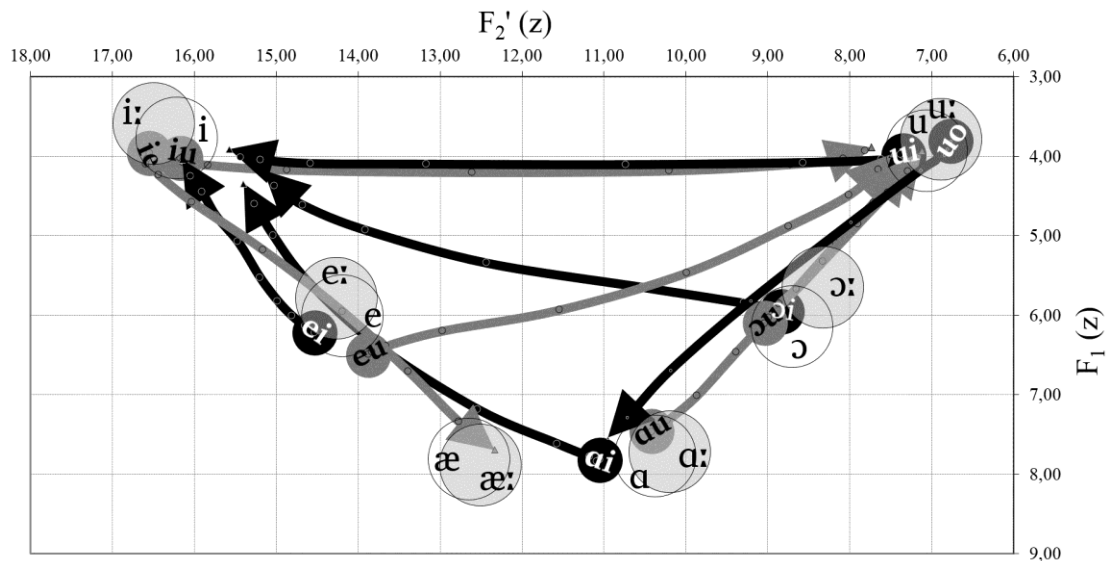


Figure 2. The vowel system of Latvian adult women (based on the mean data of informants aged 19–79) on the psychophysical F_2'/F_1 plane. Long monophthongs are shown with grey filled circles; short monophthongs — with empty circles; diphthongs ending with i-like component and diphthong [uo] — with black solid lines; diphthongs ending with u-like component and diphthong [ie] — with grey solid lines; arrows show directions of the trajectories on the plane.

INTERNATIONAL PROJECT *LAMBA*: THE RESULTS OF PHONEME PRODUCTION ACCURACY TESTS

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Each language has its own sound inventory; sounds of a language are combined in words one after another and form sound clusters in different way. The report analyses consonants in different positions in Latvian: at the beginning of the word, at the end of the word, in inter-vocalic position (between monophthongs or diphthongs, e.g., *mājas* ‘home’) as well as in consonant clusters (e.g., *prasmīgs* ‘skilled’). Sound position in the syllable can also be different — syllable onset, nuclear or coda.

Till 2015 there was clear need for norm-referenced Latvian language assessment tools that are reliable and accurate, as well as time-efficient and easy to administer and score. Latvian speech therapists tried to use and more or less adopt some assessment materials designed for Russian and English.

Of course, theories of linguists and empirical experience to develop phoneme accuracy test and children’s language analysis in other languages also serve as methodological basis in any project, but we know that Latvian speaking children acquire language in a unique way, typical only for the Latvian language. There are common tendencies for several languages, though the acquisition of the sounds of the language differs across languages. It is not surprising, if we remember that, for instance, the sound set is taught simultaneously with phonetic contrasts which are specific for each language. Therefore the original methodology of the Latvian language acquisition and testing was developed based on the Latvian language system and structure, and a corresponding terminology was adjusted and improved.

The aim of the presentation is to show the main tendencies in the consonant phoneme production at the age of 3–6. The analysis is based on the children recordings in the international research project “Latvian Language in Monolingual and Bilingual Acquisition: Tools, Theories and Application” (*LAMBA*). The main conclusions are as follows: (1) children have more difficulties to pronounce consonants and consonant clusters at the beginning of the word than in intervocalic position; (2) children aged 4–5 develop good skills in pronunciation of initial clusters, with the first component consonant [s] or [z]; (3) the pronunciation of consonant clusters is more difficult than the pronunciation of a single consonant. In general, children aged 3–6 significantly improve pronunciation of consonant clusters, especially *kr-*, *sm-*, *sp-*, *zv-*, as well as *gl-*, *šk-* [ʃc], *sn-*, *sp-* at the beginning of the word and *-rn-*, *-rp-*, *-šk-* [ʃc], as well as *-tn-*, *-rv-*, *-rd-*, *-lv-* in inter-vocalic position. As pronunciation of consonant clusters is difficult for children to manage, simplification of consonant cluster pronunciation can be observed in their speech; (4) after the final testing the authors have statistically valid data to follow the development of any individual child’s speech, and to compare it with the average standard obtained by analysing 1100 children’s speech.



THE EFFECT OF MIXED-LANGUAGE CONTEXT ON THE ACTIVATION OF PHONOLOGICAL SYSTEMS IN DIFFERENT KINDS OF BILINGUALS

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Bilinguals differ in the way their phonological systems are constructed depending on the sequence of language acquisition. Peltola et al. (2012) concluded that balanced bilinguals seem to employ one common phonological system between languages whereas dominant bilinguals employ different systems between languages in their phonological processing. Switching between systems was context-dependent, i.e., dominant bilinguals utilized the phonological system appropriate to the language used during testing. In contrast, the current study examined the effect of mixed-language context on bilingual perception. In order to create such a context both of the subjects' languages were actively used during the testing situation. The subjects were Finnish-Swedish bilinguals who had learned both languages from their parents (Balanced group) and university-level students of Swedish (Dominant group). The aim was to determine how phonological systems are activated in different kinds of bilingual people in a mixed-language context. To examine this, identification tasks and EEG registrations were conducted in order to study the behavioral identification and MMN (mismatch negativity) response of the subjects. The two vowel stimuli used in the study were chosen according to the identification task so that they belong to the same sound category in Swedish (/ʉ/) but to two different categories in Finnish (/y/ and /u/), as indicated by the subjects. Preliminary analysis from data collected thus far seems to suggest similar responses between groups. This can be explained by the effect of uncertainty of language context that has been noted in an earlier study (Peltola & Aaltonen 2005) of dominant bilinguals and overall slower processing of balanced bilinguals which is due to their unified phonological system (Peltola et al. 2012; Tamminen et al. 2013).

REFERENCES

- Tamminen, H., Peltola, M. S., Toivonen, H., Kujala, T. & Näätänen, R. (2013). Phonological processing differences in bilinguals and monolinguals. *International Journal of Psychophysiology*, 87, 8–12.
- Peltola, M. S., Tamminen, H., Toivonen, H., Kujala, T. & Näätänen, R. (2012). Different kinds of bilinguals — different kinds of brains: the neural organisation of two languages in one brain. *Brain and Language*, 121, 261–266.
- Peltola, M. S. & Aaltonen, O. (2005). Long-term memory trace activation depends on the mother tongue and the linguistic context. *Journal of Psychophysiology*, 19, 159–164.

VARIATION IN VOWEL EPENTHESIS SITE IN ONLINE ADAPTATION OF POLISH CC CLUSTERS BY NATIVE SPEAKERS OF ENGLISH

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It is well known that vowel epenthesis is one of the most common repair strategies used in loanword adaptation to nativize foreign consonant clusters (e.g., Kang 2011). Given an illicit CC sequence, in principle, it is possible to insert an epenthetic vowel before CC (only when the cluster is initial), after CC (only when the cluster is final) or between C₁ and C₂.

This paper focuses on the patterns of vowel epenthesis in the nativization of Polish CC onset and coda sequences by native speakers of Standard Southern British English. We report on the results of an online loanword adaptation study in which 30 native speakers of English reproduced Polish words with CC consonant clusters not permitted in English.

The results of the study demonstrate a general tendency for onset sequences to be nativized via internal epenthesis, i.e., /C₁C₂VC/ → [C₁V.C₂VC] and for coda clusters to be adapted by edge epenthesis, i.e., /CVC₁C₂/ → [CV.C₁C₂V] / [CVC₁.C₂V]. We argue that these patterns reflect a straightforward application of the native English hierarchy of phonological constraints. In particular, the outputs of adaptation maximally conform to the universal syllable well-formedness constraints, i.e., *COMPLEX, ONS and *CODA (Prince & Smolensky 1993/2004). Variation in the epenthesis site between onset and coda clusters is shown to result directly from the *COMPLEX, ONS, *CODA >> CONTIGUITY ranking. In the case of onset sequences, the /C₁C₂VC/ → [C₁V.C₂VC] adaptation is optimal in terms of universal syllable structure constraints and therefore it is selected at the expense of CONTIGUITY violation. On the other hand, for coda clusters there are several potential adaptations equally well-formed with regard to basic syllable constraints, including /CVC₁C₂/ → [CV.C₁C₂V] / [CVC₁.C₂V] and [CV.C₁VC₂]. The selection between these forms is determined by CONTIGUITY, which eliminates candidates with internal epenthesis. The results of the study thus lend support to a claim that there is no need for a separate loan phonology component as loanword phonology is mostly ‘native phonology in action’ (e.g., Ito & Mester 1999).

REFERENCES

- Ito, J. & Mester, A. (1999). The phonological lexicon. In: N. Tsujimura (ed.). *The Handbook of Japanese Linguistics*. Oxford: Blackwell, 62–100.
- Kang, Y. (2011). Loanword phonology. In: M. Van Oostendorp, C. J. Ewen, E. Hume & K. Rice (eds.). *Companion to Phonology*. Oxford: Blackwell, 2258–2282.
- Prince, A. & Smolensky, P. (1993/2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford: Blackwell.

**PLACE ASSIMILATION OF PALATALIZED SIBILANTS
AT WORD BOUNDARIES IN RUSSIAN:
A CASE OF INCOMPLETE NEUTRALIZATION**

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Standard Modern Russian voiceless alveo-palatal sibilant fricative [ç:] is defined as a long, or geminated, sound due to the fact that in word-initial and intervocalic positions it has longer duration than its retroflex pair [ʂ]. Like geminated consonants that occur in Russian in sandhi positions when two adjacent morphemes or words form a cluster of two similar sounds, it conforms to the constraint that prohibits long consonants in positions near other consonants. Thus it has been mentioned in Panov (1967) that word-initial /ç:/ and word-boundary /ç:#ç:/ should be neutralized completely in such nonce word combinations as *товарищ Энгра* ‘comrade Engra’ and *товарищ Шченгра* ‘comrade Shchengra’.

Modern Russian, however, has another case of this kind: a result of place assimilation at word boundaries when a verb ending with suffix *-сь* /sʲ/ is followed by a word with initial [ç:]. That is, *проявилась щедрость* ‘generosity showed itself’ can be neutralized with *проявила щедрость* ‘she showed generosity’. Namely, voiceless palatalized alveolar fricative sibilant [ʂ] is assimilated by following postalveolar forming an extra-long [ç:#ç:] cluster which is prohibited in Russian. Reduction of duration in this cluster should form an ordinary [ç:] ([ç:#ç]) sound. It is necessary to mention that such neutralization was not possible in Standard Russian before the middle of the XX century as the suffix was then pronounced with a velarized [ʂ].

As a part of the present study an experiment was conducted to find out whether this coarticulation process takes place in Modern Russian regularly and how the resulting consonant cluster is perceived. The stimuli consisted of 8 pairs of word combinations embedded in 16 carrier phrases. Twenty native speakers were instructed to read a list of sentences including carrier phrases. Spectral analysis using the computer software *Praat* showed that in most tokens (78%) place assimilation was complete. For all target words duration of fricative sounds was measured. Statistical analyses showed that the fricatives in tokens with underlying /sʲ/ are significantly longer compared to the fricatives in tokens without the underlying sound.

A perceptual experiment was further conducted in order to find out whether these durational differences can be used to distinguish minimal pairs. Fifteen native speakers were asked to listen to 37 stimuli (tokens without context) and write them down. The experiment showed that despite the durational differences listeners were unable to reliably determine whether the test words included the underlying /sʲ/.

The results of the experiments can be interpreted as a case of “incomplete neutralization”, a phenomenon that has been previously studied mostly in connection with final devoicing (e.g., recent works on Russian: Dmitrieva et al. 2010; Shrager 2012; Kharlamov 2014). The present experiment showed that the neutralization of /#ç:/ and /sʲ#ç:/ at word boundaries in Russian is phonetically incomplete due to the durational differences between the resulting fricatives; though these acoustic cues are not used in natural perception to distinguish minimal pairs.

REFERENCES

Dmitrieva, O., Jongman, A. & Sereno, J. (2010). Phonological neutralization by native and non-native speakers: The case of Russian final devoicing. *Journal of Phonetics*, 38, 483–492.

- Kharlamov, V. (2014). Incomplete neutralization of the voicing contrast in word-final obstruents in Russian: Phonological, lexical, and methodological influences. *Journal of Phonetics*, 43, 47–56.
- Panov, M. V. (1967). *Russkaja fonetika*. Moskva: Prosveščenie.
- Shrager, M. (2012). Neutralization of word-final voicing in Russian. *Journal of Slavic Linguistics*, 20(1), 71–99.

CURRENT RESEARCH IN PHONETICS AND PHONOLOGY: BACK TO EVERLASTING PROBLEMS?¹

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Many current studies in phonetics and phonology can be called anthropocentric as, in accordance with the general tendency in linguistics, they focus on how phonetic and phonological information is involved in natural speech processing. Such an approach urges researchers to look again at the questions first formulated by the phoneticians of the 20th or even 19th century. Some of these problems have been constantly discussed since that time, but still remain unsolved or at least require more detailed verification. In my talk, I will focus on two of them — the problem of syllabification and the analysis of slips of the ear — and show how current psycholinguistic methods can contribute to these issues.

It is believed that a syllable is a minimal pronunciation unit. However, the rules of syllabification differ from theory to theory. Such rules are based mainly on the principles of the phonological system of a language or on the results of an instrumental analysis. Recent experimental studies, including our psycholinguistic research where Russian-speaking adults and children were asked to divide pseudowords into syllables, show this problem to be not pure phonological (“orthographic” rules of syllabification that we learn at school being an important factor as well), but, however, provide new evidence for an open syllable to be a prototypical syllable in Russian.

Slips of the ear, although having been used as illustrations of the acoustic similarity of some sounds (see Polivanov 1968/1928, 64), were always regarded as not only phonological phenomenon. But such factors as noise level, quality of speech sound or even linguistic competence of a speaker and a listener were not checked systematically as linguists collected slips of the ear mainly from everyday communication using a post factum “paper-and-pencil” method and, thus, could not register and control what exactly had been pronounced by a speaker. Nowadays large spoken corpora and experimental paradigms allow to overcome this problem. We conducted an experiment where native speakers of Russian and Chinese students who study Russian as a foreign language listened to one and the same list of Russian words. According to the results, there are slips of the ear specific for each of these two groups of participants that can be explained by the phonological systems of the native languages of the subjects, whereas misinterpretations that both groups had in common are caused by psycholinguistic mechanisms that involve higher linguistic levels (such as semantic priming).

REFERENCES

- Polivanov, E. D. (1968/1928). Faktory fonetičeskoj evoljucii jazyka kak trudovogo processa. In: *Stat'i po russkomu jazykoznaniju*. Moskva: Nauka, 57–74.

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**“RAGE — GODDESS, SING THE RAGE OF PELEUS’ SON ACHILLES”:
AN APPROXIMATION AT RECONSTRUCTING INTONATION
OF HOMER’S *ILIAD***

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The 18th century English poet, Alexander Pope, wrote in his *Preface* to his English translation of the *Iliad* the memorable dictum: ‘Homer makes us hearers and Virgil leaves us readers.’ This paper was inspired by an oral reading analysis of Homer’s *Iliad* by Mark W. Edwards (2002, x) who painstakingly tries to “understand the intonations and implications of the original language and to see why it can be so difficult to reproduce it in the different norms of the English idiom”. In the case of Homer, my analysis deals with the specific language of the *Iliad* which was never spoken in this form, yet for centuries it existed in a spoken narrative, being recited/sung usually to the accompaniment of a lyre. Dactylic hexameter, the standard pattern used by Greeks and Romans for writing epic poetry, was skillfully manipulated in the *Iliad* (and the *Odyssey*) to lay content on form, the process being a typical tendency in the folklore of antiquity. The degree of involvement, characteristic of spoken language is maintained by rhythmic variations, word order play resulting in different topic/focus/predicate ancient Greek configurations, hence a diversity of intonation patterns, pauses, requests for forward-channel responses, vocatives and the stylized intonation associated with them, use of formulaic expressions and repetitions, use of a wealth of ancient Greek particles leading to emphasis on actions and agents rather than states and objects, the overall process being captured by a deep structure subject-object relation. The unit of analysis is the idea unit of Chafe (1980). The latter is compared to the intonation phrase of Pierrehumbert (1980) whereby a close relationship between the two is established.

Concurrently with the above-mentioned trends, the *Iliad* displays a degree of integration, with features relevant to the functioning of written language, such as conjoined phrases and series of phrases, relative clauses, attributive adjectives, etc. The balanced oscillation between involvement and integration in the case of Homer brings about the so-called “film effect” (cf. Bakker 1997) whereby the cameraman moves his/her viewfinder over the battlefield employing very smooth transition techniques manifested orally by the variety of the theoretically reconstructed intonation patterns. In this line of reasoning, Edwards (2002, 36–37) has the full right to claim, that “[h]ere, I’d sooner compare him [Homer: VP] to a ring-side commentator giving us literally a “blow-by-blow” description of a battle, communicating orally (through his microphone) with us, his audience.”

REFERENCES

- Bakker, E. J. (1997). *Poetry in Speech: Orality and Homeric Discourse*. Ithaca & London: Cornell University Press.
- Chafe, W. L. (1980). *The Pear Stories: Cognitive, Cultural, and Linguistic Aspects of Narrative Production*. Norwood, NJ: Ablex.
- Edwards, M. W. (2002) *Sound, Sense, and Rhythm: Listening to Greek and Latin Poetry*. Princeton, NJ: Princeton University Press.
- Pierrehumbert, J. (1980). *The Phonology and Phonetics of English Intonation*. PhD thesis, MIT.

THE USE OF BOUNDARY TONES IN FORMAL DESCRIPTION OF RUSSIAN INTONATION (THE IK-4 CASE) WITH REFERENCE TO SPANISH

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The intonological description of Russian is usually restricted to pitch accents, while boundary tones are mainly supposed to be redundant to Russian phrase prosody (Bryzgunova 1977; 1980; 1984; Yokoyama 2001; Odé 1989; 1992; 2008a; 2008b; 2008c).

Bryzgunova (1980) postulates seven intonational constructions (IK) which are formally described as a combination of pitch movements in the “prosodic centre” of an intonational phrase and pitch levels in the “pre-centre” and “post-centre” domains.

On the basis of perceptual studies and the autosegmental-metrical formalism, Cecilia Odé (1989; 2008b; 2008c) develops an alternative system named ToRI (Transcription of Russian Intonation). It features six types of pitch accents (PA) — L*, HL*, L*H, H*L, H*M, H*H, three initial boundary tones (IBT) — %L, %M, %H, and two final boundary tones (FBT) — L% and % (a toneless boundary not attributed to any communicative functions). Final boundary tones are entirely predictable from preceding PAs: if the rightmost element in a PA is low, the following boundary tone is also low; otherwise it is toneless.

However, some recent studies suggest that speakers of Russian do use some tonal distinctions at the end of an intonational phrase (IP) to express epistemic modality, (in)completeness or turn allocation in a dialogue (Krause 2007; Rathcke 2009; Paschen 2016). Paschen (2016) argued that functional decomposition of intonational patterns into PAs and BTs, each contributing a certain communicative meaning, should be undertaken — contrary to claims in literature.

The descriptions of IK-4 in current literature differ from the falling-rising accent, mostly for an IP’s final accented syllables to the falling centre/high post-centre, which is phonetically represented as a flat rising pitch movement, generally when the accented syllable is penultimate in an IP. Based on our experimental study of IK-4’s realizations, in a case of two or three post-centre syllables (when the PA is placed on the non-final and non-penultimate syllable of an accented word), we suggest that it rather features falling tone at the IK centre with a low post-centre and a high FBT (rising tone on the final syllable of an IP, not immediately on the post-accented one) quite similarly to the boundary tones in Spanish (Beckman et al. 2002; Estebas-Vilaplana 2009; Estebas-Vilaplana et al. 2015; Prieto 2014). Thus, FBT in the organization of talk-in-interaction may be optionally treated as part of IK-4. Nevertheless, the question whether the FBT functions in Standard Modern Russian as an independent tonal feature or as part of IK provides good reason for further discussion.

REFERENCES

- Beckman, M., Campos, M. D., McGory, J. T. & Morgan, T. A. (2002). Intonation across Spanish, in the Tones and Break Indices framework. *Probus*, 14, 9–36.
- Bryzgunova, E. A. (1977). *Zvuki i intonacija ruskoj reči*. 3rd edition. Moskva: Russkij Jazyk.
- Bryzgunova, E. A. (1980). Intonacija. In: N. Ju. Švedova (ed.-in-chief). *Russkaja grammatika. T. 1. Fonetika. Fonologija. Udarenie. Intonacija. Vvedenie v morfemiku. Slovoobrazovanie. Morfologija*. Moskva: Nauka, 96–122.
- Bryzgunova, E. A. (1984). *Emocional’no-stilističeskie različija ruskoj zvučaščej reči*. Moskva: MGU.

- Estebas-Vilaplana, E. (2009). Cuatro niveles de altura tonal en la frontera de frase en español peninsular. *Onomázein*, 2, 11–32.
- Estebas-Vilaplana, E., Gutierrez, Y. M., Vizcaino, F. & Cabrera, M. (2015). Boundary tones in Spanish declaratives: Modelling sustained pitch. In: The Scottish Consortium for ICPHS 2015 (ed.). *Proceedings of the 18th International Congress of Phonetic Sciences*. Glasgow: The University of Glasgow.
- Odé, C. (1989). *Russian intonation: A perceptual description*. Amsterdam: Rodopi. Leiden, Univ. Diss.
- Odé, C. (1992). *Perceptivnaja ekvivalentnost' realizacij tipov intonacionnyx konstrukcij E. A. Bryzgunovoj*. In: A. A. Barentsen, B. M. Groen & R. Spenger (eds.). *Studies in Russian Linguistics*. (Studies in Slavic and General Linguistics, 17.) Amsterdam: Rodopi, 227–284.
- Odé, C. (2008a). Communicative functions and prosodic labelling of three Russian pitch accents. In: A. Lubotsky, J. Schaeken & J. Wiedenhof (eds.). *Evidence and Counter-evidence*. (Studies in Slavic and General Linguistics, 32.) Amsterdam: Rodopi, 279–296.
- Odé, C. (2008b). *Tori: Transcription of Russian Intonation*. A free interactive research tool and learning module. URL <http://www.fon.hum.uva.nl/tori>.
- Odé, C. (2008c). Transcription of Russian Intonation, ToRI, an interactive research tool and learning module on the internet. In: P. Houtzagers, J. Kalsbeek & J. Schaeken (eds.). *Dutch Contributions to the Fourteenth International Congress of Slavists, Ohrid: Linguistics*. (Studies in Slavic and General Linguistics, 34.) Amsterdam: Rodopi, 431–449.
- Paschen, L. (2016). Boundary tones indicate turn allocation in Russian. In: K. Bellamy, E. Karvovskaya, M. Kohlberger & G. Saad (eds.). *ConSOLE XXIII: Proceedings of the 23rd Conference of the Student Organization of Linguistics in Europe (7–9 January 2015, Paris)*. Leiden: Leiden University Centre for Linguistics, 493–508.
- Prieto, P. (2014). The intonational phonology of Catalan. In: Sun-Ah Jun (ed.). *Prosodic Typology II. The Phonology of Intonation and Phrasing*. (Oxford Linguistics.) Oxford: Oxford University Press, 43–80.
- Rathcke, T. (2009). *Komparative Phonetik und Phonologie der Intonationssysteme des Deutschen und Russischen*. (Sprach- und Literaturwissenschaften, 29.) Munchen: Utz.
- Yokoyama, O. T. (2001). Neutral and non-neutral intonation in Russian: A reinterpretation of the IK system. *Die Welt der Slaven*, XLVI, 1–26.

**CONTEMPORARY RESEARCH METHODS
IN THE PROSODIC ANALYSIS.
TYPES OF INTONATIONAL TRANSCRIPTION**

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This paper presents an overview of contemporary research methods of different aspects of intonation, followed by a review of common notation conventions of intonational phenomena. The first part of the paper provides a brief description of current experimental methodological approaches to prosodic research such as acoustic analysis of speech productions, articulatory analysis, identification and categorization tasks (Priming, Eye-Tracking, Head-turning Preference), neurophysiological and neurobehavioral methods (ERPs and fMRI). The second part of the paper encompasses four different intonation representations: acoustic F0 trace with frequency and time scales; orthographic transcription with accent and iconic tone marks; interlinear tonetic transcription with iconic representation of pitch height, accentual prominence, and pitch movement; ToBI transcription.

OPTIMIZING THE DIAGNOSTIC RESOURCES IN DENTAL PRACTICE

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The issue of post-treatment sound production disorders is known for quite a long time. Dentists have always had difficulties in determining the degree and pattern of phonation changes before and after treatment, in changes assessment on early treatment stages, and in evaluating the efficiency of dental and maxillary prostheses. The formerly attempted methodologies of this issue were far from perfect. Until now there was lack of appropriately structured quantitative and qualitative assessment in registration of articulation changes (palatography, auditive method).

Generally, the most probable reasons of sound production disorders after orthopedic reconstructions present mistakes while determining lower face portion height, narrowed oral cavity because of improper placement of artificial teeth, the improper modeling of their palatal surfaces and bases and the length and position of incisors and configuration of their cutting edges. Besides, any flattening or narrowing the palate by the basis of prosthetic construction affects the oral resonator ability and limits the habitual speech-related movements of the tongue. In addition to the effects of prosthodontic treatment, the phonation is influenced by dental and maxillary abnormalities, as well as by some anatomic peculiarities of the oral cavity. So, mesial occlusion is often followed by articulation defects of the consonants [s], [z] and [ʒ]; narrowed oral cavity, large tongue or low flat palate may cause changes in the pronunciation of [r]; narrowed palate, mesial occlusion or macroglossia often worsen the pronunciation of [ʃ], [dʒ], [ʒ], etc. Knowing these patterns is of practical significance for orthopedists and can be applied both at the stage of constructing the dentures and of diagnosing the causes of speech disorders.

Only a few investigations include detailed analyses of sound production disorders after prosthodontic treatment supported by a quantitative assessment. The capabilities of modern software and hardware systems in acoustic signal processing could help find new approaches to proper quantitative assessment of speech disorders caused by prosthodontic treatment. Here spectrometric method was used for this purpose. The phonetic tests could also be auxiliary means for determining the centric relation of the jaws and the occlusal vertical dimension while installing the removable or fixed dentures, as well as for positioning the implant teeth. Spectral analysis was used before and after treatment of different patient groups in order to reveal the main pattern of changes.

THE IMPACT OF COMPLETE REMOVABLE DENTURES ON THE ACOUSTIC CHARACTERISTICS OF PATIENT'S SPEECH

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The most complicated sound to be restored after complete teeth loss and consequent prosthetic rehabilitation is [s]. The arrangement of artificial teeth and the degree of reconstruction of lost alveolar bone with prosthesis base has significant impact on patients' speech quality and satisfaction with the result of prosthetic rehabilitation. The aim of this study is to evaluate the relation of the acoustic quality of the consonant [s] to the functional value of removable dentures.

Only patients with complete loss of teeth in upper jaw were recruited for the study. Speech samples were gathered before the prosthetic rehabilitation and after the phonetic adaptation to newly fabricated dentures. The approval of the Committee on Research Ethics (protocol No. RSU/29.03.2012) was received. The acoustic analysis of speech samples was performed by *MAGIX Samplitude 10* software. The noise band (defined by the upper and lower limits of the most intensively coloured frequency area) in kHz was obtained using *Samplitude* spectral editor cleaner, the first highest peak of [s] was obtained with the *Voxengo SPAN Analyser* (*SPAN* is a real-time fast Fourier transform audio spectrum analyser). For statistical analysis, Mann–Whitney test was used. Diagnostic casts were obtained from the prosthetic field and from existing and newly fabricated dentures placed in oral cavity (n=21). The questionnaires (n=50) were used to assess patients' subjective evaluation. The study was performed in Riga dental clinic *Medasko* from January 2016 until February 2017.

In the energy spectrum of [s] produced by male and female speakers, statistically significant difference in the range of high intensity noise band was found. In the control group, it was 4.83 kHz for male speakers and 6.18 kHz for female speakers. For male patients speaking without dentures in place this parameter was 2.16 kHz, for patients with functionally acceptable dentures 6.6 kHz, whereas for patients with dentures with reduced functional value this parameter was only 4.1 kHz. The mean value of the first highest peak also was statistically significant among males and females. In the study group of male speakers, the lowest value of this parameter was found when speaking without dentures (3.79 kHz), followed by subjects speaking with removable dentures with reduced functional value (5.2 kHz), and the highest value was found for patients speaking with newly fabricated dentures after adaptation period (6.0 kHz). In the study group of female speakers, similar tendency was observed, only the values of parameters were higher and appeared to be 4.9 kHz, 5.9 kHz and 7.9 kHz respectively.

The spectral analysis of patient's speech quality can be used at any stage of prosthetic oral rehabilitation to evaluate existing alterations in speech production and to assess the degree of patient's phonetic adaptation in both primary and repeated prosthetic treatment using conventional prostheses. The mean value of noise band range and the frequency of the highest peak of [s] are closely related to the functional value of the removable dentures. However, informants' gender should be taken into consideration.

REALIZATION OF /t/ IN JUTLANDIC DIALECTS OF DANISH

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Danish /t/ is an aspirated alveolar stop, and it is a well-known fact that the aspiration is typically realized as affrication in Standard Danish (e.g., Basbøll 2005, 60). An overt feature of the traditional dialect of Northern Jutland is the tendency to use a phonetic variant of /t/ sometimes called the ‘dry *t*’, realized with noiseless aspiration instead of affrication. ‘Dry *t*’ is typically realized with dental place of articulation, and significantly shorter VOT than Standard Danish /t/. While well-known to speakers of Danish, this phenomenon has not been investigated systematically before. When investigating the features, I found that ‘dry *t*’ — or at least a lower degree of noisy affrication and shorter VOT than in Standard Danish — is found to some extent in all the major traditional dialect areas of the Jutland peninsula. I also found systematic variation in /t/ realization from dialect area to dialect area, in spite of the peninsula being a relatively small geographic area.

The study furthermore found an interesting association between degree of frication, VOT, and dialect area. Fully affricated /t/ was practically never found in Northern Jutlandic. It was found in Northwestern and Northeastern dialects only in marked tokens with very long VOTs, with ‘dry *t*’ being the norm. There was a more even distribution in the Central dialects, though with a tendency towards affricated realization. In the Southern dialect, ‘dry *t*’ is found only with short VOT in unstressed syllables, with affricated or highly noisy /t/ otherwise being the norm. In short, there is a continuum of interplay between VOT and affrication in /t/ realization, so that in Northern Jutland, even low levels of noisy aspiration is associated with high VOT, while in Southern Jutland, even affrication proper is not associated with high VOT.

The data for the study comes from the Peter Skautrup Centre for Jutlandic Dialect Research at Aarhus University, which has a very large corpus of recordings of traditional Jutlandic dialects (Andersen 1981). These recordings have mostly been used for lexicographic research (Hansen 2008), and not for phonetic research. This partly has to do with the age, and at times lacklustre quality, of the recordings. The quality issue was not consequential for the current study, but probably makes some forms of phonetic research inadvisable. For the current study, I used recordings of 3 speakers from each of the 6 major dialect areas of Jutland. The recordings were made between 1975 and 1991, and were all of reasonable quality. /t/ tokens in simple onset position were analysed in *Praat* (Boersma & Weenink 2016).

REFERENCES

- Andersen, T. A. (1981). Dialektbånd og databehandling. *Ord & Sag*, 1, 11–18.
Basbøll, H. (2005). *The Phonology of Danish*. Oxford & New York: Oxford University Press.
Boersma, P. & Weenink, D. (2016). *Praat: doing phonetics by computer*. Version 6.0.21. Open-source software, URL <http://www.fon.hum.uva.nl/praat>.
Hansen, I. S. (2008). Jysk Ordbog — Rapport fra en digital ordbog. *Nordiska Studier i Lexikografi*, 9, 209–218.

THE SET OF DISTINCTIVE ACOUSTIC FEATURES DENOTING VOICED OBSTRUENTS IN STANDARD LITHUANIAN

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This report focuses on Lithuanian obstruents — consonants whose spectra are dominated by the noise component that is displayed as chaotic non-periodic waveforms. This class of the consonants has a phonological opposition between voiced and voiceless phonemes. The main component in the production of voiced obstruents is noise that is produced when the airflow escapes through restriction in the vocal tract; it is supplemented by the tonality component that is produced by vibrating vocal folds and points to very relatively periodic vibrations. Production of voiceless obstruents consists solely of the noise component produced by restriction of the airflow, since during their production voice folds are opened and do not vibrate.

Standard Lithuanian has 34 obstruent phonemes: 1) plosives — voiced /b, bⁱ, d, dⁱ, g, gⁱ/ and voiceless /p, pⁱ, t, tⁱ, k, kⁱ/; 2) fricatives — voiced /z, zⁱ, ʒ, ʒⁱ, ʝ, ʝⁱ/ and voiceless /f, fⁱ, s, sⁱ, ʃ, ʃⁱ, x, xⁱ/; 3) affricates — voiced /dʒ, dʒⁱ, dʒ̥, dʒ̥ⁱ/ and voiceless /tʃ, tʃⁱ, tʃ̥, tʃ̥ⁱ/. The aim of this report is to discuss distinctive acoustic features of voicing for Lithuanian obstruents.

For experimental acoustic investigation to provide a reliable analysis of the sounds, Lithuanian obstruents were analysed in prevocalic positions in isolated CVC syllables. Symmetry and asymmetry of the analysed material was related to the real, natural production of language.

The analysis of the sounds was performed using a free license sound processing and analysis software program *Praat* (developed by Paul Boersma and David Weenink). To achieve statistical reliability, mean value was calculated as the average of all realizations of the sound. The obtained data was processed using *MS Excel* and *SPSS* (v19, IBM Corporation).

The results show the following differences in acoustic characteristics for voiced and voiceless obstruents of Standard Lithuanian:

- 1) duration of the release phase (voice onset time): voiced consonants have lower mean duration of the release phase than their voiceless counterparts;
- 2) relative intensity: voiced fricatives and affricates have higher mean relative intensity than their voiceless counterparts;
- 3) indices of locus equations (F2 of the vowel succeeding an obstruent): a few exceptions aside (e.g., in the group of velar consonants), Lithuanian voiced consonants have lower slopes and higher y-intercepts than their voiceless counterparts in the same consonant classes.

Differences of voicing in the group of plosives do not affect energy distribution in their spectra, i.e., what shape of FFT spectrum the consonant has: diffuse-flat/diffuse-falling spectrum or compact spectrum. Frequency of the spectral peak does not differentiate voiced and voiceless obstruents either, since the differences between voiced and the equivalent voiceless obstruents do not show a consistent pattern. Based on the results of some previous studies, voiced and voiceless Lithuanian consonants have different mean duration and intensity of their noise phase.

ACOUSTIC CHARACTERISTICS OF /k/, /g/ PALATOVELAR ALLOPHONES IN STANDARD LATVIAN

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The current study deals with acoustic cues of prevocalic velar stops /k/, /g/ in Standard Latvian. Like in many other languages (see Ladefoged & Maddieson 1998, 33–34), articulation of velar stops in Standard Latvian is greatly affected by vowel environment. The place of articulation for these consonants in different vowel contexts varies from truly velar to palatovelar or even palatal. As there are palatal stop phonemes /c/, /ɟ/ in Standard Latvian, in the latest edition of the *Latvian Grammar* these frontal realizations of the velar stop phonemes /k/, /g/ are described only as palatovelar. According to the *Latvian Grammar*, closure for the stops /k/, /g/ is formed at the palatovelar place if they are pronounced before monophthongs /i/, /i:/, /e/, /e:/ and diphthongs that start with a component corresponding to the monophthongs /i/ or /e/ (LVG 2015, 61). This contextual variation has low importance in the framework of Standard Latvian, but can become a theme of interest for comparative studies of the consonant inventory for the two contemporary Baltic languages, Latvian and Lithuanian, as the latter has phonological opposition between non-palatalized and palatalized velar stops.

This study is aimed at acoustic characteristics of palatovelar realizations of the stop phonemes /k/, /g/ in contrast to velar realizations of the same phonemes, as well as to the palatal stops /c/, /ɟ/ of Standard Latvian. These stops are characterized according to the three acoustic cues: 1) duration of release phase; 2) frequency of spectral peak; 3) F2 transition (using locus equations). The data of Standard Latvian are compared with the data of palatalized velar stops of Standard Lithuanian obtained in the framework of the scientific research project “Acoustic characteristics of the sounds of the contemporary Baltic languages (experimental study)” (2013–2015; No. MIP-081/2013). The data analysis is performed using the same software (*Praat*, *MS Excel*, *SPSS*) and common approach for both Latvian and Lithuanian.

REFERENCES

- Ladefoged, P. & Maddieson, I. (1998). *The Sounds of the World's Languages*. Oxford–Malden, MA: Blackwell Publishers.
- LVG 2015 — Auziņa, I., Breņķe, I., Grigorjevs, J., Indričāne, I., Ivulāne, B., Kalnača, A., Lauze, L., Lokmane, I., Markus, D., Nītiņa, D., Smiltņiece, G., Valkovska, B., Vulāne, A. (2015). *Latviešu valodas gramatika*. 2nd edition. Rīga: LU Latviešu valodas institūts.

ACOUSTIC CHARACTERISTICS OF LATERALS IN STANDARD LATVIAN (DATA FROM SPEAKERS OF DIFFERENT AGE GROUPS)

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In this paper, the acoustic properties of the Latvian laterals [l] and [ɫ] are examined. This study is part of the research project “Acoustic characteristics of the Latvian sound system by age groups (5–15, 16–39, 40–59, 60–80)” (No. 148/2012, funded by the Latvian Council of Science) that was held at the Latvian Language Institute of the University of Latvia in 2013–2016. The material consists of symmetric LVL sequences, where L is one of the Latvian laterals and V is one of the vowels [i(:); e(:); æ(:); a(:); o(:); u(:)]. The LV parts of the sequences were used for the analysis; each utterance was recorded in three repetitions by every speaker. Speech recordings from 40 informants (20 male and 20 female speakers aged from 5 to 80 years) without any speech disorders or notable dialectal traces in their pronunciation were analysed.

Laterals along with rhotics and affricates are known to be acquired late by children because of their articulatory complexity among other factors (see, e.g., Dalston 1975; Gick et al. 2007; Lin & Demuth 2015). The aim of this paper is to research into whether and how acoustic distinction between [l] and [ɫ] is influenced by speakers’ age. The changes in formant structure (F1, F2, F3, F4) of the laterals were analysed focusing on the effects of vowel context. Spectral analysis was performed using *Praat* (Boersma & Weenink 2014); for statistical analysis, *MS Excel* (Microsoft Corporation 2010) and *SPSS* (IBM Corporation 2012) were used.

REFERENCES

- Boersma, P. & Weenink, D. (2014). *Praat: doing phonetics by computer*. Version 5.4.04. Open-source software, URL <http://www.fon.hum.uva.nl/praat/>.
- Dalston, R. M. (1975). Acoustic characteristics of English /w, r, l/ spoken correctly by young children and adults. *Journal of the Acoustical Society of America*, 57(2), 462–269.
- Gick, B., Bacsfalvi, P., Bernhardt, B. M., Oh, S., Stolar, S. & Wilson, I. (2007). A motor differentiation model for liquid substitutions in children's speech. *Proceedings of Meetings on Acoustics*, 1, 1–9. URL <http://asa.scitation.org/doi/pdf/10.1121/1.2951481>.
- IBM Corporation (2012). *SPSS Statistics*. Version 21.0.0.0. Computer software, URL <http://www-01.ibm.com/software/analytics/spss/products/statistics/index.html>.
- Lin, S. & Demuth, K. (2015). Children’s acquisition of English onset and coda /l/: Articulatory evidence. *Journal of Speech, Language, and Hearing Research*, 58(1), 13–27.
- Microsoft Corporation (2010). *Microsoft Excel*. Version 14.0.4760. Computer software, URL <http://office.microsoft.com/en-001/excel/>.

POLYTONIC LANGUAGES VS. LANGUAGES WITH SYLLABIC ACCENTS

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As far as their stress concerned, all languages are usually divided into two groups: 1) polytonic languages and 2) languages with dynamic stress. The languages of the first group are rather rare in comparison to the second group. It is generally accepted that such Indo-European languages as Vedic Sanskrit, Old Greek, Swedish, Norwegian, Slovenian, Serbian, Croatian, Lithuanian and Latvian together with Chinese and languages of Southeast Asia (Vietnamese, Thai, Lao, etc.) are tonal languages. In the report, the difference between the latter languages, which are really tonal, and the mentioned Indo-European languages that possess syllabic accents will be shown. The tonal languages have a very simple morphophonological structure and opposition of tones (from four in Literary Chinese to eleven in its dialects). In contrast to this type of languages, the languages with syllabic accents are being characterized by a very complicated morphophonological structure of words and they have a contrast of intensity of moras or syllables. Any tonal opposition in this type of languages is absent.

“TIMBRE METAPHOR” IN HIERARCHIC STRUCTURE OF PROSODIC MEANS ORGANIZING “POLAR” EMOTIVE SENSES

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The investigation is based on the experimental data study of including prosody into speech perception processes on the principle “from top to bottom” which means that the process of speech production starts with establishing all possible utterance semantic links with the help of prosodic features (Kasevič et al. 1990, 124). The ability of men to keep at their disposal a complicated system of intonation units characterized by a great variety of their size, structure and functional complexity, permits a phonetician constant search for the means of getting a definite acoustic result. The instrumental study of a certain period of speech flow at the moment of expressing a concrete emotive state with all its illocutionary or perlocutionary meanings promotes the comprehension of how the intonation system is reconstructed in our brain in certain situations.

Equally with the variety and heterogenic character of the features characteristic for constituting the prosodic organization of emotive states, there must be a complex set of means providing systematic coherence of their manifestation (Gorbachyova 2009). These systematic coherent units were constituted in our brain long before phonemic and lexical layers were formed. Taking into account the efficient information of acoustic voice characteristics “cloning” caused by static parameters of an individual’s speech organs (Lobanov 2002), it was decided to investigate the voice data belonging to one and the same man — the outstanding actor Timothy Dalton (“Jane Eyre”) — playing the part of a person being often in two vividly expressed contrastive emotional states: “reverence” and “rage”. The instrumental treatment of a one-word address “Jane!” realized in his speech with polar perlocutionary meanings more than 26 times was performed on the computer programme *Wave Assistant v2.00* (2003, St. Petersburg). Though some experimental works of the 90ies were already devoted to analyzing “expressive prosodemes” of the so called positive and negative emotions we can ascertain that only Melody and Intensity were covered by this research.

The degrees of parameters modifications can be reflected on the conventional axis of decrease as follows: F0 Range < Speed Period Drop < Temporal Magnitude < F0 Medium < Intensity. Our hearing system gets the information about speech signal timbre both from temporal and spectrum signal structure. It is just prosodic timbre that transfers a specific arrangement of emotive values.

“From among these forms presented all together within the system, one beside the other, as it were, and also one beneath the other if the system is tridimensional, the mind, preparing to express something, chooses the one form that at the moment is judged to express most aptly and faithfully what it intends to express, leaving the others aside” (Guillaume 1984, 80). Nowadays it can be presumed with a high degree of caution that prosodic timbre like other properties of the language system obtains with time its invariant character due to the stability of its features.

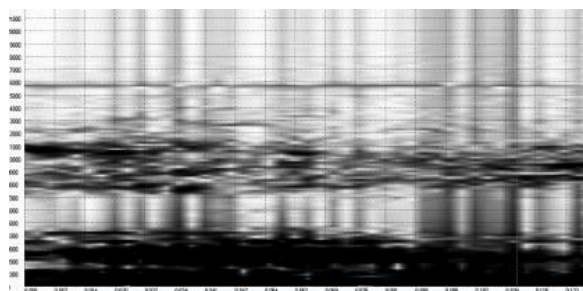


Figure 1. **Rage**

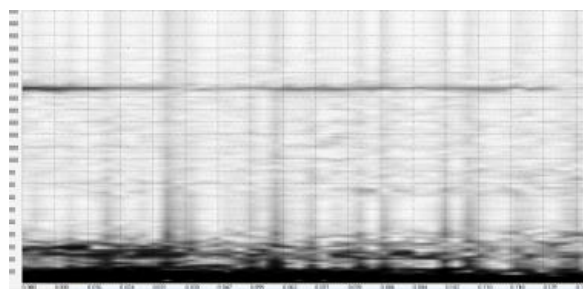


Figure 2. **Reverence**

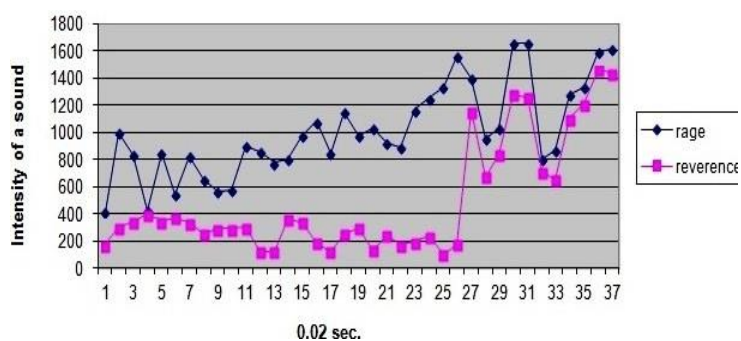


Figure 3. **Sonograms converted into signal**

REFERENCES

- Guillaume, G. (1984). *Foundations for a Science of Language*. (Current Issues in Linguistic Theory, 31.) Translated by W. Hirtle & J. Hewson. Amsterdam–Philadelphia: John Benjamins Publishing Company.
- Gorbachyova, I. A. = Gorbačëva, I. A. (2009). Zony intonacionnoj koartikuljacji v rečevoj cepi i ix rol' v strategii postroenija rečevoj programmy. *Izvestija Samarskogo naučnogo centra Rossijskoj akademii nauk*, 11, 4(5), 1273–1278.
- Kasevič, V. B., Šabel'nikova, E. M. & Rybin, V. V. (1990). *Udarenie i ton v jazyke i rečevoj dejatel'nosti*. Leningrad: Izd-vo Leningr. un-ta.
- Lobanov, B. M. (2002). Problemy i rešenija komp'juternogo "klonirovanija" personal'nogo golosa i reči. In: N. B. Vol'skaja, N. D. Svetozarova (eds-in-chief). *Problemy i metody eksperimental'no-fonetičeskix issledovanij: k 70-letiju professora kafedry fonetiki i metodiki prepodavanija inostrannyx jazykov L. V. Bondarko*. Sankt-Peterburg: Filologičeskij fakul'tet Sankt-Peterburgskogo gosudarstvennogo universiteta, 301–308.

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